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ON SALE AUGUST 23rd

OCTOBER ISSUE ON SALE SEPTEMBER 7th

CONTENTS

Short Wave Magazine

PULL-OUT SECTION

REGULARS

SEEN & HEARD

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GOOD LISTENING

FIRST WORD

Vintage Radio

You will recall that we published the pilot issue of a proposed new magazine catering for the enthusiast interested in the history of radio just twelve months ago. I had high hopes that there would be enough interest to enable us to continue to publish it, as I had originally proposed, on a quarterly basis. After trying for a year to drum up sufficient subscriptions to cover the basic costs of print and paper, I am very dissappointed with the response and we have decided to shelve the idea. There may be future issues of *Vintage Radio* as a supplement to *Short Wave Magazine* and you can rest assured that the articles planned for future issues of *Vintage Radio* will appear in *SWM*. Indeed, in this issue there are a couple of such articles.

To all of you who took the trouble to send in £10 for a subscription, thank you for your support - your uncashed cheques will be returned to you shortly.

Ecuador

The *SWM*/HCJB DXpedition to Ecuador in May 1991 is almost fully booked. Details and a booking form appeared in last month's issue if you want to go.

A WORD IN EDGEWAYS

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

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

Dear Sir

To give a little encouragement to the faint hearted, i.e., people who think a £1000 receiver and an antenna farm is really essential to achieve good results.

My receiver was an old World War II Lancaster bomber 1155, a home-made transmitter and 66 feet of p.v.c. coated mains wire round the loft space, suspended with finest quality plastic clothesline.

With this backward looking set-up I've worked (talked to people) in New Zealand, Australia, Japan and Antarctica and many other places, so it can be done as long as you have patience and a little will power.

Regarding bells and whistles on the latest receivers, my old friend in Ashton-under-Lyme has made a brilliant discovery, a four MByte memory for 14 pence new money. It's called a notepad from 'Woollies' and a sharpened pencil. So before spending multi-several pounds on the latest and greatest look on the second-hand market, Racal RA17 receivers are a good buy.

Try a home-made receiver and a piece of wire slung round the room and drop off your chair when you hear Radio Australia for the first time. If it isn't there one day it may be the next.

Digital read-out receivers are a good thing and a great help nowadays but you could manage with an old receiver and a crystal calibrator at a pinch. So think before you buy that's all I can recommend to any s.w.l., good luck and good hunting. I'll be very glad to send a QSL card to any s.w.l. who hears me on the band - but it may be in them silly old dits and dahs (Morse code).

DAVE G4EZF
CHESHIRE

Dear Sir

It would seem Mr Hill at the ripe old age of 17 would like the amateur licence on a gift wrapped plate.

I find at 49 years of age that anything gained on that basis is worth very little.

Not being the most active Ham in the world or the most prolific, I am still proud of passing the RAE and do not regret time spent on gaining enough knowledge to pass. I would like to say also that if you think the novice licence is a free pass through you are mistaken, you still have to pass the RAE.

Most young amateurs with the benefit of a young alert mind have little trouble passing the RAE. I myself have resigned from the RSGB because of the novice licence which makes the Class B licence a second rate citizen as far as transmitting privileges go this is patently wrong.

As an afterthought well done Mr Bernascoe for shooting down a myth about C.W.

M. CHORLTON GOMDF
RUTHWAITE, NOTTS

Dear Sir

As a one-valve RX enthusiast, I was very interested to read about the 'joy' experienced by Patrick Connar on receiving Radio Australia using his 0-V-0 'Codar Clipper' (July SWM).

The letter from Mr McKay on the same page, regretting the purchase of a magic Black Box, says it all.

I have been operating a trouble-free, one-valver for ten years and my album of QSL cardsis testimony to the efficiency of this simple set.

Apart from the low cost of constructing a one-valver, the absence of background noise generated by the more sophisticated receivers is a bonus to the operator.

The silent background is due no doubt to the fact that only eight components plus headphones, box and batteries are required. The whole set can be built for about £14 if you shop around for the components.

My advice to Mr McKay and with all due respect to the Black Box manufacturers, is get cracking with a soldering iron and I can guarantee you won't have a lemon or a burnt-out front end on your hands.

RON PEARCE
BUNGAY
SUFFOLK

See page 26 for constructional details of Ron's one-valver.

A WORD IN EDGEWAYS

Dear Sir

I purchased some time ago, a chart recorder from an electronics supply company. The instrument was manufactured by Babcock, Bristol.

Unfortunately, the seller had no information on the instrument or the manufacturers. If any of your readers knows where I could purchase charts for this recorder, or any information on the manufacturers, please forward to Tom Hession, 2 Church Lane, Ballinrobe, Co Mayo, Ireland. Tel: 092-41178.

TOM HESSION
CO MAYO
IRELAND

Dear Sir

May I thank Peter Buchan of Cambridge for his informative letter published in the August SWM. He has widened my knowledge of a.t.u. losses.

My particular interest is in those losses which occur within the a.t.u. Of those descriptions of a.t.u.s that I have read, none have mentioned the subject of losses, internal or external. The author's general attitude seems to be that little or no care is required for their assembly. This is not the case if the internal losses are to be kept to the minimum and, thereby, enable the a.t.u. to provide its best performance.

Kenneth Buck of Edinburgh has sent me a letter on a.t.u. internal losses, making the point that, however an a.t.u. be assembled, the assembly has to be the best compromise between positions of components and the wiring-up that can be devised.

I have acted on the comments of Tucker and Wilkinson and Kenneth Buck by rehousing an old commercially made, pi-tanked a.t.u. from its cramped, metal box into a larger plastics one.

I had never before found the unit very effective but now, on the m.w. band, the lowest band it will tune, it exceeds its maker's specification by tuning the whole of the band when only down to 1000kHz was specified. I cannot comment on the performance of the short wave bands as, so far, I have little experience of them.

During the course of the rehousing, I decided to omit one variable capacitor and wire a 3-pole, 4-way rotary switch to provide a by-pass position as well as positions for 'L' match, series and parallel circuits. Perhaps this alteration has further increased the a.t.u.'s performance but I have not sufficient radio knowledge to say if this is so.

PHIL TOWNSEND
LONDON

Dear Sir

I read with interest the letter from L. McKay in the July edition of SWM concerning the Sony ICF-2001D.

I myself purchased a Sony 2001D in June 1988. I rigged up an outdoor antenna then long the following November complete with earth. In February 1989 the set lost all sensitivity on the lower frequencies, i.e., it wasn't possible to receive BBC Radio 4 on l.w. However, sensitivity gradually improved going right up to 30MHz. I returned the set to the dealer who in turn sent it away for specialised repair. Six weeks later I received the set back fully operational. Within eight weeks of having the set back it suffered exactly the same problem (burnt-out front end transistors) again the set was away for another six weeks being repaired despite being chased up each time. In the first twelve months of use it was away for three months.

In March this year I installed an antenna tuner unit to assist reception, low and behold the following month the radio suffered the same problem for a third time. I don't know if it was connected with the installation of the a.t.u. or not but my dealer assured me from the start that it wasn't the outdoor antenna causing it.

I have now given up having the set repaired as I don't feel the carriage and repair charges warrant the cost for the problem to occur again on its return.

I would like to say to Sony "get your house in order concerning this all too frequent problem with the 2001D", otherwise you will lose many a convert, myself included.

C. M. BEDWELL
POLEGATE
EAST SUSSEX

We have asked Sony to let us have their comments on this problem for publication.

Dear Sir

In response to Mr Marsh's query regarding the callsign 'stud', I think he may have heard a military aircraft refer to the pre-set radio system that they use. Instead of having to manually tune their radios their commonly used frequencies are pre-set and known as STUD1, STUD2, etc. American aircraft use the term CHANNEL or BUTTON for the same system.

A query of my own which I should like to bring up via these pages. It appears a new off-peak airway has been set-up over the east of England. It is called UB5 and runs, I think, from Clacton beacon to Flambo on UB13. It is used by aircraft in bound to Newcastle, Aberdeen, etc and is controlled by Eastern radar or London Military. I have heard the reporting points 'W', 'X' and 'Y' mentioned. Could any readers fill in any more information about this?

STEVE FOSTER
BURTON-ON-TRENT

UP-TO-DATE NEWS AND INFORMATION FOR THE LISTENING ENTHUSIAST. RING

RadioLine on 0898 654676

Calls charged at 38p peak, 25p off peak.

If you have news for inclusion on RadioLine ring (0202) 678558 in the evenings and leave a message on the answering machine.

WHAT'S NEW

Guernsey Bailiwick Award

The Bailiwick of Guernsey is made up of the islands of Guernsey (consisting of ten small Parishes), Alderney, Sark and Herm. This award is given for working various islands and parishes, as described here.

This award is open to all licensed amateurs and s.w.l.s. All modes and bands are eligible.

Bronze Award: Contact with GU stations in six of the Guernsey parishes, plus contact with GU3HFN or GU8NIS (club stations). Total 7 QSOs.

Silver Award: Contact with GU stations in eight of the Guernsey parishes, plus one contact with either Alderney or Sark and contact with GU3HFN or GU8NIS. Total 10 QSOs.

Gold Award: Contact with GU stations in all ten of the Guernsey parishes, plus one contact with Alderney and one with Sark, and contact with GU3HFN or GU8NIS. Total 13 QSOs

Contact with /M and /P stations count as long as the QSL card states which parish was activated.

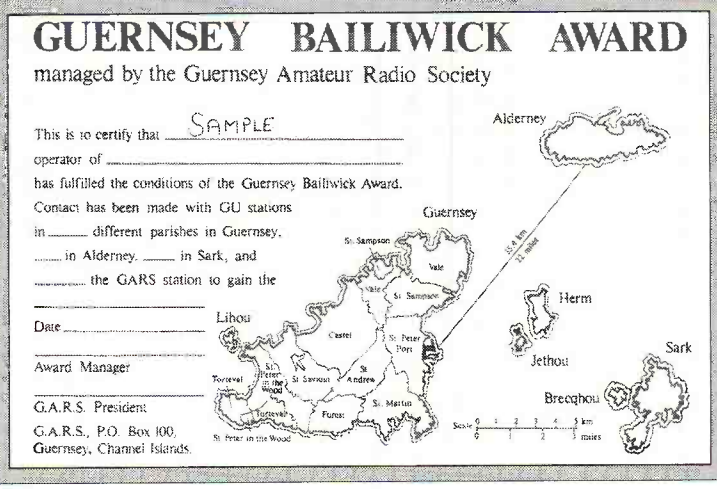
Endorsements are available for single band and/or single mode.

Five Band Award: Claiming Gold Standard on five separate bands is eligible for an engraved copper Guernsey can (cost on request).

The cost of the award will be 8 IRCs, £2 or $4. You require a certified list of QSLs by two amateurs or a national society.

Full details and list of GARS members from:

Awards Manager, Andy Nightingale GU1WDT, PO Box 100, Guernsey, Channel Islands.



Active Scanner Antenna Kit

The Howes AA4 Active Antenna is designed for users of scanning receivers who require a compact antenna giving a wide frequency coverage.

The frequency range is 25 to 1300MHz. The antenna is just over 400mm long and only about 25mm wide. It incorporates a low-noise microwave integrated circuit amplifier. The i.c. noise figure is less than 3dB rising to about 3.2dB at 1300MHz. Gain is more than 15dB over the entire range. A 10dB switched attenuator is provided on the receiver interface board. This interface board takes a 12 to 14V d.c. power input and feeds the power up the coaxial cable to the antenna.

The Howes AA4 costs £18.80 in kit form, or £24.90 as built and tested p.c.b. modules. Post and packing is £1 whn ordered by mail.

An information sheet on the AA4 and a copy of the Howes Kit catalogue is available by sending an s.a.e. to **C.M. Howes Communcations, Eydon, Daventry, Northants NN11 6PT**.

Arabic Broadcasts

BBC World Service is increasing its broadcasts in Arabic, following the Iraqi invasion of Kuwait.

The BBC's Arabic transmissions, which Iraq has made intermittent attepts to jam in recent weeks, are being extended by one hour in the evening and half and hour in its early morning programe.

The BBC Arabic Service was set up in 1938 and is the oldest of the BBC's language services. It serves the Gulf, the Middle East and North Africa and is normally on the air for nine hours a day.

BARAS

The British Amateur Radio Astronomy Society was formed last year by a core of members with mainly a background in astronomy. Since that time they have grown to almost 50 members throughout the UK. The membership, at present, consists of a mixture of amateur radio enthusiasts, astronomers and computer/electronics people.

They are very keen to hear from anyone with an interest in this field of study, especially anyone with amateur radio experience.

They publish a newsletter (soon to be bi-monthly) which contains articles, letters, observations and ideas/advice. More contributions from amateur radio enthusiasts would provide the newsletter with the wider experience of their radio knowledge.

BARAS, c/o S A Newberry, 19 Oakway, Kingsley Park, Birkenshaw, Bradford, West Yorks BD11 2PG

Snippets from Sweden

Satellite Radio: Deutsche Welle has begun a relay via the Astra satellite, using the transponder of the RTL Plus TV service in German (11.229GHz). A 24-hour relay of DW's German Service is now on the 7.38MHz audio sub-carrier, while a selection of foreign language services is on 7.56MHz. According to the DPA news agency, this service includes transmissions in 13 languages.

Deutschlandfunk is already using the Sat 1 transponder on Astra for a 24-hour relay, along with the West 3 transponder on the DFS 1 Kopernikus satellite. Altogether, there are now at least 36 satellite radio broadcasts to Europe using audio sub-carriers. Among these are several others well-known from short wave, including the BBC World Service (on Eutelsat F4 and Intelsat VA F11), the Voice of America (Eutelsat F4) and Radio France International (on TDF-1).

Greece: The Voice of Greece broadcast in English at 1530-1540 is now using 17.535MHz. Presumably this replaces 17.550MHz, and 11.645 and 15.630MHz remain in parallel. This would also apply to Greek at 1500 and Swedish at 1540.

Lebanon: Lebanese Radio, which supports the Christian leader General Michael Awn, has begun regular broadcasts on 1.368MHz. The transmissions are also to continue on v.h.f. f.m., to which further frequencies are to be added to cover more of Lebanon.

Poland: The Polish Radio Home Service has been recognised. Regional programmes are now on f.m. for 12 hours, with one hour of the BBC Polish Service carried at 2000. Fifteen minutes of news from Vatican Radio is broadcast on 225kHz at 1455.

Romania: Radio Romania (formerly Radio Bucharest) is now broadcasting in Russian at 1830-1900 on 9.625MHz.

SWEDEN CALLING DX-ERS

RADIO SWEDEN
S-105 10 Stockholm

1938 1988 RADIO SWEDEN

WHAT'S NEW

RAE Courses

Wilmslow: North Cheshire Radio Club, Morley Green Club, Mobberley Road, Wilmslow. Classes start Sunday September 23 at 6pm. Peter Kirsop G4WCE. Tel: Lymm 5959.

Swansea: Swansea RACC, South Dock Pumphouse, East Burrows Road, Swansea.. RAE classes start Friday September 7 from 7 to 9.30pm. Janet James GW0KPD. Tel: (0639) 892311 daytime.

Ifield: Ifield Adult Education Centre, near Crawley, West Sussex. RAE course starts September, lecturer B.J.R. Davies. Details from Marie Rice at the college on (0293) 26467.

Stockport: Reddish Vale Evening Centre, Reddish Vale Road, Stockport. Short course RAE class on Monday evenings, full RAE course on Tuesday evenings, both from 7 to 9pm. Morse classes on Thursday evenings from 7 to 9pm. Course tutor is Dave Wood. Tel: 061-480 9157.

Llwynypia: Rhondda College, Llwynypia. RAE on a night to be decided (possibly Monday). Enrolment is September 3-5. Lecturer John Howells GW4BUZ. Details from the college on (0443) 432187.

Engineering Announcements to Close

Engineering Announcements, a weekly television programme dedicated to supplying the radio and television trade with engineering information, will have been broadcast for the last time on July 31 after nearly 1000 editions over the last 20 years. It is one of the longest running but least-known programmes on British television.

Engineering Announcements was produced entirely 'in-house' at IBA's Engineering Headquarter near Winchester, by Engineering Information staff and is the only programme of its type on any channel.

The programme, which was launched in 1970 as 'radio with pictures' giving news about ITV's new colour service, has developed into a proper television production, usually lasting about 12 minutes, including location video. Features on an extensive range of transmission and reception technologies have been presented together with regular updates on the IBA's engineering activities.

Radio, Cassette & CD

The RX-DS20 and RX-DT5 are stereo radio cassette recorders, with built-in CD players. Both models are available now from authorised Panasonic dealers nationwide at approximately £199.95 for the RX-DS20 and £249.95 for the RX-DT5.

The units come with a full remote control, with motorised rotary volume control, giving the listener access to any mode without having to walk accross the room! Incorporating a p.l.l. digital synthesiser tuner with 36 f.m., m.w. and l.w. preset memory tuning, means that tuning is fast, easy and precise. The units also feature a multi-information l.c.d., giving the user an instant read-out of which mode the unit is in.

The RX-DT5 has a sleep function and a clock timer for recording programmes and playback.

Engineering Details

A new relay station will be opening to bring good television and teletext reception to about 1700 people in Lewes, including the Southover and South Malling areas. It is being built jointly by the BBC and IBA on the roof of Lewes County Hall.

The channels to be used at Lewes are:
Channel 22 - BBC1 South East
Channel 25 - ITV TVS (South-East)
Channel 28 - BBC2 South East
Channel 32 - Channel 4

To take advantage of this new service, viewers will need a Group A antenna, fitted outside and carefully aligned on the new relay. Viwers to the north and east of the new relay should fit the antenna with the rods vertical while those living to the south should install the antenna with the rods horizontal.

A new relay station called Millthrop will be bringing good television and teletext reception to about 250 people in and around Sedburgh, including Millthrop. It is also being built jointly by the BBC and IBA, just north of Sedburgh.

The channels to be used are:
Channel 48 - BBC 1 North (Manchester)
Channel 56 - ITV Border Television
Chanel 66 - BBC 2 North (Manchester)
Channel 68 - Channel 4

Viwers will need a Group C/D antenna, fitted outdoors and carefully alighned. The antenna rods should be fitted vertically.

A Radio 4 f.m. service will have started from Black Mountain, 7km west of Belfast from August 13. Using a frequency of 96.0MHz, it will bring Radio 4 in f.m. stereo for the first time to about 750 000 people in and around Belfast.

However, before this new Radio 4 service can commence, the Radio 1 FM service from Black Mountain must change from its present frequency (96.0MHz) to a new permanent freuqnecy of 99.7MHz. This should have taken place on August 3.

NICAM Digital Stereo comes to Grampian Television and Channel 4 in north-east Scotland from the end of July as part of an IBA initiative to bring the new digital audio technology to almost 80% of british viewers by the end of the year. The area to benefit first lies approximately between Fraserburgh and Brechin.

Wireless Signalling Worldwide 2500BC

Edward Nye has written two booklets, one called *Ley Lines Worldwide* and the other *Wireless Signalling Worldwide 2500BC*. They have been written after seven and a half years of intensive research which he believes show that our ancient ancestors were able, in a simple way, to send wireless signals through the earth all over the world from the great Megalithic Centre at Carnac in Brittany, where there are standing stones, etc.

This signal system could only send Morse type signals and operated on the same principle as the e.l.f. transmitters that the USA and USSR use to send signals to submerged submarines all over the world. The only difference is that the present day method requires great megawatt transmitters while the ancient method used beams of 'universal force' modulated by quartz standing stones in the beam being caused to oscillate by striking it with the signal at the node nearest the top.

If you would like to know more, the books are available from bookshops or Edward Nye price £1.95 and £2.95 respectively.

Edward Nye C. Eng MIEE, The Hole in the Wall, 20 Hill Street, Hastings TN34 3HU.

GRASSROOTS

Lorna Mower

Trowbridge & District ARC: 1st & 3rd Wednesdays, 8pm at the Territorial Army Centre, Bythesea Rd. Mysteries of the Wire Antenna by G0DAB on Sept 5; Social on the 19th. Ian Carter on (0380) 830383.

Yeovil ARC: Thursdays, 7.30pm at the Recreation Centre, Chilton Grove. Natter nights on Aug 30/ Sept 27, Lambda Diode Projects by G3MNM on Sept 6, Mobile WAB Operating by G4WSB on the 13th, Manufacturer of Printed Circuits by G0LNI on the 20th. David Bailey G1MNM QTHR or Adrian on (0935) 28341.

Acton, Brentford & Chiswick ARC: 3rd Tuesdays, 7.30pm at Chiswick Town Hall, High Rd, London W4. My home-brew QRP transceiver by G4HMC on Sept 18. Paul Truitt on 071-938 2561.

Lothians RS: 2nd & 4th Wednesdays, 7.30pm at The Orwell Lodge Hotel, Polwarth Terrace, Edinburgh. President's Address 'The Novice Licence' on Sept 12, Visit to the Glenkinchie Distillery, East Lothian on the 26th. P. Dick, 21 West Maitland Street, Edinburgh EH12 5EA.

Coventry ARS: Fridays, 8pm at Baden Powell House, 121 St. Nicholas Street, Radford. Quiz on Aug 24, Operation Raleigh I by John Layton on the 31st Operation Raleigh II by John Layton on Sept 7, a 144MHz DF Contest (outdoors) on the 14th, night on the air, start of Alphabet Contest(!) on the 21st. Neil Blair on Coventry 523629 home or 523523 ext 2541 work.

Vale of Evesham RAC: 1st Thursdays, 8pm at the MEB Club, Old Worcester Rd, Evesham. Underground Radio by G3ZLM on Sept 6. Ken Sheldon on Evesham 860202.

Sutton & Cheam RS: 3rd Thursdays, 7.30pm at Downs Lawn Tennis Club, Holland Ave, Cheam, natter nights on 1st Mondays in Downs Bar. Special Event Station on Aug 27, Facts & Fallacies of Learning Morse by G3ESH on the 20th. John Puttock at 53 Alexandra Ave, Sutton, Surrey SM1 2PA.

Cheshunt & District ARC: Wednesdays, 8pm in the Church Room, Church Lane, Wormley, Nr Cheshunt. Aug 29/Sept 12/26 are all natter nights. Roger Frisby on Hoddesdon 464795.

Wimbledon & District ARS: 2nd & last Fridays, 7.30pm in St. Andrews Church Hall, Herbert Rd, London SW19. Film night on Aug 31, Back in the USSR by G1SHV on Sept 14. Nick Lawlor on 081-330 2703.

Felixstowe & District ARS: Alternate Mondays, 8pm in the Back Room of the Ferry Boat Inn, Felixstowe Ferry. 3-way Quiz challenge vs Norwich and Leiston Clubs on Sept 12. Paul Whiting on Ipswich 642595 daytime.

Derby & District ARS: Wednesdays, 7.30pm at 119 Green Lane. Junk Sale on Sept 5, illustrated talk by Allan Clayton on The Green Radio Society on the 26th. Kevin Jones on Derby 669157.

Delyn RC: Alternate Tuesdays, 8pm in the Daniel Owen Centre in Mold. RSGB video night on Aug 28, the Art and Science of Photography by Glyn Jones on Sept 11, Ladies night on the 25th. Steve Studdart on Deeside 819618.

East Kent RS meet 1st & 3rd Thursdays, 7.30pm at the Cabin Youth Centre, Kings Rd, Herne Bay. Sept 6 is an operating night at Bishopstone and the 20th is a talk. Brian Tutt G4ZZK on Herne Bay 366232.

South Bristol ARC have a G4WUB club discussion - Bristol Rally on Aug 29, Sept 5 is their AGM, the 12th is a G4WUB planning evening - Bristol Rally, the 19th is a video evening - Railways G6PJS and the 26th is a VHF Activity evening. Wednesdays at the Whitchurch Folkhouse, East Dundry Rd, Whitchurch. Len Baker G4RZY on Whitchurch 832222.

Keighley ARS: Twice monthly in the club room, rear of Victoria Hall. Home Brew the Right Way by G4YDI Aug 28, natter nights on Sept 4/11, special event planning meeting on the 18th, Quiz v northern Heights with Pie & Peas on the 19th, special event on the 22/23, Intruder Alarms by G8NWK the 25th. Kathy on Bradford 496222.

Southgate ARC: Meet at Holy Trinity Chruch Hall (Upper), Winchmore Hill, London N21, 7.45pm. Power Distribution by Roger Platt on Sept 13, Inter-club darts match on the 27th. Brian Shelton on 081-360 2453.

Rugby ATS: Tuesdays, 7.30pm at the Cricket Pavilion, outside Rugby Radio Stn. 144MHz direction finding competition fifth and final round on Sept 11, presentation of various awards and cups on the 25th. Kevin Marriott on Coventry 441590.

Norfolk ARC: Wednesdays, 7.30pm at The Norfolk Dumpling, The Livestock Market, Harford, Norwich. Project Year Construction session on Aug 29, HF/SSB FD at Cart Gap, Happisburgh on Sept 1/ 2, Town & County Show final briefing on the 5th, Club stn demo on the 9th, G5RV on the G5RV on the 12th, Weather Satellites by G3REH on the 19th, Project Year Final Briefing on the 26th. Mike Cooke on Dereham 850591.

Mid-Warwickshire ARS: 2nd & 4th Tuesdays, 8pm at 61 Emscote Rd, Warwick (St. Johns Ambulance HQ). Natter night on Aug 28, RayNET talk-through unit demo by G0IZZ on Sept 11, a Vintage Radio Components illustrated talk by G8CXL on the 25th. Mike Newell on Kenilworth 513073.

Horndean & District ARC: 1st Thursdays, 7.30pm at Horndean Community School, Barton Cross, off Catherington Lane. Army Communications on the Sept 6. F. Charrett on Portsmouth 483676.

Bedford & District ARC: Allen's Club, Hurst Grove, Bedford. Home Construction by G1ZOJ on Sept 4, special event station from the 8-16th, de-briefing GB0BOB on the 18th and a social evening on the 25th. Glenn on Bedford 266443.

Bromley & District ARS: 3rd Tuesdays, 7.30pm at The Victory Social Club, Kechill Gardens, Hayes. Basic Electricity on Sept 18. Geoffrey Milne G3UMI on 081-462 2689.

Shefford & District ARS: Thursdays, 8pm at the Church Hall, Ampthill Rd. Welcome Back/SSB Field Day Planning on Aug 30, Mobile DF Hunt on Sept 13, PSUs - Design & Construction by G4OXD on the 20th, G4KQM from CM Howes taking an in depth look at their new range on the 27th. Nigel on Royston 71149.

Club Secretaries: Send all details of your club's up-and-coming events to: 'Grassroots', Short Wave Magazine, Enefco House, The Quay, Poole, Dorset BH15 1PP

TRADING POST

FOR SALE HF-225 plus Key pad, MkII ERA microreader, AT-1000 a.t.u., SEM v.h.f. converter, Skyscan v.h.f. DX antenna, all excellent condition, little used, worth £740, will accept offer £500. M. Rivers. Tel: Maidstone 30734.

FOR SALE Azden PCS-6000 2m transceiver, mint condition, £190. Also SX200N scanning receiver, £110. Paul Legg. Tel: Cowes, Isle of Wight 297084.

FOR SALE Wide-band scanner antenna, Butternut SC-3000, 30-512MHz, excellent condition, £40 o.n.o. B. Jones. Tel: Abingdon 525295.

FOR SALE Yaesu FRG-7000 receiver, 0.25-30MHz, very good condition, boxed, manual, owned from new, £150. S. Corbett. Tel: Hermitage, Berks 200865.

FOR SALE Bearcat 200XLT hand-held scanner, six months old, with box as new, £160 o.n.o. Also CB items including antenna. P. Hillman. Tel: Basingstoke 51836 after 6pm evenings.

FOR SALE BBC Model B with two disc drives (one 40/80), Philips green screen monitor, original manual, some software, separate keyboard, excellent condition, but replaced by IBM, £350. Delivery possible. David Simpson. Tel: 081-878 6014.

FOR SALE Datong FL3 multimode filter, very good condition, one year old, with manual, price new £145, sell for £75 o.n.o. P. Hall. Tel: Bosham, West Sussex 575479.

FOR SALE Sony TC-D5M stereo tape recorder and microphone (conoisseur instrument not ghetto blaster) has been used for orchestral recordings, but in mint condition. Cost believed £250. Offers to R. Collett. Tel: Cheltenham 524259.

FOR SALE 137MHz RX, similar to Cirkits one only better, with SQL and REM out, 2 xtals, cased, £40. SEM audio multifilter, £35. RX-4 W/t.i.f. for Spectrum 48K, £25. Post inc. Write to Kirit Borkhataria at 24 York Rd, London W5 4SG.

WANTED Icom R71E or similar, good condition. A. Campbell. Tel: Bridge-of-Weir 613570.

FOR SALE Bearcat 220FB scanner, £25. Ex m.o.d. communication receiver, R210, plus a.c. power pack, speaker, £20. Slim Jim antenna, £3. E. Weale. Tel: Bookham, Surrey 56741.

FOR SALE Icom R7000 comm receiver including discone antenna, also operative instructions and service manuals, very good condition, £600 o.n.o. Carriage to be arranged. C. Mason, Fort View, Fidges Lane, Eastbourne, Stroud, Glos GL6 7DW.

FOR SALE Sony ICF-PRO-80 scanner, as new, boxed with all accessories and manual, £150 o.n.o. C. Russell. Tel: Easingwold, York 22138.

FOR SALE Bearcat UBC 200XLT hand-held scanner, excellent condition plus charger, two antennas and owners manual, all boxed as new, £180 o.n.o. S. Woodhull. Tel: 021-705 9461 after 6pm.

TRADING POST

FOR SALE AOR AR-2002 scanner, 18 months old, seldom used, £350. Also one year old Tatung World Band Receiver, £80. P. Deehan, 24 Tobermore Rd, Magherafelt, N Ireland. Tel: Magherafelt 32183.

FOR SALE Sony ICF PRO-80 scanning receiver 150kHz-108MHz, 115-223MHz, a.m., f.m., a.m. wide, f.m. wide, s.s.b., mint condition, £210. Anthony Gatfield. Tel: 071-834 9751 after 8pm.

FOR SALE Fairmate HP-100E hand-held scanner, in original box, as new, 1000 channels, complete with charger and all the accessories provided when new, £190 o.n.o. R. Goodacre. Tel: Telford 593291 evenings.

FOR SALE Standard C500E 2m/70 handie, NiCads, case, £230. Various 2m/70 mobile antennas, £10. EA Kawai X430S organ, £1000 o.n.o. John Lockwood G3XLL. Tel: Diss 652043.

FOR SALE Trio R1000 communications receiver in good condition, £195. AOR-900 UK hand-held scanner, little used, in original box with accessories and instructions, £150. D. W. Foster. Tel: Chester 390184.

FOR SALE Realistic PRO-32 scanner v.h.f./u.h.f. marine, airband, amateurs, 200 memories, 66-512MHz with gaps, priority search, lockout, v.g.c., helical antenna and manual, £160. Write with address, buyer to collect. Mr McMullen, 27 Waterloo Rd, Freemantle, Southampton,Hants SO1 3AQ.

FOR SALE Jupiter-2 hand-held scanner, new and unused with NiCads and accessories, genuine reason for sale, £200. David White. Tel: Hertford 551806.

FOR SALE Spy receiver Mk328, government issue, h.f. 2.5-30MHz a.m. with b.f.o. for s.s.b./c.w., 7x3x2inch NiCad battery, all accessories, boxed, a collectors item or practical s.w. receiver, £100, buyer collects. S. Kowal. Tel: Rochdale 39803.

WANTED Scanner to value of £110. Exchange for la fleur clarinet. Excellent condition in black case, press the right button and make your own wonderful sounds. John Wilkinson. Tel: Leyland, Lancs 421336.

FOR SALE Drake SPR-4 receiver, noise blanker, notch filter, AL4 loop antenna, crystals for 18 ranges plus medium and long wave, £200. Cossor DB oscilloscope model 1052 collectors item, £25. T. Kennedy. Tel: Reading 724229.

FOR SALE Sony PRO-80, little used, complete with frequency converter, telescopic aerial, manual, carrying case, in original box, 150kHz-223MHz, £170 o.n.o. E. Bilbie. Tel: Warwick 493744.

FOR SALE Datong general converter model PC1, £120. Also Datong MPU for use with PC1, £4. Both items new 9-8-89. Drae 3-way antenna switch n/type sockets, £16 new 27-9-89. F. Upstone. Tel: Bredon 73366.

FOR SALE Collins 51J2 receiver, very good condition, £270. Marconi wide range RC osc TF1370A, £40. Marconi valve voltmeter, £12. Numerous valve radios pre and post war, £15 to £40. K. Hindle. Tel: 061-962 7577.

FOR SALE AR-88, £60. Redifon R408 comms receiver, 13kHz-28MHz continuous, £150. Trio 599TX, £60. All in good condition and with manuals, possible help with transport. Tom Burke, 42 Albert Rd, Cleethorpes DN35 8LX. Tel: 0472 602335.

FOR SALE Eddystone 880 communication receiver in excellent condition, covers 0.5mc/s to 30.5mc/s in 30 bands, 1.2mc/s wide, weighs 95lbs, buyer collects and carrys, cash only, £200. HRO-MX-superb, £100 cash. Norman Walker, 35/37 Brighouse and Denholme Rd, opposite Raggards Inn, Queensbury, Bradford BD13 1NA.

FOR SALE Thompson DX/TV (b/w) 12 inch screen, v.h.f./u.h.f., poss-neg, a.c./d.c., £55 carriage extra. UHF WB pre-amp, mains OP 15db gain, £10. Sanyo RX, portable, mains/batt, s.w.-m.w.-f.m., analog, fast/slow tuning, wide/narrow, very sensitive, suit beginner to SWLing, hence price, £25. **Wanted** band III pre-amp such as TRIAX A-S 4000/LN + its 24V @ 35mA p.s.u. Write to M. Evans, 120 Loughton Way, Buckhurst Hill, Essex IG9 6AR.

FOR SALE Lafayette HA600 amateur and short wave receiver, with speaker, 150kc to 30mc, good condition, new controls fitted on front panel, £50 or w.h.y. Mr Goodhall. Tel: Lincoln 541223.

FOR SALE Black Jaguar Pocket Scanner BJ200 MkIII with case, charger and flexible aerial, as new condition, cost £200, will accept £150 o.n.o. K. Bryant, Jessamine Cottage, Chapel Lane, Ashford Hill, Newbury, Berks RG15 8BE. Tel: Reading 811792 home or Newbury 36222 ext 2369.

FOR SALE Realistic PRO-34, purchased May '90, little used, plus load coil aerial, mains adaptor, car adaptor, boxed, as new, £175. Tel: Gravesend 361549 evenings and weekends.

WANTED Icom IC-R9000 or AOR-3000 communication receiver. J. House, 4 Elizabeth Way, Kenilworth, Warwicks CV8 1QP. Tel: Kenilworth 54556 anytime.

FOR SALE Signal R535 v.h.f./u.h.f. airband receiver, boxed with portable pack, as new, £250. Signal R537S v.h.f. airband receiver, boxed with NiCad and aerials, £45. John Garnett. Tel: Truro 40105 after 6pm.

EXCHANGE I have Sony Air 7 air, p.s.b., a.m., f.m., scanner and Sony AN1 active antenna, both mint. I require a good comms receiver or base station CB or w.h.y.? W. Johnston. Tel: Bournemouth 422273 after 6.30pm.

FOR SALE ICS FAX-1 printer, p.s.u. leads, paper, manuals, complete package bought Feb, £409, accept £309, including TAW v.l.f. converter. Wanted Hallicrafters S21 or Eddystone 990R. R. Hastie. Tel: Tedburn St. Mary 61360.

FOR SALE Icom R-7000, 25MHz to 2GHz, remote control, voice synth, BBC computer interface and software, 100 extra memory channels, delay mods, manuals, boxed, mint condition, £650 o.v.n.o. M. Turner. Tel: Herne Bay 364023.

FOR SALE Icom IC-R1 hand portable receiver, as new, boxed, under guarantee, £260 o.n.c.o. Peter Kaluba. Tel: 081-769 1499.

FOR SALE ERA MK2 microreader RTTY and c.w. decoder, built-in Morse tutor, unwanted gift, little used, new this year, £110 post paid. Bill Vann GM3TBV QTHR. Tel: Blairgowrie 2520.

FOR SALE Sony ICF PRO-80 150kHz-108MHz plus 115.15MHz-223MHz scanner, brand new and unused, still in original packaging (unwanted competition prize), value £300, offers in region of £225. Charles Ryan. Tel: 051-220 5425 after 6pm please.

FOR SALE Uniden Bearcat 200XLT hand-held scanner, 66-88/118-174/406-512/806-956MHz range, 200 memories, in excellent condition and boxed, £140. Sean Patterson. Tel: Spennymoor 813150.

CASH LIMITED enthusiast from Poland is looking for h.f./v.h.f. transceiver/receiver or scanner. Can be old or not even running. Find him on 27.320MHz PLCB3200. Adam Moscicki, 14 Dobra str, 60595 Poznan, Poland.

FOR SALE Sony Air 7 with charger, £140; Sony PRO80, excellent condition but less r.f. convertor, £135. Both boxed with instructions. Andy Metcalfe. Tel: (0773) 89726 after 6pm.

WANTED Trio TX-88D or SM-5D for use with Trio 9R-59D. No telephone, so contact J. Payne, 1 St Herbert's Drive, Skegness, Lincs PE25 2LS.

FOR SALE Sony ICF-2001D receiver complete, boxed, in excellent condition. £170. R. Knight, Hartsop, Penrith, Cumbria CA11 0NZ. Tel: Glenridding 82532.

WANTED Sony ICF SW1E radio must be mint. Tel: (0926) 56186.

FOR SALE R2000 complete with c.w filter and 12V options fitted, original box and packing £395. **FREE** to purchaser of R2000, computer and interface plus software for RTTY and c.w. Les. Tel: (0670) 760655.

FOR SALE Sony PRO80 hand-held scanner, £100 cash or swap for good 8 x 42 roof prism binoculars. Mr W Flett, 20 Wyatt Street, Kettering, Northants NN16 0TD.

FOR SALE 20in multi-standard colour TV, 11 systems - PAL B/D/G/I/K, SECAM B/D/G/K, NTSC 3.58MHz/4.43MHz plus v.h.f. Bands I and III. 50/60Hz, 90-250V, remote control, brand new/boxed £229. Norman. Tel: 081-319 3157.

FOR SALE Sony Air 7 boxed, as new, £160.00. Sony TC266, stereo tape recorder 7in reel-to-reel, immaculate with manual and tapes, £80.00. Regulated d.c. p.s.u. 3/4.5/6/7.5/9/12V £15.00. Mr Plumb, 38 Glencairn Court, Landsown Road, Cheltenham, Glos GL50 2NB. Tel: (0242) 228782.

FOR SALE Kenwood R2000 with V c/o v.h.f. converter, also instruction and service manuals, excellent condition £495. Army field antenna £30. E. M. Paul. Tel: Milton Keynes 604163 after 6pm.

WANTED AR88D in exchange for KW202 receiver and speaker and spare set of new valves. Tel: (0392) 59822.

FOR SALE SR600, £125. RA1217, £250. Plessey PR125, £250. Drake 2B/2A, £125. Icom 505, £400. R210, £75. Zenith broadcast set, £80. Ten Tec Omni digital, all filters, vfo, all bands. Mr Bysouth, Gillingham, Kent. Tel: (0634) 372854.

WANTED Service manuals for electrohome b/w monitor, Ferbuson TV type 3816, Amstrad cassette model 6000. Test leads for Solartron CD1740R oscilloscope or the Amphenol plugs and sockets to make them. Don. Tel: (0283) 68088.

FOR SALE Realistic PRO-2004 scanner, 25-520MHz, 760-1300MHz, a.m., f.m., w.b.f.m., 300 channels, as new in box. £180. L. Morrison. Tel: Great Yarmouth 782338.

WANTED Kenwood HC10 world-time clock. Andrew Harlock, Sloane Gate Mansions, D'Oyley Street, London SW1X 9AG. Tel: 071-730 3377.

FOR SALE Eddystone 680X receiver, Hewlett Packard disc drive 9133, Teleprinter 7B, 13 volues *Radio & TV Servicing*, large quantity trader and other service sheets. Offers. A. Blackburn. Tel: (0895) 638719.

FOR SALE Sony 7600D plus power supply and *Waveguide*, £80. Sony AN1 active antenna with attachments, £25. Instruction books with both items. Tel: (0930) 32714.

SWM SEPTEMBER 90 TP

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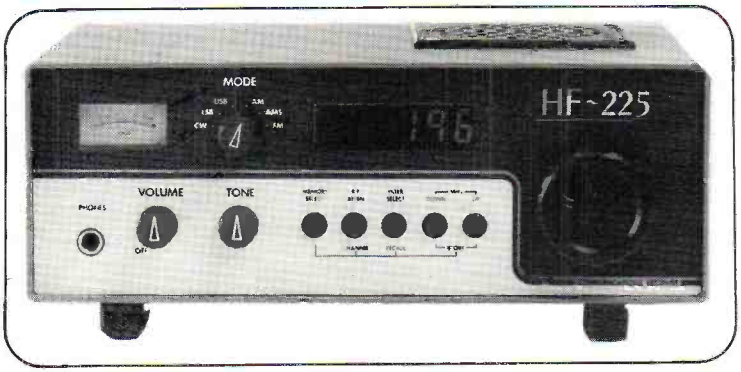

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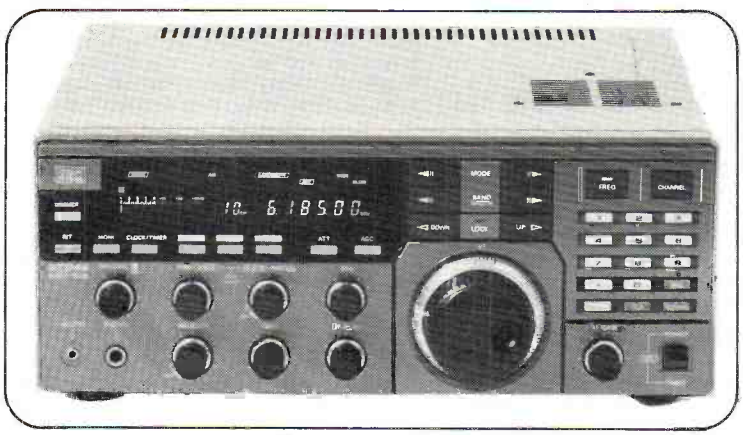

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CFL232	500Hz CW filter.....	**£126.37**	**£1.00**
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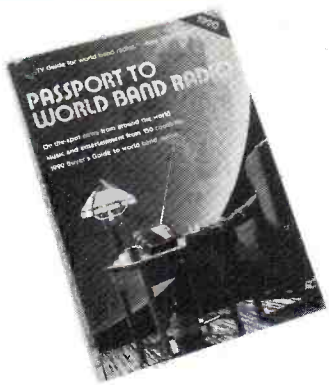

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AR-1000 . . . £249 inc. VAT

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BASIC SPECIFICATION.

Frequency ranges 8 to 600MHz continous, 805 to 1300MHz continous.

Frequency selection By direct keypad entry or by tuning knob on top panel.

Memory channels 1000 arranged conveniently in ten banks of 100, with direct keyboard access to any memory.

Search bands Ten bands which come pre-loaded with the ten most important UK bands of interest as follows:-

1. VHF air	118-138MHz	2. UHF air	225-400MHz
3. VHF PMR 1	71-87MHz	4. VHF PMR 2	165-174MHz
5. Band 3	174.5-225MHz	6. VHF marine	156-163MHz
7. VHF amateur	144-146MHz	8. UHF amateur	433-435MHz
9. Cell mobile	890-905MHz	10. Cell base	935-950MHz

Note that this is only the factory pre-loading, and any search band can be easily re-programmed by the user for any frequency range they wish. What is important is that the new owner can unpack the receiver and by pressing just 3 keys can begin using the unit straight away.

Reception modes AM, FM (narrow), and FM (wide) which gives access for the first time to FM broadcast and TV sound in a handheld scanner.

Frequency steps User programmable from 5 to 995kHz, in any multiple of 5kHz or 12.5kHz.

Scan speed 20 channels per second.

Search speed 40 channels per second.

Power source 4.8V rechargeable NiCd.

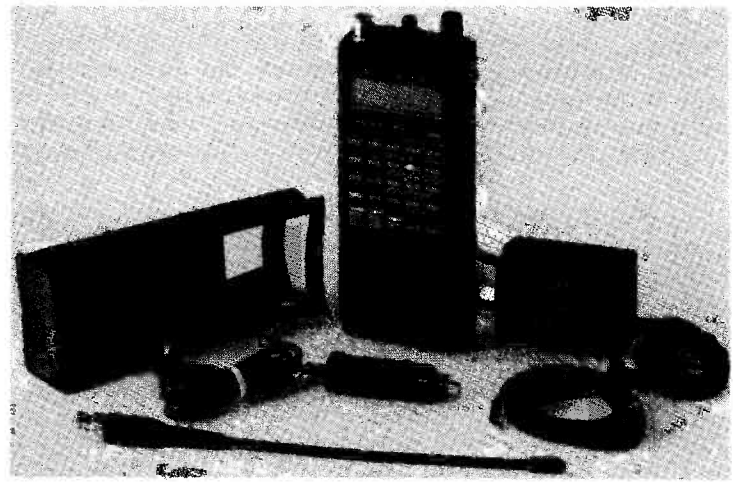
The battery pack is four separate 600mA/H AA size cells which are provided, but the user can easily remove them and replace them by four standard AA pencells. Also, and most importantly, the AR-1000 can be powered from any external dc supply of 13.8 V nominal, which not only powers the receiver but also charges the NiCd batteries — so satisfyingly simple.

Other features include a 10dB switched RF attenuator; concentric easy to use volume and squelch controls; a brilliantly designed keypad layout which anyone can understand and use; and a simple interactive operating system in which the display clearly indicates what the user's next move shoud be.

All the performance and features which we wanted from AOR are here in a stylish handheld package, measuring only 70 × 35 × 170mm, and weighing a mere 300g. (excluding batteries).

The ARO-1000 comes complete with the following accessories:-

Set of 600mA/H NiCd batteries	Belt clip
240V mains charger	Carrying strap
DC power cord with cigar lighter plug	Earpiece
Soft carrying case	High performance DA900 flexible gain antenna



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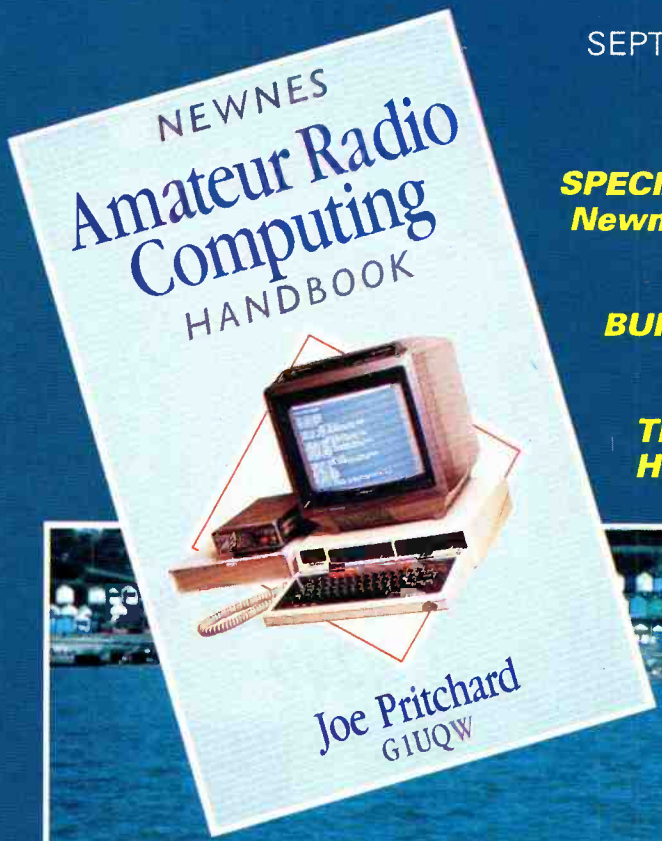

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For The Radio Listener

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- User-selectable search steps from 5kHz to 995kHz
- Modes - AM, FM and new Wideband FM for commercial reception
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Each Fairmate 100E comes complete with:

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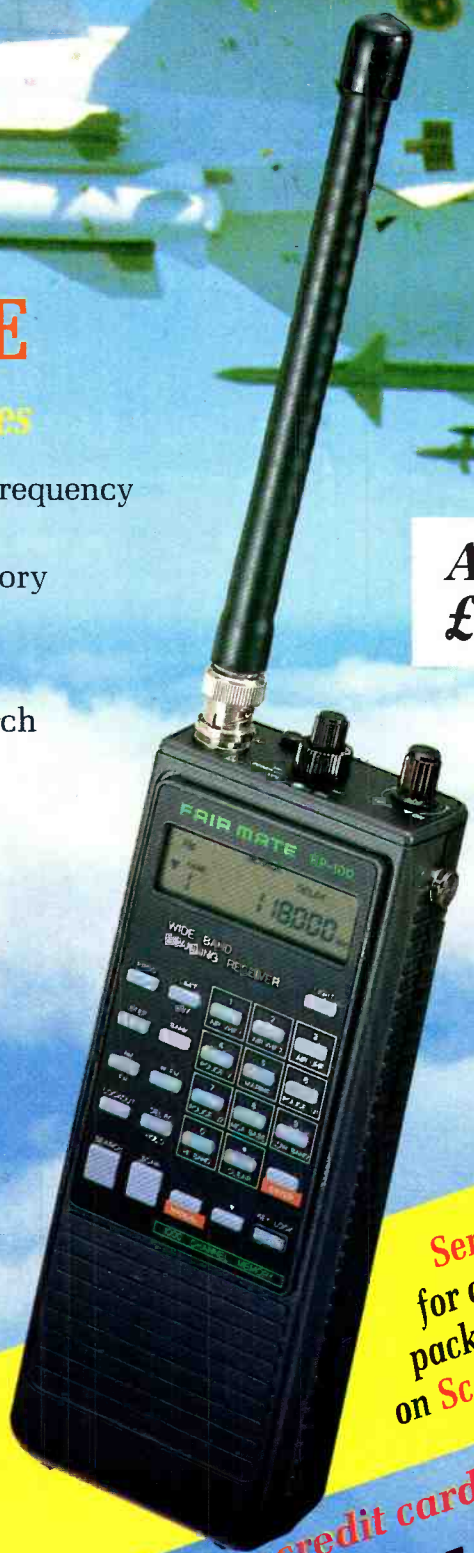

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THIS IS WALTON LIFEBOAT

J. D. Harris G3LWM

For those who live by the coast, the launching of The Lifeboat is a constant reminder of the dangers to those who go to sea for either commerce or pleasure.

The following statistics indicate the scale of operations undertaken by the RNLI. In 1989 RNLI lifeboats launched 4566 times. More than 1529 lives were saved. Almost 14% of all services carried out by lifeboats were in winds of Force 5 and above. More than 54.5% of all lifeboat services were to pleasure craft.

There are 264 lifeboats on station with a further 101 in the relief fleet. 119442 lives have been saved by the RNLI since its foundation in 1824. The cost of running the RNLI for 1989 was £36 million - all from voluntary contributions.

Callsign MOPE

Lifeboat No. 1012 *City of Birmingham* 48-009 is located at Walton on Naze, Essex. The latter number indicates that it was the ninth production vessel of the 48 foot, Solent Class, self-righting, lifeboats. The number 1012 is the total number of lifeboats built since Number 1 *The Grace Darling*.

The callsign of the Walton Lifeboat is MOPE. However, in practice, with current marine procedures the normal radio identification is 'Walton Lifeboat'. Under normal circumstances, the callsign would only be used if making charged ship-to-shore radio telephone calls *via* a Coast Station.

Moments Notice

One of the biggest problems facing every lifeboat is the requirement to be able to launch, at a moments notice, under all conditions of tide, wind and weather. As there is no harbour or jetty at Walton with sufficient depth of water at all states of the tide, the Walton Lifeboat is moored on the southern side of the well-known Walton Pier about half a mile off-shore. Due to the prevailing wind and tides it is not possible to moor the lifeboat alongside the pier and it is located some 100m from the pier itself, held secure by a complex system of chains and anchors.

Round the coast line of the British Isles, the lifeboats and crews of the Royal National Lifeboat Institution are kept in a state of constant readiness.

In order to get into the boat, the crew have to travel up the pier then row the short distance from the pier to the lifeboat in a boarding boat.

It takes little imagination to appreciate the difficulties involved, especially on a cold night in December with a Force 7 easterly wind blowing. A timely gift of bicycles from the Post Office has at least reduced the time taken for the first part of the trip!

Electronics pay a vital part in the efficient management of all operations carried out by Walton Lifeboat. These can be placed in two basic categories - Communications and Navigation.

Communications

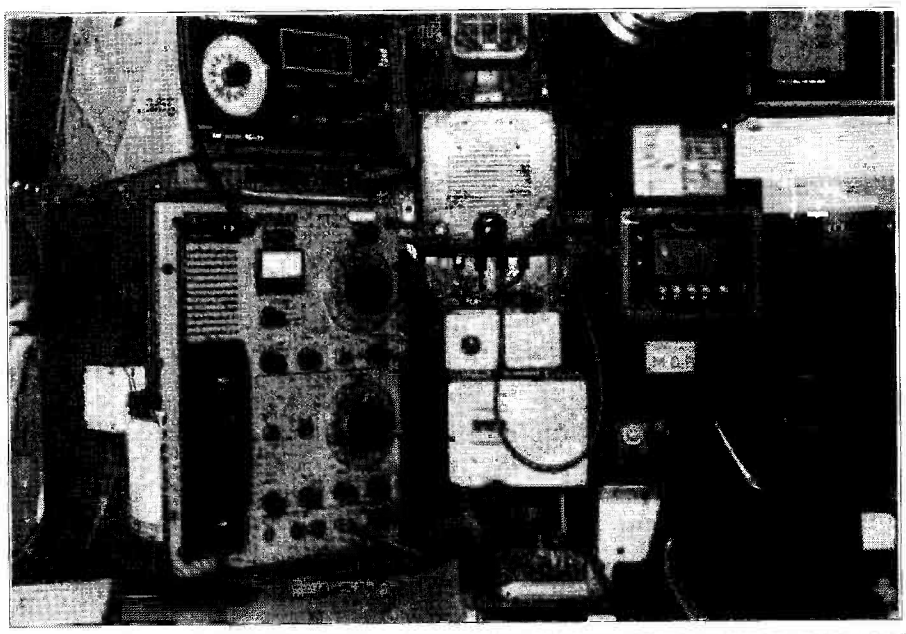
Whilst on service, the lifeboat will have many communications links. Prior to the launch, the crew and the launching authority will have, in many cases, been alerted by BT pagers or dedicated pagers on v.h.f. Channel 0. These pagers will have been activated by HM Coast Guard or other co-ordinating authority. At Walton, maroons are still fired in case of electronic failures and to inform the citizens of Walton to expect the crew to be hurrying down to the pier.

Most extensively used is the v.h.f. f.m. marine band (156-174MHz). The equipment in the boat is a Pye FM900 multi-channel transceiver with a remote operating position on the bridge.

Antennas

Two antennas are fitted - a half-wave vertical on the superstructure and a deck-mounted, slot antenna that can be used in the event of the main antenna being damaged by heavy seas or even a capsize. The majority of sea-going craft now carry v.h.f. radio and nearly all aircraft and helicopters used in SAR (Search and Rescue) operations will also carry Marine Band f.m. radio.

In addition a number of hand-portables are available for communications between the lifeboat and crew members who may have been placed on board a casualty, or for contact with other ships and aircraft in the vicinity of the rescue, freeing the main v.h.f. radio for other uses. For use on m.f. (1.6-4MHz) a Racal TRA950 a.m./s.s.b. equipment is available. This can only be operated from the radio desk. A loaded whip antenna is utilised and as the vast majority of contacts are always over a sea path, good ranges are obtained even during daylight hours. Coast Stations, both in the UK and on the Continent, are always within m.f. range. All Coast Guard (MRCC and MRSC) are also equipped with m.f. equipment. Radio checks are carried out at least on a weekly basis. The day-to-day running and maintenance is the responsibility of the mechanic who is the



The radio and navigation equipment aboard Walton lifeboat. On the bottom left is the m.f. radio with the m.f. d.f. set on top. In the centre bottom is the radar capsize switch with the v.h.f. remote control position immediately above it and the intercom to the bridge above that. The radar control is on the right, partially obscured by the p.p.i. hood, with the Decca Navigator above it. The depth finder is at the top right.

only full-time and paid member of the crew. At Walton, this task is carried out with great dedication by Jim Berry. Jim is also no mean photographer, as the cover picture shows.

Decca Navigator Equipment

Decca Navigator equipment is widely used. This system that operates in the long wave band enables very accurate positions to be obtained under virtually all conditions of weather and radio propagation. A chart overlay can give the ships position to 500m or better. When giving Decca positions, to ensure that there are no anomalies, it is also usual to give the longitude and latitude to ensure absolute accuracy.

Two d.f. systems are utilised. An MF-FD171 that gives coverage over 190-420kHz, 500-1500kHz and 1.6-4.5MHz. This system has a meter display.

In addition, a v.h.f. d.f. system is available that covers the marine v.h.f. band plus the Distress Frequencies (Aeronautical) of 121.5 and 405MHz. This equipment is a Simrad-Taiyo ADDF TD/L1520. The readout is l.e.d. compass bearing.

Radar

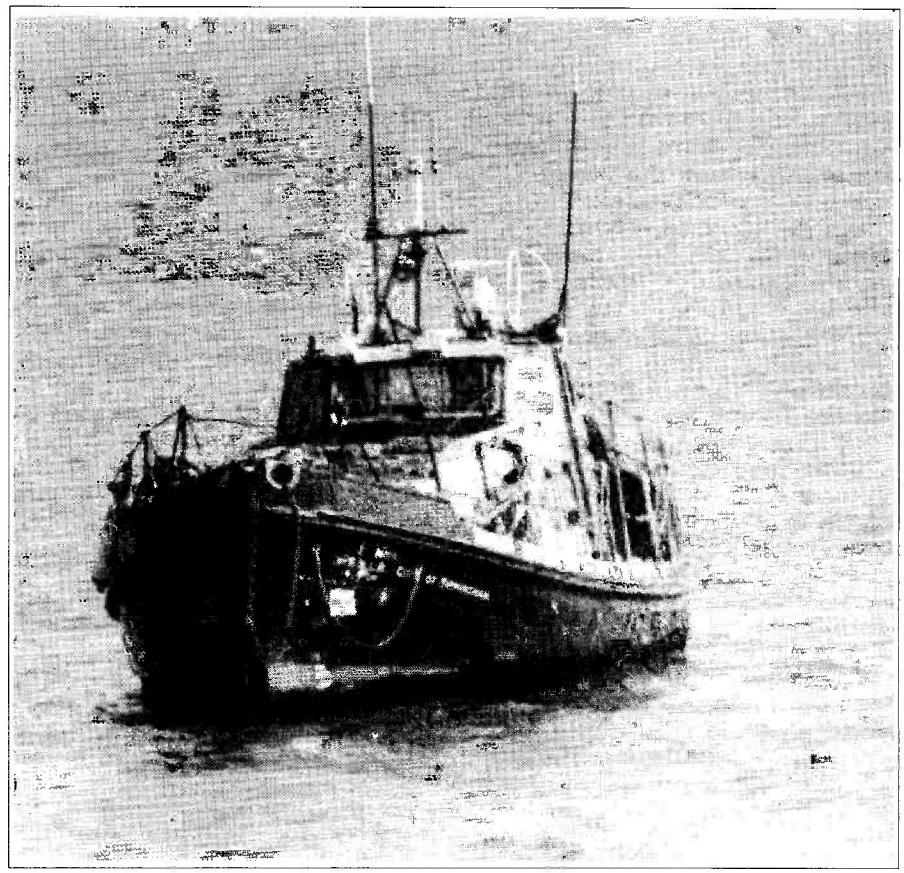
The radar fitted is a typical small boat system. Decca RD150 is used operating in the 3cm radar band. The range is in the region of 10km. A standard rotating antenna system is utilised.

Whilst radar can be a very useful navigational aid for a lifeboat, under conditions of heavy seas and looking for small boats that may not be equipped with a radar reflector it is not too efficient.

As can be appreciated, small boats made of wood or glass-fibre are not very efficient radar reflectors and unless a reflector has been fitted, the vessel can be difficult to locate on radar. A radar reflector is a specially shaped metal construction designed to give maximum returned signal in the 3cm radar band. Hoisted up to mast height will give a vastly enhanced picture on the radar screen.

Depth Finders

Two depth finders are utilised. At the radio position is an MS356 system that gives a graphic display of the sea bed, while located in the wheelhouse is a Seafarer Depth Finder that gives an l.e.d. read-out, again showing the depth beneath the vessel. The waters of this part of the coast are very treacherous and apart from navigation aid, expert seamanship is demanded from the lifeboat crew.



Walton Lifeboat showing the antennas fitted. The whip on the right is the v.h.f. antenna with the m.f. d.f. loops just inboard. The v.h.f. d.f. array is in the centre with the m.f. whip on the left. The Decca Navigator whip is the furthest left.

Walton Lifeboat No. 11012 *City of Birmingham* 48-009	
Overall length:	14.87m Solent Class, self-righting.
Engines:	2 x 110hp Gardener diesel engines.
Top speed:	9.37knots at 1300r.p.m. 8knots at 1275r.p.m.
Fuel consumption:	9 gallons/hour at 1300r.p.m. 5.5 gallons/hour at 1275 r.p.m.
Electrical Generation:	2 x 30A alternators, belt driven from engine.
Batteries:	2 banks of 4 x 12V 350Ah lead acid batteries. 1 bank for starting. 1 bank for ship's supply with coupling switch to disconnect equipment in the event of a capsize.

Abbreviations

A	amperes	m	metre
a.m.	amplitude modulation	m.f.	medium frequency
Ah	ampere-hours	MHz	megahertz
cm	centimetre	p.p.i.	plan position indicator
d.f.	direction finding	r.p.m.	revolutions per minute
hp	horsepower	s.s.b.	single sideband
kHz	kilohertz	V	volts
km	kilometre	v.h.f.	very high frequency
l.e.d.	light emitting diode		

Heavy Seas

So next time you are sitting snugly in your shack on a cold, windy, winter night and casually hear a Mayday Relay on 2182kHz, spare a thought for the lifeboat crews who may well be out battling against heavy seas, with the radio operator working under rather difficult conditions, to say the least! □

AIRBAND

Godfrey Manning G4GLM

Topical news and information for the airband enthusiast to read over the summer holiday period.

Look out for the Battle of Britain 50th Anniversary Fly-past on September 15. In the June edition of *The Log* was advance information on this event. September 10, 11 and 12 are practice days, with September 13 and 14 in reserve for more practice.

Much of the airspace below 3500ft altitude in southern England and East Anglia is involved for assembling the huge formation which joins up over Norfolk and the Wash; proceeds over RAF Wittering; and then flies over Buckingham Palace. The formation then splits and will rejoin to overfly the display at RAF Abingdon.

If you make a special journey, be advised that this event depends on the weather. Do NOT make a special flight to get nearer - you'd be in the way of a huge number of high-performance aircraft, an unpleasant experience for all concerned.

Use an Attenuator!

If all circuits behaved perfectly linearly when required, we'd be living in a fantasy world. We have to make do with what we've got - and quite often the practical circuit is 'not ba'd.

One common problem these days is receiver overload. You're tuned to one signal, but a strong transmission on a nearby frequency tries to get in on the act and causes distortion - even though the interfering signal is apparently **not** being tuned in. There are more signals around nowadays and quite often with ever increasing power. But, another factor makes things worse. This is the trend towards synthesised 'scanning' receivers. The demands made on the synthesiser mean there has to be a compromise.

It turns out that the local oscillator in a typical commercial scanner is not quite producing a pure frequency; a nearby strong signal could interact with the low-level impurities emanating from the local oscillator.

So, if you have this problem, keep the strong signal under control with an attenuator. The wanted signal will also be reduced but paradoxically becomes more readable on account of diminished interference.

Many of the scanners in current use have BNC antenna sockets. A range of BNC attenuators is sold by Electromail, PO Box 33, Corby, Northamptonshire NN17 9EL (Tel: (0536) 204555). The attenuators are (dB and part number): 3dB, 456-116; 6dB, 456-122; 10dB, 456-138; and 20dB, 456-144.

If you put more than one attenuator in series, just add the decibels. So connecting a 10dB and a 3dB attenuator together gives 13dB. The same applies if your receiver already contains a built-in switchable attenuator.

Information, Please & Thanks

Jim Wright is curious to know the details of the new central control function which will be set up in the London area over the next few years. As soon as I have any details I'll print them here.

However, Jim's initial information is that a new hold (Mike) will be established at Milton Keynes and the Biggin hold (now to be designated Golf) will move further from London. The general idea is to allow central control of approaches right up to the moment when the local tower is called on long finals. Individual airports will no longer handle their own approach radar. All holds will be moved further away from the terminals they serve.

Jim also reports a new information source that will interest readers close to Heathrow and Gatwick. On 1584kHz a.m. (medium wave broadcast band) a new commercial station has opened. Airport Information Radio is intended for reception up to 10 miles from each airport but I can receive it clearly in an upstairs room using just an Air-7, although I'm a couple of miles outside the Heathrow service area.

On an approximately 10min cycle a male announcer reads weather and flight delay reports and there are also announcements regarding checking in, road delays, etc. There is no technical information. Faintly in the background, with no evidence of a heterodyne whistle, is a female announcer who is presumably reading the separate Gatwick service.

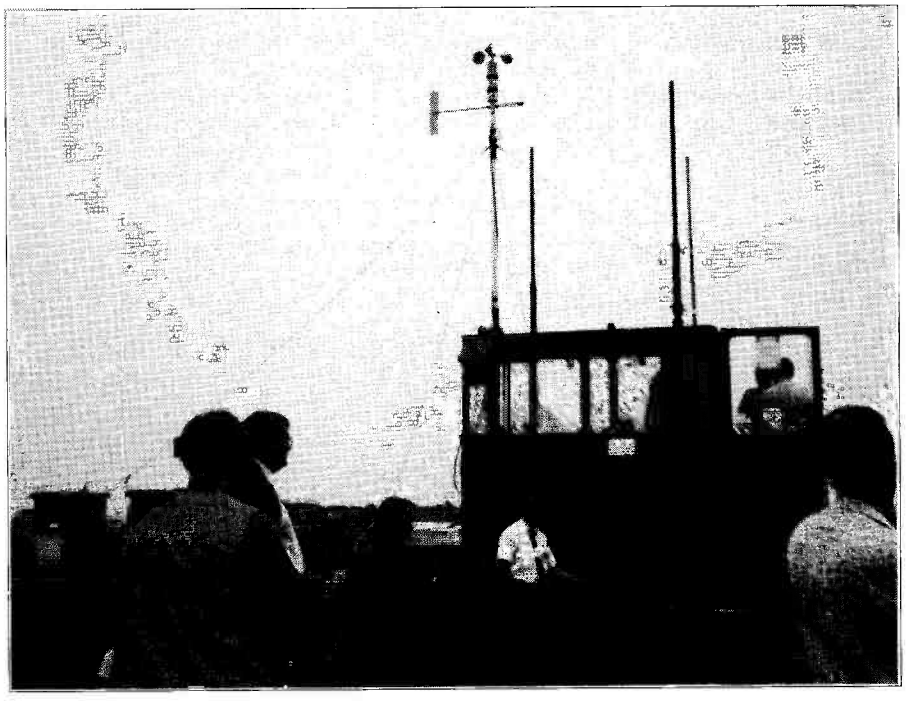
Radio Navigation

Aeronautical Information Circular (AIC) 49/1990 from the Civil Aviation Authority (CAA) makes it clear that 50kHz spacing of v.o.r.s and i.l.s. localisers will be implemented in the UK soon. Although 100kHz spacing was superseded long ago by 50kHz channels, it has only now become necessary to 'fill in' the intervening frequencies. I.l.s. glide slopes will be spaced by 150kHz. Most existing facilities will remain on their present frequencies.

In *AIC 51/1990* we are reminded of the limited operational coverage of nav aids. At excessive distances from such facilities, there may be inaccuracies due to weak signals and also interference from other beacons on the same frequency but geographically separated.

Follow-Ups

Some information from **Terry Ford** (94 Everingham Road, Sheffield 5, S. Yorkshire). London Mil North is currently on 262.8MHz (verified in the latest Aerad *Supplement*). Last month I described search and rescue. If anyone in the St. Mawgan and Kinloss areas would like to correspond directly with Terry on this subject, they are invited to do so. Finally, if you know which services use 122.75 and 135.0MHz, please write to this column.



The mobile control tower at the RAF Halton Show as described in this month's column and photographed by Christine Mlynek.

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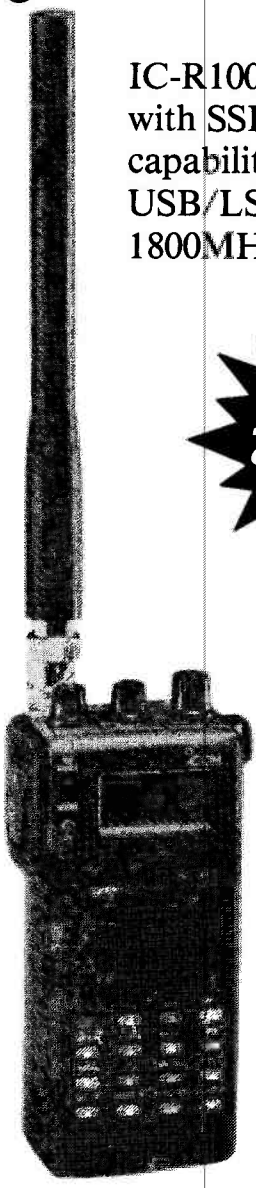

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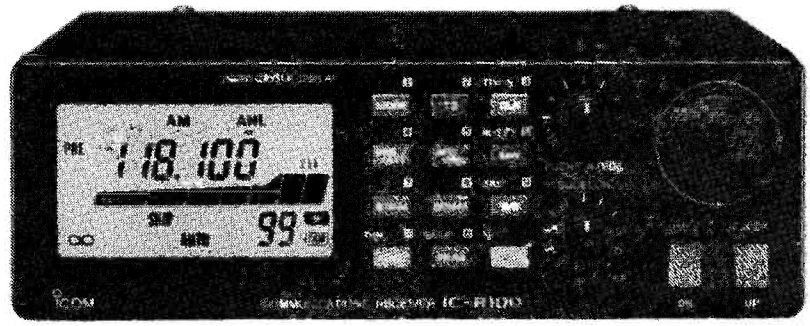

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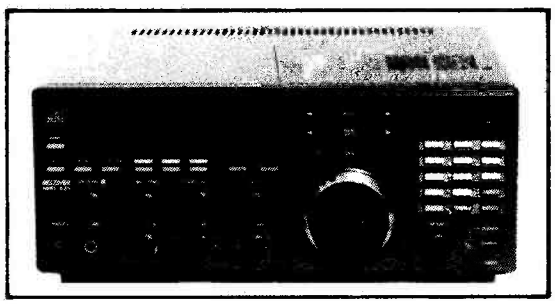

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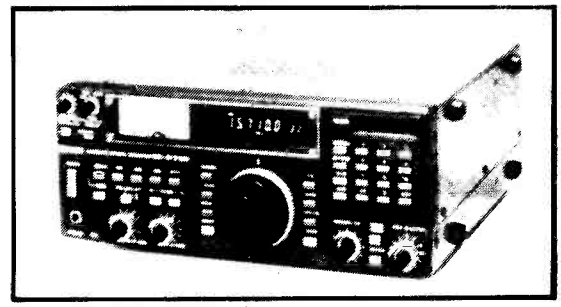
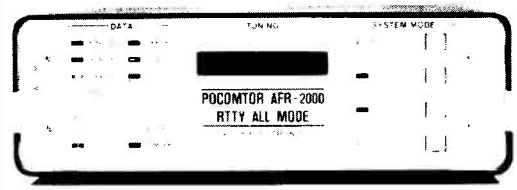


IC — R 71E £855



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AIRBAND

Frequency & Operational News

The 6/90 edition of the *General Aviation Safety Information Leaflet* from the CAA has these new aerodrome frequency changes. At Bagby (Thirsk) 123.250 replaces 122.175; at Oxford (Kidlington) 118.875 replaces 119.8 (this frequency seems to alternate from month to month, could there be a misprint?); and at Southampton 131.0 is the new primary contact frequency, 120.225 and 128.85 are only to be used when directed by air traffic control. All in MHz of course.

Not all parts of the world have a comprehensive air traffic control system. Apparently, over Africa, airliners transmit 'blind' on 126.9MHz hoping that other nearby aircraft pick up their position reports and act accordingly.

At this year's RAF Halton Show the controllers had a portable tower seen in Chris' photo. Visible are the anemometer and wind direction indicator plus a host of antennas; to the left is a pair of generators to supply the power.

The enlightened organisers read out the display frequency over the public address system: Halton's usual frequency of 130.425MHz was in use with, additionally, 354.2MHz on u.h.f.

Now for the weather. Readers may know about Airmet; this recorded message can be dialled by anyone who's willing to pay the 'phone bill.

The report is tailored to the needs of light aircraft flying at lower altitudes and the forecast only applies for one day. Dial 0898-500 691 for Scottish, 0898-500 692 for North and 0898-500 693 for South regions.

In the 1940s and '50s Airmet was in a different form. **Dick Casey** (Bansha, Co. Tipperary) remembers this as a long-wave broadcast read at dictation speed, with a distinctive interval signal (a trumpet sound). Can anyone else with an equally long memory tell Dick any more about this transmission?

A new service is Metplan which gives low-level forecasts for the next two or three days. Dial 0898-500 751 for the North and 0898-500 752 for the South.

Wish me good weather as I'm flying off on my holidays now. See you when I'm back, next month!

The next three deadlines (for topical information) are September 7, October 5 and November 2. All correspondence to the *SWM* offices in Poole, please. □

Abbreviations

AIC	*Aeronautical Information Circular*
a.m.	amplitude modulation
BNC	type of coaxial connector
CAA	Civil Aviation Authority
dB	decibels
ft	feet
i.l.s.	instrument landing system
kHz	kilohertz
MHz	megahertz
Mil	Military
nav	navigation, navigational
u.h.f.	ultra high frequency
v.h.f.	very high frequency
v.o.r.	v.h.f. omni-directional radio range

COMPETITION WINNERS

With the April and May editions of Short Wave Magazine was a Wordsearch competition. We were very pleased with the number of entries, they made a huge pile on the floor and so we couldn't use the cusomary carboard box to pick the winners.

The winner of the Microreader MkII, kindly donated by ERA Ltd of Warrington, was **Roger Harvey**, Oxon.

The Sony ICF-SW1E was won by **Mr M.F. Ferrier**, West Glamorgan.

Mr D Wallace , Surrey, is now the proud owner of the remote control colour portable television.

The Radac antenna, kindly donated by Garex Electronics, was won by **Mr T Edwards**, Middlesex.

The last of the 'big' prizes, the masthead antenna switch donated by Nevada, is now in the posession of **Mr D I Blamires**, Warwickshire.

We hope that the five winners enjoy their prizes.

Now to the 100 runners-up.

G.R. Ottey - Harpenden
J.A. Emerson - Worksop
Mrs V Parker - Burton-on-Trent
J.B. Griffiths - Loughborough
A Wakefield - Steyning
Mrs B.G. Breed - Hartlepool
K Spinks - Methil
P O'Horan - Doncaster
A.F. Blackburn - Winsford
J White - Chere
W.H. Rees - Godstone
P.J. Westbury - Bournemouth
A Bennett - Bournemouth
B.J. Head - Carstairs Junction
R.B. Neale - Leicester
J Deem - Kingsbridge
D.J. Hunt - Brighton
J Nightingale - Ramsgate
P Stern - London
K Johnson - Maltby
R Tait - Hamilton
K.H. Helgesen - London
T.W. Cooper - York
W.H. Etheridge - Stretford
E.M. Vincent - Newquay
B Bowker - Ashton-under-Lyne
J Fennell - Warley
G.J. Edwards - Llangernyw
P.A. Smith - West Drayton
C Stapleton - Torquay
D Pimblett - Leigh
B Kiddy - Stalybridge
F.J. Reed - Polruan-by-Fowey
P.V. Campbell - London
P Paintin - Gloucester
S.E. Beaumont - West Bromwich
G.E. Sykes - Bingley
R Preston - London
J Payne - Skegness
N Redfern - London
A.B. Rees - Worcester Park
R.N. Spencer - Ipswich
D.H. Austin - Ramsgate
J.F. Hewitt - Benllech
S Wilson - Hebburn
A Donaldson - Crossford
H.J. Williams - Ebbw Vale
K.H. Coffin - Bath
D Askew - Bexleyheath
R Jones - Ferndale
N Eliot - Hampton
S.J. Graham - Patrington
A Hemmings - Loughborough
S Smyth - Helensburgh
R McGlade - Blaydon
A Biro - France
C Rolfe - Folkestone
J Gould - Chelmsford
R Woodman - Leybourne
K McLaughlan - Irvine
R Cooke - Cwmbran
B.R. Martin - Rainham
A Nieminen - Finland
C.A. Butlin - Dunstable
R.C. Harvey - Weston-super-Mare
R.E. Blake - Ramsgate
Mrs P Brown - Manchester
S.P. Johnson - St Helens
L.F. Voss - Kidderminster
G.F. Claucherty - Goldings
B.C. Jones - Cheltenham
Mr J.W. Hepburn - Ashington
M.A. Seed - Newton Abbot
G.D. Perkins - Higher Kinnerton
R Dunlop - Wirral
H.R.J. Dowson - Nelson
V.G. Wood - Church Stretton
C Thomas - Switzerland
P Stone - Helston
D O'Reilly - Dublin
A Florence - Meldreth
J Murray - Co. Antrim
C Brockway - Newcastle-upon-Tyne
G.J. Colley - Yeoveil
S.F. Baldwin - London
D.A. Brudenell - Birchington-on-Sea
J.D. Fleetwood - Southampton
A Biggs - Whitley Bay
J.J. Barratt - Bury
G Hollow - Hayle
J Lewis - Carmarthen
A Bowmaker - Somerton
A.G. Hall - Bristol
J.G. Wardhaugh - Hexham
G Macaulay - Isle of Lewis
D Seton - Cheadle
D.G. Homer - Halesown
T.S. Lloyd - Tamworth
B Eddy - Penzance
J Kavanagh - Swindon

Finally, A.H. Cossens, Fareham, had the first correct entry drawn for the July Crossword.

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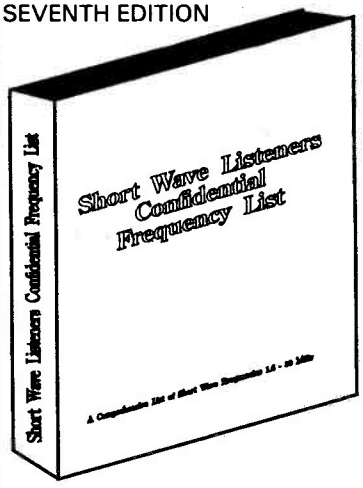

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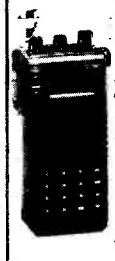

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18th Birthday Celebrations

Shortly we shall have achieved eighteen years in amateur radio. As a way of saying thank you to our old customers and hopefully winning some new ones, we intend making some unique offers over the next few months. Here are some examples. If you don't see what you need, then please phone!

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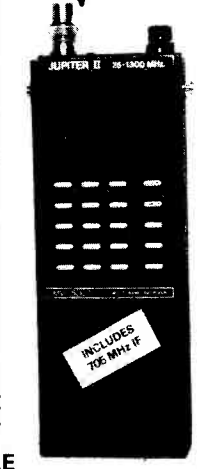

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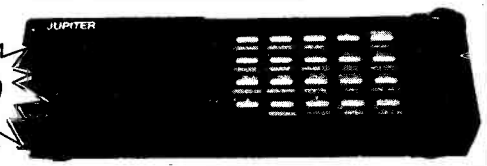

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BANDSCAN

Peter Laughton

More news, views and snippets from the world of the radio and TV broadcasting stations.

The growth of 'international local radio' seems to be unstoppable at the moment. Listeners in three East European countries are now hearing the Voice of Canada on local radio. Stations in Poland, Czechoslovakia and Hungary have begun regular broadcasts of features produced by Radio Canada International, their internal service of the Canadian Broadcasting Corporation. Polish Radio and Czechoslovak Radio - both state broadcasters - and Radio 68.18 Budapest Ltd., a new commercial station based in the Hungarian capital, are carrying the features as part of their prime-time current affairs programming.

The topical interviews in the Polish, Czech, Slovak and Hungarian languages - focus on various aspects of Canadian life of interest to listeners in Eastern Europe.

The Foreign Language Recognition Course was recently repeated on Radio Canada International's *SWL Digest*. If, like me, you missed some of the episodes because of RCI's erratic reception in the UK, there is some good news.

The Ontario DX Association has announced a deal to make the course available to short wave enthusiasts. It consists of spoken examples in fifty-five different languages which have been broadcast on short wave. Along with these language examples are comments by the noted language expert, author and DXer Dr Richard E. Wood. Dr Wood gives many helpful guides to pronunciation and recognition of the various language families and also gives many key words to help in the identification of the different languages covered in the course.

The Foreign Language Recognition Course is designed to give the serious s.w.l. and DXer the basic means to recognise and sort out the jumble of different languages that can be heard on short wave. Once the language is known, it is that much easier to determine which country the broadcasts originates from.

The 90-minute cassette is available from the Ontario DX Association, PO Box 161, Station A, Willowdale, Ontario M2N 5S8, Canada. The price is US$ 8.00 including postage to Europe. In case you've lost *SWL Digest* after some abrupt time and frequency changes, it is now on Sundays at 2135UTC on 15.325 and 17.875MHz.

Soviet Shuffle

Certain Voice of America Russian language programmes are now being rebroadcast through a new independent radio station in Novosibirsk, the first independent radio station outside of the Baltic republics. The station, Novaya Volna, says that it broadcasts on 1111m, which approximates to the long wave channel of 272kHz. The power is 100kW, and they claim to cover a rather large part of Siberia, reaching four million listeners in the process. They broadcast five hours per day...but there's no indication of the precise time. That is a pity...VOA via the USSR would be an interesting catch and maybe even a QSL?

On a national scale, Soviet President Mikhail Gorbachev has effectively stripped the Communist Party of its grip on the Soviet media, ordering that no single party or group should monopolise broadcasting. The presidential decree has since become law, but although it means that independent political parties will be able to start their own radio and TV stations, the government will still control Gostel radio, the parent organisation of Radio Moscow.

Just how the various republics will interpret the new legislation is still in question. But as far as external broadcasting is concerned, republic stations such as Radio Vilnius and Radio Kiev will no doubt continue to use airtime on transmitters elsewhere in the USSR, assuming they can still afford the rental charge. Radio Moscow said more radio buildings were expected in the Soviet capital.

VoA to Reorganise

In July, a meeting was called in the Voice of America headquarters in Washington DC. Bruce Gelb, who heads the VoA parent organisation, called the US Information Agency, announced that as from October VoA, Radio Marti, TV Marti and the international TV service Worldnet are to be merged into one new governmental broadcasting unit. the organisation will be run by VoA's current director Richard Carlson. The move has long been suggested by some members of the US Congress to remove the rivalry between VoA's radio operations and Worldnet's TV productions. The total budget of VoA, Radio & TV Marti, and Worldnet current totals US$222 million annually.

In other news, the VoA, one of the few international broadcasters with an Albanian service, says that Albanian refugees have requested loudspeakers be set up in their camps so they can listen to VoA Albanian language transmissions. People coming out of the country claim large numbers of Albanian's tune into foreign stations, even though a survey in the country is, of course, impossible. VoA has received three letters from Albania in the last couple of months, normally they get no written response at all, and it was less than a month ago that the first telephone interview with a economics professor at Tirana University was aired.

Maybe the move to give Voice of America control over TV production within the US Information Agency will give impetus to a TV project at the BBC World Service in London. The board of governors at the BBC gave its approval at the end on June for a merchant bank to raise capital for a world TV news project, based on an earlier business plan. But the BBC World Service doesn't envisage a complete TV channel of its own. The launch costs, estimated at 10 million pounds, would be needed to produce three half hour programmes of international news each weekday. Despite competition from Ted Turner's Cable News Network, Sky News from Rupert Murdoch and several commercial TV news production companies, BBC World Service managing director John Tusa believes there is a market for such an English language TV news service. Three successive market surveys indicate the selling point is the analytical approach to news coverage.

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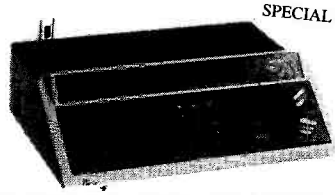

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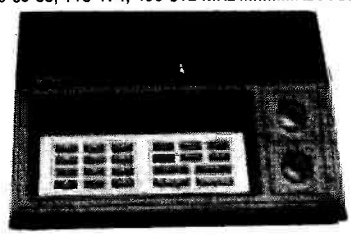

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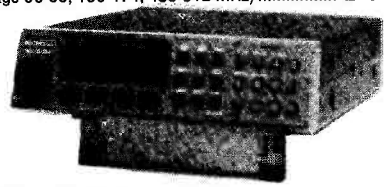

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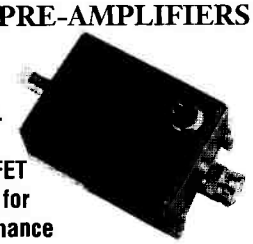

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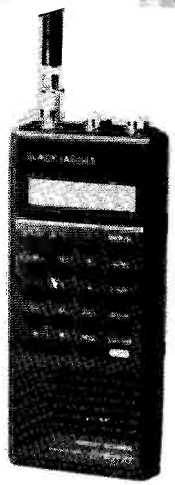

Independantly tested by a European magazine, the Black Jaguar was found to be the most sensitive handheld scanner on the market! That probably explains why it is still so popular.Features include 16 channel memories, selectable AM/FM and the facility to power the set from the mains/car using one of the many accessories now available. Covers civil and military airbands plus lots more! Frequencies: 28-30, 50-88 MHz, 115-178 MHz, 200-280 MHz, 360-520 MHz. **£199**

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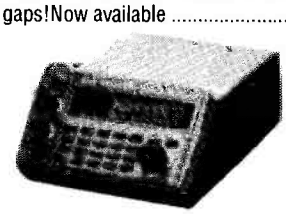

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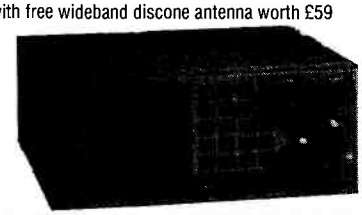

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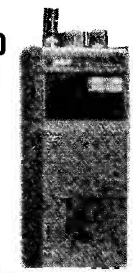

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Realistic PRO 38,
Uniden 200 XLT,
Uniden 100 XLT.

BANDSCAN

Mysteries

We all know about the misuse of the citizen bands by those who purchase linear amplifiers and boost their power to levels way beyond the legal limit. But what's going on in the Vietnamese cable industry I wonder? BBC Monitoring quotes a news item on the Voice of Vietnam that five of the seven villages in the Border district of Dac Rap, in Dac Lac province, have had 1000kW wired radio stations installed, with wires extending tens of kilometres. If that really is the power, you won't need a clock radio to wake you up in the morning!

Meanwhile, *SWM* reader Marcel Rommerts sent us a couple of puzzles to investigate. One of which was evidence that the religious station, High Adventure Ministries in California, is already sending out QSL cards confirming reception of their Pacific station, callsign KHBN, on Guam. This is curious because KHBN is still in the process of being built. David Lawrence, programme director for the station says it should be on the air around November for 10 hours a day.

In Brief...

George Poppin, in California passes on a letter from Coskun Arslan, deputy director of engineering at the Turkish Radio and TV corporation TRT. Five new 500kW transmitters, and no less than forty-nine antennas have now been purchased. Next March the first of the transmitters will go on the air to boost the Voice of Turkey's signal abroad. A future five 250kW transmitters are also foreseen as part of the audibility improvement plan.

It seems that the staff at Radio Berlin International may be made redundant at the end of the year. Their contracts run out once the two Germanies become united. If you haven't QSLed the station yet, now might be a good time to do so. The transmitters of RBI are already being co-ordinated by Deutsche Welle at international meetings.

The Swiss PTT has abandoned plans to build a new short wave transmitter site on the Jura Plateau in the western canton of Vaud. Local opposition came from environmentalists. The site would have replaced the out-dated facility at Schwarzenburg which cannot expand any further. The search is on for a new location.

Lim Kong Jin of Panang in Malaysia writes that The Voice of Indonesia's English Service is now on at 0100-0200 and 0800-0900UTC on 11.755 and 11.785MHz. However, the frequencies they announce on the air are not active. Other Indonesian locals notes in neighbouring Malaysia are RRI Padang with very good strength on 4.00 and 4.005MHz at 2300. RRI Jambi has also been noted at the same time on 4.925MHz with fair strength.

In Malaysia, plans are under way to increase the broadcasting hours for Radio Malaysia's domestic service to 18 hours per day of all of the channels. this would mean then that the domestic services will come on non-stop from 2216UTC every day of the week. Three new local stations will be built soon in the states of Perlis, Selangor and Negeri Sembilan soon. Also, it seems Malaysia will soon have the first private radio station - to be called 'Suara Johor', it is a regionalised service based within the state of Johor, a southern state in West Malaysia, the Indonesian broadcasts are currently noted between 2200-000UTC on 6.100, 6.175 and 9.750MHz.

Publications

The Ninth Edition of the British DX Club's *Guide to Broadcasting Stations in the United Kingdom* has been published. It includes a comprehensive listing of the new incremental stations that have come on the air recently, plus information on the new BBC Radio 5 service which starts in August. The cost is a very reasonable £1.50, or 4 IRCs including seamail postage anywhere in the world. The address for further info is the British DX Club, 54 Birkenhall Road, Catford, London SE6 1TE, in England.

Two years ago, Radio Netherlands published the last edition of the *Receiver Shopping List*, a free consumer guide to radio receivers on the market. At the start of 1989 they stopped sending it out because there were so many changes in the market place that the information was no longer current. Now the new 12th edition if the *Receiver Shopping List* is out. It includes price checks made in the UK, Canada, Holland, USA, Japan, South Africa, New Zealand and Australia. From the research it is clear that there is a huge price rift across the Atlantic. In the US, for instance, the top of the line radio from Kenwood, the R-5000, is around US$85. In Britain is is nearer £875, which makes it some 50% dearer. The list also discusses warranties. At 56-pages, it's the largest so far compiled, and it's free on request. The address is: English Section, Radio Netherlands, Box 222, 1200 JG Hilversum, The Netherlands. Ask for the *Receiver Shopping List Edition 12*.

Abbreviations

BBC	British Broadcasting Corporation
DX	'long distance'
IRC	International Reply Coupon
kHz	kilohertz
kW	kilowatt
m	metre
MHz	megahertz
QSL	confirmation of contact
RBI	Radio Berlin International
s.w.l	short wave listener
TV	television
US$	United States dollars
UTC	Universal Co-ordinated Time (GMT)
VoA	Voice of America

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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.

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Limited stocks of most issues of *SWM* for the past ten years are available at £1.65 each including P&P to addresses at home and overseas (by surface mail).

Binders, each taking one volume of the new style SWM, are available price £4.50 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.

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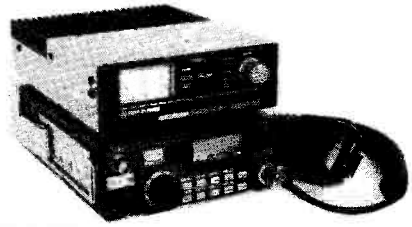

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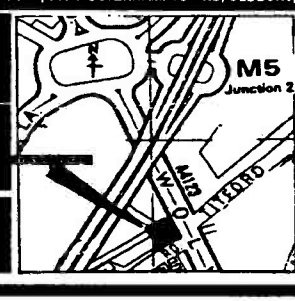

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SCANNING

Alan Gardener

Fairmate News

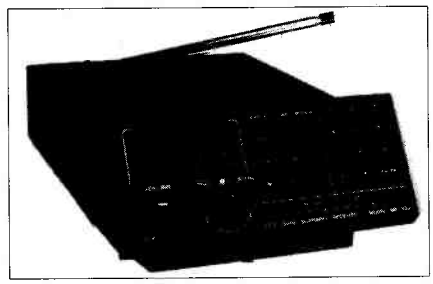
My spies have been busy again this month with reports of new versions of the popular Fairmate HP100. The first concerns a MK III version of the hand-held with an increase in its frequency coverage. This is now extended downwards to a much lower limit, permitting the reception of many additional short wave broadcast stations.

The second report is of a new mobile/base station based on the hand-held design. Although this is still only in the later stages of development the final version is anticipated to have all the existing features plus one or two extras such as an audio squelch function and improved strong signal handling performance. As well as a tape recorder socket and a socket to automsatically switch that recorder on and off. The prototype can be seen in the photograph. The controls consist of a four row press button keypad at the right hand side of the unit with separate rotary volume and squelch controls mounted under the l.c.d. display at the left hand side. The whole of the front panel is slightly inclined in order to give a better viewing angle for the display. It will be called the Nevada MS1000 and will retail for about £250.

Enhanced Propagation

Bob Wallace of Kent has written asking me to clarify a point I briefly raised in the June column in connection with the reception of American utility stations in the 30-40MHz bands. I commented that the summer weather conditions usually bring enhanced propagation conditions and that it may be worthwhile checking the lower frequencies. Bob is a keen listener to the v.h.f. low band frequencies and draws my attention to the fact that

This month Alan discusses rumours of new scanners from Fairmate and takes a close look at why signals sometimes travel further than expected.



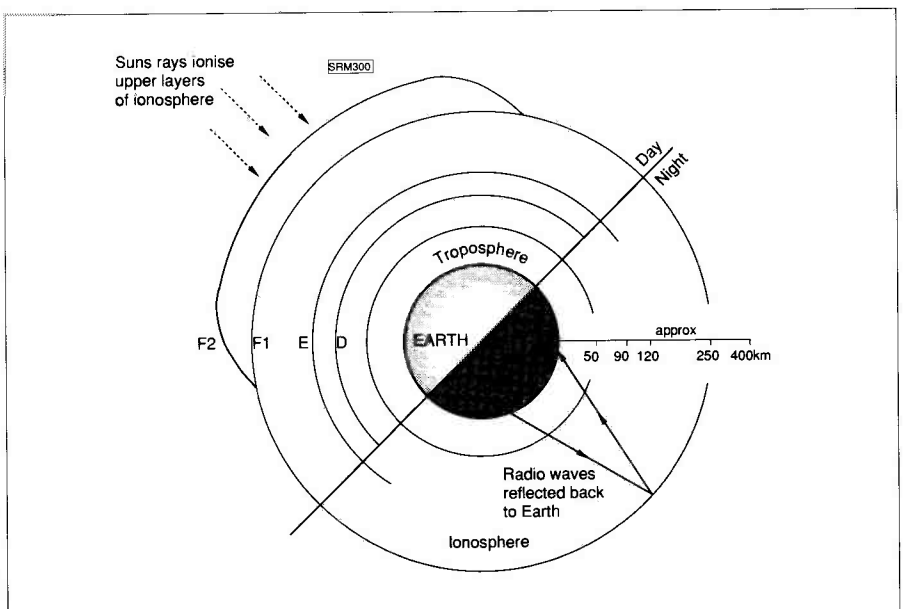
The factory prototype of the new Nevada MS1000 scanning receiver.

the best time of year to listen for American stations is during the winter. Other factors include the time of day and level of sun spot activity. As a result of Bob's comments I thought that it would be a good idea to take a look at how v.h.f. signals can travel over such great distances and the different ways in which this can occur.

Ionospheric Propagation

It is possible to receive short wave stations over several thousands of miles as a result of the signals being bounced off reflective layers of the earths atmosphere. This phenomenon occurs as a result of the suns rays partially ionising the layers of rarified air found between 100-400km above the earths surface. Not all the layers are ionised to the same degree and there are changes in the height and composition of each layer depending of the time of day and season of the year. Generally speaking there are three main layers of interest. The F layer between 200-400km, the E layer at around 120km and the D layer at 50-90km. The F layer can be sub divided into the F1 and F2 layers - both of these combine at night and during mid winter and form a single layer at 250km, but for the rest of the time the F1 layer stays at around 200km and the F2 layer stays between 300-400km. The E layer is less frequently affected by changes of ionisation but can develop very intense patches during the summer months resulting in spectacular periods of long distance reception. The D layer, on the other hand, is actually more of an absorptive layer than a reflective one so we will ignore it for the sake of simplicity in this description.

As we gradually move higher in frequency a greater level of ionisation is required in order to successfully reflect signals back from the ionosphere. The highest frequency at which reflection occurs over a given path is termed the maximum useable frequency or m.u.f. This changes throughout the day as the height of each layer and the degree of ionisation changes. Generally the maximum distance possible with F layer propagation in a single 'hop' is around 4000km, but of course there is some degree of interaction between layers and multiple 'hops' can also occur making it possible to receive signals over much greater distances. During the winter months the m.u.f. tends to be at its highest at around 50MHz. This is especially true during peaks of the 11 year sunspot cycle when the sun's ionising radiation is at its maximum. This is the primary method of long distance reception above 30MHz and it is by this means that Bob is able to monitor the American Utility stations.



Sporadic-E

During the summer months the E layer occasionally forms clouds of ionised gas which can reflect signals at much higher frequencies than would normally be possible from the F layers. This phenomena is referred to as Sporadic-E propagation and can affect frequencies beyond 150MHz, although this tends to be a bit of an exception with 70-100MHz being much more common. Because the E layer is lower in height than the F layer signals tend not to travel quite so far. However Sporadic-E reception is quite common over 2000km or more and usually results in East European broadcast stations being audible in the 60-80MHz bands. Reader **John Hepburn** of Northumberland is a keen listener to this range of frequencies and has logged many stations during the first few months of the summer with his

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Realistic PRO-2005. Sporadic-E also tends to cause problems for commercial services operating in these bands as the very strong continental stations can mask the wanted but much weaker signals from the mobiles.

Tropospheric Ducting

One other form of enhanced propagation which is very common during the summer months occurs in the layer below those forming the ionosphere. This effect is referred to as Tropospheric Ducting and is the main method by which v.h.f. signals above 70MHz and u.h.f. signals can propagate over extended distances. This occurs when certain weather conditions prevail the effect being most noticeable on summer evenings during periods of high atmospheric pressure. When the conditions are suitable different density bands air form in the lower regions of the atmosphere producing the natural equivalent of a low frequency (in microwave terms) waveguide. Under these conditions signals can travel considerable distances with very little attenuation making reception of signals from some of the near European countries possible.

Continental Interference

As I mentioned earlier although this phenomenon is of great interest to Amateurs and Scanning enthusiasts it can cause severe problems for commercial users of radio systems. This is because the limited number of frequencies available for commercial use have to be reused many times over in order to accommodate all the stations. This is normally achieved by reallocating frequencies on a geographical basis with users on the same channel being physically separated from each other.

One group of users who are having an increasing number of problems are the Police forces. This is happening on the u.h.f. frequencies used by most forces for their 'Personal Radio' schemes. These use frequencies in the range 451-453MHz for the base station transmitters which are paired with receive frequencies 13.9MHz higher up the spectrum between 465-467MHz. Unfortunately this happens to be the opposite way around to most of the nearby European countries who have base station transmit frequencies between 460-470MHz.

Normally this does not cause too much of a problem as there is a reasonable distance across the North Sea or English Channel separating the two conflicting services. However during periods of enhanced propagation signals from the continental stations start to become receivable in the areas along the Eastern and South Eastern coasts. This is a particularly bad problem for the Police services as the mobile stations only use relatively low power and tend to be overridden by the much more powerful signals from the Continental base stations. This problem is made worse by the fact that many of the Continental signals are part of national radio telephone services not unlike our cellular system. This means that the signals tend to be present for long periods at a time making it difficult for Police operators to pick out wanted signals in the short gaps between the interfering signals.

Several methods have been tried to overcome this problem, including moving base stations to lower lying sites and the installation of directional antennas. This has helped a little and a few forces are now experimenting with the use of channels offset from the normal 25kHz allocations, useful because it interleaves the British frequencies between those used by the continental stations. However this may only be a short term solution as the continental users may well change to narrower channel spacings in order to accommodate more users.

Change of Frequencies

The only real solution is to reverse the existing transmit and receive frequencies in order to bring them in line with the rest of the Continent and, strangely enough, Scotland, who also use the reversed frequencies. This of course is an enormous undertaking as all the forces would have to change over practically simultaneously in order to prevent interference with each other. One further twist of fate is that the Republic of Ireland also uses the British method of allocation and they too would probably have to reverse their frequencies in order to prevent interference from England and Wales.

The cost of doing all this has been estimated at over £10m - not the sort of cash most forces have to spare - so it may be some time before any proposals are adopted. It may also be that this would be a good time for the introduction of trunked systems in some of the more highly populated areas. This would bring the added advantages of making a larger number of communications channels available, give wider area coverage and a greater degree of system security.

This example also brings to light a factor which will become increasingly important over the next few years - the coordinated allocation of frequencies throughout Europe. This is already starting to happen with services such as the proposed Pan-European digital cellular telephone system at 900MHz and a new Europe-wide radio paging scheme. With the move towards a common European market it will be increasingly important that radio communication equipment can be used in any of the member countries without any modifications or major changes in the frequency of operation. Obviously this will not happen overnight but expect to see moves towards it during the next few years.

That's it for this month, I hope that my quick look at v.h.f./u.h.f. propagation was of interest to you and that it has helped you to be able to identify the best time to listen for long distance stations with your scanner.

If you want me to answer any specific questions relating to scanning in the column just drop me a line at PO Box 1000, Eastleigh, Hants SO5 5HB. Until next month - Good Listening. □

Abbreviations

kHz	kilohertz
km	kilometre
MHz	megahertz
m.u.f.	maximum usable frequency
u.h.f.	ultra high frequency
v.h.f.	very high frequency

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ONE-VALVE SHORT WAVE RECEIVER

Ron Pearce

The 0-V-0 short wave receiver described here is simple to construct yet performs extremely well. As readers will probably have noted from the reports in the 'Long, Medium & Short' columns, good DX is possible on both the broadcast and amateur bands.

Ron Pearce's reports are regularly featured in the 'Long, Medium & Short' column and many readers have asked for details of the receiver he uses. In this article Ron describes his one-valver.

Circuit

The circuit is the classic, one-valve, t.r.f. and uses an American Acorn valve, the 955. This is a triode valve with 6V heaters. Reaction is controlled by variable capacitor C1 and the feedback winding on T1. The prototype receiver uses the Denco Green Range coils, arranged to plug into a B9A valve base mounted on the front panel. This allows the frequency band to be changed easily without complicated switching arangements. These coils are no longer obtainable but alternatives can be wound by the constructor using the details given in the article published in the July issue of *SWM*. The pin connections throughout this article are for the original Denco Green Range coils with 9-pin bases.

Construction

The minimum number of components are used compatible with good selectivity and sensitivity. The actual layout of the components in the box is not critical and will depend on the shape and size of the box more than anything else. The box should, ideally, be all-metal to obviate hand-capacitance effects.

The 955 Acorn valve is still readily available even though it was first introduced early in the 1940s for airborne use. However, you will find it difficult, if not impossible, to obtain the proper holder. This is no great problem as the valve itself can be mounted on the front panel in a large rubber grommet.

The Acorn type 955 valve used in the one-valve receiver. The pins are pre-tinned and can be easily soldered to.

Connection to the valve pins is by simply soldering the wires onto the pins themselves. This method of mounting Acorn valves is used professionally and has the added advantage that the glow of the heaters acts as an indicator lamp to show that the set is switched on.

A slow-motion dial should be fitted to the main tuning capacitor, otherwise it will be extremely difficult to tune the set. The tuning capacitor shown in Fig. 2 and in the photograph is a 0.0003µF Dilecon type with a 68pF fixed capacitor soldered in parallel but a 10 - 365pF air-spaced type, obtained from J. Birkett, was used in the original receiver.

Coils

The coils used in the original receiver are Denco Green Range No. 3 (1.5 to 5.5MHz), No. 4 (5.0 to 17.0MHz) and No. 5 (10.0 to 32.0MHz). Although the article on alternative home-wound coils suggests the use of an International Octal base and holder, it is possible to obtain B9A plugs and valve holders from J. Birkett of Lincoln. This enables the original Denco pin numbering to be adhered to as well as the use of Denco coils if you can find them.

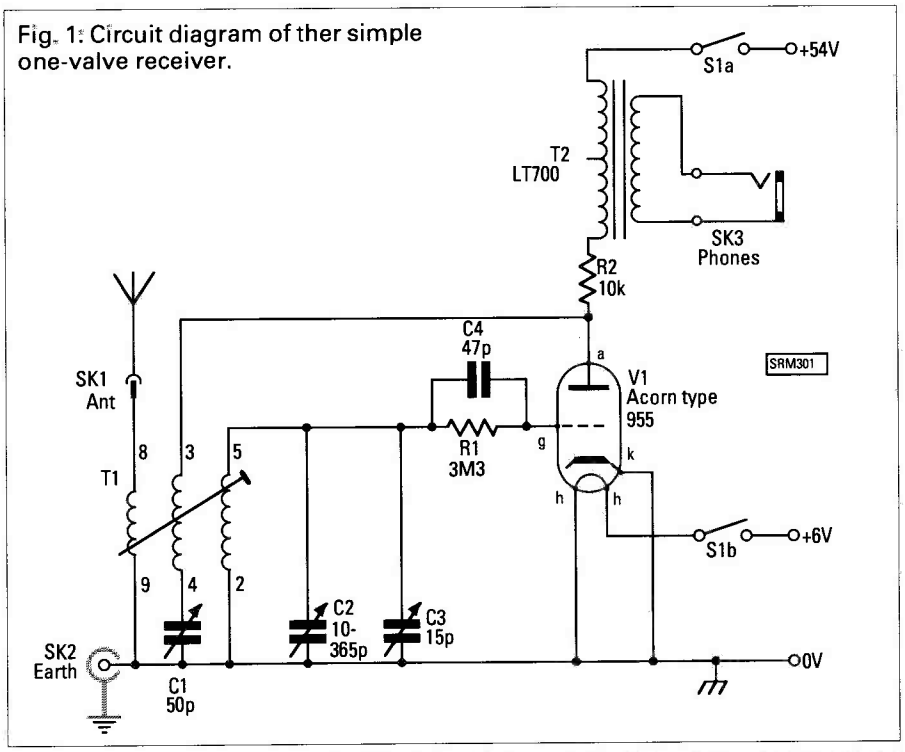
Power Supply

It is possible to power the one-valve receiver using dry batteries - if you are rich enough. The 54V h.t. supply can be obtained from six PP3 (9V) batteries in series while the 6V heater supply can be got from a Lantern battery or four U2 cells in series. However, a simple mains supply will reduce the running costs and the design in the May '90 issue of *Practical Wireless* would provide the basis of a suitable unit.

Using the Receiver

As with all t.r.f. receivers, adjustment of the reaction control is critical. Adjust this control to just below oscillation for the broadcast bands and just into oscillation for the amateur bands. Practice makes perfect.

Fig. 1: Circuit diagram of ther simple one-valve receiver.



Abbreviations	
h.t.	high tension
i.d.	internal diameter
in	inch
kΩ	kilohm
MHz	megahertz
mm	millimetre
MΩ	megohm
pF	picafarad
s.p.d.t.	single pole double throw
t.r.f.	tuned radio frequency
V	volts
µF	microfarad

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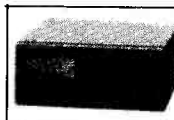

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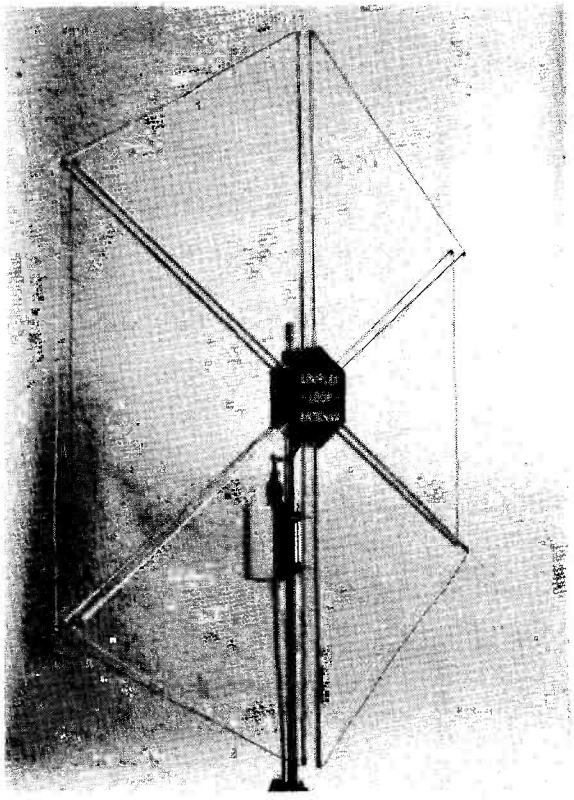

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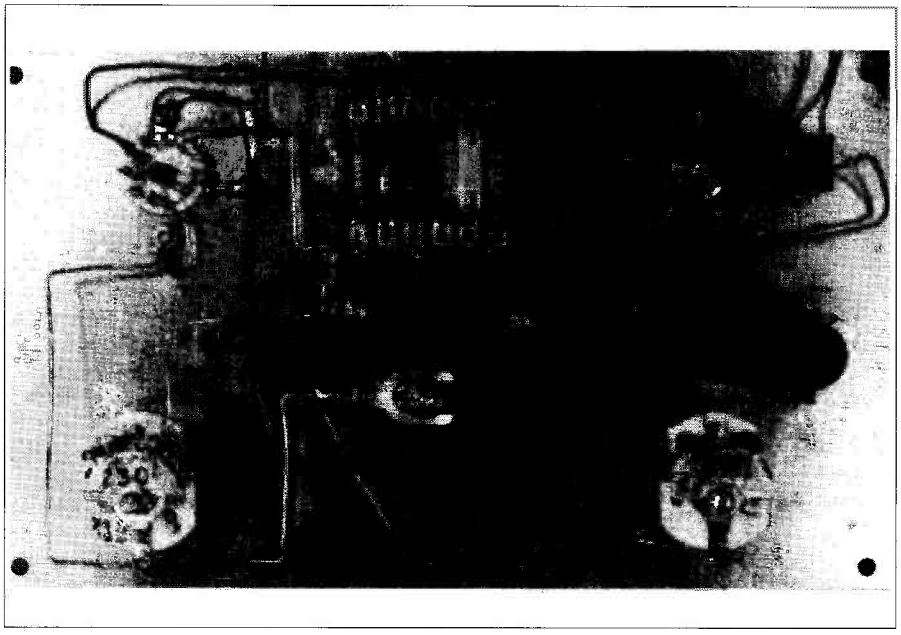

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Valves

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Miscellaneous
LT700 output transformer (T2); Denco Green Range coils Nos. 3, 4 & 5 (T1) (see text); Miniature toggle switch d.p.d.t. (S1); Tag strip (2 x 6 way); 0.25in jack socket; Rubber grommet 15mm i.d. (1); Suitable metal box; Vernier slow-motion drive; Knobs (2); Screw terminal posts (2); Valve holder for Acorn type valves (see text); B9A valve holder (1) and mating plugs for alternative coils (3) (see text).

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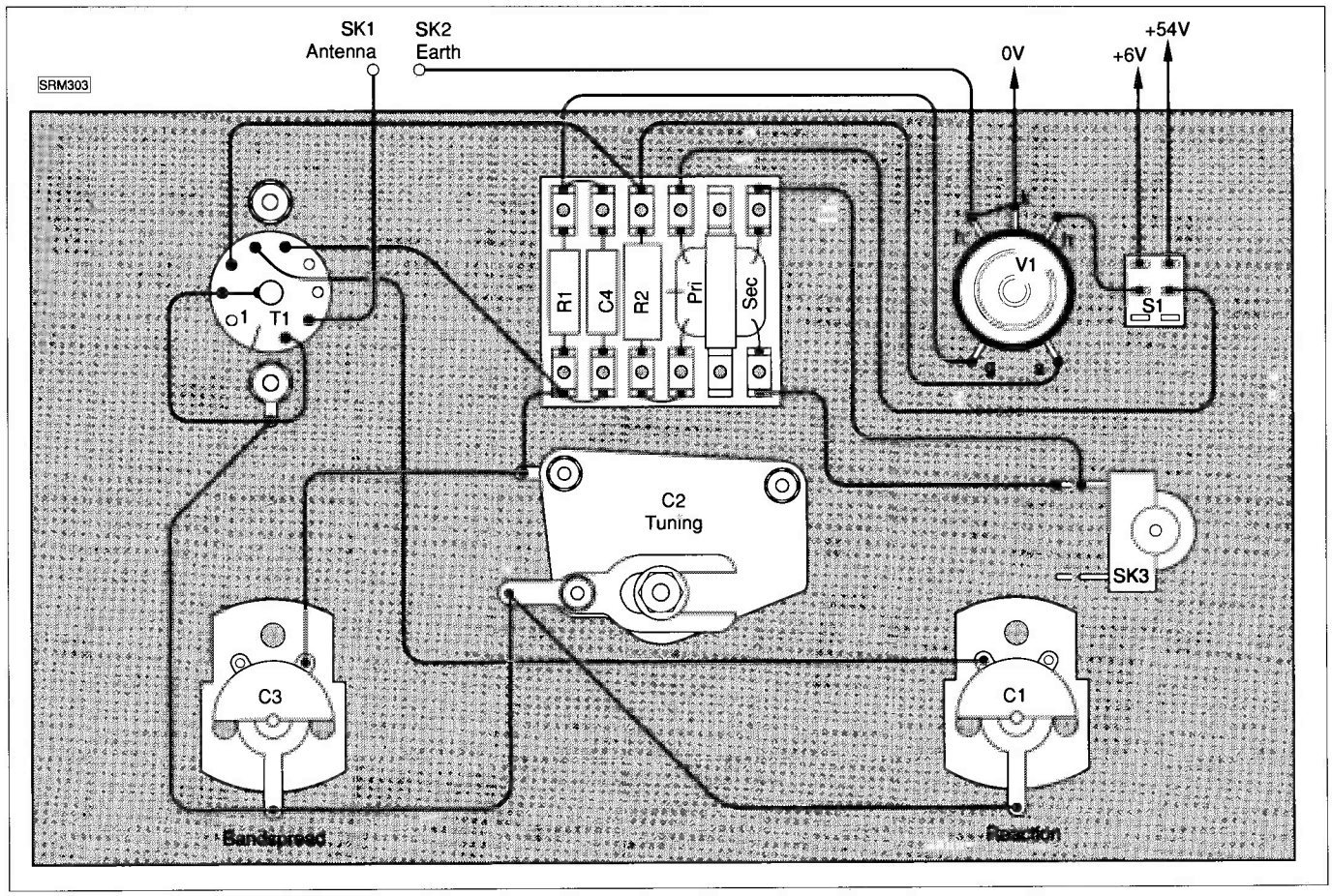

Fig. 2: Layout and wiring diagram of the one-valve receiver.

PC SWL PROGRAM

Mike Richards G4WNC

The PC SWL decoding package comes from the same stable as the popular PC HF FAX program. The decoding modes featured include RTTY, c.w. and FEC, plus some very useful tuning and analysis modes.

The program is only available for the IBM PC and compatibles and is often sold bundled with the PC HF FAX program reviewed in the May 1990 issue of *SWM*.

With utility listening becoming so popular, this decoding program should be of interest to all PC users.

Getting Started

The 70-page, A5, instruction manual was very comprehensive and well up to the standard of other products from SSC. The first few sections gave details of how to get started and included some very good advice on how to recognise utility signals. There was also an audio tape that contained samples of the signal types that the PC SWL program could decode. This is a great way to start as you simply connect the decoder to a tape recorder and play the tape. This is much easier than tuning around the bands looking for what might be a suitable signal!

Following on from this were detailed instructions on what to do if the program appeared not to work correctly. These problems were explained very clearly in language that could be understood by all. There was even a tutorial included that not only gave information about some transmission modes but included some useful hints on short wave reception.

The main core of the manual contained the operational instructions and these were covered in adequate detail.

The final section of the manual comprised several Appendices covering some frequency lists and a certain amount of useful technical information.

Interfacing the computer to the radio was extremely simple. The decoding electronics were minimal and contained within a standard 25-way D connector that connected to the computer serial port. This plug was fitted with a flying lead terminated in a 3.5mm jack plug. This jack plug was connected to the audio output of the receiver and required approximately 1V p-p for normal operation. This equates to about 350mV r.m.s. which may be available from the auxilary output of some receivers. This has the advantage that the level fed to the decoder is independant of the volume control setting. Incidentally this decoder was the same as that supplied with the PC HF FAX program. For this reason many people buy both PC SWL and PC HF FAX together.

On the computing side the minimum requirements are an IBM PC compatible with 384K RAM and CGA, EGA, HGA or VGA graphics adaptor. The operating system should be MS DOS version 2.1 or higher and a serial port configured as COM1 or COM 2. Optional requirements are a printer and tape cassette player. The handbook did contain a warning that XT machines running with a clock speed of 4.77MHz may not be able to receive FEC mode due to the limited processing power of these machines.

The review program was supplied on floppy disk, which I subsequently installed on the hard disk of my Amstrad PC-2086 with no problems.

Menu Driven

As with other products from this company, once started, the program was driven from a main menu. This was divided up into three sections:

Data Options
Buffer Operations
Miscellaneous

The speed and convenience of operation was enhanced by enabling each of the functions to be selected by simply pressing the first letter of the option. Before starting to receive for the first time, the Hardware option from the Miscellaneous menu is selected to configure the program to your own hardware. As with the main menu, all the options could be selected by a single key press. The appropriate configuration was then selected by repeatedly pressing the option key until the desired setting was displayed.

Once the hardware selection was complete you were given the opportunity to save the changes to disk as the default values.

With everything set-up and ready to go it was time to make use of the supplied audio test cassette that I mentioned earlier. I must say I was very pleased to see this tape included as many newcomers have problems when faced with both unfamiliar equipment and a mode they don't understand and are unable to recognise. This tape goes a long way to solving the problems. It starts with a general tutorial that is followed by a description of the hardware set-up procedure. The rest of the tape is dedicated to describing the different types of transmission that PC SWL can decode.

There were also sample signals of various modes and speeds included. These could be used to check that the decoder and computer were functioning correctly. The tape was very good indeed and something other manufacturers ought to consider including.

Operation

Having proved that the set-up was working the next stage was to look at the available facilities.

Any experienced utility listener will tell you that one of the most valuable tools is a good tuning indicator. The PC SWL has a built-in tuning indicator that operates with a display similar to an oscilliscope. Here the horizontal axis is used to represent time in the normal way while the vertical axis shows frequency. Although an unusual format it is, in fact, very effective when it comes to displaying RTTY signals.

Running through the centre of the display is a horizontal line that represents the main filter frequency. This can be altered by the up and down arrow keys and is set so that the line cuts through the middle of the signal.

One great advantage of this system is that receivers which have coarse tuning steps can still be used for RTTY. This is a great asset and one that very few other programs offer.

Another, associated tuning aid was the Digital Scope. This produced a smaller display of about twelve lines per screen that showed the digital waveform of the decoded signal.

As an additional aid each data word was underlined. The main purpose of this facility was to allow checking of the quality of the received signal.

Both the Digital Scope and the Tuning Scope could be accessed from the main menu. An alternative was to use ALT F1 or F2 respectively whilst receiving RTTY.

Once the main RTTY mode has been selected you are presented with a clear screen and a help line for the function keys along the bottom. The functions were:

1: Normal/Reverse toggle. This allowed the received data to be inverted that saves having to switch sidebands.

2: Baud Rate. PC SWL supports five baud rates - 45, 50, 57, 75 and 100. Pressing this function key caused the program to cycle through the available options.

3: Change Code. This was used to select either RTTY, ASCII or FEC modes.

4: Unshift on space. This forced a letter shift after receiving a space and is useful for noisy signals.

5: Printer on/off

6: Log To Buffer. This allowed the received text to be stored for processing or viewing later.

7: Line Feed and Carriage Return handling. These options enabled the user to choose whether the program inserts extra line feeds or carriage returns. This can be useful for some information services where the combined carriage return/line feed is not sent.

8: Exit.

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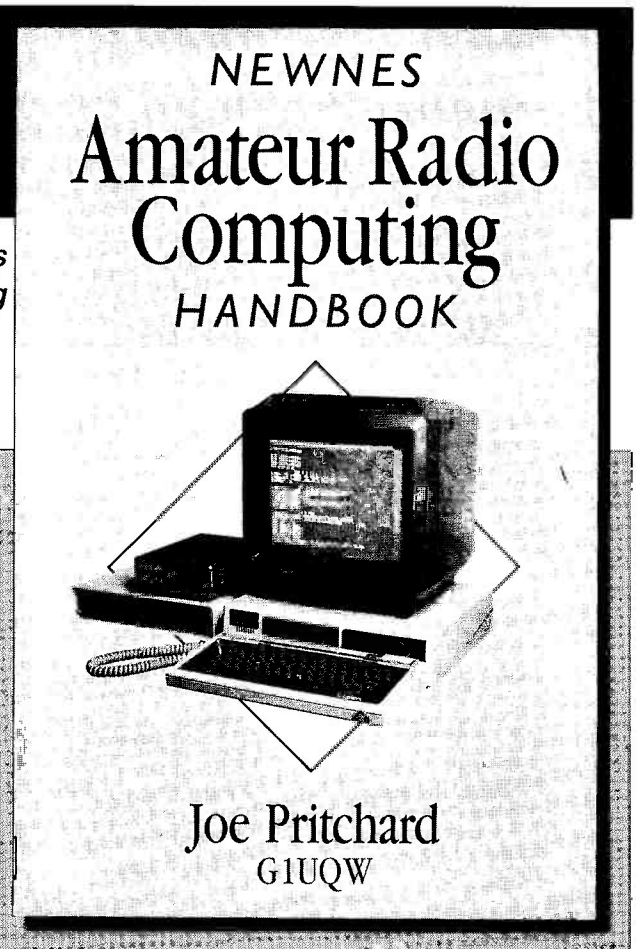

The *Newnes Amateur Radio Computing Handbook* shows radio amateurs and short wave listeners how they can 'listen' to signals by reading text on a computer screen. Joe Pritchard G1UQW is a technical author and microcomputer consultant based in Sheffield.

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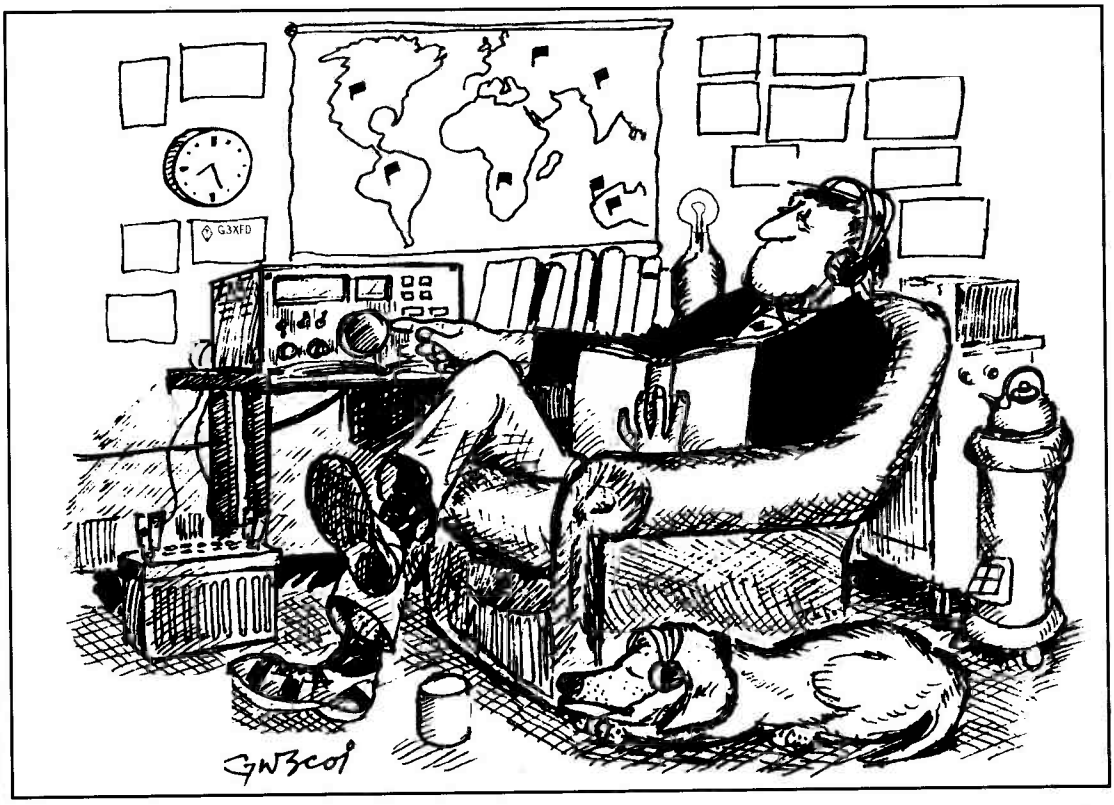

Worthington, our cartoonist, has made 12 major changes to the top cartoon. Just circle all 12 changes, in ink please, on the bottom cartoon and post the complete page to SPOT THE DIFFERENCE, Short Wave Magazine, Enefco House, The Quay, Poole, Dorset BH15 1PP to arrive not later than Friday 14th September 1990. The first correct entry drawn out of 'the hat' will win a 1 year subscription to *Short Wave Magazine*. The Editor's decision is final and no correspondence will be entered into.

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As you can see there were a good range of features included to ease the reception of RTTY signals.

The options available when receiving ASCII and FEC were largely similar except that F4 and F5 took on alternative functions. These were cycling parity and stop bits for ASCII and phasing for FEC.

When receiving text it simply scrolled down the screen from top to bottom. As text scrolled off the screen it was lost unless the buffer option was on.

Morse code reception is achieved via a similar screen again with function keys along the bottom. Before you can start receiving the tuning procedure has to be completed. This is a two stage procedure that starts with the adjustment of the main tuning scope centre frequency to match the received signal.

The next stage is to select the c.w. threshold. This is selected from the main menu and gives a screen similar to the main tuning scope. However, the horizontal line is adjusted to cut the c.w. signal but to remain above the noise. Once all this was set c.w. reception could commence.

The options available from the Morse screen were:

1: Calibrate. This caused the program to calculate and set the speed of the signal.

2: The preset speed could then be adjusted up or down in fine increments.

3: Side Tone. This caused the computer's speaker to mimic the received signal and was useful as a tuning indicator.

4: Farnsworth Toggle. This allows the program to receive signals with longer than normal spacing between letters.

5: Printer.

6: Log to Buffer.

7: Exit.

The last of the operational modes was the Automatic Signal Analysis. This performed exactly as you would expect and provided a display of the main parameters of the signal such as shift, centre frequency, baud rate and coding. This is likely to be of particular help to the newcomer.

Once signals have been stored using the log buffer option PC SWL provides and number of ways of handling this information. There are facilities to erase, view, load, save or print this infromation. Also as the buffer is stored as a simple text file it can be edited and amended with by most word processors.

In Use

For all the air tests I ran the PC SWL on my Amstrad PC-2086 computer with hard disk. The radio equipment comprised an Icom IC-720A transceiver fed by a G5RV antenna and a Yaesu a.t.u. For convenience the audio was supplied from the auxillary output of the Icom that was boosted to the required 1V p-p by a simple pre-amplifier.

Knowing that Morse is a difficult mode for computers to decode I started with RTTY. My initial reaction was one of disapointment as I had very little success. This was soon corrected once I had mastered the tuning scope. I found that the best results were to be had if, instead of opting for the normal receive tones centred on 1360Hz, this was changed to 1000Hz. This was particularly true of the narrow shift 170Hz signals. Having

Hard-copy of a news transmission from KUNA Safat 9KT27 Kuwait on 9.227MHz as decoded by the PC SWL program.

```
XKL66
   ISLAMABAD -- BENAZIR-SOVIET 2
   EARLIER IN THE DAGUZMGI
SADIK AND PAKISTAN'S
MINISTER FOR RELIGIOUS AFFAIRS KHAN BAHADUR KHAN SIGNED A
MEMORAMDKO OF UNDER-STANDING IN ISLAMABAD UNDER WHICH PAKISTAN
WOULD PROVIDE FINANCIAL MATERIAL AID TO THE BOARD.
   THIS WOULD INCLUDE ESTABLISHMENT OF A PRINTING PRESS,
MOSQUES
AND MASRISSAS (RELIGIOUS EDUCATIONAL INSTITUTIONS),
PUBLICATION OF HOLY Q RAN AND OTHER ISLAMIC LITERATURE BESIDES
GIVI G SCHOLAR-
SHIPS TO YOUNG SOVIET MUSLIMS FGR STUDIES IN PAVISTAN AND FOR
EXCHANGE OF DELEGATIONS OF ISLAMIC SCHOLIRS.
   LATER ADDRESSING A NEWS CONFERENCE, MUFTI MOHAMMED SADIK
DESCRIBED
THE VISPT OF HISIDELEGATION TO VARIOUS PLACES IN PAKISTAN AND
MEETINGS WITH RELIGIOUS SCHOLARS AS VERY USEFUL AND
SATISFACTORY.

HE SAID IT Z S GRANFYING THAT PAKISTAN HAD ALSO AGREED TO
SET UP AN ISLAMIC INSTITUTE IN PUSHANBE FOR PREPARING SLAMIC
LITERATURE IN THE LANGUAGES SPOKEN IN
MUSLIM REPUZLICS IN CENTRAL ASIA.
   ANSWERIOG A QUESTION, THE MUFTI SAID THAT HE HAD A USEFUL
MEETING WITH THE LEADERS OF MUJAHIDEEN'S INTERIMSGOVERNMENT
IN PESHAWAR AND HOPED THAT A POLITICAL SOLUTCXK TO THE
AFGHANISTAN
PROBLEM WOULD BE FOUND SOON. HE ALSO PED THAT THE MUJAHIDEEN
WOULD SOON RELEASE THE CAPTIRED
SOVIET POWS.
(END)          AY/XL
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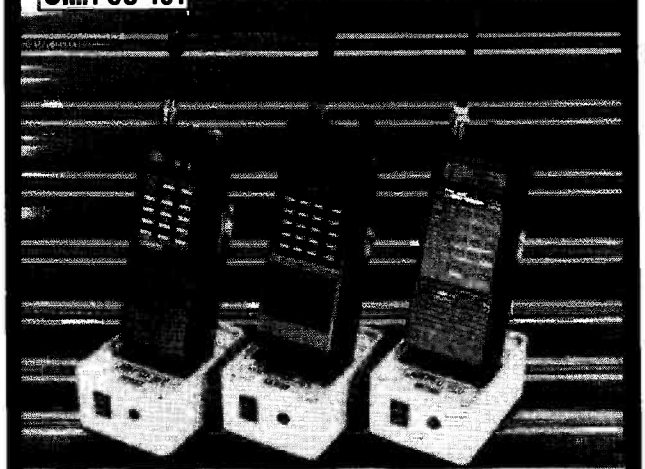

1. JIM PSU-101MKII. A high quality UK manufactured fully regulated 220-240V AC power supply with Radio Base Holder combined! For use with FAIRMATE HP-100E, AR-1000, YUPITERU MVT-5000, REALISTIC PRO-38, ICOM IC-R1, UNIDEN UBC50XL, BC55XLT, UBC70XLT, UBC200XLT, UBC205XLT, UBC100XLT. Special version available with 9VDC or or 6VDC for PRO-34 or WIN108 etc: **PRICE: £26.50**

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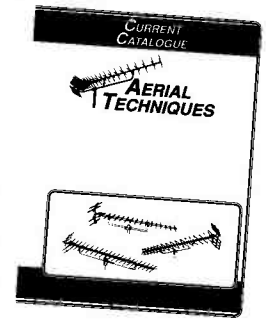

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PC SWL PROGRAM

resolved my initial problems the performance was quite good. As with most decoding programs that use software decoding, considerable improvement in the error rate could be achieved by the inclusion of additional audio or r.f. filtering. In my case I found the Icom's 500Hz i.f. filter to be particularly useful. Similar improvements could be obtained by using an audio filter such as those by Datong or ERA.

All the facilities worked very well - the tuning scope being the star performer. It was particularly useful being able to call up the tuning scope without leaving the RTTY routine.

The only feature that in my view was missing, was a means of forcing either a figure or letter shift. This can be extremely useful when a burst of interference causes the software to adopt the wrong shift. The unshift on space provided some help with text transmissions, but there was no way of forcing figures on an all figure transmission such as those from some weather stations.

With basic RTTY working well, I moved on to the more demanding FEC. Probably the most common use of this mode is the NAVTEX service on 518kHz. I found that PC SWL was very quick to phase with this type of signal but, without additional filtering, the signal needed to be a good one. Other sources of FEC are traffic lists from shore stations and amateurs. These latter transmissions were a little difficult to catch as they are normally only used for a short period at the beginning of a contact.

Although I tried ASCII, there are very few stations using ASCII regularly so the mode is of limited use.

With the RTTY modes complete it was time to see just how PC SWL fared with Morse transmissions. Although the two stage tuning process was a little cumbersome, I found that you could get away with doing this once for each operating session. You then tuned each signal for the same frequency side tone. It was here that I discovered just how useful the side tone facility was. You could use it as a simple tuning indicator by adjusting the receiver tuning until the side tone exactly mimicked the desired Morse signal.

The Farnsworth spacing option was an unusual feature, but one that proved useful for tidying up some transmissions. I was also pleased with the PC SWL's automatic speed selection which proved to be very accurate during the review.

The buffer options all worked and were very useful for unattended monitoring. You could then view and edit the transmissions at your leisure.

Conclusions

PC SWL is certainly a very interesting implementation with many excellent features. The instructions and audio tape were of a very high standard as was the novel tuning scope. The decoder's performance was good for a software-only system and with the addition of some external filtering could be brought up to the standard of many sophisticated packages.

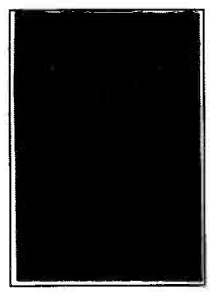
So I can recommend the PC SWL as an attractive decoding system for IBM PC owners. The system can, of course, be further enhanced by the addition of the PC HF FAX program and others from the same source.

PC SWL is available from **Comar Electronics, Birmingham Road, Cowes, IOW** and costs £99.00.

I would like to thank Comar for the loan of the review package. □

BOOKCASE

THE POCKET GUIDE TO RTTY AND FAX STATIONS
Bill Laver
Spa Publishing ISBN 0 -85934-226-3
46 pages, £2.95
Available from SWM Book Service, 75p post and packing

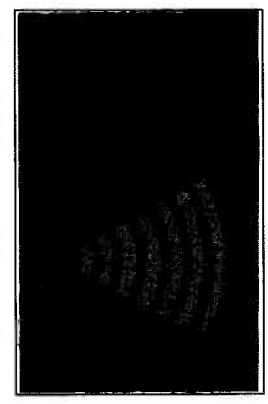


RTTY is a mode that is used widely for the transmission of messages. In the case of prews and news transmissions, the times in GMT have been shown (where known) in the right hand column, but must be regarded as a guide only. Utility stations do not normally have fixed time schedules.
FAX stations also have the times given for their pictures, sometimes a picture takes as long as 15 or 20 minutes to complete.
The listing is in accending order from 1.6 to 29.7MHz.

GUIDE TO FACSIMILE STATIONs 10th Edition
Joerg Klingenfuss
Klingenfuss Publications ISBN 3-924509-70-0
398 pages, £12.00
Available from SWM Book Service, 75p post and packing

This publications has been running for several years now and serves as an extremely useful guide for the FAX enthusiast.
In addition to the expanded frequency list of FAX stations there are many other useful items. One of the most useful sections is the list of FAX station schedules. This shows the transmission schedules for all the major stations throughout the world. Don't forget it is impossible for the schedules to be 100% accurate as many stations change their schedules quite frequently. Nevertheless the vast majority are correct.
For those interested in direct weather satellite reception, these modes are also covered with frequencies and schedules for the Meteosat, GMS and GOES series.
tion giving the addresses of many of the National Weather and Press agencies is particularly useful for those who like collecting tility QSL cards.
I section of the FAX Guide comprised some 280 pages of sample FAX charts. This may, at first, seem rather a waste of space but can be useful for recognising particular types of information.

ELEMENTS OF ELECTRONICS BOOK 6 - AUDIO
F.A. Wilson
Bernard Babani (publishing) Ltd ISBN 0-85934-086-4
308 pages, £3.95
Available from SWM Book Service, 75p post and packing

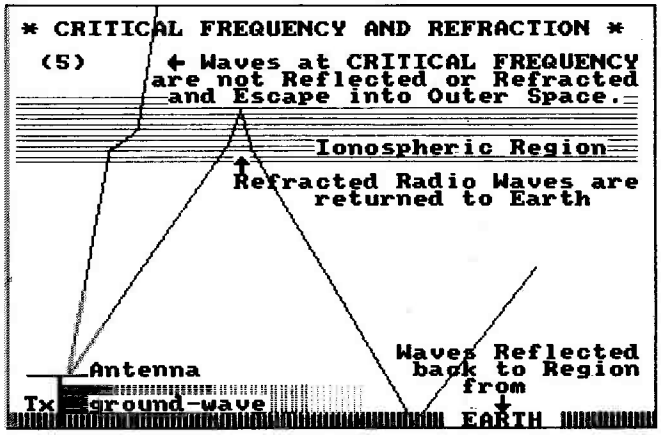


This book follows the others in the series with its layout and aims. It is not the expert's book, but neither is it for those looking for the easy way - it is of serious intent but interesting and with the objective of leaving the reader knowledgeable with a good technical understanding of such an extensive subject.
Chapters cover: The Sound Wave; Hearing; Things We Hear; Room Acoustics; Electroacoustic Transducers; Amplifiers; Audio Recording; Making Music and two appendices on Mechanics and Analysis of Complex Waveforms.

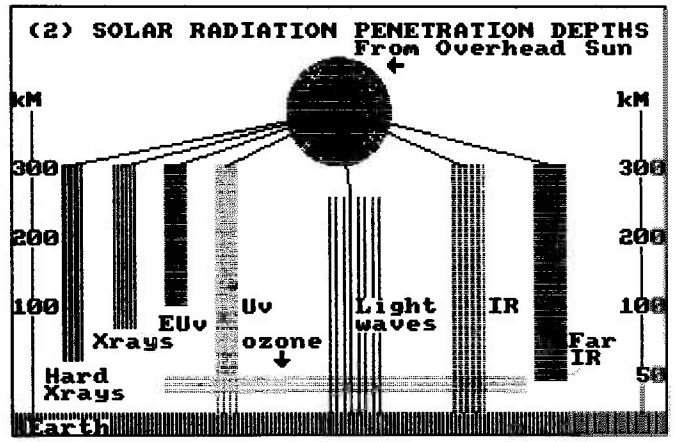
HF RADIO WAVE PROPAGATION

F. C. Judd G2BCX Part 1

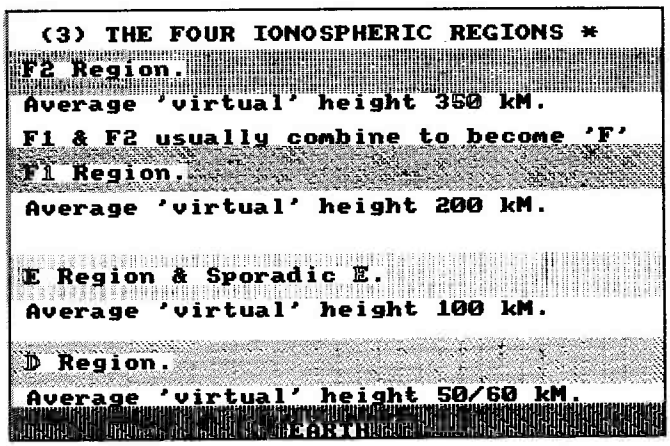
Like the weather near and at the surface of the earth, the propagation of h.f. radio waves via the ionosphere is not totally reliable. This is because of changes in solar radiation and anomalous behaviour of the ionospheric regions themselves, as regular h.f. bands operators well know. The subject as a whole is very complex but it is hoped that this pictorial feature will help to explain some of the mysteries of this mode of propagation for the benefit of those new to transmission and reception on the h.f. bands.



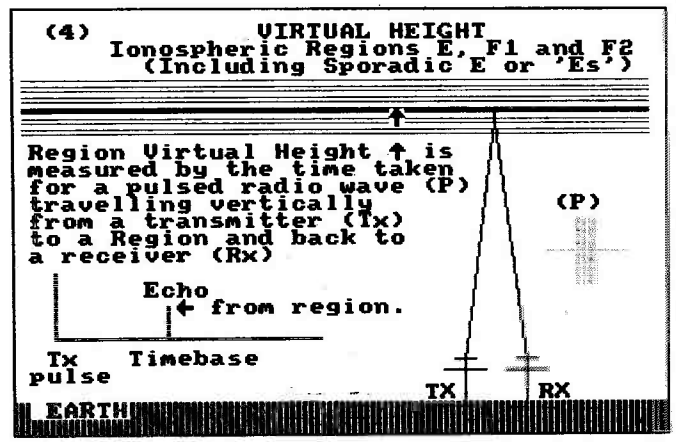
(1) The media for long-distance propagation of h.f. radio waves up to about 30MHz are the ionospheric regions E, F1 and F2. Radiation from the sun causes these regions to become ionised during daylight hours but this diminishes when darkness falls. Ground waves are dealt with later.



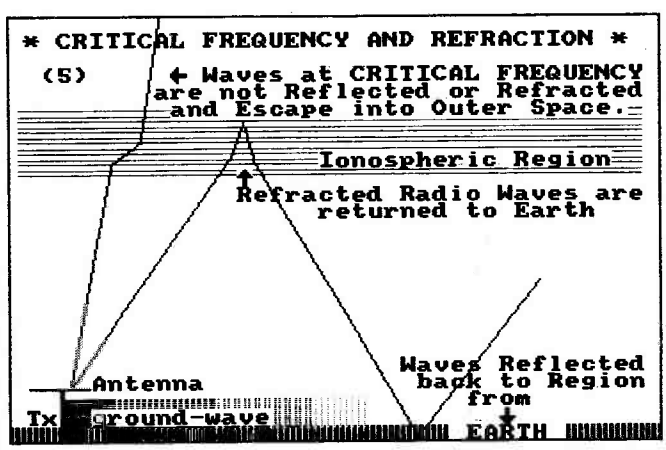
(2) Not all radiation from the sun penetrates the normal atmosphere. Ultra-violet is mainly responsible for ionisation of the ionospheric regions and although some reaches earth, its strength is reduced by the ozone layer. Visible light and i.r. is filtered by the earth's normal atmosphere.



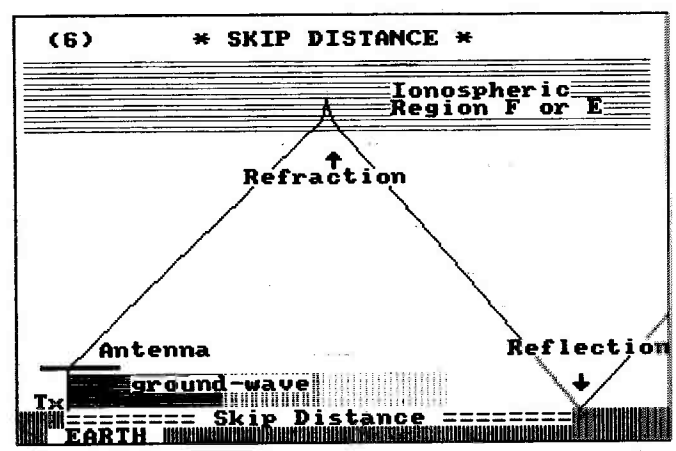
(3) The 'virtual height' of the F regions varies according to the intensity of ionisation and is the height from which reflection is direct, as in (4). The E region, Sporadic-E clouds and the D region heights remain more or less constant. An intensly ionised D region can cause 'radio black-outs'.



(4) The 'virtual height' of all the ionospheric regions is measured at intervals during day and night by special pulse transmitter/receivers, known as 'ionosondes', located in various parts of the world. There are two of these ionosondes in the UK operated by the Rutherford Appleton Laboratory.



(5) Radio waves travelling vertically penetrate an ionospheric region when ionisation intensity is low. When ionisation is sufficiently intense, the lowest frequency at which the waves are reflected to earth, as illustrated, is called the *critical frequency*. Below this frequency there is no reflection.



(6) The distance from the place of transmission at which a wave first reaches earth after refraction from an ionospheric region is known as the skip, or hop, distance and depends on the angle of vertical radiation - between zero and 90° - and the ' virtual height' of the ionospheric region.

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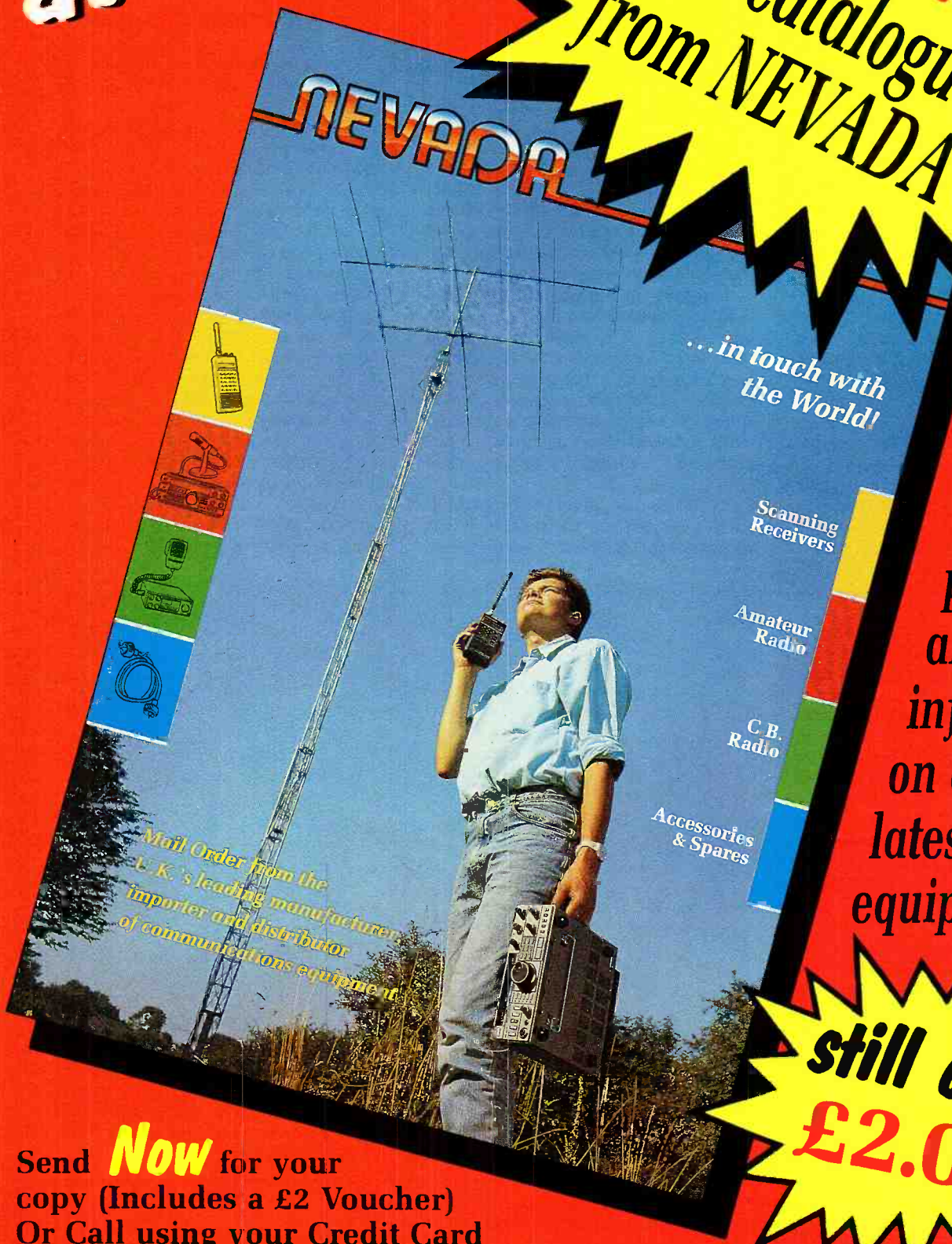

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NEVADA COMMUNICATIONS

PORTABLE POWER

Ron Ham

In the early days of broadcasting, home wireless sets were mostly battery powered. Here, we takes a look at just what this meant.

The 30 years before the transistor revolution of the late 1950s and the micro-chip technology of the 1980s saw a remarkable growth in the home-ownership of wireless receivers. This was at a time when a man's wages varied between 30 and 60 shillings per week. Even then the family had to be very selective as to which programmes they listened to if their set was battery powered, as many were. The running costs had to be considered in the household budget.

Many of the factory-made sets from the 1930s to the late 1940s, used '2-volt' valves. They derived their power from a 120V high tension battery, a grid bias battery tapped in 1.5V steps up to 9V and a 2V wet accumulator. The approximate cost of these was 10s for the 120V 'Winner', 1s.4d for the 9V 'Grid Bias' and around 14s for a glass accumulator, plus 6d to have it recharged at a wireless shop or garage as near to home as possible.

Accumulators

Despite programme economy, two accumulators were required. One was away being recharged while the other was in use. This often meant a double journey each week, in all weathers, for someone in the household to take one and collect the other.

Apart from the weekly cost of 1s, this would mean a careful walk carrying the 'beast' by its handle or cradle. Wet cells were not permitted aboard a bus, tram or train in case the sulphuric acid was spilt and ruined the seats. Also, if a drop of acid touched your clothing, holes would rapidly appear and the material would rot away. On arrival home, the accumulator was never put down on a carpet or table-cloth and if the set was in the corner by the window, you had to mind the curtains while the set was turned to allow the accumulator to be replaced and connected.

These wet cells had two large terminals, coloured black (negative) and red (positive), for the spade connectors. A stopper on the top was removed during the recharging process to let the gasses escape. Unfortunately, the gassing sprayed a fine liquid onto the terminals and the top of the accumulator. This had to be wiped off and the terminals greased to prevent corrosion. A messy job and all for a 'tanner' (6d).

The All-dry Set

Many homes throughout the United Kingdom did not have mains electricity until the late 1940s and early 1950s. Battery-powered equipment was still the only means of hearing the news and enjoying the entertainment provided in the home by a wireless receiver.

However, in the late 1930s 'all-dry' receivers, with a new range of valves incorporating a 1.5V filament were being considered. I created the need to develop and manufacture good-capacity, dry batteries at affordable prices. The lower voltage filament was needed because, while a fully-charged accumulator cell produces 2V, a fresh dry cell only gives 1.5V.

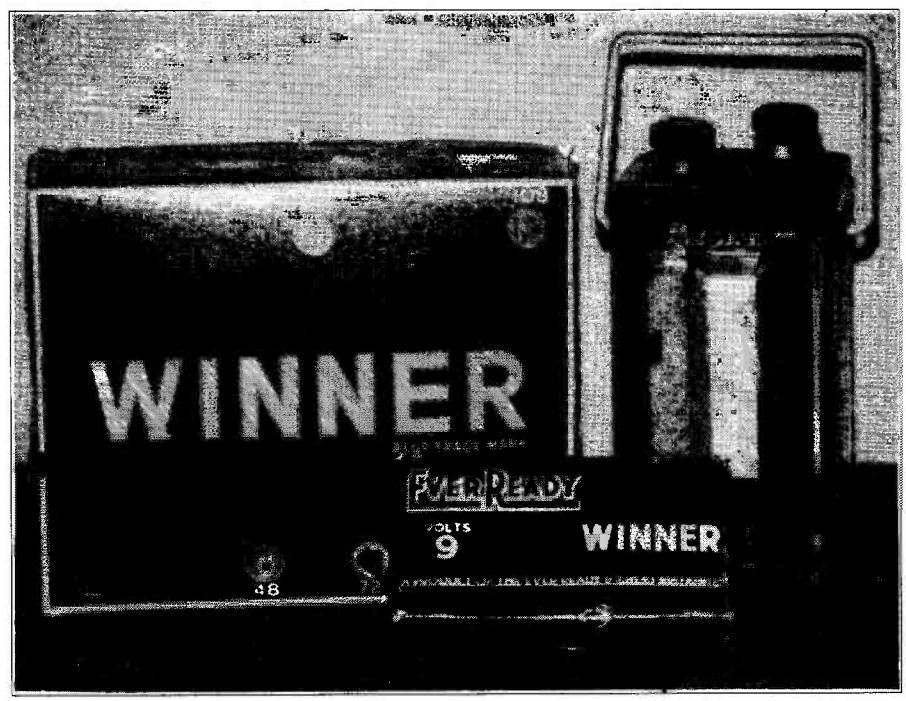
In 1942/3, the Canadian Army WS.58 transceiver and the clandestine MCR1 miniature communications receiver were among the battery-operated military equipment that used a series of small glass valves, like the 1T4. These also proved popular with set makers in the early post-war years.

Truly Portable Receivers

In the 1950s the demand increased for truly portable receivers. To meet the need for a more economical l.t. consumption, Mullard introduced their '96' series valves, DK96, DF96, DAF96 and DL96. These gave sets like the Ever Ready 'Sky Queen', powered by the B136 combined 90 & 1.5V battery and the casual Vidor 'Lady Margaret', a low filament drain of 125mA.

This was very important for the the relatively small 'Lady Margaret' which was designed around the the B126, ('Baby 90') and AD35 (1.5V) batteries. In those days I reckoned to sell about three AD35s, at 1/6d, to each B126 at 9s for such a set in regular use.

By the end of the 1960s domestic portables were using the ultra-low consumption transistors instead of those current-hungry valves and yes - you've guessed it - yet a further range of batteries, just 6 or 9V, were developed. But that's more recent history. □



Typical of the early battery set's power requirements. The Ever Ready 120V Winner h.t. battery, 9V grid bias battery and 2V accumulator.

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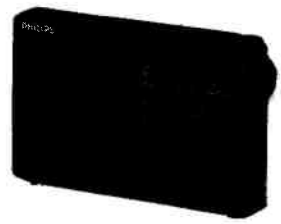

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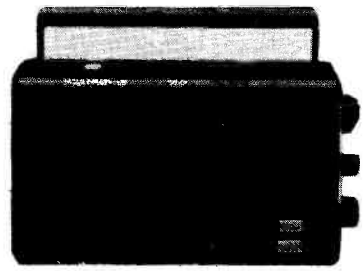

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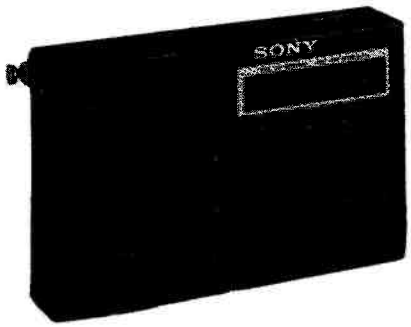

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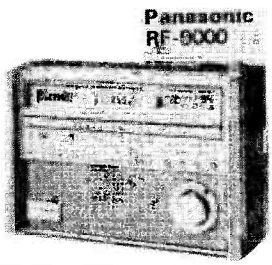

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Sony AN 1 (Antenna)	£49.95

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THE ARTIFICIAL AERIAL LICENCE

F.C. Judd G2BCX

The Artificial Aerial Licence was issued from about 1920 onwards by the Post Master General, for the benefit of those wireless enthusiasts who wished to construct transmitters and carry out experiments, without connection to an open aerial. By loading the transmitter with an 'artificial aerial', it could be tuned up, the power measured, and other tests carried out, with little radiation beyond the confines of the transmitter itself. Or so the Post Master General was advised!

The early licences, a copy of which is reproduced here, gave the holder a 'callsign' consisting of a figure and two letters, e.g. 6OI. With some, this became the full callsign *viz* G6OI when a Morse Code Test was taken.

A non-radiating transmitting licence sounds crazy, but back in the 1920s that's just the kind of licence the GPO issued.

The Change

Later, this was changed and all those radio amateurs who today have callsigns with G2 and three letters (as my own) were, at one time, holders of an 'Artificial Aerial Licence' (circa 1930 onward). The licence otherwise remained much the same as that shown.

GENERAL POST OFFICE

LONDON. E.C.1

(date).....192..

SIR,

EXPERIMENTS IN WIRELESS TELEGRAPHY.

I am directed by the Postmaster General to say that he authorises you and..... as your agent to use wireless sending apparatus in conjunction with an "artificial" aerial at..... .....

An "artificial" aerial is defined as a closed, non-earthed oscillatory circuit possessing inductance, capacity and resistance and functioning in place of the usual aerial-earth system. It must be as nearly non-radiating as possible. The inductance should be in one piece and of small dimensions (as distinct from an inductance of large dimensions, such as a frame aerial) the maximum area formed by the turns of the inductance not exceeding 3 (three) square feet.

The Call Signal..... ( ) which has been allotted to you, should be sent three times at a speed not greater than 20 words per minute, just before and immediately after each experiment or short series of experiments with the sending apparatus and on every occasion when the wave-length is changed.

It is necessary to stipulate that the sending apparatus shall not be connected with a radiating aerial, and that this permit is subject to withdrawal or modification at any time either by specific notice in writing sent to you by post at the address shown above or by a means of a general notice in *The London Gazette* addressed to all holders of licences for experimental wireless telegraph receiving stations.

I am,
Sir,
Your obedient Servant,

for the Secretary.

Up to a time just before the start of World War II, those who took the Morse Test after one year of experimental work with transmitters using an artificial aerial, got the full ticket and a new callsign e.g. G6+2 letters, G4+2 letters, etc. The few of us who now have the G2+3 letters callsign took the Morse Test directly after the war. No technical test was required, and we simply put the G on the original callsign, i.e. 2BCX became G2BCX. All ex-Artificial Aerial Licence holders had to operate for a full year on c.w. only before being allowed to operate on 'phone.

The Artificial Aerial

So, what was this 'artificial aerial'? The generally used circuit, accepted by the GPO and shown in Fig. 2 should give you a clue. Yes, you tuned the circuit (*C* and *L*) to the same frequency as the transmitter so that all the r.f. now drawn from the transmitter was dissipated in the load - an ordinary electric light bulb in most cases. Power from the transmitter was estimated by brilliance of light if no r.f meters were available.

The Terms of the Licence

The fee, if I remember rightly, was 10 shillings. The wording of later licences (my own was issued in 1934) was similar to that used in the earlier version and somewhat quaint to say the least.

See if you can work out how large the 'inductance' for the artificial aerial should be, as distinct from one of large dimensions!

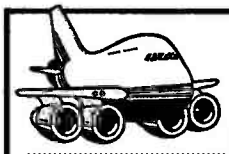
No Morse Test was required but the PMG obviously assumed that all licence holders could at least 'send' Morse even if they couldn't read it! In fact most of us could both send and receive Morse at a fair speed.

Temptation

All it needed was a little demon to whisper in your ear, "Why don't you connect the transmitter to a real aerial and have a bash?"

Well, most of us were young and enthusiastic in those days. I, for one, had a very nice outside aerial, resonant for 40m and could operate c.w. with the best of them.

Fig. 1: An exact copy of the 'Artificial Aerial Transmitting Licence' issued by the Post Office in the 1920s for amateur radio experiments with transmitters. The general terms remained the same until withdrawn during 1939, before the outbreak of World War II. This form of licence was never issued again.



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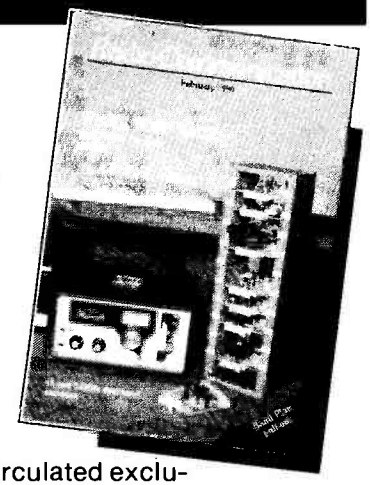

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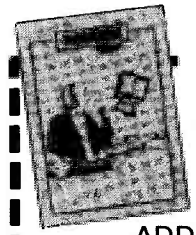

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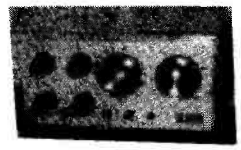

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THE ARTIFICIAL AERIAL LICENCE

Smartly Dressed Gents

That is until two smartly dressed gentlemen called one Saturday morning to 'inspect the station', shown in Fig. 3. The reason, they pointed out, was that my 'artificial aerial' seemed to be radiating rather more than was acceptable to the PMG. I naturally agreed with them.

After some complimentary remarks about my excellent Morse and operating procedure it was politely, but firmly, pointed out that the PMG really couldn't allow me to continue having QSOs with half the radio amateurs in Europe and Scandinavia every Sunday morning using an un-issued callsign.

"Please disconnect the 40m outside aerial from the transmitter," said the Senior Inspector and both departed. But all too soon the war came. Amateur radio transmitting for me, with a full licence, had to wait until 1946.

Postscript

A few years later (1949 or 50) I gave a lecture on aerial theory and practice to a group of Post Office student radio engineers at the GPO radio headquarters, Waterloo Bridge House, London - at the request of the Senior Inspector mentioned earlier! □

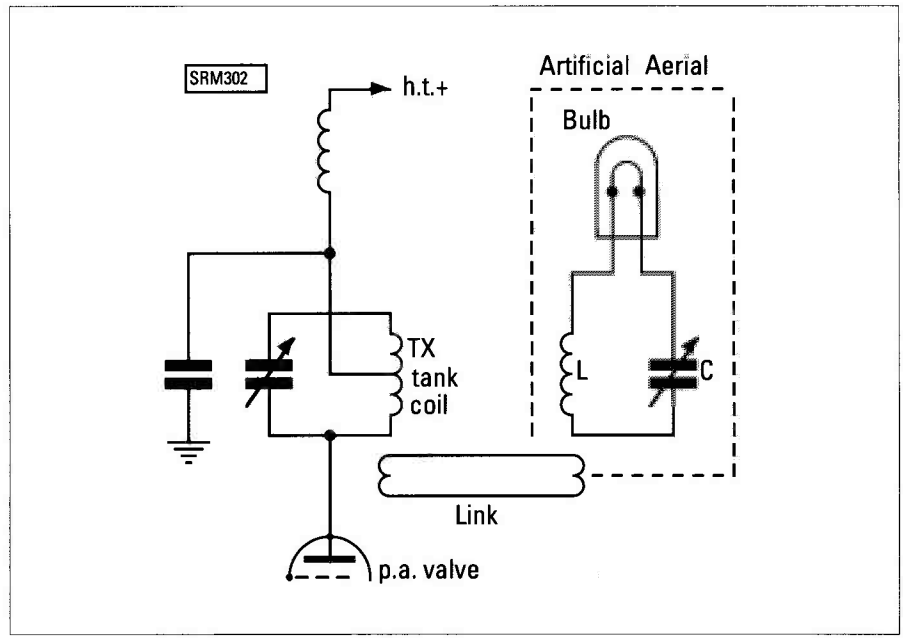

Fig. 2: The most generally used form of 'artificial aerial' circuit. The tuned circuit (*LC*) could be coupled directly to the transmitter final stage tuned circuit or by means of a link coupling as shown.

Abbreviations			
C	capacitor or capacitance	L	inductor or inductance
c.w.	continuous wave (Morse)	PMG	Post Master General
GPO	General Post Office	r.f.	radio frequency
h.t.	high tension	t.p.t.g.	tuned plate tuned grid

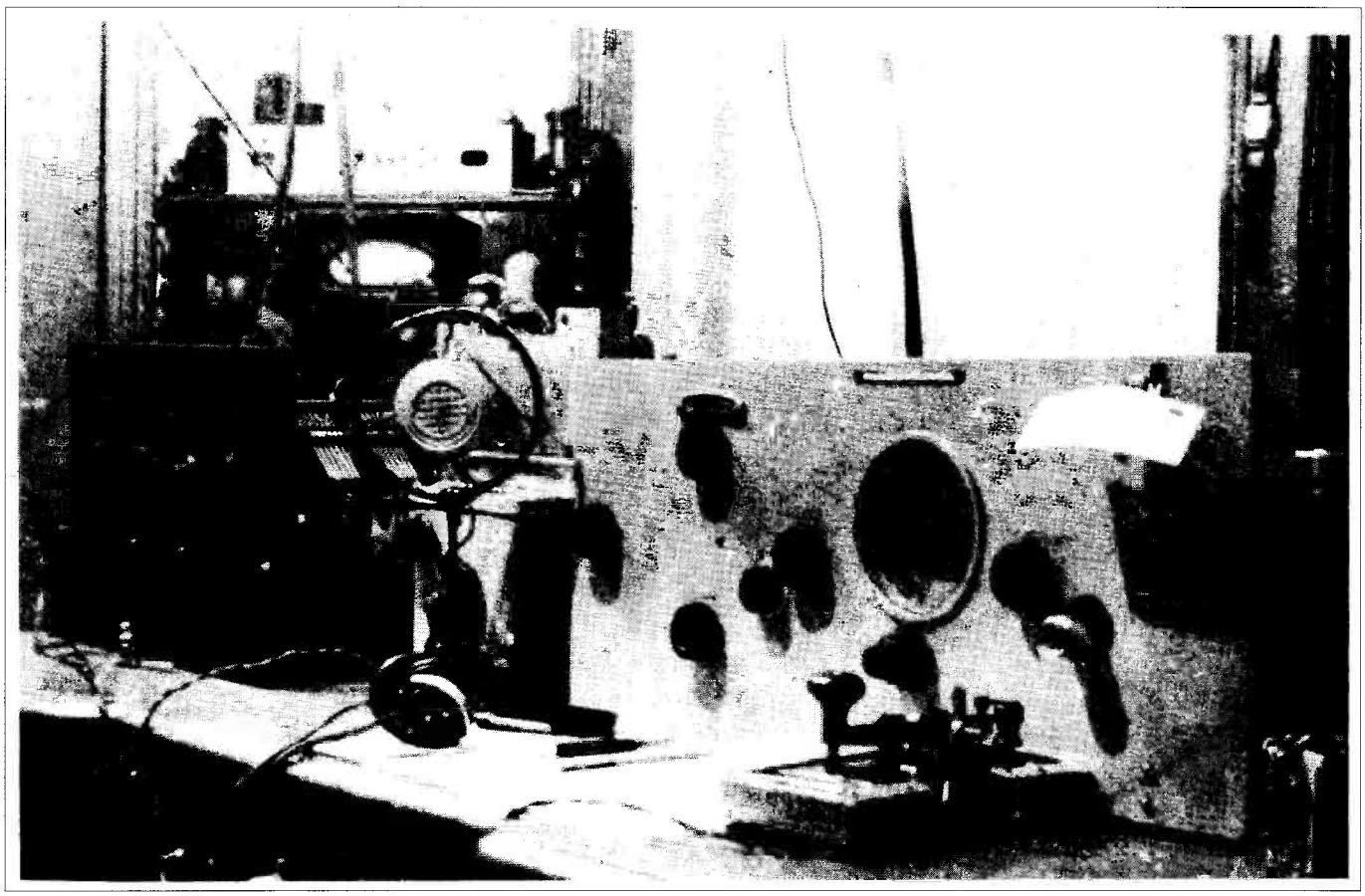

Fig. 3: The 'artificial aerial' transmitting and receiving station 2BCX in 1936 (licence issued in 1934). Transmitter (far left) is a single valve, t.p.t.g. oscillator running at about 25W with the h.t. railed keyed for c.w. The receiver is a home-constructed superhet tunable from 160 to 20m.

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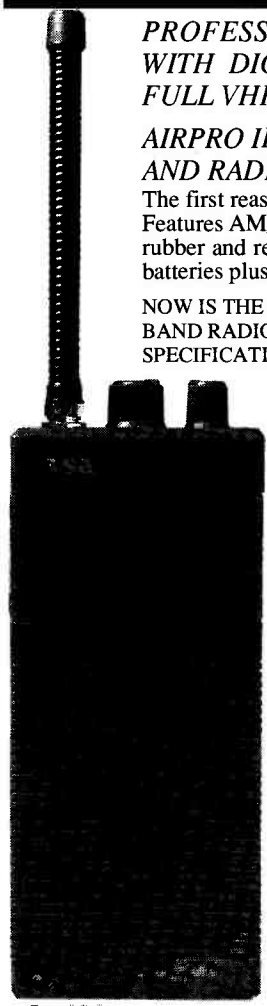

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SEEN & HEARD

AMATEUR BANDS ROUND-UP

Paul Essery GW3KFE
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Since last writing I have managed to take a brief holiday and visit the far north of GM-land and Orkney. Two memories stand out; meals at the GM0EXN eatery at Dunnet and the visit I made to the Wireless Museum at St Margarets Hope, South Ronaldsay. This visit seemed well-nigh impossible during a one-day Orkney visit, but thanks to the drivers of two coaches I was dropped at the museum and could browse at leisure...most interesting and full of memories of the past.

Vale

It will come as quite a surprise to those who have logged him recently to hear that V31BB has died, sitting in front of his two Icom 781s. At the moment it is not known just what happened, but this is one active amateur who will be much missed.

Also a Silent Key is Reg Cherrill W3HQO; Reg was born in 1907 in Kidderminster, but emigrated to USA in 1928. On a visit to UK in 1957 he conceived the idea of what is now known as the Ex-G Radio Club, brought it to fruition and, by devoting most of his spare time, built it up (membership is now over 250, spread all over the world) into the deeply appreciated club it is today; it brings together all those radio amateurs who, though born in UK, are now resident overseas.

While Reg maybe didn't appear in too many s.w.l. logs, unless they happened to listen to Ex-G Club nets, he certainly gave an infinite amount of pleasure to Ex-G Club members by his activities, until his health gave way a couple of years ago.

Technical Talk

One often hears of people putting pre-amplifiers ahead of a receiver which is considered to be 'deaf'. On almost all the bands below 30MHz, the level of noise that is picked up on a decent antenna is such that one never uses the full sensitivity that is built in to the receiver. In fact, it has to be a pretty serious fault which can genuinely make a receiver 'deaf' enough to need a pre-amplifier. Practically, if you have a reasonable receiver and a pre-amp it is often a revelation when one replaces the pre-amp by an attenuator and finds previously unsuspected DX!

Why is this? Firstly consider the lower bands from a site in the deep country away from all the r.f. pollution; TV and heating switched off, overhead power lines miles away. We have, say, a properly matched half-wave dipole up. We also have a screened dummy load to hand. Switch the receiver on and we will find on comparison that there is one level of noise when connected to a dummy load, and a different, higher, level when we connect the receiver to the antenna, even though the band is dead. The lower level is that due to the receiver in the absence of overload or other effects. The second, higher, level of noise occurs when looking at the sum of the receiver noise plus the noise external to the receiver.

Clearly, if now a weak signal appears on the band, to hear him he must be for s.s.b., a few dB above the total noise, enough to enable us to extract usable information despite some of the signal being below the noise level. Just how far above noise will depend to a large degree on the individual operator. On c.w., any reasonable operator can copy a signal equal to the noise level, skilled ones can recover the information from below noise level. (In fact, if your receiver output is hooked to an oscilloscope you can see the audio output from the c.w. signal, as a change in the appearance of the noise). So, we have a situation where the noise from space is limiting us to less than the receiver's sensitivity.

Now let the band open up some more, but not enough to cause receiver overload problems. Now we have some QRM, and if we can find a clear spot and repeat our original experiment, we shall find the difference between receiver noise and total noise has increased. The presence of propagation paths will have given an opportunity for more noise to reach our antenna.

Let's go the whole hog now, and have a band wide open and full of signals. Sure, there will be some Little Pistols to be heard among the Big Guns. Now we come to the crunch; just outside the band, but still near enough to slap a mighty signal on to our antenna, comes a megawatt BC station beaming our way with his load of propaganda...The Voice of Uglybug Creek or whatever it calls itself. Now, our receiver can't cope. Usually, it is the mixer which overloads first. It becomes non-linear in operation. Now, every signal arriving on the antenna and reaching the mixer input will beat with every other signal.

Since the receiver at this point in the circuit is still essentially broadband, there are hundreds, probably thousands of signals, all mixing with each other. The result is wideband noise coming out of the mixer, with a few big signals sticking up out of the top but the majority just not big enough to reach the level of the noise. What can we do? Either use an attenuator (preferred) or turn down the r.f. gain control.

The r.f. gain control or attenuator affects all the signals getting in to the receiver equally. As we turn it down, then every signal reduces, until suddenly we have reduced our megawatt BC station down to a level at which he ceases to overload our mixer which reverts to more normal behaviour. The noise level therefore falls back to normal, and all signals above the normal noise become audible again. I prefer the use of an attenuator to the r.f. gain control simply because as I turn back the r.f. gain the receiver noise performance deteriorates to a degree.

Now, contrast this position when you put in say a 20dB pre-amplifier. The earlier argument indicated it couldn't be a lot of help in getting a grip on a weak signal even in the absence of receiver overload. On the other hand, since we have 20dB of gain more between the antenna and the mixer input, it now overloads 20dB earlier! We have succeeded in making the receiver overload problem 20dB worse!

So - when is a pre-amp of any use? Only, when one is stuck with the very poorest of poor antennas. This case is called an Active Antenna, and calls for very clever design indeed to make the circuit 'bomb-proof'.

Summarising, if you want to hear better DX, once you have satisfied yourself your receiver is not actually defective, then you must either improve the antenna, or use an a.t.u. to extract all the signal that is offered by the antenna; preferably both. If you change your receiver, look carefully at the only parameter that is relevant to this argument, namely the Dynamic Range in dB - but in doing so never forget there are real dBs, and peddlers dBs, so rather than trust the ads, rely on figures obtained on test reviews!

The only exceptions to this rule are 1, the use from necessity of an 'active antenna system' and 2, the use of a pre-amplifier as part of such a deliberately low-gain antenna as a shielded loop for Top Band, which can bring quite good results by reducing the level of QRM and QRN.

Letters

Harold Wood is in Gorton, and he seems to operate mainly on 14MHz; this band brought him 7X2DB, RA3DMY, V31BB in Belize, 8P6BC, RN7N, V4AI, V3MR, Y26LM/A, AA4MM, V3OZZ, ES2WX, CE3NSA, ES1QD and Y22JJ; in addition W3AAA was noted on 18MHz. Harold would like to know why he hasn't heard more on this band and I offer as suggestions 1, that the antenna (not specified in the letter) doesn't put useful lobes into land areas; 2, that perhaps Harold is listening at the wrong times, and 3, most of the interesting stuff is on c.w. In the last case the cure is obvious!

Now to change tack entirely, Harold has about 20 reports, including IRCs, outstanding from January, and he sounds a bit miffed over this, understandably. Fair enough but the problems need to be considered. First, an s.w.l. report must be useful to the recipient - after all, no matter that you live in a very rare country, your s.w.l. card is no good towards DXCC! Thus, the report should compare your man's signal to other from the same area if possible, maybe plot signal strength over a period of time or at different times and over a few QSOs.

Personally I believe better results come from the use of an s.a.s.e. as well as the IRC if you MUST have a direct reply. In general terms, except for the misguided ones who regard DX-peditioning as a means to the profitable life and refuse to reply without money, it is preferable to send QSLs both ways through a QSL Bureau system. Slower it may be, but at least you can be sure it is NOT the Bureau that slow things down but the people on the ends who 'sit on' cards before they get around to replying.

QSL Addresses

Thanks to **Steve Reader**, Bedworth, I have some worthwhile QSL addresses: V51P goes to PO Box 9082, Windhoek, Namibia; V51BG to PO Box 2177 Windhoek; CO2RX to Box 5199 Havana, EL2WK via G3OCA; EL2DK via G3OCA; EL7X via Box 538 Bog; FT5XH via F6GYV; TL8WD via DL8CM; TU2QQ to Box 3023, Abijan, Ivory Coast, W. Africa; and 6W1AAD to PO Box 10135 Dakar, Senegal.

Incidentally Steve is now busy getting together the tackle for monitoring the OSCARS and RS Amateur Radio satellites. For this, high-gain antennas are not necessary, provided one can engineer the arrangement to track the 'bird' tolerably well; perhaps the most important part is to be able to know, by computer or otherwise, which way to aim and when in order to be pointing at the satellite as it rises above the horizon. I would think that the useful information obtained from AMSAT makes membership all but mandatory; details from Ron Broadbent G3AAJ, QTHR.

Denis Sheppard (Earls Shilton) has a Heathkit RA1 and bewails the fact that unlike the AR88D this receiver has a coaxial input. Personally, I have never found this a disadvantage, since his gear has always been fed into the receiver by coaxial cable. About the only time it might worry would be if you have an antenna which sports balanced feeders; in such a case perhaps the easiest answer is to convert to unbalanced by using either a balun or an a.t.u. Denis mentions RB4IIN and UB4ISW on Top Band, PY1RO, LU5GO, PY8ZBP, ZP5XHM, ZP6EM, 7X4AN, VK5HB VK3AX and VP8ML on 3.5MHz. On 28MHz, there were 5H3TW, K4CDR, 9Q5TE, VK7SA, AP2AC, G3WYG/ST2 and N3IGK; all of which leaves us the WARC bands, and here on 18MHz HZ1AB and K1KLL were noted, with KS9C on 24MHz.

Now to a new entry, from **Jack Bartram** of Bedfont, Middx. Jack started in January, and runs a Yaesu FRG-8800 into an end-fed wire. No doubt working hours - Jack is at Heathrow - account for the relatively small number of listening sessions in the log. However, I notice C31LHK, 9K2HA, 9H4E, ZS6JPP, 4X4FR, HC1AC, JE2QEY, XT2BW, PY5BI, CN8GJ, S01EA, 7X2BK, JY5HH, VP8CDR, 3D2AR, ZS6WPX, VU2TTC, PY1AQT, A41JR, 5Z4BP, 9J2FC, 5Z4BI, YC0FEO, HZ1AB, YC1YMN, TA5KA, UM8MK, LA5JEA on a North Sea platform, US1A, 4U1VIC, T77M, HS1BV, OM2BTI, A41KT and 8P6BC, who was working N2KRS/AM at 37000ft over the mid-Atlantic. Incidentally, Jack uses a 'highlighter'

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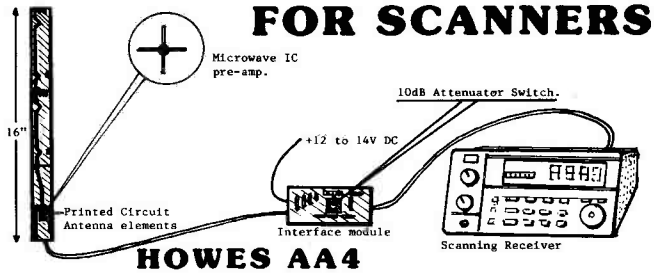

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The new **HOWES AA4** Active antenna gives full coverage from 25 to 1300MHz. It is designed to be the ideal solution for those requiring a compact, broadband antenna for use with scanning receivers. The AA4 features advanced technology with a low noise microwave IC as the active element.

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If your scanner reception could benefit from the addition of a remotely located broad-band antenna with built in pre-amplifier, or you would like a much neater, more compact alternative to the large, ugly discone types, then the HOWES AA4 could be just the job! Excellent performance in a small space!

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DCS2	"S meter" kit for all our receivers	**£7.90**	**£11.90**
CSL4	Sharp SSB and CW filters for our receivers	**£9.90**	**£15.90**
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DXR10 or **TRF3 Hardware package: £14.00. DxRx** hardware: **£15.50**
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All **HOWES KITS** contain a good quality printed circuit board with screen printed parts locations, full instructions and all board mounted components. Our kits offer the challenge and satisfaction of home construction, with the reassurance of help if you need it.

73 from Dave G4KQH, Technical Manager

SEEN & HEARD

pen to point out the favourites, in Xerox copies of the log pages - which makes it easy for him and me too!

Next we have **Phil Townsend**, in London; Phil says my remarks on the subject of 'sorting-out' the station came in handy: when he adopted my hint of coiling up the long mains leads, the amount of noise picked up has been noticeably reduced.

Lee Greaves (Dallington) sent me a tape-recording and a transcript of a quite horrifying 'debate' - altercation would be a better word - noted at 0125 on June 17 on the h.f. end of 14MHz (a few moments before he had been listening on 14.278MHz). One has to say that this sort of thing has been noted before by UK s.w.l.s as emanating from the USA, and I do feel that ARRL and the US authorities should seriously consider waving the Big Stick at the offenders.

Forthcoming Events

Now that the *Practical Wireless* 'Wireless Line' is available and updated weekly, it is hardly sense to give much information in this piece. However, I cannot help but comment on the rumours which are rife as I write, of an operation from ZA, Albania. If this one 'comes off' it will be the first genuine operation from that country for a couple of decades at least. The current story is of the Hungarian group who did such a wonderful job recently in the Far East, the South American effort seemingly having fizzled out. I hope that by the time you read this, the ZA effort will have come to fruition and been allowed to run to full-term.

More Mail

M. H. Stone (West Bromwich) notes that reference to the 'snake' antenna in the July (the question raised by Richard Williams) and rubs my nose in it by pointing out my reference to a snake in the Top Band section in *PW* September 1989. In fact, while Mark is quite right, Richard's question appeared to refer to a different creature from the one in that reference. Either way, I would love someone to clear up the mystery.

D. L. McLean hails from Yeovil, and Don notes that conditions have been poor at times, with a lot of short-skip on 14MHz, though it often was open to somewhere or other when the other bands were dead. Loggings on s.s.b. of C30CAG, J28AG, PY0FF, TA1AR, TA3G, TA5C, TJ1SR, TZ6PS, US1A, V31BB, YB0JVT, ZS6WPX, ZY0TK, 3B9FR, 4K4/UZ9KWJ, 4X6DW, 5T5SR, 7O1AA and 9M8FH were made.

Finally, **Dave Burt** (Bideford) clears up the query from Phil Cooper in Guernsey about the activity of 4X6SJ; it seems that Judy is active both from the home QTH in Israel, and also quite often as G0/4X6SJ from the Finchley area of London.

That's it for this time. The address for your letters is at the head of the piece, and the deadlines for the next three issues are to arrive by: September 10, October 8, and November 5.

DECODE

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

I must start this month with an apology to those of you who may have had to wait a while for your copy of the Decode Frequency List. I'm afraid the combined effects of my Rally and work commitments has left me behind in the despatch of lists. I hope by the time this is printed things should be starting to return to normal.

Readers Letters

Mike Branwick from the Isle of Man is currently studying for a combined electronics and computing degree. As part of the project work for this course he has chosen to design and build a data decoding system for the IBM PC. His prime interest is in FAX reception and he asks if I can help with details of the format used. As I have had several requests for help with FAX this month I have included a basic tutorial in the column. Incidentally the equipment currently in use in Mike's station is a Yaesu FRG-7 receiver with an a.t.u. and a simple ground plane antenna. Good luck with the Degree!

Atari 800 users will no doubt be pleased to hear of some information sent to me by **Nick Ashby** of Wembly. These computers have one serious omission, as far as data decoding is concerned, and that is the lack of a serial port. According to Nick a simple decoder to provide a serial input/output port is available for about £15.00. from the following address: Mr D. Fern, 265 Chester Rd, Streetly, W. Midlands.

Nick has been using this decoder for sometime with great success. I ought to stress that I have not tested the unit and as far as I know it simply gives a basic serial input and output.

Besides supplying some useful information, Nick has a problem that he would like readers help to solve. He is looking for a method of obtaining printed copy of the TeleText services provided by the BBC and ITV. Can anyone help? If so please drop me line and I will pass the details to Nick and reproduce a summary here.

Adam Moscicki is a Polish medical student who has recently taken an interest in utility listening. Not unexpectedly his main problem is a lack of suitable decoding software and technical literature. At present he is using a Commodore C-64 computer with some basic software and a home-made decoder. Although the system works, he would like to improve it. An area he would very much like to try is FAX reception, but there is nothing available in Poland. He could buy from the UK, but with an average monthly wage in Poland of £45.00, this would be very expensive.

So, are if there any benevolent souls out there who would be prepared to communicate with Adam on the subject of FAX reception or perhaps even supply some second-hand or public domain software. The address to contact Adam is:

Adam Moscicki, PLCB 3200, Dobra 14, 60595 Poznan, Poland.

Amiga AR User Group

Regular readers will remember that I recently asked for details on specialist help and software for the Commodore Amiga range of computers. **Des Bull** of Littleport has kindly obliged with details of this radio oriented user group. As of April the group membership stood at over 140, a figure that is steadily rising. The group is unusual in that no subscription is charged, membership is achieved by registering your name and details with Bob Wellbeloved G3LMH. Having said that, the group aways welcomes donations! On registration, your details are entered on a database with all the other users. This database is then made available to all other members and so enables people who are geographically close to contact each other directly.

The group also produces a Newsletter called *Amigan Airwaves* that is issued about four times a year. Rather than stick to fixed publication dates it is published when sufficient interesting information is available (sensible idea!).

For those who would like to join this group the address to write to is:

Bob Wellbeloved, 8 Orchard Close, South Wonston, Winchester, Hampshire SO21 3EY. Please make sure you include an A4 or A5 s.a.e.

FAX Tutorial

Having received many letters asking for more information on FAX. I though it would be appropriate to include a brief tutorial in the column. I can't give the topic comprehensive coverage in the space available so I will concentrate on attempting to convey the main principles of the most common formats.

So what is FAX or to be more precise Facsimile? It is the process of electronically conveying documents. These documents can be anything from simple hand written text through to high resolution photographs. The dictionary definition of the word facsimile is; exact copy of writing, picture, etc. This obviously has many uses in business and the modern FAX machine has become a standard office accessory. However the modern office FAX is a long way from the much simpler systems that are used over radio links. The radio based systems use predominantly analogue encoding techniques wheras the office machines use digital encoding. This allows maximum use of the land line and so give the best compromise of transmission speed and image quality.

The most common use of FAX over radio is for the transmission of weather charts, so I will concentrate on these systems.

The first thing we need to do is consider how can we can convert a printed image into an electrical signal. The system used in analogue FAX machines is to wrap the document around a cylinder that is rotated by an electric motor. A sensor mounted on a worm gear is then slowly moved across the surface of the cylinder, rather like an old fashioned cylinder gramaphone. The process can be likened to unwinding the image into a very thin spiral for transmission. At the receiving end a similar machine is used but instead of a sensor transversing the image, a writing electrode repeats the image onto a clean sheet.

The mechanically minded amongst you have no doubt realised that some form of standard operating parameters are required if the received image is to be a faithful reproduction of the original. The important points are the speed of the rotating drum and the speed of the sensor. The speed of the drum is normally quoted in r.p.m., though some use l.p.m. for line per minute. The most common commercial speeds are 120 r.p.m., 90 r.p.m. and 60 r.p.m. The sensor speed is a little more complicated as not only is it related to the drum speed but also to the drum diameter. The actual term used is Index Of Cooperation or IOC and takes into account all these factors. The two most common IOCs are 576 and 288.

A convenient feature of weather charts is that they are normally basic line drawings on white paper. This means that as the sensor scans the chart we would only detect two states - black or white.

The next problem is how can we send a representation of these two states over a radio link? Those of you who are familiar with RTTY transmissions or who have read my 'Decoding The Data' series will remember that RTTY signals also operate with just two states - Mark and Space. From this you can see that a similar transmission system could be employed for FAX.

The system used on most commercial h.f. stations is to employ frequency shift keying (f.s.k.) with the two carrier frequencies 800Hz apart. With this system the higher carrier frequency is normally used to represent white while the lower is used for black.

On l.f. the carrier spacing or shift used is 300Hz.

So far we have covered just the basics of the transmission system but there are one or two refinements that we need to discuss.

The process that I have just described for FAX transmission is rather slow with some images taking upto 15 mins to transmit. In the commercial it is unreasonable to expect the radio operator to be permanently monitoring the frequency for a FAX signal and then manually starting the equipment. Another problem is the synchronisation of the transmit and

spacetech ATARI WEATHER SATELLITE STATION

The Weather Satellite Reception system developed by Spacetech for the Archimedes which won the 1989/90 BETT Educational Technology Gold Award is now available for the Atari range of computers.Entirely new software provides the follwing powerful features:

Compatible with European, Soviet and American satellites
Entire image stored in maximum spatial resolution
Time lapse animation of weather systems
Automatic "hands-off" data collection
Compatible with 520ST to Mega4 ST
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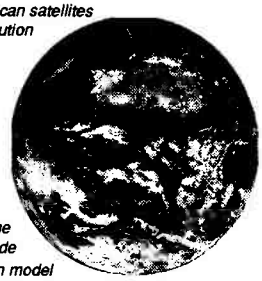
Printer support
Many powerful utilities
Frames may be exported to Art packages
Analogue zoom with fast pan over entire image
Infra-red and visible light images with cross-fade
From 13 to 146 frame animation depending on model



This package has many features that are not even closely matched by any system currently available for the Atari and has been carefully thought out for the enthusiast who wants the maximum amount of flexibility for experimentation.We know it is not the first system available for the Atari but we think you will agree that long and careful development has paid off.

There are two purchase options available : the software package on its own (for the DIY hardware buff) at £130.43 and the software and decoder at £239.13. In addition Spacetech has a range of high quality VHF and SHF satellite receivers and antennas.

DEMONSTRATION DISCS: ANIMATION £5.00 for two STILL-FRAME 520 or 1040 (please state)

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TEL. 0305 822753
FAX. 0305 860483

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FAX charts & photos to screen and printer, HF & VHF **PACKET**, Colour **SSTV**, **RTTY**, **AMTOR**, **CW**, **ASCII**, **UoSAT.**

Receive them all with every possible feature, superb performance and ease of use. Full printer & disc support. Complete system of hardware interface, EPROM, handbook and all connecting leads only £259. **DISCOUNT** for RX-4 users. Send for full information. Reviewed in Oct '89 Ham Radio Today & March '90 Amateur Radio.

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Performance, features and ease of use make this still a best-seller. Text and picture store, disc and printer support. Needs TIF1 interface. **BBC, CBM64** tape £25, disc £27. **VIC20** tape £25. **SPECTRUM** tape £40, + 3 disc £42 inc adapter board (needs TIF1 also) or software-only version £25.
TIF 1 INTERFACE Optimum HF and VHF performance with our software. 4-pole filtering and computer noise isolation for excellent reception. Kit £25, ready-made, boxed with all connections £40. Available only with software.

Also **MORSE TUTOR** £6, **LOGBOOK** £8, **RAE MATHS** £9 for **BBC, CBM64, VIC20 and SPECTRUM. BBC LOCATOR** with UK, Europe, World maps £10. All available on disc £2 extra.

technical software VISA
Fron, Upper Llandwrog, Caernarfon LL54 7RF
Tel: 0286 881886

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The PC GOES is a complete Weather Satellite program and demodulator system for the IBM PC™ family of computers.

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* Greyscale Printer output to all popular printers.

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The PC HF Facsimile is a complete FAX reception system for the IBM PC ™ family of computers.

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receive FAX machines. The solution used is to employ an automatic signal recognition and synchronisation system.

The system operates by using a strict operating protocol. The transmission starts with a 675Hz tone for an IOC of 288 or 300Hz for a 576 IOC. This is followed by 30 seconds of synchronisation pulses that comprise alternate black and white signals. These can either be symetrical or more commonly 95% black and 5% white. This signal is used to locate the start of the image and to set the drum speed of the receiving equipment. After the transmission a 450Hz tone is sent to return the receive equipment to standby.

Besides the transmission of weather charts, this system can be used for photographs simply by utilising the frequencies between black and white to be used to represent shades of grey.

So there we are a basic outline of the most common FAX transmission system. If you want to know more, the *Guide to Facsimile Stations* by Joerg Klingenfuss available from the *Short Wave Magazine* book service has much detail.

Schedules

John Taylor of Crowborough uses a Yaesu FRG-8800 receiver and BBC computer with a decoding package from Technical Software. His favourite mode is Press RTTY and he has sent me details of the latest schedule for MAP Rabat.

The format used is Callsign, Frequency, Beam direction, Language.

0030UTC - 1700UTC

CNM76/X9, 18.2209MHz, Africa, French

CNM69/1X, 15.9999MHz, Africa, French

CNM29, 10.213MHz, Europe, French

CNM20/1X, 7.8424MHz, Europe, French

CNM85/X11, 19.1711MHz, Europe, French

CNM66/X, 15.7527MHz, U.S.A., French

1200UTC - 1400UTC

CNM80/X11, 1.851MHz, Orient, English

CNM69/1X, 15.9999MHz, Africa, English

CNM76/X9, 18.2209MHz, Africa, English

CNM20/1X, 7.8424MHz, Europe, English

CNM61, 14.760MHz, Europe, English

CNM85/X11, 19.1711MHz, Europe, English

CNM66/X2, 15.7527MHz, USA, English

Jan Nieuwenhuis has sent his usual comprehensive report that included information on Chuo Radio (JFA) in Japan. This station is apparently the same as the former Matsudo F Radio that has now been closed down. The new transmitting station, Kazusa, which is used by JFA is located on top of mount Kinda - some 250 metres above sea level. Although the use of this station by JFA is new the station has been in existance since 1987. The frequencies used for FAX transmission are:

4.274MHz, 6.4145MHz, 8.658MHz, 12.6555MHz, 16.9075MHz and 22.4455MHz. The data transmitted consistes of sea surface maps and fishery reports. Unfortunately Jan does not have the transmission times so perhaps any readers that manage to receive a full schedule could send me a copy.

Frequency List

I have received a very good selection of logs this month and I have compiled the usual short summary at the end of this section. Particular thanks are due to: **Jan Nieuwenhuis**, **Day Watson**, **Alex Mackow** and **Maurice Lloyd**.

The format for the frequency list is: Frequency, Mode, Speed, Shift, Callsign, Time, Notes.

2.474MHz, RTTY, 75, -, PBC, 2037UTC, Dutch Navy

4.489MHz, RTTY, 50, -, GFL, 0002UTC, Bracknell Met

4.570MHz, FAX, 120, 288, DHJ51, 0758UTC, Grengel Meteo

4.583MHz, RTTY, 50, -, DDK, 2316UTC, Hamburg Met

7.520MHz, RTTY, 75, -, -, 1815UTC, Xinhua Press

7.592MHz, RTTY, 50, -, -, 2053UTC, Tanjug Press

7.850MHz, RTTY, 50, -, -, ATA Press, Albania

7.980MHz, RTTY, 100, -, -, 2320UTC, Potsdam Met

9.225MHz, RTTY, 75, -, -, 2102UTC, RTFN Portuguese

10.543MHz, RTTY, 50, -, ADN, 1826UTC, Berlin Press

12.315MHz, RTTY, 50, 425, RUW57, 1515UTC, TASS Moscow (English)

13.510MHz, FAX, 120, 576, CFH, 2015UTC, CF Halifax Meteo

13.770MHz, RTTY, 75, 425, -, 1200UTC, VoA Morroco

14.570MHz, RTTY, 50, 425, HMC61, 1530UTC, KCNA Pyongyang

16.971MHz, FAX, 60, 576, JJC, 1725UTC, Tokyo

16.984MHz, CW, -, -, PPR, 1652UTC, Rio de Janeiro

The next three deadlines are September 10, October 8 and November 5

INFO IN ORBIT

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

New Weathersat

Just a few days after the deadline for the last 'Info in Orbit' piece had been sent off, the Russians launched a new weather satellite. This has happened before and I managed to get a 'stop press' announcement added to the end of the column to ensure that *SWM* readers were kept up-to-date.

This time, my son Tim and I had just succeeded in getting our radio-telescope to work when an unexpected a.p.t. signal came up on 137.85MHz. This was on June 30 at 1312UTC and the satellite was on a westerly south-bound pass, suggesting to me that I had probably missed at least two previous passes - ah well - you can't be first every time!

This frequency has been used by METEOR 2/16 for some months now but 2/16 had just passed so I ran predictions for METEORS 2/17 and 2/18 but neither satellite was suitably placed and so I felt it was likely to be a new satellite - probably 2/19 or 3/4. You may recall my mentioning a probable new launch a month or so back.

Regular readers of this column will be aware that the Russians operate two series of weather satellites having the prefixes 2 and 3. The series 2 have slightly lower orbits and therefore cover more orbits each day than the series 3 satellites.

This 'orbits per day' parameter is referred to as Mean Motion (MM) in Kepler elements and so 2/16, 2/17, and 2/18 all have MM's of about 13.83, whereas the series 3 satellites cover fewer orbits each day and have a typical MM of about 13.1.

Here are the latest Keplerian elements for METEOR 2/19:

Satellite	2/19
Epoch	90197.72398912
Inclination	82.5442C
RAAN	265.2229
Eccentricity	0.0015602
Arg of Perigee	199.1053
Mean Anomaly	160.9523
Mean Motion	13.83839608
Decay Rate	0.00000108
Orbit Number	260

Elements were kindly supplied to me by Goddard. For a day or so we had two weather satellites transmitting on 137.85MHz but as expected METEOR 2/16 was switched off just a few days later. It has had numerous faults on its pictures but was still usable. Looking through my log book I notice that 2/16 was launched back in August 1987 and my first transmission was received on 137.40MHz on August 18.

Other USSR WX Sats

I have mentioned in previous months that both METEORS 2/16 and 3/3 were experiencing problems and so when both were switched off within a few days it was no surprise. In late June METEOR 3/3 was still transmitting infra-red pictures but they became very streaky, and suffered glitches. Then the infra-red transmissions were switched off, leaving only visible light pictures.

METEOR 3/2 was re-activated in early July and also uses 137.30MHz. It is transmitting both infra-red and visible but just at press time the i.r. has gone off! We can expect METEOR 3/4 to be launched soon.

OKEAN 2

During recent weeks we have been treated to regular transmissions from OKEAN and for a day or two I was astonished to collect data from nearly every pass. It seems like the satellite might have been transmitting continuously for several orbits.

METEOSAT-4

A new broadcasting schedule will be in operation from early August. More details plus some important information next month.

Frequencies

NOAAs 9 and 11 use 137.62MHz
NOAA 10 uses 137.50MHz
METEOR 3/2 uses 137.30MHz
METEOR 2/19 uses 137.85MHz
OKEAN-2 uses 137.40MHz
METEOSAT transmits on 1691 and 1694.5MHz.

Predictions

Many readers have written favourably about this section so here is another list of the main passes for a selection of satellites. This edition of *SWM* is on sale from August 23 so I have chosen Sunday September 2 for those of you who haven't yet got a working predictions program or who may simply want to test a hand-held portable scanner.

As you will realise the METEOR satellites are not totally reliable so a listed pass may possibly have changed frequency or the satellite may be off.

Following the pattern of previous tables the satellite identification is given, then its acquisition time (UTC not BST!), then loss of signal. The maximum elevation of the satellite followed by its direction whether to the east or west, and finally its direction of travel, whether southbound or northbound.

Sunday September 2

Satellite	AOS	LOS	Max-el	Direction
NOAA10	0748	0802	58E	SB
NOAA10	0928	0941	26W	SB
NOAA11	1204	1217	21E	NB
NOAA11	1344	1358	80W	NB
METEOR 3/2	1447	1502	17E	NB
METEOR 2/19	1559	1614	30E	NB
NOAA9	1631	1645	49E	NB
METEOR 3/2	1633	1652	76E	NB
NOAA10	1735	1748	26E	NB
METEOR 2/19	1743	1759	52W	NB
NOAA9	1812	1826	31W	NB
METEOR 3/21	8251	8432	7W	NB
NOAA10	1914	1929	57W	NB

SEEN & HEARD

Letters

The response to my offer to supply METEOSAT data to anyone sending a pre-paid package has been amazing! I have spent rather more time than I originally expected recording the data but as long as it has helped those of you with equipment problems to test out your decoders then that is the main thing!

John Jarvis of Wolverhampton has a Maplin satellite receiver and decoder fed from a turnstile antenna but wasn't sure whether the signals that he receives are of good enough quality for proper imaging.

The tapes that I send out contain recordings that I test first to ensure that they are suitable. I use a cheap cassette recorder with a potentiometer to reduce the input - because the receiver output is too great and would cause the tape recorder to compress the signal leading to a severe loss of grey levels. You really do not need an expensive recording system for our purposes.

John is concerned about his equipment not performing very well but I am fairly sure from his description of the problems that the first job is to listen to the sound of the audio output of his receiver when a satellite goes by and compare it with the recorded tapes that he has.

I have had some letters from Ireland, one from **Malcolm Taye** of Belfast who asked for a METEOSAT tape to test his system. He has a Sandpiper antenna and a framestore purchased through the Remote Imaging Group. Malcolm uses a PRO2004 scanner which has a n.b.f.m. setting. The problem with this type of scanner is that it is designed for the efficient reception of general radio signals, but not those from weather satellites which transmit their picture information over several kilohertz. The result is that although a picture of sorts can be decoded it will lack much of the detail that should be there and so it may be very difficult to identify features. I have a PRO-2004 used only for scanning around the satellite band at high speed - definitely not for picture production.

Finally, Malcolm received his tape and wrote again to say that he was delighted with the results which have helped him to confirm that his framestore is working well.

Fig. 1

More Letters

Keith Elgin of Coleraine and **Ernest Handford** of Rye both wrote to request some Kepler elements which were duly despatched. These are sent to me each month by **Des Watson**, membership secretary of RIG.

The METEORS

For some years I have written to various Russian organisations such as the London embassy and one or two Moscow institutes with general questions about the Russian weather satellite system. Russia operates several weather satellites and I know that many amateur radio enthusiasts listen regularly to the transmissions and, like me, would be interested to know something about the way these satellites operate.

Replies that I have received were few giving only brief notes listing Moscow addresses which often did not respond. So when a letter postmarked Mockba arrived with a set of notes, I was delighted!

The document was published by the USSR State Committee for Hydrometeorology and describes current activities on the hydrometeorological, earth resources and oceanographic satellite systems and, on the assumption that it was not sent to me in secret, I am proposing to publish some of this document over future months.

Introduction

The Russians are rightly proud of their space technology and claim that it is widely applied in the Russian economic system. They consider remote sensing (the term used to describe the monitoring by satellite of the earth's weather etc.) to be a most important use and have two types of data transmission systems - operational (APT or automatic picture transmission) and non-operational (photographic) systems.

The photographic systems are used for map production, geographical charts and structure studies and other slowly changing features that are of use, for instance, in road planning.

This implies that these missions involve the actual collection of photographic materials from the satellite rather than subsequent radio transmission of the data. This would stop unauthorised reception of marketable data.

For the instant monitoring of weather events such as natural disasters, typhoons and hurricanes, forest fires, etc., the operational APT satellites are used.

A number of different satellite systems are used because of the requirements for different rates of data acquisition, different land resolution and atmospheric states. This doesn't allow the development of a single satellite system.

Met Systems

The first satellites used for meteorology were known as the METEOR 1 series and I well remember hearing METEOR 1/30 which transmitted around 137.02MHz. These were classed officially as experimental satellites. Some of the best land detail that I have ever seen came from METEOR 1/30.

METEOR 2 Series

This consists of two to three satellites operating at about 900km with orbital inclinations of about 82.5°. There are receiving centres in Moscow, Novosibirsk and Khabarovsk plus over 80 simplified receiving stations.

The satellites are crammed with equipment for meteorological monitoring. There are three types of TV scanners in visible and infra-red, an eight-channel scanning infra-red radiometer and a radiation sensor.

More to Come!

Future coverage of the Russian scene will include actual data on the satellite on-board equipment. My thanks to the Russian authorities for this.

New Equipment

As mentioned in a previous column I have been looking into what satellite equipment is currently on the market and so I was pleased to have a visit from one of the main manufacturers of both hardware and software. I also looked into the upper end of the domestic computer market, having an eye on the future development of AVHRR (advanced very high resolution radiometer) data transmissions from the WX satellites.

My day-to-day work as the manager of the Information Technology Department at Plymouth Training Centre has pushed me into wanting a very capable machine for home use and so I combined the two requirements. The result has been the most impressive decoding equipment that I have seen.

Picture

One of my METEOSAT pictures from last summer. More of your pictures next month!

BAND II DX

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

"It has not been very hot this summer. May was nice and cool as we had a lot of rain. Temperatures were around 35°C almost 10°C below normal. June is slightly hotter with temperatures ranging between 40 and 42°, about 2° below normal," wrote **Lt. Col. Rana Roy** from Meerut, India, on June 13.

The total and much needed rainfall that I recorded for the month of June was 3.22in which is good compared with 1.16in for the same period in 1989 and only 0.32in in June 1988. The atmospheric pressure fell to 29.7in (1005mb) on June 21 and 22, bringing 1.24in of the month's total rain, then, over the next three days, the pressure increased to 30.3in (1026mb). At this point the pressure was starting to fall and while **George Garden** (Edinburgh) was DXing on Cairn O' Mounth he found "conditions turning very cloudy and windy".

Although, by noon on the 28th the barometer was back up to 30.2in (1022mb), there was a hefty build up of cloud, Figs. 1 and 2, which preceeded another gradual fall to 30.0in (1015mb) by the 30th. These photographs were taken at the Weir Wood reservoir near East Grinstead in Sussex and Joan suggested that I should use the clouds as a backdrop to those other great carriers of power, the nearby 132 and 11kV pylons in Figs. 1 and 2 respectively.

Tropospheric

With a humidity reading of 84% and the atmospheric pressure declining from 1026mb (30.3in) to 1022mb (30.2in) during the day on June 2, **P.R Guruprasad** (Molepolole, Botswana), using his Sony ICF-7600DA receiver with its own rod antenna, received signals from Radio Botswana on 89.7, 89.9, 90.05, 98.6 and 98.75MHz, Radio Jacaranda on 94.8 and 94.95MHz, Radio South Africa on 105.2, 105.5 and 105.65MHz and both Afrikaans and English voices from other unidentified stations in Band II.

At 1020 on the 3rd, he heard two stations, Radio Lotus "(the Indian Channel) stemming from South Africa" and possibly Radio Botswana "or some South African station" on 98.4MHz. "My barometer, hygrometer and thermometer read 1019mb(30.1in), 82% and 18°C(about 65°F) respectively," said PRG. He checked the frequency again at 0713 on the 9th, and this time heard only 'R 2000' from South Africa. However, around 0815 next morning he connected his indoor telescopic

SEEN & HEARD

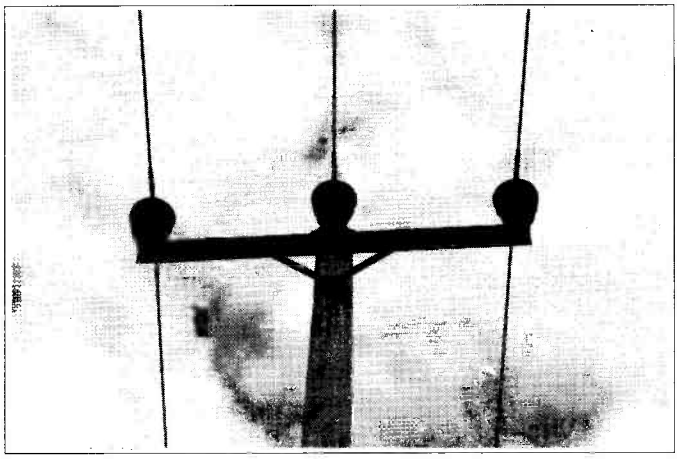

Fig. 1

dipole, via a crocodile clip, to the Sony's rod antenna and heard both Radio Botswana and R 2000 at varying levels. This time his instruments were reading 1024mb (30.25in), 74% and 12.5°C (about 54°F).

"The atmospheric pressure was very high on Saturday June 16 and over the weekend was on the point of declining," wrote George Garden. With this in mind he drove to the top of Cairn O' Mounth and received a strong signal from BBC Radios Cleveland and York. The former being 'a fair catch' for George because its signals are not often received at that location. He tried again at this site around 1500 on the 25th but only found a fading signal from the Pontop Pike transmitter of BBC Radio Newcastle and a stronger one from BBC Radio York.

I heard strong French stations around 95, 98 and 100MHz during the early evening of July 9 while the pressure was hovering around 30.2in (1022mb) and there was a tropospheric-opening to the north-east early on the 13th when, around 0830, I counted a selection of about 25 Dutch, French and (predominantly) German stations, some at amazing strength, between 87.5 and 106MHz.

Sporadic-E

A massive Sporadic-E disturbance was in progress between 1600 and 1800 on June 26, when I recognised world-cup football commentries from several Spanish stations between 100 and 107MHz. I was parked at Sissinghurst castle in Kent and tuned through Band II on my Plustron TVR5D and used its own rod antenna. The early days of July were dominated by Sporadic-E and using my ex-military R216, with an outside dipole, I counted 14 East European f.m. broadcast stations between 66 and 73MHz at 1815 on the 1st, over 50 at 1752 on the 2nd, 30 at 1830 on the 9th, 40 at 1810 on the 11th and 30 again at 2000 on the 13th. As usual these signals were exceptionally strong and were periodically subjected to the deep and sharp fading which typifies the effects of a Sporadic-E opening.

Info

A few months back we published a photograph in this column of me, with Plustron, parked on a high-spot in Ashdown Forest, one of the many beauty spots in Sussex. This prompted **Cameron Warner** to tell me about a book referring to the wartime work of the wireless station in the Forest. As a result of Cameron's letter and our interest in matters historical, Joan and I called at the Ashdown Forest Centre on June 28 and collected a walk-guide in which we found the instruction, "On arrival at Crows' Nest Clump pass round to the right and continue to the boundary of the Radio Station", plus the following explanation. "The boundary fence, which you are following belongs to the Diplomatic Corps Radio Station, code named Aspidistra during the last war, which broadcast to the continent using the well known Morse Code 'V' to identify it. It also re-transmitted the German Forces programmes and when their radio closed down during RAF raids, Aspidistra broadcast similar music and the German news interspersed with subtle propaganda.

I think the book is called *The Black Boomerang*, but, at present, I know no more, however, I well remember hearing the rock-crushing sound of 'boom boom boom boooom' from this special transmitter on my one valve set at the time and now, thanks to Cameron, I hope to learn more about it.

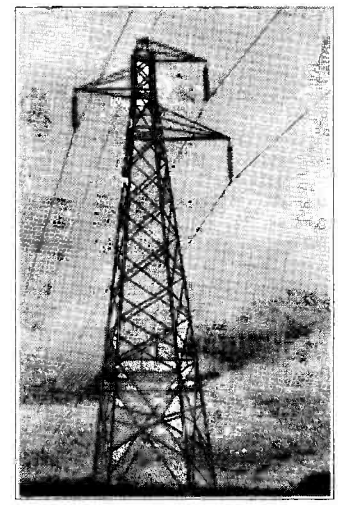

Fig. 2

TELEVISION

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

Lt. Col. Rana Roy (Meerut, India), noted Sporadic-E disturbances on May 1, 16, 22, 25 and 27 and June 1 and 2 and during these events he received pictures from the USSR on Ch. R1 (49.75MHz) at 1515 on May 25, Fig. 1 and at 1750 on June 2, Fig. 2, plus unidentified stations from South East Asian TV on Ch. E2 (48.25MHz) at 1800 on June 1, Fig. 3 and 0800 on the 2nd, Fig. 4. He also saw Arabic script on days 1 and 22, a cinemascope movie from the USSR on the 27th and the reciting of the Quran from an Arabic station on June 2nd.

Among the programmes seen by **Bob Brooks** (Great Sutton) from the stations he identified during the Sporadic-E openings on June 8, 10-14, 16, 17, 19-23, 2-30 and July 1-3, were dancing from Spain (TVE), cartoons from Iceland (RUV), Italy and Poland (TVP), a concert from Spain (TVE Barcenlona), football from Czechoslovakia (CST), Germany (ZDF), Iceland (RUV) and Italy (RAI), news from West Germany (ARD & ZDF Tagesschau), Hungary (MTV), Italy (TGI), Portugal (RTP), Spain and the USSR (TSS) plus clocks and logos from Czechoslovakia (CST Prague), West Germany (ARD1 Radio Bremen), Italy, Poland, Spain (Andalucia and Madrid), the USSR (Olivette) and Yugoslavia (RTV TV Ljubljana) and test-cards from Czechoslovakia (CST ISR-P), Denmark (DR Danmark), Finland (YLE), Iceland (RUV Island), Ireland (RTE), the Norwegian regionals (Hemnes, Melhus and Steigen), Poland, Sweden (SVT Kanal 1), Switzerland (PTT-SRG1) and the USSR.

John Woodcock (Basingstoke) received programmes from Italy and Spain on June 13, 18 and 20 and July 1, test-cards from Iceland and Sweden on the 19th and 22nd and unidentifiable mixtures of signals, typical Sporadic-E on the 19th, 20th and July 5.

During an extensive opening around 1800 on June 19, I watched a number of pictures fighting for predominance on the screen on Chs. E2 and nearby R1 and saw what looked like news from the USSR on Chs. R2 (59.25MHz) and R3 (77.25MHz). In addition, using my elderly ex-military R216 v.h.f. communications receiver and a chimney mounted dipole antenna, I heard the sound for Chs. R1 (56.25MHz) and R2 (65.75MHz) and the synchronising-pulses for Ch. R4 (85.25MHz).

When Joan and I arrived in the car-park at Sissinghurst Castle, a National Trust garden in Kent, around 1530 on the 26th, I tuned Band I with my Plustron TVR5D and found a massive Sporadic-E disturbance building up. Soon after 1600, very strong pictures and sound from a Spanish station blotted out the top end of the band from just above Ch. E3 (55.25MHz). The film they were showing ended at 1648 and at the bottom of the tail caption was 'C TVE S.A. 1990' and at 1650 the logo Avance Telediario appeared. I checked again on the way home from Ashdown forest and found the band in chaos. I used this set again while parked in East Grinstead at 1656 on the 28th and watched an animal cartoon film on Chs. R1 and R2. During the evening of July 1, World Cup football, Cameroon v England, dominated many channels in Band I and, in addition, at 1815, I received a very strong caption from Sweden (Sveriges Television) on Ch. E2 and their test-card (Kanal 1 Sverige) was dominant on Ch. E2 again at 0815 on the 2nd. The digital clock on their card was showing 0915. This Sporadic-E disturbance ebbed and flowed all day and at 1752 there were strong pictures and sound on Chs. R1 and R2 and at times on Ch. R3. **Andrew Jackson** (Birkenhead) watched football from unidentified stations, with Italian like sound, around Chs. E2 and E3 on July 1 and saw a film about glass-blowing and some cartoons on the 2nd.

I saw signs of activity in Band I from Chichester car park around 1630 on July 9 and by the time I got home, at 1800, a disturbance was well under way and during the following hour pictures and sound from the USSR on Chs. R1, 2 and 3 fluctuated in strength. Between 1650 and 2016 on June 16, **Terence Burke** (Bradford), with a dipole feeding his receiver, saw the captions TV1 Musorajanlat among many unreadable fast-fading signals on Chs. E2 and R1, what looked like 'gbs', Fig. 5 amid motor-cycle racing, [any ideas readers on the latter two?] 'REKLAM' from Hungary (MTV), a Laurel & Hardy film, adverts, a Civic Forum logo (Fig. 6) on a news bulletin with reader Peter Kucerd which Terence thinks was Czech (CST) and football from Italy plus interviews with England's Peter Shilton and others.

Terence made drawings in his letter of the 'gbs' and 'civic' captions, Figs. 5 and 6, which I copied, using the Windows Paint program on my new Amstrad PC2086 computer. On the 19th, which he described as "a real belter of an opening", Terence dug out from the jumble such captions as CST Bratislava, ODK-3 and SR-1P (Czechoslovakia), Kapcsoljuk Az Orszaghazat (Hungary), 'JRT RTV-LJNA' followed by RTV1-Ljubliana, (Yugoslavia), RAI-UNO (Italy), YLE (Finland) and +PTT-SRG1 (Switzerland). Next morning he saw Buenos Tardes followed by Conexion Programa Nacional from Spain on Ch. E2, cartoons and football from Spain on the 29th and 30th and test-cards from Italy and Norway on July 1 and 2 respectively.

With all this information pouring in I was not surprised to see that the

SEEN & HEARD

Fig. 1: Russian

Fig. 2: Russia.

Fig. 3: SE Asia.

Fig. 4: SE Asia.

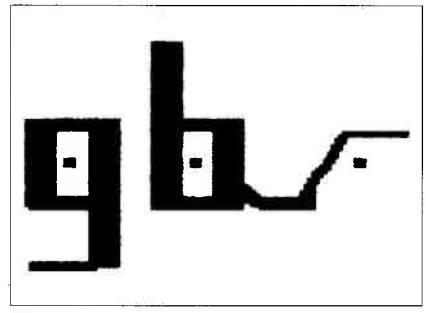

Fig. 5.

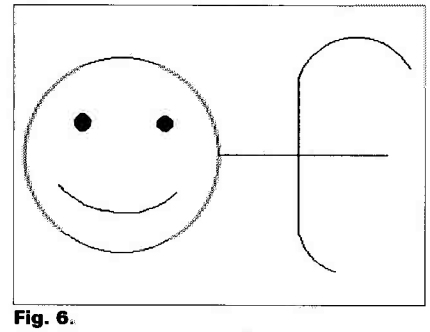

Fig. 6.

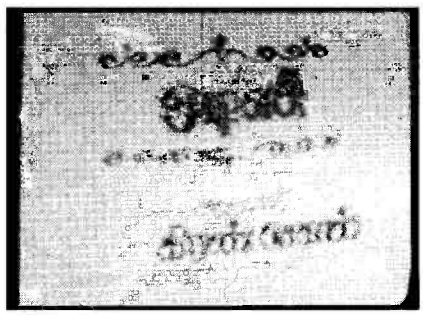

Fig. 7: Madras.

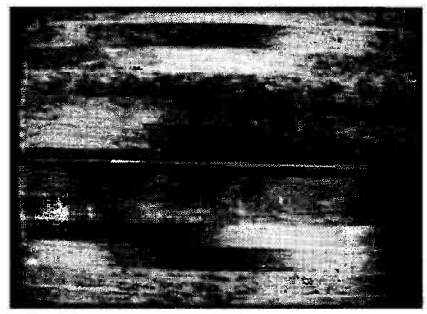

Fig. 8: Test Card via F2.

Fig. 9: Belgium.

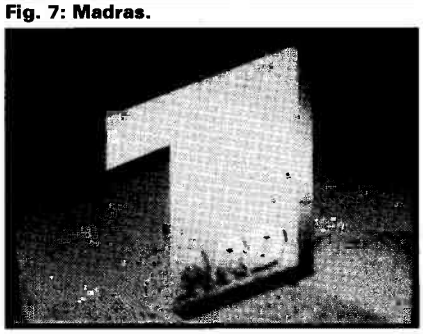

Fig. 10: ARD 1.

Fig. 11: SAT 1.

Fig. 12: Bhatinda.

log from **Simon Hamer** (New Radnor), covering some 18 Sporadic-E events from June 15 to July 7, contained reports of idents, programmes and test-cards from stations in Albania (RTSH), Austria, Belgium, Czechoslovakia, Denmark, Finland, Germany, Greece (EPT), Holland, Hungary, Iceland, Ireland, Italy, Jordan (JTV), Morroco, Nigeria (NTA), Norway, Poland, Portugal, Spain, Sweden, the USSR and Yugoslavia.

Among the idents seen by **David Glenday** (Arbroath) via Sporadic during a similar period were 'AoK' which he thinks was Estonia, on June 12th, 'Televizja Zagreb Epp (Yugoslavia) on the 16th, 'tvsa' from Yugoslavia (JRT) on the 17th, "an unidentified 'S' logo and Czwartek caption," on the 18th and 'TVZ' (Yugoslavia) on the 28th.

At 1810 on July 11, I received pictures and sound on Chs. R1, 2 and 3 and just the sync-pulses on R4 and almost caught the start of the Sporadic-E opening on the 13th from the car-park at Polsden Lacey, a National Trust house in Surrey. I checked Band I several times during the day and just before we had tea, at 1645, the band was still clear but when I returned to the car around 1720 there was a mix-up of pictures on Chs. E2 and R1. On arrival home at 1945, I found fluctuating signals on the sound and vision frequencies of Chs. R1, R2 and R3.

Picture Archives

Around 1300 on December 20, **P.R. Guruprasad** (Molepolole, Botswana), TVDXing from his home in Vellore, Tamilnadu, India, received a programme title, Fig. 7, from Madras, Doordharshan, on Ch. 1, which is not normally seen at this address. PRG uses an Indian-made Weston receiver and heard Arabic dialogue, with both male and female voices and distorted pictures for about 30 minutes on Ch. 8 at 1647 on January 30. Next day, at 1625, on Chs. 7 and 8, he again heard Arabic voices, including commercials for Brooke Bond and Coke and saw what looked like an Arabic movie with a musical background. While the F2 region of the ionosphere was upset last October, David Glenday received a typically smeary test-card, Fig. 8, with a short ident at the top and longer frame at the bottom, on Ch. E2 and during a tropospheric disturbance last June 17 and 18 he saw the teletext title page for the European elections from Belgium, Fig. 9 and the ARD1 logo and a SAT.1 schedule from Germany, Figs. 10 and 11 in the u.h.f. band.

Tropospheric

At 0700 on May 6, Rana Roy received pictures, with some interference, in Band III from Lahore on Ch. E5, Kasauli (Ch. E6), Amritsar (Ch. E7), Jallandhar (Chs. E9), an advert from Bhatinda (Ch. E12), Fig. 12, and Pakistan TV-Bhawalpur, with interference from Mussoorie, on Ch. E10. Around this time each morning between the 17th and 21st Rana saw Breakfast TV from Bhatinda and various pictures from Jallandhar, Kasauli and Lahore.

The atmospheric pressure was beginning to fall from 30.3in (1026mb) and the sky looked very changeable as we left home at 0945 on June 26 and by the time we reached Barcombe, near Lewes, my Plustron in the rear of the car was receiving pictures from France on Ch. L5 in Band III. These pictures remained throughout the afternoon and early

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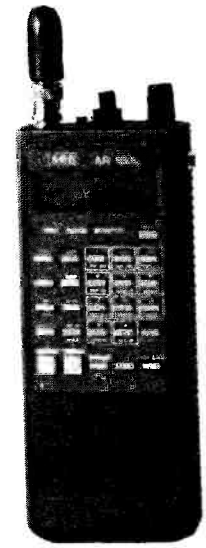

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Bank 5	Band 3	174 – 225MHz	12.5kHz step	NFM
Bank 6	VHF marine	156 – 163MHz	25kHz step	NFM
Bank 7	VHF amateur	144 – 146MHz	12.5kHz step	NFM
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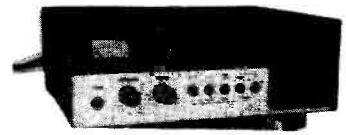

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SEEN & HEARD

evening according to my band-checks from the car-parks of Bodiam and Sissinghurst castles and in Ashdown Forest. The pressure hovered around 30.2in on the 27th and, while portable, at 1800 on the 28th, I my Plustron revealed negative pictures from France on Chs. L5 and 9 and the TDF logo on the latter.

Around 1600 on the 25th, **George Garden** (Edinburgh) took his DXTV gear to the top of Cairn O' Mounth and saw BBC North News from the transmitter at Chatton and colour pictures from the Eyemouth and Selkirk transmitters of Border TV. The latter being grainier that the former. He also logged Grampian TV transmissions from Tay Bridge. Andrew Jackson installed a new 6m high mast to carry his Triax MTH13 beam for Band III and logged a test card from Belgium (BRT TV1) on Ch. E10 on June 25 and the French Canal+ (Ch. L5) from Lille from June 23 to 28 inclusive and July 1 to 4.

Canal+ was also seen by John Woodcock on June 13, 17 and 26. David Glenday found Norway (Norge Televerket) and Denmark (DR) in Band III on the 11th and 12th respectively and Denmark (TV2) on the 12th and 13th, Germany (NDR3) and Holland (NED3) on the 16th and Belgium (BRT1 and 2), Denmark (TV2), Germany (ARD1, NDR3, SAT1 and ZDF) and Holland (NED1, 2 and 3) on the 17th and Germany and Holland again in the u.h.f. band on the 20th and 29th. Simon Hamer received pictures from Belgium, Denmark, France, Eire, Germany (ARD/WDR1 and NDR1, HR1, RTL+), Holland, Norway and Sweden in Band III and Denmark (TV2 Danmark), Germany (NDR3, RTL+, SAT1, SSVC, WEST3 and ZDF) and Sweden (SVT2) on several spots in the u.h.f. band on the 16th and Switzerland (+PTT SRG1) on Chs. E6 and 7 and +PTT/TS1 and +PTT/SSR1 on Chs. E31 and 34 respectively on the 17th.

The high pressure was just beginning to fall during the afternoon of July 12 and when we parked at Chiddingstone in Kent I found negative pictures from France (Canal+) on Ch. L5 and during the evening variable co-channel interference was seen in the u.h.f. band. Next morning, at 0755, I received strong pictures, in colour, from Holland (PTT-NL-AVVC) on Ch. E4 (62.25MHz) in Band I and a clock caption from ZDF, test-card from WDR1 and the morning news 'heute' distributed through Band III. This all died away around 1030. However for most of the evening of the 14th there was very heavy co-channel interference on many transmissions in the u.h.f. band and at 0445 on the 15th, after 'local' transmitters had closed down, I received strong pictures from Anglia TV on Ch. 21 and TSW on Ch. 45, but, by 0800 it was all over.

The next deadlines are: September 10, October 8 and November 5

LONG MEDIUM & SHORT

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

The signal ratings in LM&S follow an internationally agreed system in which a letter is used to signify an aspect of reception and a figure to denote the rating. The letters spell the code word SINPO (or SIO in a simplified version) - (S)trength of signal; (I)nterference; (N)oise; (P)ropagation disturbance; (O)verall merit. The ratings extend from 1 to 5.

A very potent signal, free from interference, noise and fading would rate as SINPO 55555. (Note that the format is not S5,I5,N5,P5,O5). Each aspect of the signal must be studied carefully to obtain the five figure rating. For an explanation of how to make the assessments refer to 'Starting Out', *SWM* October' 87.

Long Wave DX

Note: l.w. & m.w. frequencies in kHz; s.w. in MHz; Time in UTC (=GMT).

Quite a number of the l.w. stations were mentioned in the reports this time. An increase in the strength of the signal from Atlantic 252 has been noted by **Kenneth Buck** in Edinburgh. He says, "It now equals BBC4 from Westerglen, which is only 23 miles away on a line of site path. I think they must be running the full half megawatt now". However, the strongest signal to reach him stems from Kalundborg, Denmark on 243kHz (300kW) - no doubt the sea path helps, but quite weak signals reach him from Lahti, Finland 252 (200kW) and Oslo, Norway 216 (200kW).

MW Transatlantic DX

While searching the band in Grimsby, **Jim Willett** was surprised by the strange propagation conditions which enabled signals from the USA to reach him prior to those from Canada. He was delighted to hear Radio Globo in Rio on 1220 nearly every morning at 0200. Their signal generally rated SIO222, but at times their carrier appeared to be overmodulated and there was often a noticeable echo present, which suggests that the signal may have arrived via two paths.

The earliest signal to reach him stemmed from WINS in New York on 1010, which rated SIO222 at 2330. Jim also picked up the broadcasts from WABC in New York on 770 at 2350, which rated SIO222. The first signal from Canada became audible at 0010, it originated from CKOC in Hamilton, Ontario on 1150 and peaked SIO222. At 0015 he logged CJYQ in St.Johns, Newfoundland as SIO333. Later, he heard the Atlantic Beacon, Turks and Caicos Islands 1570 and the Caribbean Beacon, Anguilla 1610, both rated SIO222 around 0330.

Other MW DX

Some of the sky wave signals from stations in N.Africa have again been reaching the UK around dusk. At 2010, **Andy Cadier** (Folkestone) tuned to Alger, Algeria on 981 for the first time. He logged their signal as SIO444. In Cambridge, **David Wratten** picked up three of the broadcasts from Algeria while checking the band between 2200 and 2310. They stemmed from Les Trembles on 549, Algiers on 891 and Alger 981, all rated SIO333. A broadcast in Arabic on 891 attracted the attention of **Sheila Hughes** (Morden) at 2315, it proved to be from Algiers. Sheila also listened to songs in Arabic broadcast from Sidi Bennour, Morocco on 540 (32332 at 2325) and Les Trembles on 549 (22222 at 2335). Later, she logged Alger on 981 as 33333 at 2355.

MW Local Radio DX

Spectrum Radio, the new incremental station in London, may be heard on 920kHz in addition to their allocated frequency of 558kHz, which suffers from co-channel interference from an unofficial station. During a daytime visit to Oxford, **Marc Henry** found that he could receive both transmissions with his car radio, but only 558kHz could be heard at his home in Evesham. In Wootton, IOW **George Millmore** rated their 558kHz transmission as SIO333 and Andy Cadier (Folkestone) noted it as SIO444. It is also reaching **Roy Patrick** in Derby during the daytime!

Airport Information Radio may be heard on 1584kHz. Heathrow is served by a transmitter at Sipson Farm and reception in the areas nearby is good, e.g. **Thomas Barnett** rated it as SIO555 in Slough. Gatwick is served by a transmitter at Povey Cross, which also puts a good ground wave signal into the surrounding areas, e.g. strength 5 was quoted by **Jim Lyon** in Worthing. However, further afield the two transmissions interfere with each other so badly that it is almost impossible to receive either clearly. **John Coulter** has encountered this problem in Winchester. Whilst only a local service from each airport is intended, a much wider service could be provided by simply using two frequencies, intending air travellers would then be able to receive useful information long before they reach the airport concerned.

Some additional ILR stations now have split their m.w./v.h.f programming. **Paul Weston** (Kettering) says that the m.w. outlets of Chiltern Radio (792 + 828kHz) and Northants Radio (1557kHz) have become Super Gold. **Neil Wheatley** (Lytham St.Annes) informs me that Red Rose Radio is now calling its m.w. service on 999kHz Red Rose Gold.

Short Wave DX

From time to time the effects of solar flares have disturbed the ionosphere and severely disrupted reception in the h.f. bands, but during most days potent signals from many areas have reached the UK. The high level of solar activity is likely to continue, so more disturbances are expected.

The broadcasters using the **25MHz (11m)** band have now been joined by Radio HCJB in Quito, Ecuador on 25.950 (Cz, Ger, Fr, Sw, Da, Norw, Eng to Europe? 1800-2200). HCJB are leading the way in broadcast techniques as their transmission consists of only the upper sideband and a pilot carrier, as advocated by the last WARC for s.w. broadcasting in the future. Unfortunately a conventional a.m. receiver will not process their signal correctly, so listeners using one will find that the demodulated audio sounds distorted. Although a single sideband receiver will enable speech to be demodulated satisfactorily, it is necessary to phase-lock the carrier insertion oscillator to the pilot carrier to ensure that musical items will be

Long Wave DX Chart

Freq (kHz)	Station	Location	Power (W)	Dxer
153	DLF Donebach	Germany (W)	500	C,E,F,I,J,L,N,O
162	Allouis	France	2000	B,C,E,F,I,J,K,L,N,O,P
171	Kaliningrad	USSR	1000	C,H
171	Moscow	USSR	500	L*
177	Oranienburg	Germany (E)	750	C,F,H,I,J,K,L,N,O
183	Saarlouis	Germany (W)	2000	C,F,I,J,K,L,N,O,P
189	Motala	Sweden	300	C,H,J
189	Tbilisi	USSR	500	E*
198	BBC Droitwich	UK	500	A,H*,I,J,O
198	BBC Westerglen	UK	50	C,K,N
207	DLF Munich	Germany (W)	500	C,E,H,I
216	Roumoules	Monaco	1400	C,F*,I,J,L,N,O
216	Oslo	Norway	200	C,H,J*
225	Konstantinow	Poland	2000	C,F,I*,K,L*,M*,N,O
234	Junglinster	Luxembourg	2000	C,E,F,I*,J,L,N,O
243	Kalundborg	Denmark	300	C,E,F,H,I*,J,K,L,N,O
252	Tipaza	Algeria	1500	C,D*,E,H*,I*,L*
252	Lahti	Finland	200	C,H
252	Atlantic 252	S.Ireland	500	C,D,E,F,G,H,I,J,K,L,N,O
261	Burg (R.Volga)	Germany (E)	200	E,J,N,O
261	Moscow	USSR	2000	C,F,H,I*,L,N
270	Topolna	Czechoslovakia	1500	C,E,F,H,I*,L*,N
279	Minsk	USSR	500	C,H*,I*,L*,N

Note: Entries marked * were logged during darkness. All other entries were logged during daylight.

DXers:

A: Ted Agombar, Norwich.
B: Thomas Barnett, Slough.
C: Kenneth Buck, Edinburgh.
D: Andy Cadier, Folkestone.
E: Scott Caldwell, Warrington.
F: Jim Cash, Derby.
G: John Hepburn, Ashington.
H: Simon Holland, Douglas, I.O.M.
I: Sheila Hughes, Morden.
J: George Millmore, Wootton, I.O.W.
K: Ike Odoom, Glasgow.
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demodulated correctly. At present suitable receivers are in limited supply and they tend to be expensive, but no doubt that situation will change when the mass production of s.w. broadcast band s.s.b portables gets under way!

Good reception of the HCJB transmissions has been noted in the UK during most evenings. Listening in Prenton at 2100, **Kenneth Reece** rated their signal as 44444. Their transmissions have also been reaching Canada during some days. In Quebec, **Alan Roberts** logged it as 15222 at 2015. From time to time he also received the broadcasts from RTBF Brussels 25.645 (best SINPO 35434); SRI via Schwarzenburg, Switzerland 25.680 (25333); RNI via Kvitsoy, Norway 26.730 (15111); DW via Julich, W.Germany 25.740 (15222); Radio Yugoslavia, Belgrade 25.795 (25333); RFI via Issoudun, France 25.820 (25333); BBC via Daventry, UK 25.870 (25333). In Molepolole, Botswana, **P.R.Guruprasad** rated the broadcasts to E.Africa from Radio Moscow, USSR 25.780 (Eng 0300-1300) as 55544 at 0715.

Although intended for other areas, some Radio Australia's **21MHz (13m)** broadcasts have been reaching the UK. The transmission to C.Pacific areas via Shepparton 21.740 (Eng 2200-0730) was 34543 at 2255 by **David Edwardson** in Wallsend; to C,Asia via Darwin 21.525 (Eng 0100-0900) as 33323 at 0630 by **Ted Agombar** in Norwich; to S.Asia via Carnarvon 21.775 (Eng 0100-1100) as 33333 at 0915 by **Leo Barr** in Sunderland; to E.Asia via Darwin 21.825 (Eng 1100-1230) as 45434 at 1200 by **Darren Beasley** in Bridgwater.

Good reception of many of the 13m broadcasts to Europe was noted in the reports. They include Radio Japan via Yamata 21.500 (Sw, It, Fr, Eng, Jap 0530-0830), rated 55444 at 0715 by **Chris Shorten** in Norwich; UAE Radio Dubai 21.605 (Ar, Eng 0600-1645) 44444 at 1030 by **Roy Spencer** in Coventry; Radio Kuwait, Sulaibiyah 21.675 (Ar 0800-1800) SIO433 at 1305 by **Peter Hall** in Chichester; Voice of Israel Jerusalem 21.760 (Heb 0515-1645) 55444 at 1325 by **Ike Odoom** in Glasgow; WCSN Scotts Corner, Maine 21.780 (Eng 1400-1555) SIO444 at 1445 by John Coulter; Radio Japan via Moyabi, Gabon 21.700 (Eng, Jap 1500-1700) 34433 at 1528 by Andy Cadier; WYFR via Okeechobee, Florida 21.615 (Eng, Ger, It 1600-2145) 43434 at 2030 by **Cliff Stapleton** in Torquay; Radio HCJB Quito, Ecuador 21.470 (Cz, Ger, Sw, Eng, Norw, Da, Fr 1800-2200) 44544 at 2145 by **Tom Parrotte** in Weston-Super-Mare.

Some of the many broadcasts to other areas were also logged; BBC via Hong Kong 21.715 (Eng to C.Asia 0100-0900), logged as 24333 at 0424 by Kenneth Reece; Voice of the UAE in Abu Dhabi 21.735 (Ar to ?) 45554 at 0715 by **John Parry** in Northwich; Radio Japan via Moyabi, Gabon 21.690 (Eng, Jap to Middle East, E.Africa 0700-0830) SIO332 at 0730 by **Brian Hallett** in Burgess Hill; Radio Moscow, USSR 21.785 (Eng, So to E.Africa 0800-1730) 44444 at 0840 by Sheila Hughes; Radio Portugal via San Gabriel 21.700 (Port to Africa 0800-1430) 25333 at 1136 by **Jim Cash** in Swanwick; Radio Yugoslavia, Belgrade 21.555 (Eng to E.Asia 1200-1230) 33333 at 1229 by **Rhoderick Illman** in Thumrait, Oman; SRI via Schwarzenburg 21.695 (Eng, Fr, Ger to S.Asia 1315-1500) SIO444 at 1350 by Kenneth Buck; Radio Finland via Pori 21.550 (Eng, Sw, Fin to E.Africa, Middle East 1405-1557) SIO443 at 1505 by Thomas Barnett; Radio DW via Cyclops, Malta 21.680 (Ur, Hi, Eng to Middle East, S.Asia 1430-1650) 43432 at 1515 by **John Sadler** in Bishops Stortford; BBC via Ascension Island 21.660 (Eng to S.Africa 0700-1745) 55555 at 1600 by P.R.Guruprasad (Botswana); WSHB Cypress Creek, USA 21.780 (Eng to E.USA 1800-1955) 55545 at 1938 by **Robin Clark** in Plymouth; Radio Nederlands via Bonaire, Ned.Antilles 21.685 (Eng, Fr, Du to W.Africa 1830-2125) SIO333 at 2035 by **Ted Walden Vincent** in Gt.Yarmouth; also 21.710 (Ar to N.Africa 1730-1825) SIO444 at 1735 by **Philip Rambaut** in Macclesfield.

The **17MHz (16m)** broadcasts from Radio New Zealand Int., Wellington on 17.675 have reached our shores during some mornings. Owing to co-channel interference from Radio Moscow, USSR on 17.680, RNZI moved 5kHz lower to 17.675, but reception there is still marred by interference from Radio Moscow, as they use 17.670 and 17.680 simultaneously and the upper and lower sidebands mingle to produce a blanket effect. Listening in Northampton, **Alan Smith** rated the RNZI transmission in English from 0430-0815 as 32232 at 0558.

Some of the 16m broadcasts from Radio Australia have also been received here. Their transmission to S.E.Asia via Shepparton 17.715 (Eng 2200-0000) was rated as 34343 at 2220 by Cliff Stapleton; to E/C.Asia via Darwin 17.750 (Eng, Chin, Fr 2300-0900) as 22222 at 0355 by Jim Cash; to C.Asia via Carnarvon 17.630 (Eng, Chin 0000-0900) as 22422 at 0716 by Kenneth Reece.

Also received here, were some of the many other broadcasts to areas outside Europe, namely Radio Japan via Yamata 17.765 (Chin, Jap, Eng 0300-0900) 44344 at 0725 by Chris Shorten; KHBI Saipan, N.Mariana Islands 17.780 (Eng to E/C.Asia 0400-0755), noted as 43553 at 0745 by John Parry; Africa No.1, Gabon 17.630 (Fr, Eng to W.Africa 0700-1600) SIO211 at 0926 by Philip Rambaut; Voice of Greece, Athens 17.535 (Gr, Eng to USA 1200-1250) 45454 at 1240 by Roy Spencer; Radio Sweden via Horby 17.880 (Sw, Fr, Eng to USA 1430-1630) SIO333 at 1510 by Thomas Barnett; Radio RSA Johannesburg, S.Africa 17.835 (Eng to Africa 1400-1600) 32333 at 1550 by Tom Parrotte; RTM Tanger, Morocco 17.815 (Eng, Fr to N.Africa, Middle East 1700-1900) 44333 at 1700 by Sheila Hughes; VOA via Bethany, USA 17.800 (Eng to W.Africa 1600-2200) 44334 at 1826 by Ted Agombar; Radio Nederlands via Bonaire, Ned.Antilles 17.605 (Eng, Fr, Du to W.Africa 1830-2125) 32322 at 1830 by John Sadler; KVOH Los Angeles, USA 17.775 (Sp, Eng to C.America 1300-0200) 23343 at 2013 by Robin Clark; RNE via Noblejas, Spain 17.890 (Sp to Africa 1300-2145) SIO333 at 2026 by Ted Walden-Vincent; VOA via Greenville, USA 17.785 (Eng to W.Africa 1600-2200) SIO333 at 2030 by Peter Hall; WYFR via Okeechobee, Florida 17.612 (Eng, Ar, Fr, Port to W.Africa 1600-2245) 31342 at 2105 by Darren Beasley; Radio Norway Int via Kvitsoy 17.730 (Norw, Eng to W.Africa, S.America 2200-2230) 32233 at 2221 by Leo Barr.

The broadcasters using the 16m band for listeners in Europe include Radio Sophia, Bulgaria 17.825 (Ger, Fr, Eng 0530-0700), rated SIO222 at 0630 by **Francis Hearne** in Bristol; Voice of Israel, Jerusalem 17.545 (Heb 0300-2215) 43222 at 1325 by Ike Odoom; Radio Moscow, USSR 17.695 (Eng 1600-2100) 55555 at 1700 by **Darran Taplin** in Brenchley; Radio HCJB, Ecuador 17.790 (Cz, Ger, Eng, SW, Norw, Da, Fr, Sp 1700-2230) SIO344 at 1925 by Kenneth Buck; RCI via Sackville 17.875 (Fr, Eng 2030-2200) SIO422 at 2100 by Brian Hallett.

Some of the **15MHz (19m)** broadcasts from Radio Australia via Shepparton reach the UK at remarkable strength, despite the fact that they are intended for other areas. Their transmission to SE.Asia 15.465 (Eng 2100-0730) was heard at 0700 by **Donald Blashill** in Cheltenham; to S.Pacific 15.240 (Eng 2200-0830) was rated as 44433 at 0830 by Tom Parrotte; to C.Pacific, W.USA 15.160 (Eng, Fr 0030-0830) 44444 at 0635 by Ted Agombar; to C/W.Pacific areas 15.560 (Eng 0030-0600) 44444 at 0554 by Kenneth Reece.

Most of the broadcasts to Europe in this band are potent signals here too! Those noted stemmed from Radio HCJB Quito, Ecuador 15.270 (Cz, Sw, Norw, Da, Ger, Eng 0500-0830), rated as SIO444 at 0800 by Brian Hallett; RCI via Daventry, UK 15.325 (Pol, Russ, Fr, Eng 1500-1630) 32221 at 1622 by Rhoderick Illman (Oman); UAE Radio Dubai 15.435 (Ar, Eng 0600-2050) SIO423 at 1638 by Philip Rambaut; Radio Pakistan, Islamabad 15.605 (Ur, Eng 1645-1900) 54444 at 1720 by Chris Shorten; VOA via Tanger, Morocco 15.205 (Eng 1700-2200) 43454 at 1745 by Robin Clark; Radio Korea, Seoul 15.575 (Ar, It, Eng, Sp, Port, Ger 1645-2300) SIO322 at 1830 by **Ron Pearce** in Bungay; Radio Sophia, Bulgaria 15.330 (Eng, It, Ger, Fr 1830-0025) SIO534 at 1840 by John Sadler; Radio

Freq kHz	Station	ILR BBC	Power (kW)	Dxer
558	Spectrum R	I	7.50	D,L,P,Q,S,W,Y,2
585	R.Solway	B	2.00	E,F,I*,R,T,1*
603	Invicta Snd (Coast)	I	0.10	D,N,Y,2
603	R.Gloucester	B	0.10	F,G,P,R,T,2
630	R.Bedfordshire	B	0.20	D,F,K,N,P,T,Y,2
630	R.Cornwall	B	2.00	M*,P
657	R.Clwyd	B	2.00	E*,N,P,T,1*,2
666	DevonAir R	I	0.34	N,P,V,X,2
666	R.York	B	0.80	I*,M,T,V,1,2
729	BBC Essex	B	0.20	D,P,U,Y,2
738	Hereford/Worcester	B	0.037	G,K,T,2
756	R.Cumbria	B	1.00	I*,R
756	R.Shropshire	B	0.63	M,P,T,2
765	BBC Essex	B	0.50	D,F,P,T,U,Y,2
774	R.Kent	B	0.70	D,N,P
774	R.Leeds	B	0.50	I*,T,1*
774	Severn Sound	I	0.14	G,P,T,2
792	Chiltern R	I	0.27	D,P,T,U,Y,Z,2
792	R.Foyle	B	1.00	M
801	R.Devon	B	2.00	I*,P,R,T,Y,2
819	Hereford/Worcester	B	0.037	T,2
828	2CR	I	0.27	P
828	R.WM	B	0.20	G,T
828	R.Aire	I	0.12	M
828	Chiltern R	I	0.20	D,Y,Z,2
837	R.Cumbria	B	1.50	I*,T,1*
837	R.Leicester	B	0.45	G,N,P,T,Y,2
855	R.Devon	B	1.00	P
855	R.Lancashire	B	1.50	E*,S,T,1*
855	R.Norfolk	B	1.50	D,N,T,Y,2
873	R.Norfolk	B	0.30	D,F,N,P,Y,2
936	GWR (Brunel R.)	I	0.18	G,N,P,T,2
945	R.Trent (GEM-AM)	I	0.20	G,I*,P,T,X,2
954	DevonAir R	I	0.32	N,P
954	R.Wyvern	I	0.16	I*,T,2
990	Beacon R. (WABC)	I	0.09	T
990	R.Devon	B	1.00	P
990	Hallam R.(C.Gold)	I	0.25	2
990	Spectrum	I	?	D,Q,W,2
999	Red Rose R	I	0.80	E*,T,1*
999	R.Solent	B	1.00	D,N,P,2
999	R.Trent (GEM-AM)	I	0.25	2
1026	R.Cambridgeshire	B	0.50	N,T,U,Y,2
1026	Downtown R	I	1.70	M,R,1*
1026	R.Jersey	B	1.00	D,P
1035	R.Kent	B	0.50	D,N,P,Y,2
1035	NorthSound R	I	0.78	I*
1035	R.Sheffield	B	1.00	T
1035	West Sound	I	0.32	M,R
1107	R.Northampton	B	0.50	G,N,2
1116	R.Derby	B	1.20	M,T,1*,2
1116	R.Guernsey	B	0.50	D,P,2
1152	R.Broadland	I	0.83	L*,M*,2
1152	R.Clyde (Clyde 2)	I	3.60	R
1152	LBC (L.Talkback R)	I	23.50	D,N,P
1152	Metro R. (GNR)	I	1.80	I*
1152	Piccadilly R	I	1.50	E*,T,1*
1161	R.Bedfordshire	B	0.10	V,2
1161	GWR (Brunel R.)	I	0.16	V
1161	R.Sussex	B	1.00	D,N,P
1161	R.Tay	I	1.40	R
1161	Viking R.(Gold)	I	0.35	T
1170	Ocean Sound	I	0.12	N,P
1170	R.Orwell	I	0.28	D,U,2
1170	Signal R	I	0.20	E*,F,T
1170	TFM Radio (GNR)	I	0.32	I*,L*
1242	Invicta Snd(Coast)	I	0.32	B,D,N,Q,2
1242	Isle of Wight R	I	0.50	H,I*,M,P,Q,S,2
1251	Saxon Rlm	I	0.74	2
1557	R.Lancashire	B	0.25	M,T,1*
1557	Chiltern R	I	0.76	C*,D,I*,Z,2
1557	Ocean Sound	I	0.50	P,2
1584	Gatwick	I	?	O,Q
1584	Heathrow	I	?	B,H,J,Y,2
1584	R.Nottingham	B	1.00	T,2
1584	R.Shropshire	B	0.50	M,P,2
1584	R.Tay	I	0.21	M
1602	R.Kent	B	0.25	D,F,M,N,P,S,Y,2

Note: Entries marked * were logged during darkness. All other entries were logged during daylight.

DXers:
A: Ted Agombar, Norwich.
B: Thomas Barnett, Slough.
C: Darren Beasley, Bridgwater.
D: Andy Cadier, Folkestone.
E: Scott Caldwell, Warrington.
F: Jim Cash, Derby.
G: Matthew Clarke, Birmingham.
H: John Coulter, Winchester.
I: Adrian Don, while near Alnwick.
J: Geoff Harris, Sturminster Newton.
K: Francis Hearne, Bristol.
L: Marc Henry, Evesham.
M: Simon Holland, Douglas I.O.M.
N: Sheila Hughes, Morden.
O: Jim Lyon, Worthing.
P: George Millmore, Wootton, I.O.W.
Q: John Nash, Brighton.
R: Ike Odoom, Glasgow.
S: Roy Patrick, Derby.
T: Philip Rambaut, Macclesfield.
U: Chris Shorten, Norwich
V: Roy Spencer, Coventry
W: Darran Taplin, Tonbridge
X: Lucian Thomas, London
Y: Phil Townsend, London
Z: Paul Weston, Kettering
1: Neil Wheatley, Lytham St Anes
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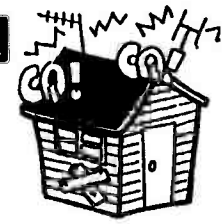

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Freq kHz	Station	Country	UTC	DXer
531	Ain Beida	Algeria	600	L*
531	Leipzig	Germany (E)	100	D*,L,S
531	Oviedo	Spain	10	E*
531	Beromunster	Switzerland	500	S
540	BRT-2 Wavre	Belgium	150/50	E,L,Q,S
540	Sidi Bennour	Morocco	600	J*
549	Les Trembles	Algeria	600	J*,S*
549	DLF Bayreuth	Germany (W)	200	E,J*,L,Q,S
558	Espoo	Finland	100	S*
558	La Coruna	Spain	10	E*
558	Valencia	Spain	20	S*
567	West Berlin	Germany (W)	100	S*
567	RTE-1 Tullamore	S.Ireland	500	D*,E,J,L,M,Q,S
576	Stuttgart	Germany (W)	300	L,S
585	FIP Paris	France	8	S
585	RNE-1 Madrid	Spain	200	E*,J*,L,P,S*
594	HRF Frankfurt	Germany (W)	400	L,S
603	Sevilla	Spain	20	D*
603	BBC-R4 Newcastle	UK	2	E,G*
612	RTE-2 Athlone	S.Ireland	100	D,E,L,M,S
621	RTBF-1 Wavre	Belgium	300	E,J,L,Q,S
639	Liblice	Czechoslovakia	1500	L,S
639	La Coruna	Spain	100	J*
648	BBC Orfordness	UK	500	E,G*,J,L,Q,S*
657	Burg	Germany (E)	250	S*
657	BBC-R Wales Wrexham	UK	2	E,S*
666	Bodenseesender	Germany (W)	300/180	S*
675	Marseille	France	600	S*
675	Hilversum-3 Lopic	Holland	120	E,J,L,O,Q,S
684	RNE-1 Sevilla	Spain	250	S*
684	Beograd	Yugoslavia	2000	S*
693	BBC-R2 Stagshaw	UK	50	G*
702	Aachen/Flensburg	Germany (W)	5	S*
711	Rennes	France	300	E,J,L,S,Q
711	Heidelberg	Germany (W)	5	S*
720	WDR-2 Langenberg	Germany (W)	200	L
720	BBC-R4 Lisnagarvey	N.Ireland	10	G*,H*,L
720	BBC-R4 Lots Rd London	UK	0.5	E,S*
729	RTE-1 Cork	S.Ireland	10	L
729	Oviedo	Spain	50	S*
738	Paris	France	4	L,S*
738	Poznan	Poland	300	S*
738	RNE-1 Barcelona	Spain	250	J,S*
747	Hilversum-2 Flevo	Holland	400	A,E,J,L,O,Q,S
756	Brunswick	Germany (W)	800/200	J,S
765	Sottens	Switzerland	500	S*
774	RNE-1 San Sebastian	Spain	60	J
783	Burg	Germany (E)	1000	D*,E*,L,S*
810	BBC Scot.Westerglen	UK	100	E,G*,J*,M,S*
846	Rome	Italy	540	E*,S*
864	Paris	France	300	E,J,L,Q,S
873	AFN Frankfurt	Germany (W)	150	D*,E*,J*,M*,S*
882	BBC-Wales Washford	UK	70	E*,F,G*,J,L,M,Q
891	Algiers	Algeria	600/300	E*,J*,P,S*
891	Hulsberg	Holland	20	S
900	Milan	Italy	600	S*
909	BBC-R2 Moorside Edge	UK	200	G*,L
909	BBC-R2 Westerglen	UK	50	M
927	BRT-1 Wolvertem	Belgium	300	E,L,O,R*,S
954	RCE Madrid	Spain	20	E*
963	Pori	Finland	600	E*,J*,P*,S*
963	Paris	France	8	L
972	NDR/WDR Hamburg	Germany (W)	300	E,L,M*,S
981	Alger	Algeria	600/300	C*,E*,J*,S*
990	RIAS Berlin	Germany (W)	300	S*
990	SER R.Bilbao	Spain	10	S*
999	Hoyerswerda	Germany (E)	20	S*
999	Al Khaisah	Qatar	50	K
999	R.Popular, Madrid	Spain	20	J*,S*
1008	Hilversum-5 Flevo	Holland	400	E,J,M*,O,Q,S
1017	SWF Wolfsheim	Germany (W)	600	E*,S*
1035	Milan	Italy	50	J*
1044	DDR-1 Burg	Germany (E)	250	E*,J,S*
1053	BBC-R1 Stagshaw	UK	50	G*
1062	Kalundborg	Denmark	250	E*,J*,S
1071	Brest	France	20	E,J,L,S
1080	La Coruna	Spain	3	E*
1089	BBC-R1 Moorside Edge	UK	150	G*
1107	RNE-5 Barcelona	Spain	20	S*
1125	La Louviere	Belgium	20	L,S
1134	Valencia	Spain	10	J*,R
1134	Zadar	Yugoslavia	1200	E
1143	AFN via Stuttgart	Germany (W)	10	H*
1143	Kaliningrad	USSR	150	E*
1152	RNE-5 Zamora	Spain	?	E*,S*
1161	Strasbourg (F.Int)	France	200	D*,S*
1179	Solvesborg	Sweden	600	E*,J*,P
1188	Kuurne	Belgium	5	L,S
1197	BBC-R3 Bournemouth	UK	0.5	L
1206	Bordeaux	France	100	E*,R*
1206	Wroclaw	Poland	200	J*,S*
1215	BBC-R3 Moorside Edge	UK	100	L
1215	BBC-R3 Newcastle	UK	2	G*
1224	COPE Madrid	Spain	20	E*
1233	Prague	Czechoslovakia	400	E*,J*,S*
1233	Al Khatisah	Qatar	100	K*
1242	Marseille	France	150	R*
1251	Huisberg	Netherlands	10	E*
1260	SER San Sebastian	Spain	10	J*
1269	Neuminster	Germany (W)	600	D*,E*,J,L,S
1278	Strasbourg	France	300	J
1278	RTE-2 Dublin/Cork	Ireland (S)	10	D,E,J,S
1296	BBC Orfordness	UK	500	E*,G*,H*,L
1296	Baku	USSR	150	K
1314	Kvitsoy	Norway	1200	E,J*,M,S
1323	R.Moscow via Leipzig	Germany (E)	150	D,E*
1332	Rome	Italy	300	E,J
1341	BBC-Ulst Lisnagarvey	N.Ireland	100	D,E*,L
1350	Nancy/Nice	France	100	B*,E*,S*
1359	RBI Berlin	Germany (E)	250/100	E*,J
1368	Manx Radio, Foxdale	I.O.M	20	N*
1377	Lille	France	300	A,B*,E,J,L,Q,S
1386	Kaunas	USSR	1000	E*
1395	R.Tirana via LushnjeAlbania	1000	B*,E*,J*
1404	Brest	France	20	E*,L
1413	RCE Zaragoza	Spain	20	E*,J*
1413	Pristina	Yugoslavia	1000	B*,L*
1422	Heusweiler	Germany (W)	600	B*,E*,J*,L,M*
1440	Marnach	Luxembourg	1200	E*,I,J,L,M,S
1449	BBC-R4 Redmoss	UK	2	E*
1458	R.Tirana, Lushnje	Albania	500	D*
1467	TWR Monte Carlo	Monaco	1000/400	B*,D*,E*,J*
1476	Wien-Bisamberg	Austria	600	B*,E*
1485	BBC-R4 Carlisle	UK	1	H*
1494	Leningrad	USSR	1000	B*,E*
1503	Stargard	Poland	300	B*,E*,J*,S*
1512	BRT Wolvertem	Belgium	600	A,E*,J*,L,O,P,S
1530	Vatican Radio, Rome	Italy	150/450	D*,E*,J*
1539	DLF Mainflingen	Germany (W)	700	E*,S*
1557	Nice	France	300	E*
1566	Sarnen	Switzerland	300	B*
1575	RBI via Burg	Germany (E)	250	B*,E*,I,L
1584	Pamplona	Spain	2	B*
1593	Langenberg	Germany (W)	400/800	B*,E*,J*,M,S

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

Bangladesh, Dacca 15.225 (Eng, Ben 1815-2000) SIO454 at 1858 by Kenneth Buck; WWCR Nashville, USA 15.690 (Eng 1200-0100) 34333 at 2000 by Roy Patrick; Voice of Vietnam, Hanoi 15.010 (Eng, Russ, Viet, Sp 1600-2130) SIO444 at 2030 by **Alf Gray** in Birmingham; Radio Yugoslavia, Belgrade 15.105 (Eng 2100-2145, also to USA) 54444 at 2134 by Jim Cash; Voice of Israel, Jerusalem 15.640 (Fr, Eng, Yi 2100-2225) SIO444 at 2150 by Peter Hall; WINB Red Lion, USA 15.185 (Eng 2003-2245) 34343 at 2240 by Cliff Stapleton.

Some of the many 19m broadcasts to areas outside Europe stem from Radio DW via Wertachtal, W.Germany 15.185 (Eng, Fr to W.Africa 0600-0750), logged as SIO544 at 0615 by Francis Hearne; VOA via Greenville, USA 15.120 (Eng to C.America 1000-1200) 43333 at 1045 by Alan Smith; Radio Austria Int., Vienna 15.430 (Ger, Eng to E.Asia 1100-1400) 45444 at 1157 by Roy Spencer; Radio Tirana, Albania 16.230 (Chin to C.Asia 1300-1400) 53343 at 1300 by Ike Odoom; FEBA Radio, Seychelles 15.325 (Ta, Hi to S.Asia 1300-1458), heard at 1312 by P.R.Guruprasad (Botswana); Vatican Radio, Rome 15.090 (Hi, Ta, Mal, Eng to S.Asia 1500-1555) SIO555 at 1550 by Thomas Barnett; VOA via Greenville, USA 15.580 (Eng to W.Africa 1600-2200) 53324 at 1814 by **Scott Caldwell** in Warrington; Radio RSA Johannesburg, S.Africa 15.220 (Port to W.Africa 1900-2100), heard at 1900 by **John Stevens** in Largs; Africa No.1, Gabon 15.475 (Fr, Eng to W.Africa 1600-2110) 43554 at 1910 by John Parry; RUV Reykjavik, Iceland 15.767 (Ice to USA 1935-2010) SIO444 at 1935 by **Simon Hamer** in New Radnor; Radio Portugal, Lisbon 15.250 (Port, Eng, Fr to Africa 1400-2100) 43433 at 2028 by Darran Taplin; Radio Damascus, Syria 15.095 (Eng to USA 2110-2210) SIO222 at 2120 by **Julian Wood** in Elgin; BBC via Ascension Island 15.400 (Eng to Africa 1500-2300) 54444 at 2140 by Andy Cadier; Radio Vilnius, Lithuania 15.485 (Eng to USA 2200-2230) 44444 at 2207 by Leo Barr; VOA via Tinang, Philippines 15.290 (Eng to E.Asia 2200-0100) 22332 at 2220 by **Robin Harvey** in Bourne; Radio Kiev, Ukraine 15.485 (Uk, Eng to USA 2300-0000) 55555 at 2301 by David Edwardson.

The broadcasters using the **13MHz (22m)** band include WSHB Cypress Creek, USA 13.760 (Eng, Sp to C.America 0400-0555), logged as 34333 at 0450 by Kenneth Reece; Radio Australia via Shepparton 13.705 (Eng to C.Pacific 0600-0830), noted as 'good' by Donald Blashill; WYFR via Okeechobee, Florida 13.760 (Eng to Europe 0600-0745), heard by **Lucian Thomas** in London; Radio Austria Int., Vienna 13.730 (Ger, Fr, Eng, Sp, to Europe 0400-1700), rated as SIO555 at 0730 by Alf Gray; AWR Agat, Guam 13.720 (Eng, In, Tag 1000-1300) 45344 at 1030 by P.R.Guruprasad (Botswana); Radio Australia via Carnarvon 13.745 (Eng to S.Asia 1430-1700) SIO454 at 1530 by Kenneth Buck; Radio Pakistan, Islamabad 13.665 (Ur, Eng to N.Africa 1315-1630) 44444 at 1610 by Chris Shorten; WHRI Noblesville, USA 13.760 (Eng, Sp, Port, Yu to E.USA, Europe 1700-0000) SIO222 at 1710 by Philip Rambaut; Voice of Israel, Jerusalem 13.750 (Heb to E.Europe 0300-2215) SIO444 at 1835 by John Coulter; Radio Kuwait, Sulaibiyah 13.610 (Eng, Ar to Europe, USA 1800-2100) SIO444 at 1851 by Ron Pearce; ISBS Reykjavik 13.855 (Ic to Europe 1855-1930) SIO444 at 1915 by Simon Hamer; Radio Baghdad, Iraq 13.660 (Eng to Europe 2000-2200), heard at 2000 by John Stevens; Radio Nederlands via Flevo 13.700 (Fr, Ar, Eng to E/W. Africa 1830-2125) 34554 at 2048 by Jim Cash; WCSN Scotts Corner, Maine 13.770 (Eng, Ger, Fr to Europe 2000-2155) 55544 at 2140 by Andy Cadier; Voice of the UAE in Abu Dhabi 13.605 (Eng to N.Africa 2200-0000) 54444 at 2202 by Darren Beasley.

Quite a number of the **11MHz (25m)** broadcasts to Europe were noted in the reports. They stemmed from WYFR via Okeechobee, Florida 11.580 (Ger, Eng, It 0400-0700), rated as 44544 at 0548 by Kenneth Reece; Radio Finland via Pori 11.755 (Fin, Ger, Sw, Eng 0525-0655), rated as 55444 at 0639 by Roy Spencer; Radio HCJB Quito, Ecuador 11.835 (Eng 0700-0830) 33333 at 0730 by **Ted Gould** in London; UAE Radio Dubai 11.795 (Eng 1600-1640) SIO433 at 1630 by Kenneth Buck; Radio Pakistan, Islamabad 11.570 (Eng 1720-1800) 55445 at 1740 by Ike Odoom; Radio Afghanistan via USSR 11.830 (Ger, Eng, Fr 1700-2000) 44333 at 1835 by Ted Agombar; RTV Sfax, Tunisia 11.550 (Ar 0430-2345) SIO444 at 1905 by John Coulter; RUV Reykjavik, Iceland 11.418 (Ic 1855-1930) SIO333 at 1915 by Simon Hamer; Voice of Israel, Jerusalem 11.605 (Eng Fr, Russ, Yi 1900-2225) 55545 at 1915 by Chris Shorten; AIR via Aligarh, India 11.620 (Eng, Hi 1845-2045) SIO433 at 1930 by Alf Gray; Radio Romania Int, Bucharest 11.940 (Ger, Eng, Fr 1900-2126) 44444 at 2005 by David Edwardson; Radio Damascus, Syria 12.085 (Ger, Fr, Eng 1805-2105) SIO444 at 2020 by Brian Hallett; Radio Beijing, China 11.500 (Russ, Ger, Eng 1700-2155) 43433 at 2025 by Tom Parrotte; Radio Sophia, Bulgaria 11.660 (Ger, It, Fr, Eng 1830-2100) SIO222 at 2048 by Julian Wood; Radio Sweden via Horby 11.705 (Eng, Sp, Sw 2100-2230, also to S.America) 53433 at 2105 by John Sadler; Radio Peace and Progress, USSR 11.830 (Eng 2100-2200) 55433 at 2136 by Andy Cadier; RHC Havana, Cuba via USSR 11.705 (Fr, Eng 2100-2300) 43454 at 2210 by Darren Beasley; Radio Japan via Moyabi, Gabon 11.835 (Jap, Eng 2200-0000) 43434 at 2345 by Cliff Stapleton.

A few of the many broadcasts to areas outside Europe were also noted: KLNS Anchor Point, Alaska 11.715 (Eng to E.Asia 0800-0900), logged as 33233 at 0800 by Alan Smith; BBC via Kranji, Singapore 11.920 (Ben, Hi to S.Asia 1330-1445) 41232 at 1435 by P.R.Guruprasad (Botswana); TWR Agana, Guam 11.910 (Eng to E.Africa, Middle East 1600-1700) 34332 at 1621 by Rhoderick Illman (Oman); SRI via Schwarzenburg, Switzerland 11.955 (Ar, Eng, Ger, Fr to Africa 1715-2000), heard at 1945 by Donald Blashill; RAI, Rome 11.800 (Eng to Middle East 2025-2045) 43433 at 2030 by Darran Taplin; Radio Vilnius, Lithuania 11.790 (Eng to USA 2200-2230) 44444 at 2200 by Sheila Hughes.

Good reception over long

DXers:
A: Ted Agombar, Norwich.
B: Darren Beasley, Bridgwater.
C: Andy Cadier, Folkestone.
D: Scott Caldwell, Warrington.
E: Jim Cash, Swanwick.
F: Matthew Clarke, Birmingham.
G: Adrian Don, while near Alnwick.
H: Marc Henry, Evesham.
I: John Hepburn, Ashington.
J: Sheila Hughes, Morden.
K: Rhoderick Illman, Thumrait, Oman.
L: George Millmore, Wootton I.O.W.
M: Ike Odoom, Glasgow.
N: Roy Patrick, Derby.
O: Chris Shorten, Norwich.
P: Roy Spencer, Coventry.
Q: Phil Townsend, London.
R: Paul Weston, Kettering.
S: David Wratten, Cambridge.

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SEEN & HEARD

Equipment Used

Ted Agombar: Grundig Satellit 400 + random wire.
Thomas Barnett: Kenwood R2000 + random wire.
Leo Barr: Matsui MR4099 + Howes active antenna with 2m vertical wire.
Darren Beasley: Philips D2935 + Hexagon loop or a.t.u. + 10m random wire.
Donald Blashill: Philips D2935 portable + built-in whip.
Kenneth Buck: Lowe HF225 + random wire or loop.
Andy Cadier: Saisho SW5000 + 40m random wire or Datong active antenna.
Scott Caldwell: Saisho 2000 + random wire or Toshiba RT-SX1 + loop.
Jim Cash: Kenwood R5000 + trap dipole.
Robin Clark: Saisho SW5000 + 16m random wire.
Matthew Clarke: Sony Walkman radio cassette.
John Coulter: Yaesu FRG-7 + random wire.
Ron Damp: Racal RA17 + random wire or Sangean ATS803A portable.
Adrian Don: Philips 752 digital car radio + whip antenna on car.
David Edwardson: Trio R600 + trap dipole 22m long.
Ted Gould: Sony ICF7601L portable + built-in whip
Alf Gray: Codar CR70 + Codar ATU + Ex-Army rod antenna.
P.R.Guruprasad: Sony 7600DA + built-in whip.
Peter Hall: Lowe HF225 + folded dipole.
Brian Hallett: Trio R2000 + 10m random wire.
Simon Hamer: Grundig S1400 + 19m wire.
Geoff Harris: Panasonic RF1403L portable + hexagon loop.
Robin Harvey: Matsui MR 4099 + s.w. loop.
Francis Hearne: Sharp GFA3 cassette radio + random wire.
Marc Henry: Car radio + whip or Roberts R25 portable.
John Hepburn: Selena Vega 215 portable.
Simon Holland: Sangean ATS-803A portable + built-in whip.
Sheila Hughes: Panasonic DR48 + 15m inverted L or Sony ICF7600DS portable.
Rhoderick Illman: Sony ICF 7600DS + 23m random wire.
Jim Lyon: Uniden CR2021 + random wire.
George Millmore: Racal RA17L + random wire or Tatung TMR 7602 portable.
John Nash: Kenwood R5000 + Datong AD370 active antenna.
Ike Odoom: Philips D2935 portable.
Fred Pallant: Trio R2000 + random wire in loft.
Tom Parrotte: Sony ICF7600 + a.t.u. + 7m vertical.
John Parry: Realistic DX-400 + 33m random wire.
Roy Patrick: Lowe HF125 + 20m wire.
Ron Pearce: Home built one valve (1C5G) straight RX.
Philip Rambaut: Int.Marine Radio R.700M + random wire.
Kenneth Reece: Icom R9000 or Kenwood R5000 + delta loop.
Alan Roberts: Lowe HF225 + dipole or Panasonic RF-B40 + whip.
John Sadler: DX-400 or Omega 4020 + a.t.u. + s.w. Loop.
Chris Shorten: Matsui MR4099 portable.
Alan Smith: Matsui MR4099 + Mizuho KX-3 a.t.u. + vertical dipole.
Roy Spencer: Realistic DX200 + 0.5m loop or DX400 + a.t.u. + random wire.
Cliff Stapleton: Trio R1000 + dipole or 25m random wire.
John Stevens: Hammarlund HQ 180 or Icom R70 + random wire.
Darran Taplin: Lowe HF225 + Global 1000 a.t.u. + 30m random wire.
Lucian Thomas: Panasonic RF-1680L + short wire
Phil Townsend: Lowe SRX-30 + a.t.u. + random wire or loop.
Ted Walden-Vincent: Grundig Satellit 1400 + random wire.
Neil Wheatley: Sangean ATS 803 portable.
Jim Willett: RCA AR77 + Diawa CL-22 a.t.u. + X dipole in loft.
Julian Wood: Trio R2000 + Yaesu FRT 7700 a.t.u. + 3m wire.
David Wratten: Philips D2999 + loop or Trio R2000 + a.t.u. + 30m random wire.

		USA		
770	WABC	New York, NY	2350	A
880	WCBS	New York, NY	0100	A
1010	WINS	New York, NY	2330	A
1560	WQXR	New York, NY	0230	A
		Canada		
930	CJYQ	St.John's, NF	0015	A
950	CHER	Sydney, NS	0200	A
1150	CKOC	Hamilton, ON	0010	A
		C.America & Caribbean		
1570	Atlantic Beacon	Turks & Caicos Ils	0320	A
1610	Caribbean Beacon	The Valley,Anguilla	0330	A
		South America		
1220	R.GloboRio	Brazil	0200	A

DXers:
A: Jim Willett, Grimsby.

Peter Easton's listening post in Edinburgh.

Tropical Band Chart

Freq	Station	Country	UTC	DXer
3.215	R.Orange	S.Africa	0317	C,D,O
3.220	R.Togo, Lome	Togo	2055	C,I
3.255	BBC via Maseru	Lesotho	1920	O
3.270	SWABC 1, Namibia	S.W.Africa	2026	C,M
3.300	R.Cultural	Guatemala	0412	C
3.315	SLBS Freetown	Sierra Leone	2140	C
3.355	R.Botswana	Gaborone	1618	D
3.365	GBC Radio 2	Ghana	2210	M
3.905	AIR Delhi	India	1923	L
3.915	BBC Kranji	Singapore	2023	B
3.925	AIR Delhi	India	0100	O
3.955	BBC Daventry	England	2100	A,E,G,H
3.965	RFI Paris	France	2140	B,G
3.980	R.Pakistan	Islamabad	2300	O
3.980	VOA Munich	W.Germany	2120	B,G
3.985	R.Beijing, China	via SRI Berne	2110	B,C,G
3.985	SRI Berne	Switzerland	1847	B,H
3.990	VOA Monrovia	Liberia	0418	B
3.995	DW Cologne (Julich)	W.Germany	1955	B,G,N
4.719	RRI Ujung Padang	Indonesia	2100	O
4.735	Xinjiang	China	2225	C,F
4.740	R.Afghanistan	via USSR	1824	B
4.750	R.Bertoura	Cameroon	2030	O
4.760	ELWA Monrovia	Liberia	2055	B,F,I
4.765	Brazzaville	Pep.Rep.Congo	1920	H,I,J,K
4.770	FRCN Kaduna	Nigeria	2030	C,G,O
4.775	R.Gabon, Libreville	Gabon	2200	F
4.775	RRI Jakarta	Indonesia	1958	C
4.785	RTM Bamako	Mali	2107	I
4.785	R.Baku	USSR	2030	O
4.790	R.Atlantida	Peru	0235	C
4.790	TWR Manzini	Swaziland	1840	I
4.795	R.Douala	Cameroon	1940	I
4.800	LNBS Lesotho	Maseru	1937	C,D,I,O
4.810	R.Yerevan 2	USSR	1947	B
4.815	R.diff TV Burkina	Ouagadougou	2020	I
4.820	La Voz Evangelica	Honduras	0330	B,O
4.820	R.Moskva 4 (Khanty-M)	USSR	2255	M
4.825	R.Moscow	USSR	2001	B
4.830	Gaborone	Botswana	2054	I
4.830	R.Tachira	Venezuela	0306	B,C,K
4.832	R.Reloj	Costa Rica	0527	C
4.835	R.Tezulutlan, Coban	Guatemala	0130	B,O
4.835	RTM Bamako	Mali	2120	B,I
4.840	R.Valera, Trujillo	Venezuela	0237	B
4.845	ORTM Nouakchott	Mauritania	2040	I
4.850	R.Yaounde	Cameroon	2118	B,C,I,M,O
4.860	AIR Delhi	India	1535	D
4.865	PBS Lanzhou	China	2110	C,I
4.865	Caracol	Colombia	0407	B
4.865	V of Cinaruco	Colombia	0527	C
4.870	R.Cotonou	Benin	2115	B,C,F,I
4.885	Voice of Kenya	Kenya	1930	I
4.895	Voz del Rio Arauca	Colombia	0206	B
4.900	V de la Rev.Conakry	Guinea	2040	I
4.905	R.Relogio, Rio	Brazil	0245	C
4.905	R.Nat.N'djamena	Chad	2100	B,F,I,O
4.910	R.Zambia, Lusaka	Zambia	2050	D,I
4.915	R.Anhanguera	Brazil	0140	B,C
4.915	R.Ghana, Accra	Ghana	2015	B,C,I
4.915	Voice of Kenya	Kenya	1922	I
4.930	R.Moscow	USSR	1958	B
4.935	Voice of Kenya	Kenya	2050	B,C,F,I,J,M,O
4.940	R.Kiev 2	USSR	1945	B,G,I
4.958	R.Baku	USSR	1940	B
4.975	R.Uganda, Kampala	Uganda	2050	B,C,I
4.980	Ecos del Torbes	Venezuela	0340	B
4.985	R.Brazil Central	Brazil	0209	B,C,F,O
4.990	FRCN Lagos	Nigeria	2050	B,H,I,M
5.005	R.Nacional, Bata	Eq.Guinea	2030	B,C,F,I,K
5.005	R.Nepal	Nepal	1525	D
5.010	R.Garoua	Cameroon	1937	I
5.035	R.Bangui	C.Africa	2125	B,C,F,I
5.035	R.Alma Ata	USSR	1915	B
5.040	R.Tbilisi 1	USSR	1824	B
5.047	R.Togo, Lome	Togo	2045	B,I
5.055	Faro del Caribe	Costa Rica	0440	O
5.055	TWR Manzini	Swaziland	0335	B
5.065	R.Candip, Bunia	Zaire	1950	F,I,O
5.075	Caracol Bogata	Colombia	0318	B,F
5.163	R.Beijing	China	2115	F
5.260	R.Alma Ata 2	USSR	1918	B
5.440	PBS Xinjiang	China	?	F

DXers:
A: Ted Agombar, Norwich.
B: Jim Cash, Swanwick.
C: David Edwardson, Wallsend.
D: P.R.Guruprasad, Molepolole, Botswana.
E: Robin Harvey, Bourne.
F: Simon Holland, Douglas, I.O.M.
G: Sheila Hughes, Morden.
H: Rhoderick Illman, Thumrait, Oman.
I: Fred Pallant, Storrington.
J: John Parry, Northwich.
K: Roy Patrick, Derby.
L: John Stevens, Largs.
M: Darran Taplin, Brenchley.
N: Ted Walden-Vincent, Great Yarmouth.
O: Jim Willett, Grimsby.

distances has been noted in the **9MHz (31m)** band. In Worthing, **Ron Damp** has been monitoring the broadcasts from Radio New Zealand Int and he found reception good on 9.855 (Eng 0645-1100, Sat only). Radio Australia's transmission to C.Asia via Carnarvon 9.715 (Eng 1700-1800) was rated 33443 at 1700 by David Edwardson; to S.E.Asia via Shepparton 9.770 (Viet, Eng 1330-1900) 33233 at 1445 by Chris Shorten.

There are many broadcasts to Europe in this band. They include Vatican Radio, Rome 9.645 (It, Fr, Eng, Sp 0600-0700), heard at 0600 by Donald Blashill; Radio Finland via Pori 9.560 (Fin, Ger, Sw, Eng 0525-0655), rated 53444 at 0637 by Roy Spencer; Radio Polonia, Warsaw 9.675 (Fr, Eng, Pol 0500-0800) 44434 at 0650 by Leo Barr; AWR via Sines, Portugal 9.670 (Pol, Ger, Eng 0600-0900, Sun only) 44444 at 0800 by Sheila Hughes; Radio HCJB Quito, Ecuador 9.610 (Cz, Ger, Fr, Eng, Sw, Norw, Da 0500-0830) SIO333 at 0815 by Philip Rambaut; Radio Nederlands via Flevo 9.715 (Du, Eng 1030-1225) 54444 at 1217 by Scott Caldwell; TWR Monaco 9.485 (Pol 1615-1645, heard by Lucian Thomas; Radio

SEEN & HEARD

Budapest, Hungary 9.585 (It, Ger, Eng, Tur, Hung 1500-2100) 43444 at 1830 by Robin Clark; RBI via Wusterhausen, GDR 9.730 (Fr, Eng, Ger 1700-2145) SIO222 at 1949 by Julian Wood; VOIRI Tehran 9.022 (Russ, Fa, Tur, Ger, Fr, Eng, Sp, Ar 1530-2230) SIO333 at 2023 by Ron Pearce; Radio Beijing, China 9.920 (Ger, Eng 1800-2155) 55344 at 2055 by Darren Beasley; Radio Sweden via Horby 9.655 (Sw, Fr, Ger, Eng, Sp 1900-2200) 54544 at 2108 by Andy Cadier; Cyprus BC, Limassol 9.650 (Gr 2215-2245) 45444 at 2215 by Roy Patrick; Voice of Turkey, Ankara 9.445 (Eng, Tur 2200-0355) SIO444 at 2310 by Peter Hall.

Good reception over long distances has also been noted in the **7MHz (41m)** band from WWCR Nashville, USA 7.520 (Eng to Europe 0100-0530), rated as 43333 at 0502 by Kenneth Reece; WHRI South Bend, USA 7.315 (Eng, Ar, Sp to Europe 0000-0600) 44333 at 0520 by Alan Smith; AIR via Aligarh, India 7.412 (Eng, Hi to Europe 1845-2230) 44444 at 1910 by Rhoderick Illman; Radio Australia via Carnarvon 7.240 (Eng to S.Asia, Europe 1700-2100) 52433 by Jim Cash.

The numerous broadcasts to Europe in the **6MHz (49m)** band include Radio Austria Int, Vienna 6.155 (Ger, Fr, Eng, Sp, Ar 0400-2300), rated SIO333 at 0730 by Francis Hearne; BRT via Wavre 5.910 (Du, Eng, Ger, Fr, Sp 1700-2125) SIO434 at 1815 by John Coulter; Vatican Radio, Rome 6.185 (Fr, Eng, It 2100-0000) SIO333 at 2200 by Alf Gray.

Station Addresses

BBC R. Oxford, 242/254 Banbury Road, Summertown, Oxford OX2 7DW.

ILR Radio Mercury, Broadfield House, Brighton Road, Crawley, W.Sussex RH11 9TT.

R. Brazzaville, R.Diff.TV Congolaise, Boite Postale 2241, Brazzaville, People's Rep. Congo.

Radio Jordan & TV (JRT), P.O.Box 909, Amman, Jordan.

Mauritius Broadcating Corp., Broadcasting House, Louis Pasteur Street, Forest Side, Mauritius.

R. Mozambique, Ext Service, CP2000, Maputo, People's Rep. Mozambique.

Abbreviations

Ar	Arabic	Jap	Japanese
Beng	Bengali	Mal	Malay
Chin	Chinese	Norw	Norwegian
Cz	Czechoslovakian	Pol	Polish
Dan	Danish	Port	Portuguese
Du	Dutch	Russ	Russian
Eng	English	So	Somali
Fa	Farsi	Sp	Spanish
Fin	Finnish	Sw	Swedish
Fr	French	Ta	Tamil
Ger	German	Tag	Tagalog
Gr	Greek	Tur	Turkish
Heb	Hebrew	Uk	Ukrainian
Hi	Hindi	Ur	Urdu
Hung	Hungarian	Viet	Vietnamese
Ic	Icelandic	Yi	Yiddish
It	Italian	Yu	Yugoslavian

RALLIES

August 26: The Three C's Rally will be held at the Tiddenfoot Leisure Centre, Linslade, Leighton Buzzard, Beds. Entrance fee is £1, children free. **A Perkins. Tel: (0582) 33885.**

August 26: The Open Day of the Galashiels & District ARS will be held at the Focus Centre, Livingstone Place, Galashiels. There will be trade stands, a Bring & Buy, catering and all the usual activities. Talk-in on S22.

August 27: The Huntingdon Junk Sale & Auction will be held at the Medway Centre, Coneygear Road, Huntingdon, Cambs. The doors open from 10am to 4pm, food and drink will be available all day. **G1YVS. Tel: (0836) 611025 or (0487) 830212 (eves).**

***September 2**: The Telford Rally will be held at the Raquet and Exhibition Centre in Telford. Doors open at 11am (10.30 for the disabled). There will be a hundred stands selling radio, TV, computer equipment and antennas, a flea market and refreshments.

September 9: The Vange ARS will be moving the rally this year to The Laindon Community Centre, Aston Road, Laindon, Basildon, Essex. Doors open from 10am to 4.30pm wth admission at 50p. The rally will include many traders, a Bring & Buy, refreshments and free raffle. Talk-in on S22. **Doris Thompson. (0268) 552606.**

September 9: The Madley Satellte Earth Station Amateur Radio Group will be holding heir annual Car Boot Rally between 1000 and 1600 at Madley Air Field, near Herefrod. In addition to the car boot sales, a number of local traders will also be in attendance. Car parking is available and the entrance is free. Pitches on the day £5, pre-booked £4, traders £8. Talk-in on S22 by G7BTI. **David Butler G4ASR. Tel: (0981) 250001** (daytime).

***September 9**: The Lincoln Hamfest will be held in the Exhibition Centre, Lincolnshire Showground. Gates open at 10.30am (10am for the disabled) and the rally closes at 5pm. All the usual trade stands will be there, along with the real ale bar. There will be lots of attractions for the whole family too. Caravans welcome by prior arrangement. Talk-in on S22 by the West Lincs RAYNET Group. **Sue Middleton. Tel: (0522) 531788.**

***September 15**: The 1990 Scottish Amateur Radio Convention will be held at Cardonald College, Glasgow. There will be free parking for hundreds of cars, the college dining hall will be open as well as snack bars, there's a licenced bar, three exhibition halls as well as all the usual amateur radio attractions. Doors open at 11am (10.30am for the disabled) with the admission at £1.50. **Tom Hughes. Tel: 041-427 0122.**

***September 16**: The British Amateur Radio Teledata Group annual rally will be held at Sandown Park Exhibition Centre, this time in the larger Surrey Hall. Admission, £1.50 adults, 75p OAPs, children and disabled. **Peter Nicol G8VXY. Tel: 021-453 2676.**

September 16: The Bristol Radio Rally will be held in Brunel's Great Train Shed, Temple Meads Station, Bristol. All the usual traders will be there, a large Bring & Buy, food and refreshments as well as displays and demonstrations. **D.S. Farr. Tel: (0272) 839855.**

September 22: A QRP Convention beside the Sea will be held in The Garnham Centre, United Reform Church, Back Chapel Lane, Gorleston, Great Yarmouth. Talk-in from 1315 on S22. Prize for the longest traveller and best home-brewed gear, big display of home-brewed QRP gear, light refreshments. Open from 1400-1730 (clocktime). Admission free. **G3OEP, QTHR.**

***September 23**: The Centre of England Amateur Radio Rally will be held at the British Motorcycle Museum, Bickenhill, Nr the NEC. There will be a Bring & Buy, over 60 trade stands all in three large exhibition halls. There are concessionary rates for all who wish to visit the museum and ample free parking. Doors open at 10.30am. Admission £1, concession for RAIBC members and Senior Citizens. Talk-in from GB0COE from 7.30am on S22. **Frank Martin G4UMF. Tel: (0952) 598173.**

September 23: The Peterborough Mobile Rally will be held in the Wirrina Sports Stadium, Peterborough from 10am to 5pm. All the usual traders will be ther, a Bring & BUy and tables may be hired on the day (space permitting). Talk-in is on S22 and SU22 by G3DQW. **Robert Maskill. Tel: (0836 542630)** any evening.

September 30: The 6th North Wakefield RC Rally will be held at Outwood Grange School, Potovens Lane, Outwood, near Wakefield. Admission is 50p at 11am - disabled 10.30am. Fully licensed bar with real ale, good selection of food from cafe, raffle, Bring & Buy, radio, computer and electronic traders and repeater groups. **Richard G4GCX on (0532) 622139.**

STARTING OUT

Brian Oddy G3FEX

The importance of keeping the tuning of the radio frequency amplifier, mixer and local oscillator stages of a superhet receiver in step was outlined last month. The mechanically coupled, or 'ganged', air-spaced variable capacitors employed in most of the older domestic and commercial valved receivers were very cumbersome, but the losses they introduced were low and that was of more importance than space-saving considerations at the time.

Air-spaced variable capacitors have tuned r.f. stages in superhets for years, but an alternative approach may be adopted in some modern designs.

Miniaturisation

As soon as miniature valves became readily available to receiver manufacturers they set about reducing the physical size of their sets. The component manufacturers were able to reduce the size of their products by adopting new production techniques, often using newly developed insulators and other materials. The spacing between the plates of variable capacitors was minimised by replacing the air dielectric with very thin sheets of insulating material. This had the effect of increasing the capacitance so that the physical size of the plates could also be reduced.

Relatively high voltages were needed for the satisfactory operation of the miniature valves in most receivers, imposing a limit on the physical size of the components. It was not until the advent of the transistor, using very low voltages, that substantial advances in the reduction of component size could be made. Many of the components used in the early transistor receivers were much larger than a transistor, but it was not long before very much smaller components were produced in large quantities. The size of the ganged variable capacitor then became a limiting factor in the design of truly miniature sets and an alternative method of tuning the r.f. circuits had to be found. A number of possible systems were investigated, but the properties of semiconductor diodes led to a compact solution.

Semiconductors

Some materials have greater resistivity than a good conductor but less than that of a good insulator, so they are called semiconductors. The elements Silicon (Si) and Germanium (Ge) are commonly used in the manufacture of solid-state devices. In their pure form they are poor conductors, but their crystal structure can be modified by a carefully controlled manufacturing process so that they become a good conductor of either positive or negative current carriers. The silicon (or germanium) is refined to an extremely high degree of purity and it is then doped to form either *n*-type or *p*-type material.

The most basic of all solid-state devices is the junction diode. In the early days they were manufactured by fusing together small pieces of p-type and *n*-type material, but subsequent advances in technology have made it possible to produce them from a single crystal of silicon (or germanium) which has been doped so that one half of its volume consists of *p*-type and other half *n*-type material. Such a diode could be represented by **Fig.1a**. Initially, owing to the different characteristics of each half of the crystal, some of the electrons in the *n*-type material will migrate into the *p*-type region and a few of the holes in the *p*-type material will cross into the *n*-type region This will result in the build up of a negative charge along the *p*-type side of the junction and a positive charge along the *n*-type side. Eventually, the negative charge will be sufficient to repel the electrons as they attempt to cross the junction. Similarly, the positive charge will prevent the holes from crossing the junction (**Fig.1b**). The charges create a difference in potential across the junction, which is called the barrier potential. The region between the positive and negative charges is known as the depletion layer, since it contains no free current carriers.

The energy barrier can be reduced by applying an external e.m.f. across the crystal, as shown in **Fig.2a**. The junction is then said to be 'forward biased'. An increase in forward bias will permit more current carriers to cross the junction, so the flow of conventional current (I) will increase. The energy barrier will be increased if the junction is reverse biased by applying the e.m.f. as shown in **Fig.2b**. This will have no effect on the migration of current carriers, because the barrier is already sufficient to prevent current flow. In practice however, it will be found that a very small leakage current exits when the junction is reverse biased. This is due to thermally produced electronhole pairs which arise throughout the crystal structure. The characteristics of a junction diode are shown in **Fig.3**.

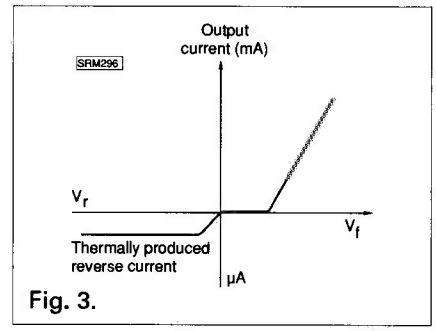

Fig. 3.

The width of the depletion layer is usually about 0.001mm, but it will become wider when a reverse bias is applied to the diode because the positive terminal of the voltage source will attract electrons away from the *n*-type side of the junction and the negative terminal will attract holes away from the *p*-type side. In this condition the depletion layer acts as a dielectric between the *p*-type and *n*-type regions and the device exhibits capacitance. An increase in the reverse bias potential will cause the layer to widen and thereby reduce the capacitance. Similarly a reduction in the bias will increase the capacitance. It is these properties which enable a diode to be used as a variable capacitor.

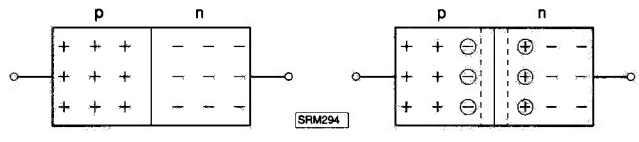

Fig. 1a. Fig. 1b.

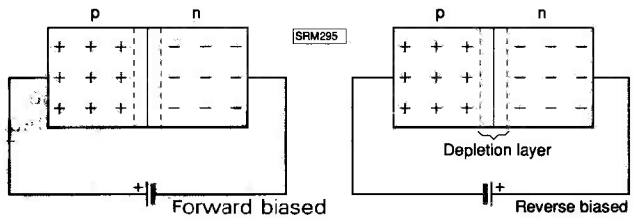

Fig. 2a. Fig. 2b.

Varicaps

It is possible to use an ordinary silicon switching diode as a variable capacitor, but the low maximum capacitance may prove to be inadequate for many applications. Provided an increase in the minimum capacitance can be tolerated, two switching diodes could be connected in parallel to increase the maximimum

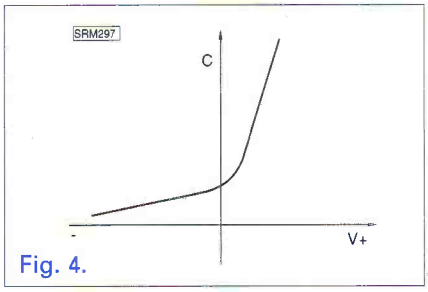

Fig. 4.

available capacitance. However, special silicon diodes known as Varicaps (variable capacitor diodes) or Varactor diodes (variable reactance diodes) are readily available, which have a much larger depletion layer capacitance. This is achieved by using complex doping techniques during the manufacture of the crystal material. Although a Varicap intended for v.h.f. applications will still have a small capacitance range, e.g. 1 to 5pF, or 2 to 20pF, one designed for use at m.f./h.f. will provide a much greater range, e.g. 10 to 105pF, or 13 to 230pF.

The relationship between reverse bias and the capacitance of a typical Varicap is shown in **Fig.4**. Note that it is non-linear. When using a Varicap in a tuned circuit it is important to ensure that the r.f. signal voltage cannot drive it into conduction. Such a situation can easily arise when a Varicap is used to tune the frequency determining network of the local oscillator in a receiver. To avoid this, two Varicaps are usually connected in the back to back configuration shown in **Fig.5**. In this arrangement the two anodes (A1, A2) are connected to the tuning inductor (L) and the common cathode connection (K) is taken via an r.f. choke (RFC) and decoupling capacitor (C), to a potentiometer (VR) connected across the d.c. supply. The potentiometer acts as a tuning control, since it enables the reverse bias and hence the capacitance to be varied. Although connecting two Varicaps in this way halves the maximum available capacitance, it does prevent a significant amount of current from flowing through them.

By now you will appreciate that it is possible to tune the radio frequency amplifier, mixer and local oscillator stages of a superhet receiver simultaneously by simply installing matched sets of tiny Varicaps across the appropriate inductors and then connecting them to a source of reverse bias derived from single potentiometer across the d.c. supply! Such an arrangement is shown in **Fig.6**. It is essential that the d.c. supply is regulated, well filtered and free from noise, as any variation in the bias voltage will impair the stability of the local oscillator. To enable adjustments to be made to the alignment of the circuits at the h.f. and l.f. end of each range it will be necessary to employ trimmer capacitors and dust-iron cored inductors, as outlined last month in this series.

Appendix

Our present concept of matter is that all materials are composed of molecules. A molecule is the smallest quantity of a substance that can exist and still display its true physical and chemical properties. All molecules are made up from a combination of smaller particles called atoms. Atoms consist of a relatively heavy core or nucleus of protons and neutrons. The protons are positively charged but the neutrons carry no electrical charge. A number of negatively charged electrons orbit around the nucleus at high speed. Because they have different energy levels they orbit the nucleus in bands or 'shells'. Under normal circumstances the total positive charge of the nucleus is equal to the total negative charge of the electrons, thereby making the atom electrically neutral.

There are over 100 different types of atom, each being determined by the number of protons and neutrons which make up the nucleus and the number and arrangement of the orbiting electrons. The Silicon (Si) atom has three shells of electrons around the nucleus. The innermost shell contains only two electrons, but the second shell has eight electrons. There are four electrons in the outer shell, which are able to join with the four electrons in the outer shell of adjacent atoms to form a crystal lattice.

Current flow through a material is based on the movement of the electrons from one atom to another. This depends upon how loosely or tightly the electrons are bound to the nucleus of each atom, also the external potential that is applied to move them. Because the four electrons in the outer shell of an atom of pure silicon are not far from the nucleus they cannot move far, consequently it is a poor conductor. However, it can be made into a semiconductor by adding a carefully controlled amount of another element, usually referred to as an impurity. Such a process is called doping.

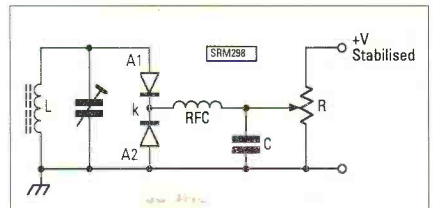

Fig. 5.

During the manufacture of *n*-type material the crystal lattice of pure silicon is doped with an element which has five electrons in the outer ring, e.g. Arsenic (A) or Phosphorus (P), so that there is a surplus electron and the lattice appears to be negative. To produce *p*-type material the pure silicon lattice is doped with an element which has only three electrons, e.g. Aluminium (A) or Boron (B). This results in a gap or 'hole' in the lattice, which could be filled by a free electron.

These interesting subjects have been explained in detail in numerous textbooks - try your local public library. □

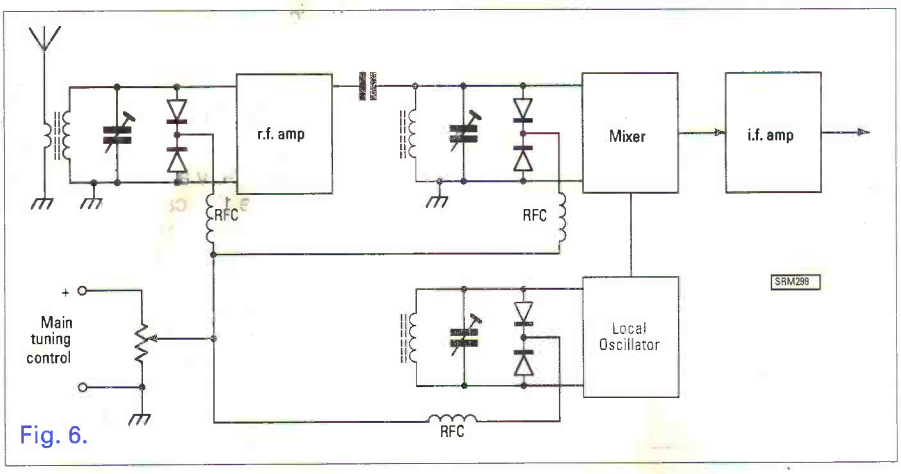

Fig. 6.

Abbreviations	
d.c.	direct current
e.m.f.	electromotive force
h.f.	high frequency
l.f.	low frequency
m.f.	medium frequency
mm	millimetre
pF	picofarad
r.f.	radio frequency
u.h.f.	ultra high frequency

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