JUPITER II SCANNER as previewed in Scanning

RIGHT FROM THE START
new series for the beginner
by George Dobbs

REVIEWED
ITC world receiver

For The Radio Listener
SONY ICFC2001D RECEIVER SUPER PORTABLE AM/FM / AIR BAND COVERAGE

This is the third edition of the famous airband guide published by Spa Publications. Not the normal budget kind of publication produced by competitors on a home computer, this is professionally prepared and laid out. All the information is taken from commercial sources, both military and commercial, and is undoubtedly the most complete airband listing generally available for the UK enthusiast. There is plenty of editorial and explanations, photographs and of course complete frequency listings. Entries are listed both alphabetically and numerically for ease of use. The list also includes company and airway frequencies. Essential reading for any airband enthusiast. A quick reference book that is very useful in the news media are a purchasing it. In the unlikely event of you not being totally satisfied we offer a full refund if returned within 7 days of purchase. How's that for confidence?

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Low HF 225 Short wave £395.00
FRG260 Scanner 50/96MHz £590.00
AR 2002 Scanner 25-1300MHz £475.00
ICF-V1 VHF scanner £127.00
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RECEIVERS

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FRGB80 150N/30MHz £839.00
FRV820 VHF car £100.00
FRG260 Scanner 50/96MHz £590.00
S9500 Short wave £159.00
Sony SPX7100 Short wave £299.00
Low HF 225 Short wave £395.00
FRG260 Scanner 50/96MHz £590.00
AR 2002 Scanner 25-1300MHz £475.00
Sony VHF scanner £127.00
Honda 12V VHF + SW scanner £299.00
RS528 Air band scanner £96.50
AR30 Air band scanner £245.00
RS56 Air band scanner £125.00
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NEW INSTRUCTIONS FOR MAIL ORDER CUSTOMERS

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### Cover

Alan Gardener gives us a preview of the new Jupiter II handheld scanner in his “Scanning” column.

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Sir
I was interested to read Patrick Wodehouse’s letter regarding his problem in finding suitable software for his Amstrad 1640 and his implied criticism of us for not providing it.
As you may well imagine, this is not a new comment. We long ago lost count of all the different computers we have been asked to supply software for and of all the different attitudes people adopt when we have to tell them that we don’t support their machine, especially when, like Mr Wodehouse, they regard it as somehow superior to the ones we do support.
The argument that conversion to their own computer is a simple operation which would lead to huge extra sales is also frequently used. Perhaps this is the right opportunity to set out the facts.
Utility radio listening is not a universal hobby and the market for radio software is limited. The complexity and sophistication of our software, on the other hand, is increasing all the time, in response to our customers’ demands.
We can only produce these systems if we think that we can sell enough of them to warrant the very considerable investment involved in their development. This means that we can only support the most popular computers among our potential customers.
It would be wonderful if there could be some sort of “universal” program which would run on a wide variety of compatible machines. Unfortunately, this approach produces a “lowest common denominator” type of software, limited to those standard routines and specifications which all the machines have in common. Anybody who remembers BASICODE will quickly realize the problems and, while DOS is not as bad as that, it is still far too limited and slow for our use as the very high performance of our software demands great flexibility and direct access to all the computer hardware.
The radio software which is available for PCs generally uses a lot of external hardware to reduce the requirements of the software to those which DOS can manage, resulting in a package which is often short on facilities but long on price, a fact which Mr Wodehouse has perhaps already realized. The alternative is for him to go out and invest in a BBC and treat himself to some really good receive software. I don’t think that he will regret such a choice and thousands of our customers will agree.
Just as an Olympic sprinter and a farmer will choose very different footwear to suit their different requirements, so it makes sense to choose your computer with a regard to its intended use. The BBC was designed to be very flexible and has excellent facilities for connecting to the outside world. PCs were designed with other purposes in mind. Each does its job well but it’s not the same job. A computer is only as good as the software available for it and for radio use the BBC is much more suitable.
Sensibly, most people check on the availability of software first and purchase a well-supported machine. Those who already have a PC for others usually get a BBC as well and if Mr Wodehouse does the same, he, too, will reap the benefit.

RICHARD WILMOT
TECHNICAL SOFTWARE
CAERNARFON
Gwynedd

Sir
Re: A Word in Edgeways, Sept SWM.
George Millmore thinks that Tom Marks is somewhat mistaken when he says his father’s sets used 6-volt accumulators. He is not mistaken.
I remember my father building sets in the early 1920s which used bright emitter valves with 6-volt filaments. They lit up like electric lamps and were fed from a 6-volt accumulator. The 2-volt dull emitter (coated filament) valves arrived later. The 6-volt indirectly heated octal valves belonged to the next decade and were for mains sets.
SWM is an excellent magazine and is well worth the new price of £1.60.
K. R. BUCK
EDINBURGH

Sir
Re: A Word in Edgeways, July SWM.
Tom Marks could be correct when he writes of his father using 6-volt accumulators. There was an h.t. supply unit, namely the Milnes h.t. unit, which was charged from 6-volt car-type accumulators and so it is possible that Tom Marks saw one of those in use. When I was about 14 years old and very interested in radio I was befriended by an oldish chap who had built several Scott Taggart sets who, at the time, was using a Scott Taggart 600 driven by a Milnes h.t. unit.
I remember this unit as a wooden crate about 380 x 300 x150mm, those sizes may be a bit out, but that’s as I recall it. At one end was a lever operated switch and the crate contained a large number of glass pots. In the pots were plates and some chemical. The unit was coupled to a 6-volt car battery. In use the lever switch thrown one way supplied h.t. to the set. When the set was not in use the switch was put to the other way and the 6-volt battery charged the Milnes h.t. unit.
I must add that I think the SWM is better now than it ever was and I really look forward to each publication and the new Vintage Radio is going to rekindle some happy memories. When I was 11 or 12 years old and first started my radio interest it was crystal set making and I knew about galena (lead ore) as rocks and numerals were, and still are, another of my interests. I used to go out into Derbyshire and pick up lumps of galena and have great fun testing various pieces as crystal detectors. You are doing a great job.
CHARLES A. KING
SWALLOWNEST, NR SHEFFIELD

Sir
Re: A Word in Edgeways, August ’89 SWM.
I read Mr C. S. Walden-Vincent’s letter with outrage; not at him, but at the insensitive arrogant attitude of the officials of the club that he and his friend approached.
I do not think that it matters what sort of radio equipment you use; any good radio club SHOULD be prepared to welcome new members, no matter what their radio listening interests (CB, v.h.f./u.h.f., aircraft band, s.w.) are.
I predict that this deficient radio club will soon be disbanded.
GORDON RENNIE
LEATHERHEAD
SURREY
A WORD IN EDGEWAYS

Sir
I have a Panasonic RF-2900 LBS/LBE 3.2 to 30MHz with about 30ft or 40ft long wire about 30ft in the air, so it should find some form of life.
I like short wave radio listening but find some of the terms beyond my simple mind so please keep it as simple as possible, this applies to all articles. As a disabled listener I think this is an ideal hobby for anyone who is house-bound.
One aspect the amateur side of the hobby suffers is snobbishness, which will not attract new blood into the hobby.
When I was into CB, I saw an antenna on a car and asked the owner of the car if it was a CB antenna, he turned red with rage and snottily said no, this is an amateur antenna. So that put me off them for life and this does come across, which is why I like Short Wave Magazine, as it isn’t stuck up.
Paul Essery doesn’t give this impression though he does seem to get technical in his articles and carried away with abbreviations and this points thing he goes on about.
Mr C. S. Walden-Vincent is absolutely right in what he says about the attitude of the Amateur Radio fraternity. The average short wave listener just does not have the sort of money needed to take part in amateur radio, especially if they are disabled and out of work like me.
Anybody who would like to correspond on the different aspects of radio would be very welcome.
MR W. R. SEMMENS
PENZANCE

Sir
I am an elderly and somewhat decrepit s.w.i. My ears are no longer good enough to hear a callsign through what sounds like a cat-fight, or a zoo at feeding time, nor are my fingers nimble enough to write it down before defective memory has forgotten it. However, deliverance has now come to me, and my troubles are over, thanks to SWM.
In the May issue of SWM I read an article by G3RJV on the ERA Microreader, I was so impressed that I immediately raised my piggy bank and sent for one. Now, instead of struggling with s.s.b. and c.w., I have gone over entirely to RTTY.
The letters and figures are big enough for me to read without glasses, and the callsigns travel along the display slowly enough for me to write them down, done can always freeze them in position by turning down the gain of the RX.
Already, I’ve received amateur signals from many parts of the world, including VK, ZL, N and S. America, Africa, etc., as well as all over Europe, Scandinavia and the USSR and of course there’s plenty of non-amateur RTTY to be found, including “Diplo Paris” (giving news in French at a speed even I can understand).
Having found what amounts to a new hobby, I can heartily recommend it to old crocks like myself who wish to retire from the “rat-race” and of course, if you can’t stay away from c.w., the Microreader will do that, as well as RTTY.
My thanks to G3RJV, SWM and ERA Ltd.
H. S. STEVENS
AYLESBURY
BUCKS

Gift Wrapped
The Studio Line Yacht Boy 225 is a gift-boxed set, ideal for the traveller. The black presentation box makes a hard carrying case to protect the radio whilst travelling. Also in the case are three batteries, high quality feather-light stereo headphones, a retracting pencil for filling-in the self-attaching station reminders, a guide explaining what is short wave radio and a soft vinyl cover for the Yacht Boy 225.
The radio covers medium wave, long wave, f.m. and nine short wave bands. There is an I.E.D. tuning indicator and an I.E.D. band indicator. The gift-boxed Studio Line Yacht Boy 225 costs £59.95 from Grundig dealers.

WAB Comes of Age
1990 will be WABs (The Worked All Britian Award Scheme) 21st Anniversary year. It has been decided to mark the occasion by making a special fund raising effort. The aim is to provide sufficient funds to train a guide dog for a blind person (licensed or s.w.i.) who is interested in amateur radio. The intention is to hand over the cheque at the 1990 AGM at Drayton Manor.
The organiser of this project is Adrian Keeble G4HPU. 4 Manor Cottages, Debden, Saffron Walden, Essex CB11 3JY. He would be pleased to hear from people prepared to donate prizes for the Grand Raffle or those who are willing to sell tickets.
Please send all ideas and donations to Adrian.

More Rallies For 1990
The Radio Society of Great Britain have announced the dates for their next Convention and Exhibition at the NEC, Birmingham, April 21-22.
The venue will be in one of the new halls at the NEC.
The VHF Convention at Sandown Park Racecourse will be held on 13 May 1990. More details on both these rallies when we start the 1990 "Rally Season".

New QSLs
A new series of QSL cards has been issued by Radio Netherlands to celebrate 25 years of the European Space Agency (ESA). The technical centre for ESA is located in Noordwijk on the Dutch North Sea Coast.
Correct reception reports will get one of these new cards, but the series is limited and is available only while stocks last.

Radio on the High Seas
The Grundig Satellit 500 International has been designed for use on-board yachts and boats.
The radio is capable of storing up to 42 stations in memory. To simplify searching, all stations are identified by an alpha-numeric read-out on the large liquid crystal display. This display also acts as a multi-function information centre and indicates the frequency range, wave-band, memory, position and field strength.
Other features of this radio include a rechargeable battery with a built-in charger, search and scan function and a lockable telescopic antenna.
Coverage is medium wave, long wave, f.m. and short waves from 1.6 to 30MHz. Stereo sound is provided via headphones or an additional speaker.
The built-in timer has two time zones and a time switch for turning on and off two different radio stations. There is also a sleep function that lasts between 10 and 60 minutes.
The Satellit 500 has a threaded socket for on-board mounting when used in a boat and has a practical cover to offer protection from the elements.
The Satellit 500 International is available from selected Grundig dealers at £299.95.

Short Wave Magazine October 1989
**Snippets from Sweden**

**Bolivia:** The Radio Television Popular network resumed its activities on June 19 - a year after being closed for "violating national laws". The network had broadcast comments by drug-trafficker Robert Suarez Gomes, which the government believed harmful to national dignity. On June 28, Radio Horizonte from La Paz was observed signing on in Spanish at 1000 on the new frequency of 6.005MHz. The opening announcement also mentioned 1.06MHz.

**Guam:** AWR Asia will open an f.m. station by the end of 1969. The 3kW transmitter will operate 24 hours a day. English programs from AWR on short wave are now broadcast at 6000 in 15.125MHz, 1000 on 13.720MHz, 1600 on 11.98MHz and 2300 on 15.125MHz. On Saturdays and Sundays they also broadcast at 0200 on 11.7MHz.

**North Korea:** Radio Pyongyang in Russian at 16000-1650 has been noted on 11.76MHz replacing 11.74MHz. The frequency of 9.325MHz remains in parallel.

**Poland:** Radio Polonia has introduced a programme in German at 0530-0600 on 5.995, 7.27, 9.675 and 1.503MHz.

**Sri Lanka:** The Deutsche Welle relay station in Trincomalee should have gone into full operation in July. The installation of the station has been interrupted several times because of the internal situation in Sri Lanka.

**Burundi:** Radiodiffusion du Burundi has been heard around 1915 on 3.3MHz and around 1820 on 6.14MHz.

**Ireland:** Radio Dublin is now back on the air 24 hours a day on 1.188 and 6.912MHz as well as 99.97MHz f.m.

**Northern Mariana Islands:** KYOI, now belonging to the Christian Science Monitor ceased operation on July 3 for four months owing to the installation of new transmitters. KYOI will return to normal full schedule programming in November this year.

**Lesotho:** The BBC relay station in Lesotho can now be heard at 0430 on the new frequency of 11.94MHz.

**Mexico:** All Mexican short wave stations must activate a minimum number of days every year, or lose their licence. Normally inactive XEWW is currently in such an active phase on 9.515MHz.

**Netherlands Antilles:** Trans World Radio in Bonaire in Portuguese to Brazil 0655-0930 uses a new frequency of 11.865MHz, this replaces 8.145MHz. The frequency of 9.515MHz still remains in parallel.

**Temperature Controlled Iron**

Electronic and Computer Workshop have introduced a new temperature controlled soldering iron to their range. The TC82 is a 45 watt iron, available in 25, 50, 115 and 220-240V versions. It operates in the temperature range 260 to 420°, adjustable to 2% tolerance.

**Electronic and Computer Workshop Ltd., Unit 1, Cromwell Centre, Stephiend, Witham, Essex CM8 3TH. Tel: (0376) 517413.**

**MWN Publication**

Medium Wave News have a new publication called Eleven Years of Trans-Atlantic MW DX. This 20-page booklet lists every station from the Americas and Caribbean heard in the UK and Ireland since 1978.

Around 250 different stations are itemised will details of when they were last heard and by whom. Details of callsign and frequency changes are also noted.

The publication, by Steve Whitt, is available at £1.50 for MW Circle members in the UK, £1.75 for UK based non-members and all overseas orders are available at the flat rate of £2.00 or 7 IRCs.

**MWN Reprints, 43 Atwood Drive, Lawrence Weston, Bristol BS11 0SR.**

**Aircastle Products**

We recently carried a series of advertisements for Aircastle Products. We would now like to hear from anyone who is experiencing difficulty in obtaining goods or refunds from this company. Please contact Roger Hall at PO Box 346, London SW6 2DS with the details.
Hot New Radios From Icom
We have heard on the grapevine that Icom are currently working on some interesting new radios. We have managed to sneak a look at some of them too.

The IC-R100: This is described as a super wide-band receiver and, if the specifications that we have seen are to be believed, it certainly is!

The frequency coverage is 100kHz to 1856MHz (with guaranteed performance between 500kHz and 1800MHz). There are 100 memory channels, plus a priority channel, plus 20 programmable search bands as well as six different scanning modes (not to mention three scan modes). One interesting feature of this set is that it has a built-in 15dB pre-amplifier that works between 50MHz and 905MHz along with the more usual 20dB attenuator.

The step sizes are 1/5/8/9/10/12.5/20/25/25kHz, there is a multi-function timer and a squelch that operates in all modes (that’s a.m., f.m. and w.b.f.m.).

This radio is quite small, about the same size as the IC-2400/2500, and apparently it will not be expensive - but the price hasn’t yet been finalised.

Keep your eyes open in future issues for more details.

The IC-R1: This radio is bound to be a sensation when it is released as it is a hand-held scanner that covers 150kHz to 1300MHz in a.m., f.m. or w.b.f.m. - all in a case that is about the size as the IC-2SI! The step sizes are 0.5/1/5/9/10/12.5/15/20/25/30/50kHz and there are 100 memory channels which store both the frequency and the mode. There are lots of features including: six different scanning modes, a built-in clock timer, an adjustable five-step power save function, a built-in S-meter and a tuning knob. We hope to bring you a review of this in one of our magazines in the near future.

The IC-R72: This is Icom’s entry into the low-cost receiver field. It covers 30kHz to 30MHz (guaranteed between 100kHz-30MHz) and is about the same size as the IC-725.

It has 98 memories, a 10, 20 or 30dB attenuators and a 10dB pre-amplifier. The supplied modes are w.s.b., l.s.b., a.m. and c.w. - but an f.m. option is available. As the R72 has lots of features that you would expect to find on quite expensive sets - such as a two-position noise blanker - it’s hard to see how it can be sold for the price that I have heard mentioned.

I have been told that some of these radios may be on the Icom stand at the Leicester show, but do not be disappointed if they are not. Copy dates for this magazine mean that this was written while some of these sets are at the prototype stage and some may never reach production.

For further information, contact: Icom (UK) Ltd, Sea Street, Herne Bay, Kent CT6 8LD. Tel: (0227) 363859.

Filtered Mains Plug
Britentic International have just introduced a high-performance, low-cost, filtered mains plug which incorporates solid-state transient suppressors and an r.f.i. filter with excellent attenuation characteristics.

Designed for the protection of microprocessor-controlled equipment against mains-borne interference such as voltage spikes and r.f.i., the plug is ideal for use in the home, shack or office.

Britentic International Ltd, Crow Arch Lane, Ringwood, Hants BH24 1NZ. Tel: (0425) 474617.

Catalogues
A multi-page brochure from Anville Instruments describes the Series 400 system - an integrated hardware and software package for data acquisition and control using micro-computers. Anville Instruments, Watchmoor Trade Centre, Watchmoor Road, Camberley, Surrey GU15 3AJ. Tel: (0276) 25107.

Global Specialties has produced a new 36-page catalogue covering its range of electronics testing, prototyping and training equipment.

Products covered in the catalogue include signal sources, power supplies, counters, timers, wattmeters, multimeters, clamp meters to name only a few.

Global Specialties, Rackery Lane, Llay, Wrexham, Clwyd LL12 OPB.

European CW Association
The European CW Association’s annual Fraternising CW Party will be held on Saturday and Sunday, November 18-19. This is the EUCW’s major event of the year, intended to bring members of EUCW-clubs and their friends “on-the-air” for a weekend of enjoyable c.w. activity, embracing all levels of operating ability.

Although mounted within a contest style framework, individual participants are free to treat the Fraternising Party how they wish. They can go “all-out” for contest type points, or can take it easy and just enjoy meeting Morse friends. It is hoped, however, that all taking part will send in logs afterwards to demonstrate their enthusiasm for the event.

Dates: November 18 & 19
Frequencies: 3.52-3.55, 7.01-7.03 & 14.02-14.05MHz
Schedule: Nov 18 1500-1700UTC, 7 & 14MHz,
1800-2000UTC 7 & 3.5MHz
Nov 19 0700-0900UTC 7 & 3.5MHz
1000-1200UTC 7 & 14MHz
Call: CQ EUCW. Please keep to the times and frequencies shown to allow others QRM-free QSOs.

Classes: A - licensed members of EUCW organisations, using more than 10W input or 5W output.
B - licensed members of EUCW organisations, using QRP
C - Other licensed amateurs, using any power
D - short wave listeners

Exchange points claimed by all participants will be logged.
EUCW member organisations are: AGCW-DL, BQRP (Benelux QRP), BTC, FISTS, FOC, G-QRP, HCC, HSC, INORC, SCAG, SHSC, TOPS, UFT and VHSC.

Scoring: Class A, B & C - 1 point with own country, 3 points with other countries
Class D - To claim points, the exchanges of both stations in the QSO must be logged.

EUCW member organisations are: AGCW-DL, BQRP (Benelux QRP), BTC, FISTS, FOC, G-QRP, HCC, HSC, INORC, SCAG, SHSC, TOPS, UFT and VHSC.

Scoring: Class A, B & C - 1 point with own country, 3 points with other countries
Class D - To claim points, the exchanges of both stations in the QSO must be logged.

Multipliers: 1 for each EUCW member organisation worked or logged per day and band, for all classes

Awards: Certificates will be issued to the first three stations of each class.

Logs: Log must show date, UTC, band, callsign, info sent, info received, points claimed for each contact. A summary sheet should show name, address, own call, score and details of rig used - including power used.

Signature?
Logs should be sent, not later than December 20, to:
The Contest Manager, Guenther Nierbauer DJ2XP, Illingerstr 74, D-6682 Ottweiler, FRG.
Save 95p off the normal price of £5.95 inc P & P.

Amateur radio is a fascinating and absorbing hobby but can be very bewildering to the tyro - and sometimes to the more expert as well.

To enable you to hear what some of the more exotic modes sound like, we have produced this new cassette.

On Side A you will hear a selection of off-air recordings of QSOs via a variety of satellites, QSOs on the new 50MHz amateur band and QSOs using meteor bursts, aurora, Sporadic E and moonbounce on the 144MHz band.

Side B is given over to the various data modes. Morse, RTTY, Amtor, fax and packet are all featured with off-air examples of QSOs to give you an idea of what they sound like and to enable you to set up your gear if necessary.

The special offer price to Short Wave Magazine readers is £5.00 including post and packing and VAT.

HOW TO ORDER

Complete both coupons in ink, giving your name and address clearly in block capitals. Coupon (2) will be used as the address label to despatch your book to you.

Send the coupons with your cheque to: Short Wave Magazine, Cassette Offer (October), FREEPOST, Enefco House, The Quay, Poole, Dorset BH15 1PP. If you wish to pay by credit card (Access, Mastercard, Eurocard or Visa only), please fill in your card details and sign the coupon where indicated.

Available to readers of SWM in England, Scotland, Wales, N. Ireland, the Channel Islands and the Isle of Man. Orders are normally despatched within 28 days, but please allow time for carriage. The closing date for this offer is 1 November 1989.
TRADING POST

FOR TRADE Plessey PR155, several Eddystone 9583/3, Collins 32V2, Leitz trinocular microscope and more. Want Leica screw mount cameras and wireless equipment prior to 1930. All replies answered. W. J. Ford, Box 606, Smiths Falls, Ont K7A 4T6, Canada.

WANTED There is money waiting for your German WWII Military Radio Equipment. Want receivers, transmitters, accessories. Will collect. Lissok, Rue M Poedts 9, B-1160 Brussels, Belgium. Tel: 00-322-6737115.

FOR SALE Grundig Satellites 650, £225 and 300, £75. Also Franklyn Spellmater, £50. All in excellent working condition. Offers considered J. S. Phillips. Tel: Bristol 241900. Carriage extra, could be delivered in Bristol area.

FOR SALE SEM multimeter £45 p/p. RX4 with Tel: 926 Spectrum £55 p/p. DSB-80 3W d.s.b./c.w. h/f rig, GVO £45 p/p. Wea-Sat RX and f/s for sale, h/b, s.a.e for details. K. Borkhataria, 24 York Rd, London W5 4SG.

FOR SALE Icom 720A h.f. transcvr £600. ICX2L linear £1200. AT500 auto a.t.u. £300. Altron telescope wall mounted tilt mast 40 feet £250. TBL 2-el Yagi £150. Tony, 35 Milton Cres, East Grinstead, Sussex. Tel: Alderley Edge 982524 or East Grinstead 312374.

FOR SALE WWII military radio collection, selling with regret due to illness. Mr D. Bowles. Tel: Cambridge 841293, for details of this bargain collection.

FOR SALE Bearcat 100XL scanner boxed as new with manual, £100. J. Cox, 100 Gwendoine St, Treherbert, Rhondda, Mid-Glam CF42 5BW. Tel: 774053.

FOR SALE Grundig Satellit 400, eight months old, v.g.c. £145. Mizoju AX1 SkyChange, v.g.c. £30. Mizoju KK3 Sky Coupler as new, £70 o.n.o. All plus p&p. Tel: Bristol 828586 between 6-8pm no time wasters please.

FOR SALE Trio R-2000 in perfect working order with VC10 v.h.f. unit fitted £465 no offers below price asked for, + cost of transit. Signal pocket airband RX + charger, etc. £70 plus p&p. Write with offer to A. G. Brimming, 43 Atwood Drive, Bristol BS11 0SR.

FOR SALE Yaesu FRG-9600 Mk5 as supplied by Raycom. One year old, mint condition, boxed with p.s.u. and manual, £550 plus p&p. S. Harvey, Tel: Swindon 828456 weekends only.

FOR SALE AOR AR-2002 scanner (the market leader) current model, see any radio magazine for condition, buyer collects. D. H. Farr, 40 Homedee House, Garden Lane, Chester CH1 4HD. Tel: 47936.

FOR SALE JIL SX-200N receiver, v.h.f.-u.h.f. a.m/f.m., home or mobile use, with manual, discone and books, £165. Mr T. Copus. Tel: Basildon 556131.


FOR SALE Telequipment D83 scope needs attention hence £130, antenna rotator £25, Advance PMA 54 p.s.u., 130W, 1 to 30V 15, LM17 heterodyne frequency meter £30. J. Lee-Rand, 7 Jersey Rd, Ferring, Worthing BN12 5FZ. Tel: Worthing 42927.

WANTED Receiver Drake R424 DSR2, R3 or R7A Collins 651S1 & 51S1. Cash waiting. P. McAlister G3YKF. Tel: Shrewsbury 884858.

FOR SALE Akai GX-4000 tape deck £65. Roberts Radio R900 £45. Both v.g.c. Exchange either or both for FRS-7 or Tatung TMR-7602 or Signal-R 532 or w.h.y. L. J. Taylor, 1 Cadley Close, Blandford, Dorset. Tel: 459303.

FOR SALE JRC NRD-515 receiver. JRC NH-518, 96 memory unit, ham gear PMX preselector. All mint condition with manuals and original boxes £850. E. Garrett. Tel: Kedderminster 68792.

WANTED Sony AIR-7 hand-held receiver or similar receiver for swap for a Sony ICF-2001D receiver. P. Gore. Tel: Bolton 398644 after 5pm.

FOR SALE Military surplus circuits manuals, 4 volume set £50 inc p/p. Also available Eddystone receiver service manuals, models 640, 670, 770R, 770U, 840A and 840C, £75 each inc p/p. M. J. Small, 10 Sibleyes Rise, South Heath, Great Missenden, Bucks HP16 9QG.

FOR SALE Realistic PRO-32A hand-held scanner covers airband. Complete with NiCad and charger, excellent condition £140 o.n.o. Will deliver within reasonable distance. Vince. Tel: Birmingham 021-451 2047 evenings and weekends.

WANTED Trio R-1000 or similar in exchange for my Sony ICF-2001D plus new Yoko 5in multi system TV. Excellent TV DX. Total second hand value £270. Prefer interested party collects. K. Anderson. Tel: Knot End New 611648 (Backpool area).

WANTED desperately needed to complete s.w. radio project. Denco i.f.t.s 18/465kHz, 14/470kHz, 18/16MHz and transistor tuning coils 3T, 4T, 5T, red, white, blue and yellow. John Ridgway. Tel: Brighton 561503.

FOR SALE Sony ICF-2001D portable receiver, rarely used, as new condition, £225 o.n.o. R. Sharp. Tel: Cynder (Dundartonshire) 831765 after 6pm.

FOR SALE RX40 receiver 141-180MHz, 2.5kHz, step NiCad battery and charger, £65. Patrolman 50.a.m. f.m. air, 2 metre amateur, v.h.f. marine, TV sound. Battery operated, £50. Buyer collects. P. Swansbury, 16 Greystoke Ave, Bearcross, Bournemouth, Dorset BH11 9NL. Tel: 572877.

SWAP my Sony Air-7 (mint condition) along with Yaesu headphones, royal blue monopole 2-30MHz, plus Daiwa a.t.u. (won’t split). All mint. For Sony ICF-2001D, must also be mint. Mr R. B. Watson, 41 Kinsbourne Green, Dunsforth, Doncaster DN7 4BL. Tel: 840658.

FOR SALE Trio 9R-59DS communications receiver, very good condition, with Trio speaker, £70. Dave Miller. Tel: Stockport 0161-456 2921.

FOR SALE Sony Air-7 portable scanner, i.w./m.f./f.m., 108-136MHz (air), 144-174 p.s.b., 40 memories, many facilities, boxed, antenna, instructions, 18 months old, little used, £145. Mike Sarney. Tel: Durham 091-384 0930 evenings.


FOR SALE Sony ICF-7600D complete with mains adaptor and carrying case. Perfect working order, original box and instruction manual, £50 o.n.o. Paul Kennett, 7 Carpenters Wood Drive, Chorleywood, Rickmansworth, Herts WD3 SRH. Tel: Chorleywood 3846.

FOR SALE AR-900 hand-held scanner, excellent condition, less than 6 months old, c/w charger, v.h.f./u.h.f. antennas, instructions, boxed, £180 o.n.o. D. Lacy. Tel: Loughborough 852072 after 6pm.

FOR SALE Trio R-1000 receiver, excellent condition, manual, manufacturer’s packaging, £190. AT-1000 antenna tuning unit, £45. Tanberg a.m./f.m. stereo receiver, 40W channel, superb quality, service manual, £75. Phil. Thomas. Tel: Bledlow Ridge (Bucks) 27531.

Write out your advertisement in BLOCK CAPITALS - up to a maximum of 30 words plus 12 words for your address - and send it, together with your payment of £2.30, to Trading Post, Short Wave Magazine, Enefco House, The Quay, Poole, Dorset BH15 1PP.

Advertisements will be published in the earliest available issue and SWM reserves the right to exclude any advertisement not complying with the rules. You must send the flash from this page, or your subscription number as proof of purchase of the magazine.

Advertisements from traders, auctioneers or for equipment which if it is illegal to possess, use or which cannot be licensed in the UK will not be accepted.
When you are ready to graduate to real listening
Look to Lowe

The R-2000 from Kenwood
150kHz-30MHz, SSB/AM/CW/FM
VC-10 converter 118-174 MHz
R-2000 . . . . £595
VC-10 . . . . £162

The R-5000 from Kenwood
100kHz-30MHz, SSB/AM/CW/FM/FSK
VC-10 converter 118-174 MHz
R-5000 . . . . £875
VC-20 . . . . £167

The NRD-525 from JRC
Simply the best receiver you could buy . . . £1095

What do I mean by “When you are ready to graduate”? Well, like all hobbies or pastimes, short wave listening is a progressive hobby, and many people come to it almost by accident when they hear an unusual broadcast station on their ordinary domestic radio, particularly if the radio has a short wave band. Interest is aroused, and before long the listener begins to wonder why there are some signals he cannot resolve. He may well turn to the pages of Short Wave Magazine for advice, and become familiar with terms such as SSB, RTTY, selectivity, propagation, and so on.

It is at this point that our worthy listener takes his first step in upgrading his equipment, and comes out of primary education into more advanced listening. Many people at this same point rush along to their nearest High Street multiple retail store and buy what they are told is a “Short Wave Radio”, bristling with push buttons and coloured knobs. Sadly, the so-called “Short Wave Radio” is often no more than a domestic portable with a fancy front panel, and the performance when used for anything other than casual listening is no better than the old radio with which he started — in fact it’s often worse.

So — these push button portables are excellent for taking on holiday, or carrying to the river bank during a fishing trip, but for real listening — no, no, no.

Our listener is about to graduate from the University of Short Wave Listening, and armed with the knowledge of what he really needs for his hobby will proceed, to find a suitable receiver for his purposes. Now it is true that the cost of a properly designed short wave receiver will be higher than the domestic portables; but not so much higher as to be prohibitive, and by going to a specialist (and I mean a true specialist, not someone who talks about “Tranny Radios”), the listener will get good advice based on years of experience in the field, and access to not only new receivers but usually a range of guaranteed second hand units as well. The specialist will also stock and sell a full range of necessary accessories, ranging from simple aerial insulators to complex morse and RTTY decoders for more advanced enthusiasts.

You may get the impression that I am referring to Lowe Electronics when I talk about a specialist dealer, and of course I am. After 25 years of specialising, it is generally accepted that we are without equal, and this is re-inforced by the fact that we have been appointed by so many leading manufacturers to represent their products. As a final point, how many other companies in the UK have designed, built, and sold a real short wave receiver to 17 countries around the world. WE HAVE.

The receivers shown on this page are representative of the best in the world, and are on show at all our branches and at selected dealers throughout the UK. For full information on how to choose your short wave radio, just send off for our “LISTENER’S GUIDE” (details below), or call and ask. We are happy to help, and we know what we are talking about.

FREE
Send £1 to cover the postage and we will send you, by return of post, your FREE copy of “THE LISTENER’S GUIDE” (2nd edition), a commonsense look at radio listening on the LF, MF and HF bands. Its unique style will, I am sure, result in “a good read” but underneath the humour lies a wealth of experience and expertise. You will also receive detailed leaflets on our range of receivers and a copy of our current price list.

LOWE ELECTRONICS LIMITED
Chesterfield Road, Matlock, Derbyshire DE4 5LE Telephone 0629 580900 (4 lines) Fax 580020 Telex 377482

Short Wave Magazine October 1989
There has never been a more exciting time for the VHF listener than right now. With the leading manufacturers making VHF and UHF receivers, and using microprocessor control which would have been impossible even five years ago, the keen listener can carry in his pocket the kind of receiving power that used to take up a nineteen inch rack, and consume enough electricity to light a small house.

We at Lowe Electronics have made it our task to seek out the best of these amazing radios, and bring them to you at attractive prices. We are the sole factory appointed importers for Signal, AOR, and WIN; all of whom represent the very best in scanning monitor receiver design and manufacture, and we show a small selection on this page. Not only do we stock and sell all these radios, we also offer you the best advice in the business, and we carry a full range of listeners’ accessories from a humble egg insulator to RTTY and Morse decoders.

Let’s start with what is acknowledged to be the finest wide range monitor receiver ever made; the AR-2002 from AOR. This receiver in all modes, on frequencies from 25 to 550MHz, and also from 800 to 1300MHz, so there isn’t much you cannot receive: airband both VHF and UHF, marine, amateur, FM broadcasts and TV sound, cellular radio, land mobile radio and so on. The AR-2002 is in use in professional installations all over the world, but is available at a price that the amateur can afford.

**AR-2002**
- Price: £487
- Carr. £8 (Securicor)

The established favourite hand held scanner from AOR is the AR-800E. This mighty midsize covers 75-105, 118-174, 406-495, and 830-950MHz, and you can have AM or FM reception on any frequency in the tuning range. 20 memories, scanning, frequency searching, all the facilities you need, and it comes complete with rechargeable batteries, mains charger, and flexible aerial for an attractive price of only £199.

**AR-800E**
- Price: £199
- Carr. £8 (Securicor)

Brand new from AOR is the AR-900; a delightful hand held scanner with more than a hint of airband in its specification. AM/FM reception in the bands 108-136MHz, 137-174MHz, 220-280MHz, 300-380MHz, 406-470MHz, and 830-950MHz, give the AR-900 a wide appeal, particularly to the UHF airband listener. New slim and elegant styling, an attractive price, and a wide range of facilities including 100 memory channels make the AR-900 unbeatable in the market.

**AR-900**
- Price: £235
- Carr. £8 (Securicor)

Signal Communications have always specialised in receivers for the airband, and we have often said that Mr. Hayakawa is one of those rare men who truly understand how to design VHF AM receivers. The audio quality which comes from any Signal airband receiver is outstandingly good, and the operating facilities are equally excellent. Top of the range is the R-535, which covers not only the VHF airband from 108 to 136MHz (also 136 to 143MHz), but also the UHF airband from 220 to 380MHz. No less than 60 memory channels can store any frequency within the range of the receiver, and scanning takes place at very high speed, so you don’t miss any of the action.

**R-535**
- Price: £249
- Carr. £8 (Securicor)

Signal also make the ideal starter receiver, the R-537S, which combines fully tunable operation for searching around the VHF band and two channel crystal control for spot-on accuracy when you need it. A special version of the R-537S is in use by most parachute clubs where the instructor can talk directly to a falling pupil — helps to advise them that they should have opened the ‘chute.

Our most successful airband receiver has been without doubt the WIN-108. Designed to incorporate all the features asked for by UK users over the years, the WIN-108 is the most convenient, powerful, and feature packed dedicated VHF airband receiver ever made available. Simply cannot be described in this space, but details of the WIN-108 and all our other models are available on request, enclosing £1 to cover post and packing. You will also receive our “Listeners’ Guide” and “Airband Guide” free of charge.

Send right away, and see why you should “look to Lowe” for all your listening requirements.
As usual, the Civil Aviation Authority (CAA) provides useful information in the General Aviation Safety Information Leaflet 1789. There is a new air/ground facility on 110.0 MHz at Wigtown (Baldown). Now, would somebody like to tell me where that is?

In Tamworth, Staffordshire, Geoffrey Powell has been writing to the airlines again! Although Geoffrey received a Speedbird ticket (no guesses as to which airline sent him that), he’s still right as I’m sure that the gift was meant as a special privilege. Geoffrey has ascertained that Bangkok to work on 6.565 MHz and Portishead Radio (available for airline operational communications) to use 11.306 MHz for initial calls.

Alan Jarvis (Cardiff) has noted the change from 121.2 to 125.0 MHz at Cardiff Tower (last month’s “Airband”) and asks why. Your answers will be printed here. Alan also believes a new facility will be available in his area on 119.95 MHz; I would like to point out that this is an i.f.s. localiser frequency (paired with a glideslope on 330.95 MHz) so find a runway that hasn’t got one yet, and watch out for the CAA calibrator HS748 aircraft.

Retired DC-9 pilot Leslie Grevelle-Smith G4SUJ (Wolverhampton, West Midlands) points out a useful list in The Lowe Airband Guide (see the supplier’s advertisements in this magazine). For each London Air Traffic Control Centre relay station the list gives all frequencies available on both v.h.f. and u.h.f. There is also an amateur net run by the International Association of Airline Hams: Sunday & Wednesday, 14.280 MHz, 0700-0900Z, 1100-1300Z, 1500-1700Z, 1900-2100Z daylight saving time. Monitoring on 14.280 MHz is encouraged at all other times.

Can You Help?

Yes you did! Thanks to Jack Nicholls (Buckhurst Hill, Essex) and also Eddie...

**AIRBAND**

**Godfrey Manning G4GLM**

What goes on “behind the scenes” in the cockpit of a jet aircraft when the engines are started?

**Burkett G6DUV** (Deganwy, Gwynedd) for information on the Ediswan V1505 valve (August “Airband”). It’s a transmitting triode, directly heated cathode, capable of 800W carrier output up to 1.5 MHz and possibly dating from the pre-War period. I still don’t know what it was doing at an aerodrome...

Also in August, Terry Ford (Sheffield) asked if the Tandy PRO-2004 scanner can be converted to PRO-2005 standard. The answer from Malcolm Bowden (Hales Owen, Birmingham) is that it can be done for around £25 by Tandy, Unit 5, Bilston Road, Wednesbury, West Midlands - but I suggest you telephone them on 021-556 0766 first to check that this service is still available.

Bill Wilson (Aberdeen) refers to “Scanning” on page 25 of the May 1988 edition of this magazine where you will find details enabling the memory to be expanded to 400 channels along with other useful information. Bill warns that speeding the scan rate will affect everything else timed by the inbuilt microprocessor i.e. shorter delay, higher pitched and shorter bleeper, reduced priority channel sample time and reduced sensitivity on scanning and searching as the phase locked loop gets rushed off its feet. If you really want to do this, first note the memory contents as the modification will erase them. Find the 7.37 MHz ceramic resonator CX501 (between pins 29 and 30 of IC503) and replace it with a crystal in the 9-11 MHz range. The guarantee would probably be invalid by modifying the set. Alan speaks highly of the PRO-2005’s 5KHz incremental tuning which helps resolve the offset frequencies used by repeaters on the same channel. Also, sound squelch enables the receiver to scan past a channel blocked by an unmodulated carrier.

Now a request for help from Leslie who collects navigational compasses and early navigational instruments of all types - not just limited to aeronautical ones. If you can offer any such items that Leslie might be interested in buying for his personal collection then please make contact directly Tel: Wolverhampton (0902) 731294.

**George Hainsworth G4JFC** (Aston Lane Walls, Northamptonshire) is interested in frequency information. Unfortunately, lists of frequencies just won’t fit a column of this size; I know it sounds a lame excuse, but unfortunately it is necessary to be practical. There are great thick officially published books of frequencies, all on sale to the public and I regularly quote such sources (see the description of location indicators in the July “Airband”).

If you want to know something specific about the typical procedure on any type of frequency, then please ask. The column is largely determined by readers’ requests.

Now, George wants to know about callsigns. These are officially allocated and I can fill in some of them for you. As far as I know: “Fordair” is Ford Motor’s private airline, used for ferrying personnel and parts; “Leisure” is Air UK Leisure; “Macline” is McAlpine Aviation; “Majic” belongs to McAlpine/GEC, a company formed with the break-up of the McAlpine group; “Skyguard” is run by Securicor, mainly freight; and “Starjet” belongs to Novair (I think the company name sounds too much like the phonetic November to be used on the air) which I believe came into existence from the break-up of British Caledonian. Right, who can elucidate the following: Airwise, Eastex, Jetset, Neatex, Rosie, Teestar, Transat, Vickers and Viking? George, along with the rest of us, would like to know!

**You Write**

Harry Longley G0JKT (Lancaster) is well known for putting technical magazine articles into “Airband” including annotating newspaper tapes for blind radio enthusiasts. During his war service with 82 Squadron RAF in the Far East, Harry saw the arrival of new equipment: the de Haviland Mosquito. The laminated wood wings were a problem at first. Prior to that the Squadron flew the Vultee 72 Vengeance dive-bomber (of American origin). This meant learning how to enter a dive; also, of course, how to pull out of one again! What with desert dust clogging the carburettor air intakes and wrongly assembled fuel pumps (necessitating manual reversion, with a to-and-fro handle) those were interesting times.

The forerunner of the present-day secondary surveillance radar transponder was the wartime Identification Friend or Foe (i.f.f.). At the time, these were top secret - if the enemy could also emit a...
Land's End v.o.r. - this differs from one or two others. It has three large birds nests in it
Leslie Greville-Smith

“friendly” radio signature, the whole purpose would be defeated. So, each airborne installation was armed with a detonator which caused self-destruction during the impact of a crash. It also had the same effect on pulling out of a dive, and the g-switch underwent urgent modifications when this was found out!

To improve our education, Leslie has decided we should know what a v.o.r. beacon looks like. He came across the one at Land’s End (LND: di-dah-di-dit, dah-di-dit, 114.2 MHz) almost by chance (see photograph, which also shows the associated channel 89 d.m.e. in the background on the right). On a different topic, Leslie will supply a decoded flight plan for a transatlantic route if you send £2 to cover costs to Capt. Greville-Smith, Hilton Lea, Westcroft, Wolverhampton WV10 8QH.

Start Approved

Just what goes on when the controller gives clearance for a pilot to start a jet engine? Although most engines are two-spool types with bypass taken to extremes in the case of big fan engines like the Rolls-Royce RB-211 on the Boeing 747) we’ll consider a simple turbojet with just one “revs per minute” (r.p.m.) tachometer to look at. First let’s see how a jet engine works.

Air is ingested at the engine intake and forced through. It blows past a continuously burning jet of ignited fuel, which heats the air and gives it energy. The hot gas now expands its way out of the engine, exiting backwards through the jet pipe at high speed. If a light object (such as this mass of gas) is thrown backwards at speed, the thrower receives a forwards push. A common knowledge situation like this is a skater holding a small weight. If the weight is thrown, the skater also moves off in the opposite direction. Newton explains this well - very crudely, it’s all about the action producing an equal and opposite reaction. Also, the momentum of the light, fast gas from the jet (going one way) will equal the momentum of the much slower, heavier aeroplane travelling the other way.

So far, so good - but I’ve described something more like a ram jet than a gas turbine engine. If the incoming air could be first compressed, then heated in the combustion chamber and finally allowed to re-expand, the engine would become more powerful. Where do we find the power to do the compressing? Answer - sacrifice a little of the engine’s thrust and divert it to drive the compressor. This is easily done by making the outflowing gas impinge on a turbine. Rather like a windmill, the turbine blades catch the passing gas (before it leaves the engine) and the mechanism starts to turn at high speed. A shaft runs the length of the engine and drives the compressor at the front of the engine. So the final sequence along which the air passes is: intake - compressor - combustion chamber - turbine - jet pipe.

The pre-start check is complete. In the tail of the aircraft is an auxiliary power unit (a.p.u.), itself a small jet engine; it runs a generator and supplies pressurised air whilst the aircraft is on the ground with the main engines off. The a.p.u. does not provide any propulsion but is small enough to be started from the aircraft’s battery.

Captain: “Manchester ground. Short wave One Zero Eight Niner, on stand Alpha Four Niner, request start, over.”

Ground movements controller: “Short wave One Zero Eight Niner, good morning, start approved, temperature plus two zero.”

Captain (on service interphone): “Hello engineer, we’ve got our startup clearance, how does it look to you?”

Ground engineer: “Doors are closed, nose gear pins in, beacon’s on and rotating, you are clear start.”

First officer (selects No. 1 engine start switch): “Start valve open, r.p.m. building ... Now 20%.”

Captain (opening fuel cock): “Fuel open.”

First officer: “Fuel flow indicated. Oil pressure building. Light-up! Jet pipe temperature now rising.”

Sometimes the fuel ignites with incorrect air flow through the engine. This is almost like a jet of flame coming out of the back of the engine! A sudden, explosive rise in jet pipe temperature signals this and the Captain would hastily shut the fuel off again. Or, the fuel might not ignite at all - the jet pipe temperature doesn’t rise and the start sequence concludes with the engine r.p.m. winding down again. In this case, the engine must then be turned over without fuel flow or ignition in order to blow out the unburnt fuel that’s now slopping around in the combustion chambers.

If all is well, the engine starts correctly and becomes self-sustaining at about 50% (idle) r.p.m., the jet pipe temperature settling to a steady value. The engine-driven generators can be brought on line and bleed air from this engine can be used to start the other engines. At the end of the flight, the only way to shut the engine down is to close the fuel cock again.

We’ll leave our crew to get on with their flight for now, but I hope that you’ll come “up, up and away” with me again next month.

The Battle of Britain Memorial Lancaster at the Cranfield Popular Flying Association Rally 1989

Short Wave Magazine October 1989

11
The Jupiter II

Eagle-eyed readers may well have already spotted the first appearance of the Yupiteru MVT-5000 Hand-held Scanner I have mentioned during the past few months, and which is now being sold under the name "Jupiter II". Unfortunately, I only managed to test drive one just after the closing date for last month's column so let's get straight into the specifications.

Just for a moment think of all the facilities you would like to find in a hand-held scanner - well this model has them all (most of them anyway).

The main features include: frequency coverage in two bands (one from 25MHz to 550MHz and the other 800MHz to 1300MHz), good receive sensitivity, 100 memory channels in 5 banks of 20 with the ability to select memory banks or lockout individual channels, 10 user definable search bands, manually selectable a.m. or f.m. (at last), selectable tuning step sizes of 5, 10, 12.5, 25 or 30kHz, fast search and scan rate of 20 channels per second, readable liquid crystal display with backlight, good built-in loudspeaker, BNC antenna connector, case size 177 x 63 x 38mm - and all for just under £300.

If this wasn't enough, the receiver also has a range of options to halt the scan or search when a signal is detected. In addition to the normal facility of stopping the scan when a signal is detected and then continuing once the transmission ends, the receiver has a switchable delay which halts the scan for an extra period in order to wait for a reply. Alternatively, the "Skip" facility can be used which resumes the scan after seven seconds even if the signal is still present. Finally, if you are plagued by strong signals with no modulation (such as links in the 433MHz band) then you can switch in the "a.f. Scan" facility which only stops the scan when modulated signals - and before you say it, this one does seem to work properly.

I also like the simple method of keyboard entries, once the basics have been learnt. It is also easy to transfer a frequency from the search mode to one of the memory channels and quickly tune up and down in frequency or check the contents of memory channels by use of the up and down keys.

The receiver also has a battery saving facility which permits monitoring of a channel for extended periods with the display alternating between a "Sleep" mode and its normal condition every five seconds. However, it should be noted that this does not operate in the search or scan modes. Battery consumption is a little on the high side, but being AA cells it is possible to change them easily and users would be advised to invest in some rechargeable types if long periods of operation are envisaged.

Sensitivity is very good with all sorts of signals being audible on just the supplied telescopic antenna. In fact I found it difficult to believe that it was possible to receive some transmissions in this way, as many other scanners would mask the really weak signals with noise radiating from the microprocessor control circuits. Good circuit design and a first f.f. of 705MHz also help to ensure freedom from unwanted image signals and internally generated spurious carriers which tend to plague many hand-held designs. The only shortcoming I have noticed is a slight susceptibility to overloading on very strong signals. This is quite common in continuous coverage receivers of this type and is mentioned in the instruction manual. In normal use it is not a problem, it is only when external antennas are used in close proximity to TV or f.m. radio transmitting stations that some effects may be noticeable. If you use it for the purpose it was designed for - hand-held operation - you shouldn't have any problems.

What didn't I like about it? - not much, the keyboard confirmation "Bleep" is a little too loud for my liking, and a slight "Plop" each time the squelch opens is irritating when using headaphones, but examination of the service manual when it becomes available may provide a solution to these problems.

I don't think I have had as much fun using a scanner since I first got my hands on an AOR-2001 - which was like a breath of fresh air compared to other models available at the time. The MVT-5000 looks set to dominate the hand-held scanner market in the immediate future - it will be interesting to see how quickly other manufacturers rise to the challenge.

It is hoped that a review of the receiver will appear in a later issue of SVM but you can obtain further details from: Waters & Stanton, 18-20, Main Road, Hockley, Essex SS5 4QS. Tel: Southend-on-Sea (0702) 206835.

Rumour has it that there will be a base station version called the MVT-6000 available soon, so eyes peeled for the first sightings!

Discones

Antennas are the subject of many of the letters I receive, in particular the sometimes disappointing performance of discones when compared against simple antennas such as dipoles.

I must admit that I have never been a great fan of the discone but it is still a great deal better than a telescopic antenna on the back of the scanner - especially when mounted in a good location outside.

Theoretically, the gain of a discone should be the same as that of a dipole but over a much larger frequency range.
interesting article published in 1953 in the US magazine *Electronics* entitled "Designing Discone Antennas". It was written by J. J. Nail who worked for Federal Telecommunication Labs Inc and was based on research done for the Navy Department. The bulk of the text is devoted to finding the optimum dimensions for each section of the antenna. However, the most interesting part for me is towards the end of the article where the radiation angle of several different discones is shown in graphic form.

This is plotted for three different angles of "Cone" at 35, 60 & 90 degrees and at 1, 1.5, 2, 2.5 & 3F(low). The effect of increasing the frequency on the angle of radiation is not too noticeable up to 2F(low), but beyond this point the pattern changes dramatically. This is particularly true of the 35 degree angle discone where at 3F(low) the main response is tilted downwards rather than towards the horizon where it is required.

Measurements made on a 60 degree discone - which is the most common design, showed a loss of 2dB at 2F(low), 3.3dB at 3.75F(low) and 2.5dB at 4.85F(low) when compared to a dipole. Discones with a larger "Cone" angle gave a slightly better performance at these frequencies but all exhibit some distortion of the radiation pattern.

The effect of the change in radiation angle for terrestrial reception is noticeable but is of particular importance to aircraft enthusiasts who may use the same discone for both the v.h.f. and u.h.f. airbands. In this case it may be better to choose a discone with a 90 degree "Cone" angle as the radiation pattern tends to rise at the higher frequencies rather than dive towards the ground. I would be interested to hear readers' comments on this suggestion.

Part 9 of the spectrum explanation follows in next month's "Scanning".

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Short Wave Magazine October 1989
Perhaps one of the most unlikely places to discover the allure of short wave listening is Lincolnshire farmer’s cottage. As a young schoolboy I frequently stayed with my grandparents, a farmer labourer and his wife. Usually I was accompanied by a cousin of around the same age.

The dry weather daytimes were easy, but the evenings and wet weather meant being confined to the house. My grandmother had precise ideas about what small boys could do, or rather what they could not do, in the house. Her great saving grace was that she allowed us to use the brown Bakelite Ekco A22 radio set. Odd really, because I was never allowed to “fiddle with” the radio set in our rather less restrictive home. It was on those dark Lincolnshire country nights that I discovered the excitement of short wave listening.

Keeping the volume control down, so as not to be told to “switch that thing off”, we scoured the single short wave band for exciting stations. There was magic in listening to English language radio broadcasts from distant places and even more magic when we found we could listen to Humber Radio in conversation with trawlers as they came in and out of Grimsby and Hull.

Eavesdropping
This was not just listening: it was eavesdropping on another world. Then someone at school showed me a Boys Own Paper plan for building a crystal set. I talked my father into buying the parts I needed to build the crystal set and that was real magic. I had joined in the mystery of radio - voices and music were coming from something I had built myself. Other home-made radios followed, each a little more sophisticated than the last.

All my other hobbies were laid aside, not only was there the excitement of listening to interesting and often distant

Fig. 1.1

The Diode
The diode, so called because it has two electrodes (di means 2), is a device which simply allows electrical current to flow only one way. Most diodes look like a small sealed glass cylinder with a wire at each end. The two connections to the diode are called the anode and cathode. The symbol for the diode is shown in A. Without going into the complications of how they are made and perform their function, what they do is easily shown in B. The simple circuit of a battery and bulb has a diode connected in series (in line). With the anode on the positive side of the battery, current flows and the bulb lights. If the diode connections are reversed (cathode to positive), no current can flow and the bulb will not light.

C shows one of the commonest used properties of a diode. An alternating current (a.c.) signal is passed through a diode. An a.c. signal has a voltage which undulates between positive and negative. If the signal meets the diode “anode first” only the positive part of the a.c. signal will be conducted or pass through. This process is called rectification and the resultant signal is said to have been rectified. If the undulations are very fast the peaks of positive signal will be so close together that they will appear to be a steady positive voltage. This principle is used in detection of radio signals as in the simple crystal set.
Wherever possible alternative suppliers will be named and it may be possible to obtain the components from local shops. The early projects will be built up using non-soldering techniques but later in the series soldering will be introduced.

Symbols and Circuits

An electrical circuit is an arrangement that allows an electric current to flow. The circuit has to be complete in order for the current to flow. One of the simplest examples of a circuit is shown in Fig. 1.1: it is the common pocket torch. Part (A) shows a simple torch consisting of two battery cells, a switch and a bulb. When the switch is closed the circuit is complete and the bulb will light.

In electronics two types of diagram may be used to show how a piece of equipment is built. The Circuit Diagram is a shorthand way of showing how the components in the circuit are connected together. It is rather like a map and uses symbols for the individual components. The "map" is not to scale and may not show exactly how the components are arranged in the completed piece of equipment. It shows the route that the circuit takes between the components.

The obvious comparison is the well known London Underground Map. That is certainly not to scale and does not show the intricacies of the routes but it does show how the lines interconnect between one place and another.

Part (B) shows a circuit diagram for the torch. The symbols for the batteries, switch and bulb are joined by neat straight lines to map out the route of the circuit. Two batteries are used and we have also shown the symbol for one battery cell. In the torch these batteries are used "in line". The name for this type of circuit arrangement where the current flows one component first, then another is a series circuit. The two batteries are in series. A quick glance at the circuit and the drawing of the torch shows that circuit diagrams very often do not look like the actual completed piece of equipment. It would be possible to build the circuit in many practical forms. Part (C) shows another way of building up the same circuit.

The example in Fig. 1.1(C) uses a method of quickly building up circuits called Veroblock. Veroblock is a plug-in circuit prototyping board. It enables components to be interconnected on a plastic board by pushing the component wires into connector holes. The Veroblock consists of a matrix of holes in a plastics base board. Each hole is a small socket which grips any wire pushed into it and makes a good electrical connection. These holes are connected together underneath the board into a series of groups. There are two sets of 30 rows of 5 holes connected together either side of a central gap. Along each outer edge of the board there is an additional row of holes connected in series (in line). In Fig. 1.1(C), the lines shown between the holes shows exactly how the connections between the holes are arranged. The Veroblock will be used for the earliest projects in this series. It enables circuits to be built up quickly without being soldered and the components can be pulled out and used again.

So, Fig. 1.1(C) is called a layout drawing as it shows the actual physical layout of the built up circuit. Compare this layout drawing with the circuit diagram of Fig. 1.1(B). Four of the rows of connected holes are used to form part of the circuit. The gap between the two rows of connected holes at the top of the Veroblock makes it easy to insert the switch at this point. The drawing shows a simple touch switch made by touching two wires together, although a proper switch could be used. The gap in the lower two rows of holes used in the circuit has a wire link to complete the circuit.

This layout happens to look rather like the circuit diagram. The components are in the same positions as the circuit symbols. But it would be the same circuit if the link and switch were changed over or the batteries and the bulb. It would also be possible to work out an alternative route for the circuit using other parts of the Veroblock board. Think about, or even try out, other ways in which this circuit could be built upon a Veroblock board. It is common to use link wires on Veroblock layouts and with the arrangement of links and existing interconnections between the holes, several alternative layouts can exist for most circuits. The skill is translating from the circuit diagram to a practical layout on the board which connects the components in the correct manner.

The Crystal Set

Surely everyone who knows anything about radio will know the crystal set. It is the simplest form of radio receiver and takes us back to the earliest days of radio reception. It is simple and cheap to build and is an ideal introduction to the basics of radio construction and the principles of radio reception.

Radio signals are all around us, all the time, but we cannot see or hear them without a radio receiver. Often we call them radio waves and this gives a clue to their nature. They are electromagnetic waves. Like all waves they are produced by oscillation: forward and backward movement. The number of these waves which occur in a second is called the frequency. The radio wave usually serves as a carrier wave, it carries the information we wish to receive. This information is usually at audio frequencies: frequencies we can hear. These audio, or sound, signals have been converted into electromagnetic waves and are imposed on the radio carrier wave. The job of the radio receiver is to pick up the radio carrier waves, separate the required audio waves and then turn them from electromagnetic waves back into sound that we can hear.
The diagram, Fig. 1.2, is a very simple representation of how a radio receiver can perform these tasks. Most radio receivers are more complex than Fig. 1.2 suggests but it does show the basic principles.

The radio frequency signals are picked by the aerial (more often called the antenna) these days. The antenna will pick up any radio signals in its path but since we only wish to listen to one signal at once, the required signal must be selected. This process is called *tuning*. The tuned circuit, or circuits, selects the wanted radio signal from all the signals in the antenna.

The signal now has to be processed to remove the required audio frequency waves from the radio frequency carrier. The way this is done depends upon the nature of the required signal. There are several ways of carrying information on radio waves and we will discuss these as the series unfolds.

The resulting audio frequency signal can be very weak and there may be several stages of *audio amplification*. These stages make the audio signal stronger. The signal is still an electromagnetic wave and although it is at audio frequencies, we cannot hear it. The electromagnetic waves have to be converted into sound waves that we can hear. This is done in a loudspeaker or perhaps a pair of headphones.

The circuit for a crystal set is shown in Fig. 1.3. A first glance shows that it is a very simple radio receiver. There are only four components in the whole radio. Note that there is no battery in the circuit. The crystal set is totally powered by the radio signals. Neither is there any audio amplification so only strong radio signals can be received on such a simple radio set.

### Tuning

The tuning is done by two of the components: a coil (usually called an *inductor*) and a tuning capacitor (called a *variable capacitor*). The detection is done by a *diode*, the simplest form of detector circuit. The detected audio signals directly drive a pair of headphones without the advantage of audio amplification.

Why is it called a crystal set? Well – in the early days of radio construction the diodes were clumsy electro-mechanical devices. They consisted of small pieces of certain types of crystal mounted into a holder. This formed one side of the diode. The other connection was a thin wire which was gently pushed or scratched onto the crystal surface until signals were heard. It was a tortuous process and the family dare not move when father operated his crystal set. The piece of wire was often coiled to aid contact with the crystal surface. It was this that gave these detectors their famous nickname: The Catswhisker.

The crystal set will require an external antenna and may require an earth connection. The earth connection provides a return route for the radio signals. This may seem a curious idea because these days domestic radio sets do not usually require an external antenna although we are familiar with their use with television signal reception. Short wave listeners will be familiar with providing an antenna for a receiver and perhaps familiar with the idea that in some cases reception is aided by providing an earth return path for the signals.

In Part 2 we will actually start building your first receiver.

### FIRST AID

Mr Dunn is a Class A licence holder and would like to be issued with the callsign G3DUN which has not appeared in any callbook for about 30 years. The authorities at Waterloo Bridge House confirm that the callsign is no longer in use and are prepared to consider his application providing he can get it released from the original holder or his next of kin. Does anyone know who held this callsign and where Mr Dunn may contact them? If so, write to him at 8 Eden Close, Beverley, HU17 7HE.

Has anyone got a copy of The History of Wireless Telegraphy by J.J. Fahie, published in 1901 and reprinted by Arno Press in 1971. If so, would they like to contact John Taylor G0AKN on 01-891 2820.

A Dragon 32 instruction book, disk drive card and software are being sought by Mr J. Brown. 45 Marlborough Avenue, Falmouth, Cornwall TR11 4HS.

Radio Electrics are engaged in the repair and overhaul of vintage radios and transistor-type radios. Several years ago, they were supplied from Messrs Osmors with a coil pack LMS which was miniature and built around a three-pole switch and a small plate capacitor. If anyone knows a firm who can supply these completely with i.f.s, contact: Mr S. Kelly, 3 New Road, Portlaoise, Ireland.

Does any reader have any information on Cintel test equipment, e.g. their wide range capacitance bridge Type 1963 and their mutual and self inductance bridge type 1852? Ken Smith has been looking in at rallies to pick up Cintel equipment to renovate, etc., so he rather admires this firm’s products. He thinks these bridges are based on the interesting transformer bridge principle, but has been unable to locate operating manuals/service sheets on these pieces. Ken Smith, Staple Farmhouse, Staple, Canterbury, Kent CT3 1JX.

Has anyone got assembly instructions for the Flick Mechanism of the tuning dial on the Canadian Wireless Set No. 52, if so please contact: A.J. Humphris. Tel: (0926) 400876.

Information on the Lafayette Guardian 6600 is being sought by Charles Elvin, 39 Kintillo Place, Perth, Scotland PH2 9AS if any one can help.

Mr Gist would like to obtain a workshop manual for the National NCX3. All costs will be paid. M. Gist G4KFX, Sunnyside Cottage, Hugus, Threemilestone, Truro, Cornwall TR3 6EQ.

Mr Wallington says, "My old and trusty Hacker Sovereign radio (a twenty-first birthday present) has finally ceased to function and my local repair shop cannot help without a circuit diagram. Can anyone please help?" S.J. Wallington, 86 Kings Meadows, Sowerby, Thirsk, North Yorkshire YO7 1PB.

If "First Aid" can help you with a radio query or a search for information, just drop us a line and it will be published in the next available issue of Short Wave Magazine. Make sure you send us enough information for other readers to contact you.
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When you purchase a 2001D it is very important to check which version you buy since there are six models on the market targeted at different countries. Some countries have legislation that restricts receiver tuning range; for example in many countries the 2001D will come without the airband or the section of the f.m. band between 76 and 87.5MHz.

Ironically the official UK model is intended to omit the airband but most units actually on sale come complete with all facilities. In addition you could find 2001D models intended for West Germany and the Middle East that omit the frequencies 285 - 530kHz and 26100 - 29999kHz.

If you are about to purchase a 2001D it is really a case of "buyer beware". That is small consolation if you find yourself with a less than complete 2001D, but fortunately it is relatively easy to undo some of the mischief.

Restoring the Missing Frequencies

Regrettably, restoration of airband to a model lacking it is not really practical since the entire r.f. front-end stage (over 20 components) and the front panel selection switch are left out at the factory. In contrast, it is possible to restore the missing short wave and f.m. frequencies with minimal effort and cost. Again, to do this the service manual is essential but this modification consists of locating a number of soldered links located on the keyboard p.c.b.

These links program the behaviour of the receiver and cutting or desoldering the appropriate link will restore the receiver tuning ability. There are a maximum of four links located directly next to diodes D511 and D512, each one associated with one of four suppressed facilities.

- (i) 265 - 530kHz
- (ii) 116 - 136MHz (airband)
- (iii) 76 - 87.5MHz
- (iv) 26100 - 29999kHz

A more serious problem exists with the 2001D destined for West Germany and the Middle East in that the receiver lacks the front panel switches for u.s.b. and l.s.b./c.w. reception.

The 2001D, when compared with other portable receivers, offers good s.s.b. reception and it is shame that this facility is left off some models. In actual fact it seems that only the front panel push buttons are missing and that all the associated circuitry is inside waiting to be used. A brave experimenter might try drilling new holes in the front panel for new switches!

Although some of the restricted facilities can be restored easily to the 2001D, the moral of this story once again very few receivers are capable of high sensitivity as well as handling very large signals and the majority are usually a design compromise.

Overload Reduction

To reduce overload in the 2001D there are two approaches one can take and, unlike the other suggestions in this article, neither involve invasive surgery to the receiver itself.

It is worth noting that the 2001D is fitted with a DX/LOCAL switch which has the effect of reducing receiver sensitivity by about 14dB (measured at 6MHz). It also provides a variable r.f. gain control which can vary sensitivity by about 38dB.

Unfortunately neither control is ideal since they are both preceeded by transistors exposed to the full unattenuated signals. Reference to the receiver block diagram (Fig. 1.1) shows the relative position of these controls. The DX/LOCAL switch is the most effective tool for reducing overload short of adding an external attenuator between an external antenna and receiver. The RF GAIN control is of little benefit since it is located after the first mixer stage which, in most receivers, is the most overload-prone stage in the receiver.

The second factor contributing to overload in the 2001D is the total lack of any r.f. pre-selection at the receiver front-end. This means that every signal on l.w., m.w. and s.w. (and more!) is received simultaneously and this mass of signals has to pass, undistorted, through the r.f. preamplifier and first mixer stages.

This is a tall order and it is not surprising that all possible receiver designs this is the one most prone to overload problems.

To overcome this problem any serious user of the 2001D will avail themselves of an external pre-selector, passive antenna tuning unit (a.t.u.) or pre-filter. The practical usage of such accessories is shown in Fig. 2.1.

![Fig. 2.1: The use of preselection and attenuation.](image-url)
**HOT-RODDING THE ICF-2001D**

**Fig. 2.2: Use of tuned loop antenna.**

For serious DX usage on low frequencies the pre-selector and external antenna can be combined very conveniently into one unit by using a tuned loop antennas.

Numerous designs of loop antennas have been published [4] over the years for all frequencies from 100kHz up to a few megahertz.

At resonance the antenna provides excellent pre-selection and overload by unwanted signals becomes a thing of the past, provided the antenna and the receiver are tuned to the same frequency! It is possible that the signal from the loop is too great and an attenuator, as shown in Fig. 2.1, may need to be used between the buffer amplifier and the receiver. □

**Abbreviations**

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>a.m.</td>
<td>amplitude modulation</td>
</tr>
<tr>
<td>a.u.</td>
<td>antenna tuning unit</td>
</tr>
<tr>
<td>c.w.</td>
<td>continuous wave (Morse)</td>
</tr>
<tr>
<td>dB</td>
<td>decibel</td>
</tr>
<tr>
<td>DX</td>
<td>long distance</td>
</tr>
<tr>
<td>f.m.</td>
<td>frequency modulation</td>
</tr>
<tr>
<td>i.f.</td>
<td>intermediate frequency</td>
</tr>
<tr>
<td>kHz</td>
<td>kilohertz</td>
</tr>
<tr>
<td>l.s.b.</td>
<td>lower sideband</td>
</tr>
<tr>
<td>l.w.</td>
<td>long wave</td>
</tr>
<tr>
<td>m.w.</td>
<td>medium wave</td>
</tr>
<tr>
<td>MHz</td>
<td>megahertz</td>
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<tr>
<td>p.c.b.</td>
<td>printed circuit board</td>
</tr>
<tr>
<td>r.f.</td>
<td>radio frequency</td>
</tr>
<tr>
<td>s.s.b.</td>
<td>single sideband</td>
</tr>
<tr>
<td>s.w.</td>
<td>short wave</td>
</tr>
<tr>
<td>u.s.b.</td>
<td>upper sideband</td>
</tr>
</tbody>
</table>

**Recommended Reading**

[4] 'The V-W MW Loop' G.S. Maynard

**Practical Wireless** November 1985.

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**RALLIES**

*October 1: The Great Lumley Radio Rally will be held at the Community Centre, Great Lumley, Chester-le-Street, Co. Durham. Doors open at 10.30am for the disabled and 11am for everyone else. The entrance fee is 50p. There is a Bring & Buy stand, RSGB Book stand, the usual traders, repeater groups as well as refreshments. Barry G1JDP. Tel: 091-388 5936.*

*October 1: The Blackwood Amateur Radio Rally will be held at the Oakdale Community College. Doors open at 10.30am and admission is £1. There will be the usual dealers, Bring & Buy, raffle, free car parking as well as a lecture on ATV. B Matthew. Tel: (0495) 243858.*

*October 8: The Armagh & Dungannon District ARC will be holding their rally at Drumsill House Hotel. Morse tests will be held.*

*October 15: The Bishop Auckland Radio Rally will be held in the Sunnnydale Leisure Centre, Shildon, Bishop Auckland. Ernie G4YF, 64 Gurney Valley, Bishop Auckland, Co. Durham DL14 8RW. Tel: (0388) 607500.*

*October 15: EL/H0EXB in The Floral Hall, Hornsea, North Humberside. Doors open 11am, 10.30am for the disabled. Talk-in S22, trade stands, club displays, cafe, bar, Bring & Buy, etc. G4IGY. Tel: (0964) 533331.*

*October 27/28: The Leicester Amateur Radio Show will be held in the Granby Halls, Leicester. There will be a second hall in use this year to cater for the huge amount of interest in this rally.*

*November 4/5: The 3rd North Wales Radio Rally will be held in the Aberconwy Conference Centre, Llandudno. The rally opens at 11am on both days. The entrance fee is £1 with OAPs and children under 14 free. Talk-in will be on S22 and 430MHz. There will be computer hardware and software, data transmissions, packet radio, satellite reception, TV and video, short wave listening, amateur radio, CB radio, marine radio, p.m.r. to mention but a few. More details from: Edward Shipton GW0DSJ. Tel: Rhyl 336839.*

*November 4: The 9th North Devon Radio Rally will be held in the Bradworthy Memorial Hall, near Holsworthy. Doors are open from 10am to 5pm. All the usual attractions. Talk-in on S22. G8MXJ, QTHR.*

*November 19: The Bridgend & District ARC will be holding their 1989 rally at the Bridgend Recreation Centre, Angel Street, Bridgend, Mid-Glamorgan. Doors open at 11am.*

*November 19: The West Manchester Radio Club's Red Rose Winter Rally will be held in Astley & Tyldesley Miners Welfare, Meanley Road, Gin Pit Village, Astley, Tyldesley, Manchester. More details from: D.R. Camac. Tel: (0204) 24104.*

*Practical Wireless & Short Wave Magazine* in attendance.

If you are organising a rally and would like it mentioned in Short Wave Magazine, then drop us a line, preferably as soon as you have fixed the date but no later than six weeks in advance (marking your envelope Rally Calendar) and we'll do the rest. Please make sure that you include all the essential details such as the venue, starting time, special features and a contact for further information.
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However you view the Voice of America, there is no doubt that the station is one of the world’s most powerful stations, putting out more than 40 language services for hundreds of hours each week.

It was on 24 February 1942 that the Voice of America first went on the air with a 15-minute programme in German. Funded from public monies appropriated by Congress, the new radio station was part of the Office of War Information and programmes in Italian, French and English followed quickly.

The first studios and headquarters were situated in New York and were led by the Romanian-born actor, author and theatrical producer-director, John Houseman. From the beginning, Voice of America pledged to tell the truth to its listeners, be it good or bad and Houseman recalled “The news that the Voice of America would be carrying to the world in the first half of 1942 was almost all bad … we would have to report our reverses without weaseling. Only thus could we establish a reputation for honesty which we hoped would pay off on that distant but inevitable day when we start reporting our own invasions and victories”.

VoA grew rapidly during the Second World War, and by 1945 was broadcasting in 41 languages. At the end of hostilities, international broadcasting throughout the world reduced, or in some cases, disappeared altogether, and a diminished VoA was transferred from the Office of War Information to the Department of State.

Reluctant Funding

Congress was reluctant to provide funding for VoA immediately after the war, but this hesitancy to support international broadcasting all but ended when the Cold War escalated, and the Soviet Union and its allies increased hostile international broadcasting.

In 1948, Congress enacted legislation giving permanent status to America’s international information exchange programme, including VoA.

Those first transmissions of Voice of America were directed to Europe and came not from the station’s own transmitters - for it had none - but through BBC senders, and commercial broadcasters in the United States. Construction had begun in 1942 of stations at Dixon and Delano in California where two 50kW and one 100kW transmitters were to be housed. These came on stream in 1944, and today Delano operates nine, and Dixon three, short wave transmitters. Also in 1942, construction of a high-powered facility at Bethany, Ohio, began and three 200kW transmitters came on the air in 1944.

In 1946, four existing transmitters at

Government mouthpiece or independent unbiased international broadcaster? Just what makes the Voice of America tick.

Ismaning near Munich were overloaded for the VoA, giving two 75kW and two 100kW senders, and in 1948 five 50kW transmitters were made available to VoA by the BBC at the h.f. station at Woofferton in the U.K. It seems that despite those early doubts on the need for VoA, the station’s management had a clear objective - to be one of the world’s major international broadcasters in as short a time as possible.

A Proper Role

Between 1948 and 1950 there was debate in the government about VoA’s proper role - was it to report news and reflect America, or was it to be an instrument of foreign policy and counter Soviet propaganda? Congress greatly favoured the latter. When the Korean war started in 1950, the Truman administration called on all America’s media, including the Voice, to “combat communism and communist media by exposing its lies and subjecting it to ridicule”. Early in 1953, however, VoA came under close scrutiny from the Congressional committees looking into alleged subversive activities and mismanagement. The alleged subversive activities were not proven, but in the aftermath of these hearings, Congress reduced the station’s budget and cut a number of language services.

In 1953, VoA was separated from the State Department and became part of the new US Information Agency, and by 1954, VoA had moved to its home for the last thirty-five years, 330 Independence Avenue, Washington DC.

During this turbulent period of VoA’s history, developments on the technical operations front managed to continue. In 1949, the Tangier relay station opened with the first of ten 50kW transmitters starting work. In an attempt to beat Soviet jamming and to increase broadcasting range, a Coast Guard cutter, the SS Courier was commissioned in 1952 to provide a mobile relay station. The ship had 150kW medium wave transmitter, and two 35kW short wave senders, with special medium wave antennas held aloft, when weather permitted, by helium-filled balloons. Special turntables were designed to prevent records from being scratched if the ship suddenly lurched with a wave. Whilst the ship was capable of broadcasting from the high seas, international treaties prevented it from doing so, and thus it depended on permission from a host country to operate within its territorial waters.

The Courier broadcast until 1964 at anchor off Rhodes in Greece, when a land-based relay station with two 50kW h.f. and one 500kW medium wave, transmitters came on the air. VoA also used long wave for a number of years, on 173kHz from the Erching plant near Munich, with 1000kW. In 1953, a relay in Ceylon started to use three low power short wave transmitters and in Poro in the Philippines, a medium wave transmitter with 1000kW started work at a site later to hold five short wave transmitters.

The Cold War

The Cold War escalated during the late 1950s and into the 1960s, the Hungarian crisis, Suez, the Space Age began, Czechoslovakia - all these offered the Voice of America new opportunities. A new Charter was established, calling on VoA to serve as a consistently reliable source of accurate, objective and comprehensive news, and to present the policies of the United States clearly and effectively. Despite this definition of the role of the Voice, there are times when its broadcasts seem to be an uneasy mixture of somewhat slanted news coverage and bland music programmes whose style is rather dated. Having said that, there are some outstanding landmarks in the Voice’s recent history; when Neil Armstrong set foot on the moon in 1969, both the BBC and Australian Broadcasting Corporation joined the VoA net, resulting in a combined audience of VoA programming of an estimated 800 million or so. VoA also gained a certain amount of respect for its coverage of two events which caused a great deal of soul searching amongst the American people: Vietnam and Watergate.

Technical Developments

Technical developments continued in the 1960s: in 1962, two transmitter sites at Greenville in North Carolina began broadcasting, giving a total of six 50kW h.f. transmitters (each constructed from a pair of two 250kW units) and five other lower power units. In 1968, four new 500kW senders were installed, replacing lower power units. Monrovia in Liberia became the site for another Voice relay in 1962, with six 250kW transmitters, and some 50kW units. In 1968, a 1000kW m.f. transmitter began broadcasting in Bangkok, Thailand. The Greek Kavala relay...
behind the scenes at voa

went on the air in 1972, currently using a 500kW m.f. sender and ten 250kW h.f. transmitters. In the 1980s, medium-wave transmitters were installed at sites in Antigua, Botswana, Costa Rica and Belize, and VoA also operates the 50kW medium wave transmitter at Marathon in Florida for the programmes of Radio Marti broadcast to Cuba.

Ageing Equipment

The Voice of America struggled on with ageing equipment and facilities until a review shortly after President Reagan came to power led to the appropriation of $1 billion for a major modernisation of VoA headquarters in Washington and of existing transmitter sites and relays, and for the construction of new relays around the world. Much of the equipment used by VoA dates back to the early 1950s, and was obsolete to all intents and purposes. The modernisation programme includes a world-wide satellite communications system, new short wave relay sites with 500kW transmitters in a number of areas of the world, and a new master control centre for electronic programme routing to replace the existing 35 year old system.

New studios with modern control desks are also to replace all the 1950s generation studios in Washington. However, the upgrading process is not limited entirely to the technical side of the Voice. Resources have also been directed into making VoA programmes more creative and dynamic, and to strengthen the quality and independence of VoA news.

News

VoAs largest element is news, with more than 200 full time staff in Washington and at the bureaux around the world. A 24 hour-a-day operation, it produces a constant flow of stories for the English and vernacular services, with on an average day, more than 150 news stories written, covering events in the United States and around the world.

Each news item written in the VoA newsroom is reviewed by at least one Editor (and sometimes as many as three) to ensure that the story has been told accurately and objectively. Accounts from VoAs own correspondents and stringers around the world are used whenever possible, but if none are available, the two-source rule is applied - all stories must be carried by two independent news agencies to ensure accuracy. Current affairs employs more than 40 writers and Editors, preparing programmes on a diverse range of subjects: Focus, a twenty-minute examination of a major topic in the news; Press Conference, USA; America Today; services and local f.m. stations in the continent. Doubts have been cast during its short life as to whether or not it should continue, but following budget cuts a year or two ago, it now seems destined to remain on the air for the foreseeable future.

VoAs Fortunes

As with most western international broadcasters, the VoAs fortunes are ruled by the desires of the government in power. The Republican administrations of Reagan and Bush feel a need for a major flagship broadcaster, and as such budgets are appropriate to keeping the VoA going. Indeed, new facilities will take the station into the 21st century sending signals of tremendous power around the world. New relay stations in Sri Lanka, Morocco, Thailand, Botswana, West Germany and Israel will be completed.

In Sri Lanka, four 500kW and two 250kW transmitters are planned; in Morocco there will be up to ten 500kW transmitters; Thailand will have six 500kW and one 250kW transmitters; in Botswana there will be six high-power short wave transmitters and two high power m.f. transmitters; in West Germany there will be another four 500kW transmitters directed towards Eastern Europe and the Soviet Union and in Israel, there will be six 500kW transmitters.

All this will be a far cry from the days when VoA was run on a shoestring, with relay stations rebroadcasting short wave signals received from other VoA short wave stations. For many years, the BBC operated a rebroadcasting service for VoA, taking h.f. signals from the US mainland on receivers at the BBC Receiving Station at Tatsfield Park in Surrey, later re-located to serve the BBC Monitoring Service at Crowsley Park near Reading. In those days, scratchy, atmospherically-disturbed signals for listeners were the order of the day.

VoA Today

Today, VoA is striving to become number one in the league table of international broadcasters - clearly it will have the technical ability to put its message across, but will the programmes live up to a new dynamic era in broadcasting? VoA broadcasts to Europe: 0600-0700 on 11.805, 7.325, 6.095, 5.965 and 3.98MHz (from 0630) 1700-1720 on 3.98 and 1.179MHz; 1700-2200 on 15.205 (to 1900), 11.76, 9.76 and 6.04MHz

VoA Europe is heard on 1.179MHz between 0700 and 1700UTC, and in Croydon (on cable) on 104.0MHz.
When evaluating antennas and pre-amplifiers, a signal strength meter is a very worthwhile addition to any scanner, or for that matter any receiver.

The PRO-2004 poses few difficulties in this respect, as an out-board S-meter along with a sensitive control can easily be housed in a small box and connected to the scanner via a jack socket. There is ample room within the scanner to house the simple electronics needed to drive the S-meter. Although there is insufficient room to house a conventional S-meter within the body of the scanner, there is however, enough room to fit an i.e.d bargraph display. The design for such a display can be found in Scanners 2 by Peter Rouse. The only problem with an i.e.d bargraph display is that, to gain the same resolution as an ordinary mechanical meter, you need to cram into your scanner about 30 i.e.d.s with their attendant drivers. Although this arrangement is quite feasible it is, however, a little impractical.

AGC

It would have been easy enough to monitor the receiver’s a.g.c. line and make use of this voltage to drive an S-meter, even though the 2004’s a.g.c. line is inoperative in the w.b.f.m. mode. However, it was decided to look at the r.f. developed in the i.f. stage and process this signal to give a meaningful logarithmic type reading on the meter, instead of the more usual linear response.

After consulting a few manufacturers’ data sheets the Hitachi HA1197 a.m. receiver i.c. came up as likely candidate to be pressed into service. This i.c. contains a complete a.m. receiver and is usually found in i.w./m.w. broadcast radios. Those of you that read Practical Wireless will have come across this i.c. before, in the PV “Orwell” m.w. DX receiver. This particular device features a very wide range a.g.c. circuit and even has a pin dedicated to drive an S-meter—what more could one ask for?

Just the slightest whiff of signal from the scanner’s last i.f. stage is enough to drive the HA1197 i.f. amplifier, where before detection the a.g.c. and S-meter drive current is derived. In this application the HA1197 mixer oscillator stage is not used. The final S-meter drive circuit is shown in Fig. 1.

**Construction**

There is nothing particularly critical about the construction of the circuit, except that all leads carrying r.f. should be kept as short as possible. The finished p.c.b. is bolted to the underside of the 2004 chassis, near the mains transformer, using two metal spacers. Fortunately there are already two unused holes in the chassis awaiting such an eventuality and the rear panel has ample space for a 2.5mm jack socket for the meter plug.

The only component which may need alteration once the circuit is installed is capacitor C1. If this is too small the full-scale deflection of the meter will not be obtained, and if too large there will be a standing deflection due to noise. A suitable value for this component will be between 5.6pF and 10pF.

**Setting-up**

There is no need to remove the main p.c.b. in the receiver to access the 2004’s i.f. stage. Simply prise off the i.f. stage screening cover (the rectangular enclosure near the front of the board above the chassis) and locate TP5. This test point is located near T8 and CF2 and is clearly marked on the p.c.b. Capacitor C1 is soldered to TP6 and connected to the other side of this component is a length miniature coaxial cable which feeds the i.f. signal to the metering p.c.b.

Remember to keep the length of this lead to a minimum, the screening braid of which is connected to the point provided on the metering p.c.b. and the opposite end the braid to the i.f. screening enclosure. This connection provides 0V point for both the S-meter circuit and the automatic switch described later.

It is probably best to insulate C1 with a piece of tape in order to stop shorting to the i.f. screening cover. This cover should be replaced 180 degrees to its original position, as there is a small gap in the edge of the cover through which the inner conductor of the coaxial cable can pass. When replacing the cover be sure not to pinch this conductor.

The 14 volt supply for the S-meter circuit is taken from the collector of Q32, which is mounted on a thick heatsink above chassis near the mains transformer. Once powered up, the only adjustment (apart from selecting the correct value for C1) is to set R9 to give maximum meter deflection on the strongest local signal. These adjustment must be made with the scanner in either a.m. or n.b.f.m. There is no signal strength monitoring point within the 2004 that will operate on all modes simultaneously, except in the early i.f. stages. As mentioned earlier, this is before any useful selectivity comes into play and metering here would be pretty meaningless.

Although the S-meter addition doesn’t work on the w.b.f.m. mode, you can, of course, select either a.m. or n.b.f.m. mode to check signal strength. The only problem with this approach, is that the wide modulation tends to cause a slight

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**Abbreviations**

- **A** - ampere
- **a.g.c.** - automatic gain control
- **a.m.** - amplitude modulation
- **DX** - long distance
- **f.s.d.** - full scale deflection
- **i.f.** - intermediate frequency
- **F** - farad
- **kΩ** - kilohm
- **l.e.d.** - light emitting diode
- **l.w.** - long wave
- **mm** - millimetre
- **m.w.** - medium wave
- **nF** - nanofarad
- **n.b.f.m.** - narrow band frequency modulation
- **p.c.b.** - printed circuit board
- **pF** - picofarad
- **r.f.** - radio frequency
- **s.p.s.t.** - single pole single throw
- **TP** - test point
- **µA** - microamp
- **µF** - microfarad
- **w.b.f.m.** - wide band frequency modulation
- **Ω** - ohm
variation in the overall meter deflection. While working on the PRO-2004 scanner, the author looked into the possibility of including an automatic tape recording switch. This device simply provides a pair of switch contacts that close when the receiver’s squelch is lifted by a signal and automatically open when the signal disappears. A system like, when used in conjunction with either, a cassette or tape recorder, provides a nice way of monitoring activity when the scanner is left unattended. Its quite interesting to come back to a neatly compressed tape of all the activity during the night before. Most cheap cassette or tape recorders are equipped with a "remote" socket for such a purpose.

How It Ticks

The circuit for the automatic switch is shown in Fig. 3. As the squeal on the 2004 opens and closes, pin 1 of IC3 in the scanner toggles high and low. This voltage is used to control TR1 in our circuit, which in turn biases the relay driver transistor TR2 on and off. Diode D1, together with C11, retains a voltage on the base of TR2 for about a second to prevent the relay opening immediately the signal disappears.

Capacitor C11 sets the switch-off delay time and can obviously be altered in value to suit individual requirements. Switch S1 disables the relay when the automatic recording function is not required. Both S1 and SK2 are mounted on the rear panel. This second circuit is built on the same p.c.b. as the meter amplifier. To connect up this second circuit, first remove the speaker panel (three self-tapping screws) and locate IC3. There is a track leading from pin 1 to an unoccupied solder pad. Solder one end of an insulated wire to the pad at the opposite end to the gate of TR1, via the connection point on the switch p.c.b. Next connect the "normally open" set of contacts on relay RLA to SK2, a 2.5mm jack socket. From this socket a lead with suitable plugs connects to the tape or cassette deck's "remote" socket.

Incidentally, it is easy to extract the 455kHz i.f. of the 2004 for further processing (demodulation of s.s.b. signals) in any communications receiver capable of covering this frequency. To facilitate this connect a small value capacitor, 100pF or so, to TP5 and taking the other end of the capacitor via screened cable to a suitable coaxial connector on the rear of the scanner. See also “100 extra memories to the Realistic PRO-2004.” in the “Scanning” column, SW/M May 1988.

These modifications will be found to make an already very "friendly" scanner even more so.

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**YOU WILL NEED**

<table>
<thead>
<tr>
<th>Resistors</th>
<th>Capacitors</th>
<th>Semiconductors</th>
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<tbody>
<tr>
<td>0.25W 1% Carbon film</td>
<td>Miniature ceramic plate</td>
<td>Diodes</td>
</tr>
<tr>
<td>150Ω</td>
<td>6.2pF</td>
<td>OA202</td>
</tr>
<tr>
<td>15kΩ</td>
<td>1nF</td>
<td>1N4002</td>
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<tr>
<td>4.7kΩ</td>
<td>10nF</td>
<td>BC337</td>
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<td>10kΩ</td>
<td>3.3µF</td>
<td>2N3819</td>
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<tr>
<td>22kΩ</td>
<td>Tantalum bead 16V wkg.</td>
<td>1 TR2</td>
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<tr>
<td>270kΩ</td>
<td>4.7µF</td>
<td>HA1197</td>
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<td>10MΩ</td>
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<td>4.7kΩ</td>
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<td>2.5mm jack sockets (2); Micro-min 6V relay (Maplin FM89W); Meter 200mA f.s.d. (Cirkit 37-09007); Small plastics box to house meter; 2.5mm Jack plug; Miniature toggle switch, s.p.s.t.; Connecting wire; Miniature coaxial cable; Veropins; Spacers 6BA (2); Nuts &amp; bolts 6BA (2); p.c.b.</td>
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BEARCAT Marine Band H/HELDs

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<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Price</th>
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<tr>
<td>UBC 50XL</td>
<td>(10 CH MEM.) (66-88, 136-174, 406-512 MHz)</td>
<td>£99</td>
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<tr>
<td>BC 55XLT</td>
<td>(10 CH MEM.) (29-54, 118-174, 406-512 MHz)</td>
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<td>BC 70XLT</td>
<td>(20 CH MEM.) (29-54, 118-174, 406-512 MHz)</td>
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BEARCAT AM/FM H/HELDs

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BEARCAT MARINE BAND H/HELDs

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<td>(200 CH MEM.)</td>
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<tr>
<td>SONY ICF 2002</td>
<td>(28-30, 50-88 MHz)</td>
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<td>SONY ICF 7600</td>
<td>(135kHz-108MHz)</td>
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SCANNING RECEIVERS

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<td>AOR 3000</td>
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<td>AOR 2002 Base with Full Coverage</td>
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<td>AOR 900 Handheld with 900MHz</td>
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<td>SONY AIR 7 Airband H/held</td>
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<td>SONY PRO 80 Wideband H/held</td>
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<td>SONY AN1 Active Antenna</td>
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<td>COBRA SR 925 Base Airband (29-54, 118-174, 406-512 MHz)</td>
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<tr>
<td>STANDARD AX700 (50-905MHz)</td>
<td>£575</td>
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The first thing to be decided is what sort of case to use. It should be all metal to give adequate screening from outside interference and, obviously, it must be large enough to get everything inside and the controls on the front panel.

I decided to use one of the low-cost cases from the range made by MiniFord Engineering. Their cases are simple but effective, with the front and rear panels formed as part of the base and a pre-painted lid which slides over the base to be fastened with two self-tapping screws through the sides into the base.

The size of the case was arrived at by the simple expedient of laying all the modules out on the bench in the positions shown in Jandek’s Direct Conversion RX information sheet.

**Boxing the VFO**

The v.f.o. must be mounted inside its own metal enclosure and for this I used a die-cast aluminium box. These boxes come in a variety of different shapes and sizes but, because of the dimensions of the v.f.o. board, the smallest box in the range into which it could be fitted is quite large. The v.f.o. board was rigidly bolted into the bottom of the die-cast box with the power supply fed through the box via a feed-through capacitor. The output was taken out through a hole in the end of the box which closely fitted the miniature 50Ω coaxial cable used.

The tuning potentiometer was mounted in the lid of the box with the connections to the board being kept as short as possible while still allowing the wires to be soldered in place.

**Tuning Range**

With the v.f.o. rigidly mounted in its box it was tested to ascertain its frequency range and decide what needed to be done to provide the desired tuning range over 180 degrees of the control rather than the full 270 degrees. Although I was able to use a variety of test gear to achieve this it could be done using a receiver which tunes over the appropriate band.

To cover the 20m amateur band required a total v.f.o. swing of from 14,000 to 14,500MHz and I found that adding a 2.7kΩ resistor between each end of the potentiometer and the v.f.o. board gave the required swing over 180 degrees, so allowing the use of a conventional slow-motion drive designed for use with conventional tuning capacitors having a mechanical swing of 180 degrees.

The output from the v.f.o. was set to a maximum level by adjusting the trimming capacitor TC1 while monitoring the output on an oscilloscope. I managed to get 400mV r.m.s. out of the v.f.o. which is considerably more than the 300mV r.m.s. stated in the instructions.

**Slow-motion Drive**

A slow-motion drive is a necessity and I used the Jackson 4103/A dial (available from Electrovalue) which has a 36:1 reduction as well as offering a logging scale and a blank dial on which can be marked the frequency scale if required.

The only other controls needed on the front panel are a switch to change the audio filter from s.s.b. to c.w. and the volume control for the audio amplifier.

I mounted the dial on the front panel so that it lined up with the v.f.o. control spindle. The v.f.o. box was bolted to base of the case using two long 6BA bolts and nuts, while the other boards were bolted to the bottom of the case with 6BA nuts and bolts and connected following the diagram in Jandek’s instructions.

**Rewarded**

I must admit that I was not met with instant success on tuning on as the maximum volume obtainable was very low. Although I could see nothing wrong with the audio amplifier board I decided to go over all the soldered joints with a hot iron and this seemed to do the trick.

Having got that sorted out I was rewarded with a host of signals across the band. The c.w. ones were fairly easily tuned - not much use to me, however, as I have not yet mastered the Morse!

The sideband signals were a bit more difficult to resolve but I had success with several North American amateur stations as far apart as New York and Washington state and a UB4 (Ukraine).

**The Interesting Part**

With the receiver working, the interesting part starts - trying to improve the performance and making it easier to operate. For me this is what home construction is all about - to some extent the actual listening tends to be of secondary importance.

**Cost**

As the basis for a home-built, single-band, s.s.b. and c.w. receiver the Jandek kits offer very good value. Although the actual construction is well within the capabilities of a novice, I would not, however, recommend them for the absolute beginner unless you can call on some experienced help in getting the completed receiver set up. For the complete set of kits to make up the single-band direct conversion receiver as reviewed here would set you back less than £35. Add a further £20 for the case, tuning components and other miscellaneous parts and you could have a receiver for well under £50, plus, of course, a few interesting hours spent with a soldering iron.

You can obtain further details of the kits by sending an s.a.e. to Jandek, 6 Fellows Avenue, Kingswinford, West Midlands DY6 9ET who I would like to thank for supplying the review kits.
This month Fred Judd delves further into the mysteries of quads and Yagis and what happens when they are stacked or bayed.

The last paragraph in Part 7 contained a brief reference to v.s.w.r. and its relationship to the frequency bandwidth of an antenna.

To continue, assume that an antenna is otherwise matched to its transmission line and/or antenna tuner. As the graph in Fig. 9.1 shows, the v.s.w.r. obtained with a sharply resonant antenna can rise from a more or less 1:1 ratio at the centre frequency to an unacceptable level at each end of the working frequency band. This means that the usable bandwidth for a v.s.w.r. not exceeding about 2:1 will be as indicated by “X”.

Whilst an antenna will function with a very high v.s.w.r., there will be some loss of radiated power and unwanted radiation from the transmission line (if used). There is also the possibility that reflected power may be high enough to damage transistors used in a transmitter output stage. However, in due course the subject of v.s.w.r. will be dealt with a little more fully since it is more closely associated with the performance of antennas than is generally realised.

Long Yagi Beam Antennas

Parasitic arrays, including the quad, may consist of a large number of elements but it is hardly practicable to employ more than four at frequencies below 30MHz. However, parasitic arrays that are long in terms of wavelength and containing a much larger number of elements are commonly used for v.h.f. and u.h.f.

Investigation into the properties of multi-element Yagis has shown that, in general, the directivity gain of this type of antenna, expressed as a power ratio, is proportional to the length of the array and dependent on the number, length and spacing of the elements.

Array Length, Element Number and Spacing

The graphs, Fig. 9.2(a) and (b), show respectively the directivity gain over a dipole (dBi) versus the number of elements and the array “length” in terms of wavelength. For most cases the array will consist of one driven element, a reflector and a number of directors spaced and tuned accordingly.

For example, if the antenna is to have
a directivity gain of 14dBd, 12-elements -reflector, driven element and 8-directors - will be necessary. For an array of this nature the "length" required will be about three wavelengths at frequency of operation; see Fig. 9.2.

Whilst element spacings and lengths depend on the frequency of operation, there is some latitude as far as the position of the directors along the array is concerned. Optimum tuning will depend on the spacing chosen. Directors nearer to the driven element are generally a little longer than those furthest away, but the length of each does not decrease uniformly as the distance from the driven element is increased.

Typical element spacing and lengths for a long (50MHz) Yagi are shown in Fig. 9.3. For constructional details of Yagi antennas for h.f., v.h.f. and u.h.f. operation, the ARRL Antenna Book and Beam Antenna Handbook by W.I. Orr W6SAI are recommended; both are available from the SWM Book Service.

**Yagi Beam Arrays**

Parasitic beam antennas can be stacked (one above the other) or bayed (side-by-side), or both, to obtain greater directivity gain, which also depends on the spacing between each antenna in the array.

Arrays may consist of two, four, six, eight or more antennas - always an even number - and each must be identical. With all arrays the beamwidth at -3dB of the main (forward) radiation that would otherwise be obtained with a single antenna is decreased and a number of side lobes may be generated. The magnitude of any side lobes depends on the original directivity pattern of the individual antennas, the number of these in the array and the spacing between them.

Optimum spacing between antennas is chosen to provide the greatest possible directivity gain from the whole array with the magnitude of any side lobes not exceeding some predetermined level relative to maximum forward radiation.

The theoretical additional gain for two stacked or bayed antennas is 3dB, which is more or less constant for spacings between 0.75 and 2 wavelengths; with these spacings side lobes are minimal.

With an additional two antennas, making four in all, the extra directivity gain will be about 6dBd; note that this gain is in addition to that provided by a single antenna. For example, if an individual antenna has a maximum directivity gain of 12dBd, a pair stacked or bayed will only provide the additional 3dB. The total gain of the pair in this case would be 12 + 3 = 15dBd, and not twice the gain obtained with a single antenna.

---

**Methods of Feeding**

There are numerous methods of feeding the driven element of a parasitic beam and the choice of a matching system may depend on constructional considerations. Direct feeding from a 50 or 70Ω coaxial cable is common practice and to facilitate this a folded dipole is often employed as the driven element, since proximity to the reflector and first director brings the otherwise 300Ω impedance down to about 70Ω. For a 50Ω feed the driven element may be a dipole with a "gamma" matching system; a suitable "impedance step-down" balun could also be used.

**Feeding Arrays**

There are two methods of doing this, and one, employed for two stacked antennas spaced one wavelength apart, is to use folded dipole driven elements in each antenna. Both elements are connected by an open-wire transmission line and the system is fed at the centre of the line via a quarter-wave transformer (Q match) from a 50Ω coaxial cable. The method shown in Fig. 9.4 is a rather more simple arrangement where the driven elements are gamma-matched dipoles, each coupled to a 50Ω cable via 75Ω Q sections, 0.75λ long. These and various other methods, including the more modern technique of using "power splitters", are fully illustrated in Wires and Waves. They are also described in the October 1983 issue of Practical Wireless.

**Abbreviations**

| ARRL | American Radio Relay League |
| dB | decibel |
| dBd | gain relative to a half-wave dipole |
| MHz | megahertz |
| v.s.w.r. | voltage standing wave ratio |
| λ | wavelength |
| Ω | ohms |
The Polish built R-610 is a straightforward receiver covering all the main short wave broadcast bands in addition to the usual I.W., M.W. and V.H.F. reception. This, of course, allows the R-610 to perform the dual role of conventional domestic and short wave receiver. The styling is a little dated, but typical of many Eastern European countries.

**Getting Started**

Being a self-contained portable radio, the external connections required are minimal, though the manufacturers have added a number of useful features. The power requirements were the first area I examined and the R-610 could either be powered by dry batteries or mains. The mains option used an internal power unit, which could handle 50Hz a.c. between 220 and 240 volts. The mains power was applied via a two pin socket on the rear panel which also incorporates a mechanical switch to disconnect the battery power when the mains lead is inserted.

For battery power the R-610 required six cells which mounted in a compartment on the rear panel.

With the power sorted out, it was time to turn my attention to the antenna requirements which turned out to be a little limited. Although the R-610 was fitted with a whip antenna there was no socket provided for the connection of an external antenna. This is an unfortunate limitation, as it makes it very difficult to minimise man-made interference from TVs, etc., without removing yourself from the area.

Having said that, it is possible to connect an external antenna simply by wrapping the antenna wire around the tip of the whip antenna with the whip retracted. Although not ideal, it did go part way to solving the problem.

That completes the basic connections but, as I mentioned earlier, there are one or two facilities which are quite useful and not always provided on this type of simple short wave receiver.

The first is a dedicated headphone socket which was particularly useful when searching out DX stations late at night - it at least keeps the family off your back! The only slightly odd point about the socket was that it was a 3.5mm jack as found on personal cassette players rather than the more common 6.3mm type.

This shouldn’t prove too much of a problem as there are plenty of cheap headphones designed for personal cassettes which would be suitable for use with the R-610.

The second socket on the rear panel was for an external speaker and comprised a standard DIN speaker socket which, when a plug was inserted, disconnected the internal loudspeaker. The rather limited specification did not indicate the external speaker impedance range, but you ought to be safe with any 8 ohm type that can handle 2 watts.

The final socket on the rear panel comprised a standard 5 pin DIN socket. This had an output suitable for the connection of a tape recorder and could also accept an external input direct to the amplifier. This of course means that it could be used to play back recordings or even for the connection of other devices. In order to disable the radio output when using this function the external input button is depressed on the top panel.

Before moving on to the main operation of the R-610 I will describe the “manual”. I use inverted commas because it simply consisted of two sheets of poor quality A4 paper folded to make an A5 booklet. The print quality was also very poor and the content was minimal. The manual was bilingual covering German and English, with each language covering two A5 sides, of which one was instructions and the rest being an index and specification. Fortunately the operation of the receiver was pretty much self-explanatory for anyone who had used a short wave receiver before, so this was not too much of a problem.

**Operation**

The front panel was dominated by a large dial assembly which took up nearly half the width of the panel. This dial was of the traditional analogue type, with a pointer which traversed a set of ten scales marked with the appropriate frequency for each band. The xxxmm main tuning knob was located on the right hand side and featured a finger hole to facilitate rapid tuning which was useful. The reduction drive gave a total of five turns to shift between band limits. This may not seem a very high ratio but this is compensated by the relatively small band sections covered.

Still with frequency selection, the short wave coverage of the R-610 was divided into seven bands - 13m, 16m, 19m, 25m, 31m, 41m and 43m. All but the 49m band were selected by pressing the K button on the top panel and then rotating the large knob on the left hand side to reveal the appropriate band marking. The 49m band on the other hand was selected by pressing a button on the top panel as were the long, medium and V.H.F. bands. On the audio side, the R-610 featured quite good control with separate bass, treble and volume controls giving the operator a full range of controls. All three of these were of the slider type mounted on the top panel.

**Performance**

The first area I examined was the performance on V.H.F. This proved to be surprisingly good for a budget receiver. The sensitivity at 1µV for 26dB signals to noise was very good and the
switchable a.f.c. was useful for digging out those weak DX signals. One of the main reasons for using v.h.f. of course is for higher quality audio and the R-610 was able to do justice to these higher quality signals. One of the main reasons being the use of a decent sized loudspeaker. The treble and bass controls had a very good range and enabled a wide range of adjustment to suit most preferences. On the long and medium wave bands, these controls made it very easy to obtain the optimum quality compromise as demanded by band conditions.

The use of a ferrite rod antenna for long and medium wave meant that the set could be rotated to effectively minimise interference from adjacent interfering stations.

Moving on to the performance on short wave, as I mentioned earlier, this was divided up into seven separate sub bands, each switch selectable. This proved to be a very effective idea, as the tuning for each band became like the old fashioned band spread with each band allocated up to about 60mm of dial movement. I found this to be really helpful when tuning on these very crowded bands.

The tone controls also proved to be very versatile on short wave as they could be used to help minimise whistles and a variety of other interfering signals.

The sensitivity on the short wave bands was a little disappointing, requiring 40µV of signal for 20dB signal-to-noise ratio on all except 49m where 60µV was required to achieve the same signal-to-noise ratio. Although this sensitivity was not good for a communications receiver, it was probably adequate for a newcomer to short wave listening.

Contraction

One of the first things that struck me when I first set eyes on the R-610 was the rather dated styling which understandably is common in products from eastern block countries. The standard of construction aligned with the "robust" external styling being generally well made. The p.c.b. was made of s.r.p.b. board as opposed to the more common glassfibre, but it was well supported so shouldn't give any problems. The speaker was a 150 x 70mm eliptical type which contributed significantly to the final sound quality.

Tuning was achieved with a very good quality air spaced tuning capacitor which was enclosed in a plastics shield to help prevent the ingress of dust. The case mouldings were substantial and gave good support to the electronics assemblies. I was particularly interested to see that the mains power unit had been mounted inside a sealed metal case for protection.

The whole construction reminded me of the techniques being used by Western manufacturers about ten years ago.

Summary

Like a lot of products that reach us from the Eastern block the R-610 performs basically well despite its dated appearance. The frequency coverage and sensitivity was fine for a newcomer to broadcast short wave listening. The simple operation and use of band spread tuning would also be useful to the newcomer.

My conclusion is that the R-610 would make a good budget entry point to short wave broadcast listening, whilst also being very useful as a general domestic receiver.

My thanks to Johnsons Shortwave Radio, 43 Friar Street, Worcester WR1 2NA. Tel: (0905) 25740 for the loan of the review model, which costs £44.95.

---

**Specification**

| Frequency Coverage: | l.w. 165kHz-285kHz |
| m.w. 525kHz-1605kHz |
| 49m 5.95MHz-6.2MHz |
| 41m 7.1MHz-7.3MHz |
| 31m 9.5MHz-9.775MHz |
| 25m 11.7MHz-11.975MHz |
| 19m 15.1MHz-15.45MHz |
| 13m 21.45MHz-21.75MHz |
| 87.5MHz-108MHz |
| Sensitivity: | l.w. 2mV/m (20dB S/N) |
| m.w. 1mV/m (20dB S/N) |
| s.w. 49m 60µV (20dB S/N) |
| s.w. 40µV (20dB S/N) |
| v.h.f. 10µV (26dB S/N) |
| Audio Output: | 1.6 watts music |
| Power Supply: | 6 x R. cells or |
| 220V-240V 50Hz |
| Power Consumption: | 6.5 VA |
| Dimensions: | 288 x 176 x 76mm |
| Weight: | 2.3kg without batteries |
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Short Wave Magazine October 1989
South Bristol ARC have a Computer & Audio Bring & Buy Evening, G4RZY on October 4, ATV Activity Evening G0DRX on the 11th, Home Brew - Bring & Display G3XED on the 18th and 20 Metre Activity Evening Club 5th on the 25th. Wednesdays, at the Whititch Folkhouse, East Dundry Rd, Whitchurch. Len Baker G4RZY on Whitchurch 834282.

Verulam ARC have an Informal on October 10 and their annual Great Erg Race - an interclub construction competition on the 24th. 2nd & 4th Tuesdays at the RAF HQ, New Kent Rd, St. Albans. Walter Craine G3PMF at 5 The Crescent, Abbots Langley, Watford, Herts WD50DR.

Brighton & District ARC meet 8pm, 1st & 3rd Wednesdays in Rose oat Beef Bar, Brighton Racecourse. Oct 4 is G4B/6W on his Experience as an RSGB Newsreader and The Radio Control of Model Aircraft and the 18th is a Surplus Equipment Sale. Harold Lunson G3VWI on Brighton 501 1100.

Chelmsford ARC have their AGM on Oct 3. 1st Tuesdays, 7.30pm in Marconi College, Arbour Lane. Roy G3PNX on Chelmsford 360545 Home or 353221 Ext. 3815 Office.

Barnsley & District ARC meet Mondays at St. Mary’s Church Hall, Lathe Lane. Oct 9 is Pig Check G0COA. Ernie G4LUE on Barnsley 716339.

Trowbridge & District ARC meet Wednesdays fortnightly, 8pm in TA HQ, Bythithsea Rd. Oct 11 is Visit & Talk from AMDAT of Bristol Packet Radio and the 25th is a Social Evening. Ian Carter G0GRI on Bratton 630383.

Ipswich RC have 21/28MHz phone contest on Oct 8, Morse Test at Ipswich on the 12th and Jamboree on the Air on the 14/15th. Red Lion, 284 Bramford Rd, 8pm. Jack Tootill G4IFF on Ipswich 644074.

Wimbledon & District ARC have Safety is no Accident G8DPS on Sep 29 and their AGM on Oct 13. 2nd & last Fridays, 7.30pm in St. Andrews Church Hall, Herbert Rd.

Nick Lawler G6AJY on 01-330 2703.

Norfolk ARC have Radio Navigation Systems G3PDH on Oct 4, an Informal & Committee Meeting on the 11th, News Gathering by the RSGB GW4FRX on the 18th and an Informal on the 25th. Wednesdays, 7.30pm in The Norfolk Dumpling, The Livestock, their AGM at Harford Steve Sewell G4VCE on Mulbarton 78256.

Biggin Hill ARC have a Junk Sale on Oct 17, 3rd Tuesdays, 7.30pm at the Victory Social Club, Kecilhill Gdns, Gdns. Geoff Milne G3UMI on 01-462 2689.

Southgate ARC meet 2nd & 4th Thursdays, 7.45pm at Holy Trinity Church Hall (Upper), Winchmore Hill. Oct 12 is Round The World Voyage by Mark Brandenburg and the 26th is an Informal. Brian Shelton on 01-360 2453.

Loughton & District ARC have HF Night on the Air with G4ONP on Oct 6 and The Essex Data Group Roundhouse, packet demo radio by G3KXV/G6OQJ at the 20th. Room 14 of Loughton Hall, Rectory Lane, 7.45pm. John Ray G8DZOn on 01-508 3434 after 6pm.

Pembrokehire RS meet Mondays, 7.30pm at the Further Education Centre, Toster Hill, Haverfordwest. 1st Mondays are Lecture nights and 2nd are Committee meetings. Oct 16 is their AGM. Martin Goodall GW8ZML at Haverfordwest 764009.

Coventry ARC have Nights on the Air & Morse tuition on Sep 29 / 30 Oct 13, their AGM and Preparation for JOTA/Night on Air with Morse tuition on the 20th. Fridays, 8pm at Baden Powell House, 121 St. Nicholas St. Radford. Jonathan Ward GW4HT on Coventry 610408.

Sutton & Cheam RS have a Natter Night on Oct 2 and a Junk Sale on the 20th. 3rd Fridays, 7.30pm at Downs Lawn Tennis Club, Holland Ave, Natter Nights are 1st Mondays in Downs Bar.

John Puttcock G0B/WV on 01-644 9945.

Wirral ARC have their AGM on Oct 4 and an Equipment Sale for Members’ funds on the 18th. 1st & 3rd Wednesdays, 7.45pm at Ivy Farm, Arrows Park Rd, Birkenhead. Aec Seed G3FOO on 051-644 6094.

Bath & District ARC have a Constructors Competition on Oct 25. Alternate Wednesdays 8pm at Englishcombe Inn, Englishcombe Lane. Eric G4GEV on Combe Down 832156.

Cheshunt & District ARC have Natter Nights on Oct 4/18, Interclub Darts Match on the 11th and Spectrum Abuse G3OUF on the 25th. Wednesdays, 8pm at The Church Room, Church Lane, Wormley, Herts. Roger G4OAQ on Hoddesdon 464795.

Thornbury & District ARC have Packet Update GW1FJ on Oct 4 and HF Activity on the 18th. 1st & 3rd Wednesdays, 7.30pm in the United Reform Church, Chapel St, Tom Cromack G0FGI at Rose Cottage, The Naile, Oldbury-on- Severn, Bristol, Avon.

Nene Valley RC have What Makes An Archivist Tick on Oct 4 and G3RLW with an Amsat UK and Oscar talk. Wednesdays, 8pm in the Prince of Wales Public House, Well St., Finedon. Paul Byles G6UUV on Wellingborough 71189.

Todmorden & District ARC have a Junk Sale on Oct 3 and a Natter Night on the 17th. The Queen Hotel, 8pm. Mrs Edie Tyler G0AEC on Halifax 882038.

Darent Valley RS meet 2nd & 4th Wednesdays, 8pm at Crockenhitch Village Hall, nr Swanley, Kent. Oct 11 is Spectrum Analyser GT4AQ and the 25th is Short Wave Listening by Bob Treacher. Sheila Hillman G1NMX on Orpington 26951.

Dragan ARC have their AGM on Oct 2 and talk by Dr. Ieuan Jones GW4FQU on the 16th. 1st & 3rd Mondays, 7.30pm at Four Crosses, Menai Bridge. Tony Rees on Bethesda 600963.

Farnborough & District RS meet 2nd & 4th Wednesdays, 7.30pm at The Railway Enthusiasts Club, of Hawley Lane (by M3 bridge). Oct 11 is annual Construction Contest. Tim Fitzgerald G4UQE on Camberley 29231.

Fylde ARC have Space Exploration in the 1960s by Peter Sullivan on Oct 12 and an Informal on the 26th. 2nd & 4th Thursdays at South Shore Tennis Club, Midgeland Lane. Frank Whitehead G4CSA on St. Annes 720867.

Mid-Warwickshire ARC have These Things Do Happen G8HRI on October 10 and The World of Computers G0AJB on the 24th. 2nd & 4th Tuesdays, 8pm in St. John’s Ambulance HQ, 61 Emorce Road, Mike Newell G1HG on Kenilworth 513073.

Acton, Brentford & Chiswick ARC have Members’ Holiday Reports on Oct 17. 3rd Tuesdays, 7.30pm at the Chiswick Town Hall, High Rd. W. G. Dyer G3GHE on Acton 3778.

Lothians RS meet 2nd & 4th Wednesdays, 7.30pm at the Orwell Lodge Hotel, Polwarth Terrace, Edinburgh. Oct 11 is Call My Bluff and the 25th is Women in Radio by GM6KAY. P.J. Dick GM4DTH at 21 West Maitland Street, Edinburgh.

South Manchester RC meets Fridays, 8pm at Sale Moor Community Centre, Norris Road, Sale. Ian Butterworth on 061-231 580.

Derby & District ARC meet Wednesdays, 7.30pm at 119 Green Lane. Kevin Jones G4FPY on Derby 669157.

Paisley (YMC) ARC meet 2nd Wednesdays in the YMC, 5 New St. Thomas Wylie GM4DFM on Johnstone 22749.

York ARC meets Fridays, 7.30pm in United Services Clubroom, 61 Micklegate. Keith Cass G3WVO at 4 Haworth Village, York Y03 0AF.
VIDEO FILM MAKING
by Keith Brookes
First published in 176-page book describes how video film making is done and what you can do yourself. Practical step-by-step instructions are given for making your own films. Originally £9.95 our bargain price is £2.95 including P & P.

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This 72-page book, first published in 1987, explains all about setting up your own satellite TV terminal at home. Originally sold at £4.95 it can be yours for just £1.50 including P & P.

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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 board for the SWM Audio Filter, July '87 issue, is available price £2.75. The printed circuit board for the SWM Active Weather Satellite Antenna, June '88 issue is available price £4.20. Orders to Short Wave Magazine, Enefco House, The Quay, Poole, Dorset BH15 1PP. Prices of p.c.b.s include VAT and P&P.

Back Numbers and Binders
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 £3.50 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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Practical Wireless OCTOBER 1989 ISSUE

REVIEWED
The Kanga "Cheriton" 18/20m Receiver Kit

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STARTING OUT

Brian Oddy G3FEX

Tuned circuits are an essential part of all receivers, selecting or rejecting signals. Marked improvements in selectivity and performance can often be made by adding a Q multiplier.

With such a vital role to play, it is perhaps rather surprising that a simple tuned circuit consists of just two components, namely a coil of wire called an inductor, and two closely spaced parallel metal plates which form a capacitor. They may be connected in series or parallel to provide two distinctly different characteristics. Unfortunately, there are losses associated with all tuned circuits because the two components can never be perfect; the losses are assumed to be resistive. An indication of the "goodness" of a tuned circuit is provided by the magnification factor (Q). The Q of a tuned circuit is determined mainly by the coil, since the losses in good quality capacitors are negligible. The Q also determines its selectivity, which is its ability to select a wanted signal and reject unwanted ones on adjacent frequencies. A high Q corresponds to good selectivity. The name Q multiplier is given to a device which is capable of greatly increasing the apparent Q of a tuned circuit. Some basic concepts of the tuned circuits were briefly outlined in a previous article in this series (SW/M January '88), but more detailed notes on inductors, capacitors and their combination into tuned circuits may be found in the appendix.

Early experiments with tuned circuits and triode valve amplifiers led to the discovery that a very considerable increase in gain could be obtained by feeding back part of the output from an amplifier to the input tuned circuit so that the signal is amplified over and over again. The regeneration (positive feedback) had to be carefully controlled otherwise the amplifier would burst into self-oscillation. Passing a signal through the same tuned circuit several times in this way also results in high selectivity. Exactly the same principle is used in a Q multiplier, whereby controlled positive feedback is applied to a tuned circuit to increase the Q by a factor of 20 to 40. If the coil used in the multiplier has a Q of 100 and a multiplication of 20 is obtained, the apparent Q will be 2000 - which represents a high degree of selectivity. A Q of 4000 would be comparable with that of a crystal filter.

Perhaps the most important feature of a Q multiplier is that it may be used to improve the performance of a receiver without the need for modifications to the original circuit or layout. It can be constructed as an external unit since only one connection is required - to the primary of the first i.f. transformer in the receiver - which can easily be made via a short length of coaxial cable. The effect of connecting the device can be likened to adding a high Q parallel resonant tuned circuit across the transformer primary. A signal at the resonant frequency of the circuit will pass through unattenuated since the impedance is high, but signals slightly off resonance will be attenuated by an amount which will depend on the Q of the circuit.

In addition to improving the selectivity, some Q multipliers can act as a notch filter. By simply adjusting the tuned circuit in the multiplier the notch can be moved to any point in the receiver i.f. passband to eliminate an unwanted carrier. An attenuation of 60dB can be achieved in some designs. By employing different levels of regeneration, both facilities can be obtained with the Q multiplier circuit shown in Fig. 1. The configuration is basically that of a Colpitts oscillator, but self-oscillation can be prevented by adjustment of the regeneration control, R2. The coil, L2, is effectively between the base and collector of the transistor, Tr1, with an earth tap provided by two capacitors, C4 and C5. A variable capacitor, C6, tunes L2 to the i.f. employed in the receiver - the values indicated are suitable for an i.f. of 450-470kHz. The series circuit, L1 and C3, enables the reactance of the short length of coaxial cable used to link the multiplier to the receiver to be tuned out. For optimum performance both coils should have low resistance windings and minimum self-capacitance. Inductive coupling between them must be avoided.

The inner conductor of the coaxial cable to the receiver is connected to the "hot" end of the first i.f. transformer primary and the outer screening braid is attached to an adjacent earth point. To tune out the reactance of this cable, connect the multiplier to the receiver, turn S1 to OFF and set C6 to half mesh. Tune in a weak signal and adjust L1 until the signal level reaches a peak. Provided it is correctly tuned in, the same incoming signal can now be used to set up the multiplier. Set R2 to minimum resistance (maximum regeneration) and the pre-set resistor, R1, to its mid-point. Turn S1 to ON and decrease R1 until strong oscillation occurs. Adjust the core in L2 until the oscillation is zero beat with the incoming signal. Next, adjust R2 until oscillation stops. The multiplier can now be used to improve the selectivity by adjusting C6 while increasing the regeneration towards the point of oscillation with R2. To notch out an unwanted carrier, set R2 to minimum regeneration, adjust C6 to the point where the unwanted signal is weakest and then increase the regeneration to further attenuate the signal. Carefully readjust C6 and R2 for maximum attenuation. If the "notch" or "peak" setting of R2 occurs too close to one end of the control, slightly readjust R1.

The performance of many of the smaller long and medium wave portable sets leaves a lot to be desired, but they can often be greatly improved by the addition of a Q multiplier. Instead of employing an external unit linked to the receiver i.f. the device can be fitted internally and operated at the incoming signal frequency. The ferrite rod antenna employed in most of these sets provides a convenient point for mounting the Q multiplier shown in Fig. 2. There is no direct connection between the receiver and the device, which can be built on a tube made from gummed paper and simply slipped over the ferrite rod winding; the receiver operates normally with the multiplier turned off. The regeneration control, R5, enables the positive feedback between the collector and the emitter of Tr1 to be varied. The Q can be increased from about 100 to well over 1000 before self-oscillation occurs.

Appendix

When a direct current (d.c.) is passed through a straight wire it causes a magnetic field to be set up around the wire. The field can be greatly intensified by winding the wire into a coil. The north and south poles of the field can be
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reversed by passing the current through the coil in the opposite direction. When the d.c. supply is connected to the coil the current does not rise instantly to the full value because the rising magnetic field causes a counter electromotive force (e.m.f.) to be developed in the coil which opposes the applied potential. This peculiar effect is called self-induction. A similar effect will occur if the current is reduced, whereby the induced e.m.f. adds to that present and tends to prevent the change in current from taking place. If the supply is suddenly removed, the induced voltage may be sufficient to cause a spark at the point where the circuit is broken!

The coil is said to possess inductance because it can store energy in the magnetic field. The unit of inductance is the henry (H). A coil has an inductance of one henry if an e.m.f. of one volt is induced in it by a current changing at the rate of one amp per second. The inductance of the coils used at radio frequencies is likely to be much less than one henry, so the terms millihenry (mH) and microhenry (µH) are used, where 1 mH = 10⁻³ H and 1 µH = 10⁻⁶ H.

A capacitor is a device which can store energy in the form of an electrostatic field. In its simplest form it consists of two closely spaced parallel metal plates which are insulated from each other. The insulation between the plates may be air or some other material and is known as the dielectric. When a source of d.c. potential is momentarily applied to the plates, a deficiency of electrons arises at one plate and surplus at the other. Electrostatic stress arises in the dielectric and the capacitor is said to be charged. The amount of electrostatic energy stored is dependent upon the capacity, or charge storing ability, of the device. This depends on the size of the plates, the distance between them and the nature of the dielectric. The unit of capacitance is the farad (F). If a charge of one coulomb is produced by a potential of one volt, the capacity is one farad. The farad is a large unit, so for practical purposes the terms microfarad (µF), nanofarad (nF) and picofarad (pF) are used. 1 µF = 10⁻⁶ F, 1 nF = 10⁻⁹ F and 1 pF = 10⁻¹² F.

If an alternating supply is connected to a coil or to a capacitor the flow of current will be impeded by the effect of their respective fields. This opposition, or reactance is expressed in ohms, but differs from resistance in that it does not dissipate energy and varies with frequency. A decrease in frequency results in a decrease in the inductive reactance (XL) of a coil. Its value is given by:  

\[ X_L = 2\pi fL \]

where \( f \) is frequency in hertz, \( L \) is inductance in henrys.  

An opposite effect occurs in a capacitor, whereby a decrease in frequency results in an increase in the capacitive reactance (XC).  

\[ X_C = \frac{1}{2\pi fC} \]

where \( f \) is frequency in hertz, \( C \) is capacitance in farads.

The reactances XL and XC have exactly opposite effects on the phase relationship between current and voltage in a circuit. The current through an inductor lags the applied voltage by 90 degrees, whereas the current through a capacitor leads the voltage across it by 90 degrees.

When reactances are combined their effects tend to cancel out. XL is always considered as positive and XC as negative. The net reactance \( X = XL - XC \). When a circuit contains both reactance and resistance the total opposition to the current is called an impedance \( Z \). Although they are both measured in ohms, they can only be added by taking the square root of the sum of their squares:  

\[ Z = \sqrt{R^2 + X^2} \]

where \( R \) is resistance, \( X \) is reactance, and \( Z \) is impedance.

A capacitor (C) and inductor (L) may be connected either in series or in parallel to form a tuned circuit. A series tuned circuit is shown in Fig. 3a. It is said to be resonant, or tuned to a particular frequency when the reactances of L and C are equal but opposite and cancel out. Only the effects of circuit resistance (R) then remain, which will be low. The response of this acceptor circuit is shown in Fig. 3b. The resonant frequency \( f_0 \) is given by:  

\[ f_0 = \frac{1}{2\pi\sqrt{LC}} \]

where \( L \) is inductance in henrys, \( C \) is capacitance in farads.

A parallel tuned circuit is shown in Fig. 4a. Resonance occurs at the frequency where the reactances of L and C are equal but opposite and cancel out. For most practical purposes the resonant frequency \( f_0 \) can be calculated by using the formula quoted for the series case. It can be shown that the impedance at resonance is very high and purely resistive, being equal to \( LC \), which is called the dynamic resistance (RD); this is very different in value from the effective resistance of the coil. It follows that the LC ratio in a parallel tuned circuit is very important since it affects the impedance of the circuit at resonance. Sometimes called a rejector circuit, the response is shown in Fig. 4b.

The resistance (R) of the coil is also important since it affects the magnification factor (Q), which is given by:  

\[ Q = \frac{R}{2\pi fL} \]

YOU WILL NEED

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Notes:

L1, L2 consist of 10 turns each of 32s. w.g. enameled wire around paper tube to slide over maker's coil; spacing between inner ends of L1 and L2 = 15mm; if oscillation cannot be obtained reverse position of L1 and L2 on rod.
Have YOU ever listened to any other mode than common-or-garden s.s.b. (telephony), not only at the same of QRM, or c.w., or RTTY, or AMTOR, or slow-scan TV, or packet on the amateur bands? What about reception of satellites, the OSCAR or RS series? Perhaps you just weren’t interested; but more likely you looked at the cost of equipment and decided to give it a try, because you knew that "Milady" wouldn’t authorise the extra expenditure—yes, we’ve all been through it!

However, old-timers like me, who are nowadays on a pension, have even greater reason not to spend. What to do?

Take my own case: The tape recorder had been pensioned-off anyway, but wasn’t a runner. The computer—in this case a Spectrum —was up in the loft, kept for the odd game of chess. The TV was “diverted” when it was observed being placed upon the pile for the dustmen to take away. The fault upon it was serious enough to warrant a new set, but the control volume stuck in a fixed position! All I needed now was some software. A little scrounging around among friends and I was given a Morse decoding program, a RTTY program and a slow-scan TV receiving one. The software was just a “software man.” In effect, the total cost was—zilch!

As for the QRM from the computer, the "software man" doesn’t really matter, does it? Similarly with the time consuming business of loading from a tape. You can always let the receiver warm up and have a cup of tea while the program loads! After all, the object is to find out as cheaply as you can, whether any of these modes turn you on.... if they do, then is the time to consider ways and means of improving performance.

As far as Morse reception is concerned, there is no substitute for actually learning Morse! For one thing, most amateurs actually send Morse that, quite copiable by ear, deviates too much from the ideal for the machine to cope with. The machine, though will cope admirably with QRG (high-speed) Morse sent on an electronic key. If you doubt your ability to send good Morse, if you can make the computer read it, ANY human will accept it.

What it boils down to is this: for effectively nothing I have given myself, instead of just one, FOUR modes of receiving amateur stations. In effect, I found myself a new interest, slow-scan TV, after all these years.

However, enough of this for the moment; I’ll come back and talk about suppression later. Let’s turn to your letters.

Your Letters

Pat Parmentier (Kortrijk, Belgium) uses all the “old” bands between 3.5 and 30MHz. Starting at 28MHz, he first found Q5 in NYSM/KH2, ZS3UM, 5M2AX, TJB2M, 2J2CY, OD/ FI1LV, IRI1J, XT2CW, HL5BDS, J5US, S7M9, H21HZ, Z8M1i (Marion Is), etc.

The next three deadlines are October 17, November 20 & December 18

Short Wave Magazine October 1989

SEEN & HEARD

Paul Essary GW3KFE PO Box 4, Newtown, Powys SY16 1ZZ
Readers Letters

Les Painter of Swansea has been a keen short wave listener for some 57 years, having built his first receiver back in 1932. Les has recently expanded his listening interests to include utility stations by purchasing an FT711. I am a great fan of the FT711 and have used one myself. It is a very sensitive receiver and works well in the conditions that I have experienced. The only modification I would like to see made is the addition of a SSB mode.

Doug Middleton of Broadstone is a very good friend of mine who has supplied reports for the column on many occasions. Unfortunately, I have failed to give him a mention in the column so far. Anyway, back to business with Doug's comments. His short wave listening comprises a Trios 9A+ receiver with wide coverage. During the summer months, he has been receiving many stations, including the Armed Forces Network, BBC World Service, and many others. The Trios 9A+ is a very sensitive receiver and provides excellent reception quality.

Utility station decoding is achieved using a microcomputer, and amateur software for RTTY, Packet, and c.w. While FAX is handled by an ICS Electronics FAX-1.

Andrew Abbot is a new subscriber to the column and is enjoying the sort of problems that newcomers experience. His advice mainly revolves around the use of a Raspberry Pi computer and VSAM software for RTTY. Packet and c.w. While FAX is handled by an ICS Electronics FAX-1.

Ken Longley of Dover has written with yet another common problem - reading meter. It would seem that there is a serious shortage of technical literature for the newcomer. I have, in this issue of Short Wave, discussed various aspects of the use of WARTY but it seems that

This type of antenna as with all other types for that matter, should be placed as far away as possible from all sources of interference. One of the main sources being domestic televisions, so steer well clear of t.v. antennas. Interference can sometimes be reduced by screening the lead-in from the antenna to the receiving equipment.

One area of many other areas that may need attention and I would recommend that you read the excellent RTTY and use an R.F. power in the March '88 edition of SWM. This article covers the subject very well and is based on my practical experience.

Station Schedules

I have a variety of schedules for this month, thanks to the efforts of Jean-Andre, FRG7.

The first concerns Algerie Press Service (APS) which uses 14.932MHz to transmit 50 baud RTTY signals in English, French and Spanish according to the following schedule:

1000UTC-1100UTC - English to E. Europe
1100UTC-1200UTC - English to E. Africa
1200UTC-1300UTC - French to E. Africa
1300UTC-1400UTC - English to E. Africa
1400UTC-1600UTC - Spanish to Latin America.

Tokyo Meteo also transmits 50 baud RTTY and uses an R.F. power of 5kW. The frequencies and callsigns are:

3.67MHz - JMG
5.1025MHz - JMG2
7.4255MHz - JMG3
14.880MHz - JMG4
19.529MHz - JMG5
23.972MHz - JMG6

Another meteo station worth looking out for is New Delhi (VDD) which operates according to the following schedule:

3.1925MHz - VDD63 (1430UTC-0040UTC)
7.65MHz - VDD69 (24hr)
12.075MHz - VDD69 (24hr)
19.4MHz - VDD6 (0040UTC-1400UTC)

For those of you interested in c.w. stations the following US Pacific Coastguard stations are worth listening for:

USCG Honolulu, Hawaii (NMO) 440kHz - 0500UTC and 2100UTC.
9.95MHz, 13.685MHz, 16.4575MHz and 22.437MHz.

USCG Apra Harbour, Guam (NRF) 466kHz - 0100UTC and 0800UTC in 8.15MHz and 21.76MHz - 0300UTC, 1300UTC, 1700UTC and 2200UTC.

If you receive any station details or schedules, please drop me a line so I can pass on the news to everyone.

Fig. 1: Weather chart received by Ivor Cooper
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ACCESS AND BARCLAY CARDS ACCEPTED.
Frequency List

My frequency list is still available by sending three stamps to the address at the start of this column. I will add thought to this list, which has been rather overloaded with correspondence of late so don't expect a reply by return of post! All contributions to the list are welcome.

Now back to this month's selection of frequencies which have been gathered from recent readers' reports. The format used is the usual -

Having had several requests for basic information on receiving satellite signals in the amateur bands, I have decided to start a regular feature looking at each part of a satellite set-up in turn - month by month. We will look at antennas, pre-amps, receivers, decoders including both framestores and computer systems.

Antennas

There are many types of antennas, ranging from long wires to Yagis and dishes. The type to be used depends largely on the frequency and polarization of the signals that you want to receive. Several satellites transmit on more than one frequency and so you also have to decide what type of data you wish to pick up.

The University of Surrey satellites UoSATs 1 and 2 can transmit data at 145.825MHz, 435.025MHz and 2401MHz. Most interest is shown in the 145MHz signal and a simple or crossed dipole (left circular) can be used to get a good signal. I personally use a simple dipole for the UoSATs with one set of reflectors - I abandoned my crossed dipole after tests showed that the simple one worked better!

For the NOAA and Meteor weather satellites the crossed dipole is best but a simple dipole will provide good signals. I have tried using monopoles and finally installed a crossed dipole with one set of reflectors on my chimney to get the best height possible.

Dimensions

For those wishing to minimise costs and just get a system working you can construct a dipole using stiff copper tubing with the correct circumference and install it to suit a suitable piece of mast, antenna, and so on. For more permanent installations, however, I would recommend using a suitable piece of tubing or mast and installing it to suit the correct height. It is also possible to use a simple dipole for some types of antennas. For example, it is possible to use a simple dipole for the Eta Aquarid meteor shower, which is visible in the northern hemisphere from May 3 to May 12. The dipole can be mounted in a straight line and will be visible above the horizon for several hours.

The next three deadlines are October 17, November 20 & December 18

- frequency, mode, speed, shift, callsign, time and notes.
- 3.85MHz, RX, 120, 576, DOH3, 0731UTC, Hamburg Metro
- 10.63MHz, RTTY, 50, 7, SUC
- 2115UTC, Cairo Air
- 11.175MHz, RTTY, 50, 7, 5HD, Dar es Salaam Air
- 11.44MHz, RTTY, 50, 7, EIP, Shannon Air
- 13.53MHz, RTTY, 50, 7, HFM49, 1925, KCNA P'yongyang
- 13.54MHz, RX, 120, 576, LRO81, 2056, TELAM Buenos Aires
- 13.920MHz, RX, 120, 576, AXM35, 0655, Canberra Metro
- 18.055MHz, RTTY, 75, 7, DF2G, 1440UTC, MFA Belgrade
- 18.225MHz, RX, 120, 576, JMN5, 1548UTC, Tokyo Metro
- 18.355MHz, RTTY, 50, 7, 9MY63, 1530UTC, Kuala Lumpur Metro
- 19.7475MHz, RTTY, 50, 7, EUL79, 1907UTC, Dakar Metro
- 21.837MHz, RX, 120, 576, NPM, 1003UTC, USN Pacific Subway
- 22.2525MHz, c.w., 7, 7, PPR, 0951UTC, Rio de Janeiro Radio
- 22.409MHz, c.w., 7, 7, JOR, 0948UTC, Nagasaki Radio

INFO IN ORBIT

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

Ariane-4 launch

It is always fascinating to listen to a live launch. I have been lucky enough to participate in 2 satellite launches and so I was pleased to receive a letter from Jeremy Houseman of Stourport-on-Severn who tuned into the Ariane-4 launch on 9th August. He was monitoring 20.192MHz on his Matsui MR4099 which is fed from a long wire and a.t.u., and heard a commentary from the French Guiana Space Centre. Jeremy heard of the reboosting of the stages and the radar tracking that follow the launch and was able to comment on future occasions - thanks to Jeremy.

UK 6

I have previously mentioned that you can hear many satellites in the 136 to 138MHz band, some of which are not supposed to be still transmitting. Last month I listed a few of the frequencies that I have been monitoring of which one is that of Ariel 6 (UK 6) transmitting on 137.66MHz. I was privileged to be a space-craft controller on UK 6 back at the beginning of the eighties and we did switch her off - honestly!

It has an orbital inclination of about 56 degrees, selected to bring it over the UK for some 6 or 8 consecutive passes each day and it can be heard transmitting data quite clearly. Its signal varies and can transmit either real-time data which contains voltages and currents etc and sounds like a repeated tune, or it can send playback data from one of its tape recorders, which sounds like noise. Both seem to be transmitted but I suspect that the "commands" are spurious signals caused by interference.

Another feature that you can hear is a drop out. The signal suffers from deep fades which should be avoided! Casting my mind back several years I remember that UK 6 was pointed in different directions - a magnetorquer, a coil which behaves like a magnet when current is passed through it, and this reacts with the earth's magnetic field and turns the satellite around. With no-one using it I suspect that the satellite is unstable and probably tumbling - this would cause the drop-outs.

Chatting with my colleague from years back Harry Bevan, who also knew UK 6 like the back of his hand, agreed with my suggestion of the tumble. Harry has been helping a Birmingham school to tune into UK 6 - perhaps they might like to send me some details of their work?

Mystery Signals

I mentioned last month about the mystery signals heard on 130.0MHz. I haven't received any other reports on this but the signals continue to be heard regularly, forming aperiodic bursts. They are heard around 2000UTC and 0900UTC suggesting that the satellite responsible is sun-synchronous.

I do have an old list of frequencies used by early Tiros weather satellites and other craft and a letter from Geoffrey Falworth of Penwortham suggests that Tiros 10 could be responsible. He writes a periodical called 'Satellite News' and commented to me that satellites in sun-synchronous orbits may become active again if exposed to continuous sunlight for long periods, enabling the solar cells to generate sufficient power to reactivate the transmitter.

I believe that on 137.44MHz which I suspected might be Aryabhata, a satellite launched back in 1975. Geoffrey agreed with this suggestion.

Finally, a strange signal that I have heard on 137.08MHz - Geoffrey suggests that it might be a beam from a Navy satellite launched back in 1971.

I doubt whether many professionals will be listening to this band so there is much scope for the dedicated hobbyist to keep a look out for unusual signals. Please send me any reports of signals that you believe interesting.

Short Wave Magazine October 1989
might be unexpected satellite transmissions for inclusion here.

MIR

Readers are still monitoring radio transmissions while waiting for the station to be re-occupied. Alistair Tunstall of Kenilworth sent me a list of MIR and Shuttle frequencies that he has obtained from various publications and asks whether he can expect to hear them with his AR-900 scanner which is fed by a Diamond D130 discone antenna. The answer is yes but of course the main voice communication channel of 143.625MHz will remain quiet until the next group of cosmonauts go back. His receiving system can be tested by listening out for one of the NOAA or Meteor satellites. Leave the scanner on 137.625MHz between noon and 3pm and you should hear NOAAs 9 and 11 at least once! That will prove the set-up works.

Meteosat-4

Good noise-free pictures can be seen from Meteosat. My home-made dish is about 1 metre diameter with a dipole, the focus which feeds 2 metres of low-loss cable into a down-converter changing the 1690MHz signal to 137.50MHz. The dish cost me about £40 or so to build and the converter was about £120. I can only use the WEifax data but who knows about the future?

S. Church writes from Norwich asking a number of questions about receiving weather satellite data. I have replied separately but it is worth mentioning that the digital data transmitted by some weather satellites cannot be processed by our humble domestic computers for several reasons notably the very high data storage capacity required but also a wide-band receiver is required.

GOES-E Variations

George Miller of Axminster contacted me about his observations of signals from GOES-E. He has noticed how poor the signals seem to be in the morning and how they improve during the afternoon. In fact many people have spoken to me about this effect and I know of no explanation.

During the seventies I worked with frequencies to be used for satellite transmissions around 1800MHz to 71000MHz (1.5GHz - gigahertz) which were to be used for satellite TV (amongst other things) in the future. The fact is that at the low end, 1700MHz the atmosphere hardly affects the signal. By the time you get up to 30GHz you start to see drop outs caused by heavy rain, so I'm inclined to believe that the low signal strength seen during the early morning may be caused by a reduction in the output power of the transmitter onboard GOES-E.

As has been mentioned in previous months GOES-E transmits pictures from other imaging craft such as GMS-3 and the Japanese geostationary satellite. Sequences of pictures taken by GMS start at about 0310UTC and 1510UTC.

Weather Satellites

Looking at my log book for the last few weeks I noticed that I hadn't heard any slow-scan infra-red signals from Meteors 2/16 or 2/17 on 137.40MHz so I set my tape recorder to record on August 8 at 0140UTC and found that 2/16 was still transmitting this mode as well as the normal visible pictures. I haven't heard from met 2/17 recently because it has been near the twilight zone! Neither is it transmitting infra-red as of mid August.

These satellites pass near to the poles as well as over the UK several times a day, but they are not synchronous so they pass over us a bit earlier every few days. So each meteor occasionally goes into a twilight orbit where it runs north bound up one terminator and southbound down the other, often producing very dramatic pictures.

The use of suitable software or mechanical prediction methods is invaluable for tracking the movements of the different meteors.

Meteor: 2/18 transmits visible pictures only and is on 137.30MHz.

Meteore: 2/16 was transmitting visible pictures only, after yet another period of being off, and then I heard its infra-red signal back on August 14 during the evening.

NOAAs 9, 10 and 11 continue to broadcast on 137.62, 137.50 and 137.625MHz respectively. It is encouraging to know that so many people are taking an interest in tuning into the various weather satellites that are passing over Britain.

Ian Garrocks writes from Queensferry High School in West Lothian to say that he would like to become involved in satellite reception and that his school is holding a "Green Week" in June 1990 for which satellite environmental data would provide a good input.

How many times have the sudden sharp cracks of thunder static spoiled your reception of a rare piece of DX or have the content of your favourite radio or TV programme been interrupted by lightning discharges? Well readers, it came mighty close to me and this particular streak of lightning seems to have wrapped itself around my own telephone line about 15m from my house. Fig 1 shows where I was standing to take the picture. As you know from this column I have an interest in all aspects of weather and while the violent thunderstorm was raging, around 0130 on July 7, I directed my camera to the "active" area of the sky and fired off a roll of film. I set my 50mm f/1.7 lens at infinity focus, kneel by our bedroom window with arms firmly resting on the sill, held the button down and let the Minolta 5000s on-board computer do the rest. I have several shots of the surrounding countryside illuminated by the abundance of "sheet" lightning, but only one "streak", the jackpot, hi, "Did you hear the phone "ting" by chance?", asked a friend, "definitely not", said I, "the thunder crash was far too loud!"

Reports Sporadic-E

Clive Grey (West Kirby), using a Tokyo Crusader 6-band v.h.f. receiver with digital readout, heard several of the East European f.m. stations, which operate between 66 and 73MHz, during the afternoon of July 13. In about 40 minutes after 0800 on the 22nd he identified at least 13 Italian stations in Band II and remarked, "Virtually every gap between the English nationals was occupied with Italian." He also logged France Musicue on 87.95MHz from Ajaccio, Corse, plus ident from Scandinavia and Spain at 0909 on 88.25MHz. The Spanish announcer was saying "RNE1". Although these exotic signals dropped out after 0945, Clive did hear a Spanish station at 1217 on 87.95MHz.

For my part, I counted 10 of the East-European broadcasters while Sporadic-E was present at 1730 on the 19th and 40 of them early on the 22nd. At 0900, the tuneful iden of Radio Moscow came up around 72.5MHz and, like Clive, I noted that the opening had spread to Band II and at 1000 I counted at least 6 Italian voices between 98 and 101MHz. The 866kHz band was open again around 0630 on August 2 and 8 when I found at least 25 East Europeans and a few more rising above the receiver noise as the disturbance varied its direction and to my surprise I counted 8 of these stations fading between 51 and 9+ around 2330 on
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the 10th. During the afternoon of July 15th, Barry Bowman (Prestwich) logged a number of Spanish stations, including one on 95.8MHz which completely blocked the normal “powerhouse” signal of Radio Menaswède. He also identified many stations, in stereo, from Italy and his first from Portugal.

Simon Hamer (New Radnor) also heard Portuguese on the 15th, plus Arabic and Spanish. On the 22nd he identified stations from West Germany, Italy, Scandinavia and Yugoslavia. Simon also heard synchronising pulses and sound from the USSR on the Band II television channels R4 (v85.25MHz & s91.75MHz) and R5 (v93.25MHz & s99.75MHz).

**Tropospheric**

The slightly varying high atmospheric pressure and temperatures produced some late night and early morning tropo. For instance at 2300 on July 17, I found 8 foreign voices between 87.5 and 103MHz plus Late Night West from Radio Bristol on 102.7MHz, found separately from BBC Radio WM. Both of these BBC stations were strong with me again at 0645 and 0715 respectively, plus at least a dozen mixed continental voices each time.

However, despite frequent checks at points around Kent and East Sussex during the day on the 20th and from home on the 21st, most of these signals had gone. Early on the 22nd, I added Radio 210 to the list, plus a mixture of about 10 French, Dutch and German voices in addition to the Italians mentioned earlier. At this point Band II signals were being subjected to tropospheric and Sporadic-E conditions.

Simon Hamer reports hearing signals from West Germany and Scandinavia on July 20, Belgium, Eire, Holland and Luxembourg on the 23rd and RTE FM 1/2/3 plus the Irish Independant radio station Capital Radio (Dublin) on 104.4MHz, on August 3. From his home in Newcastle-Upon-Tyne, Brian Renforth logged Hallam FM (103.4MHz), Hereward Radio (102.7MHz) and fingerprints FM (102.5MHz) at 0800 on July 26.

“Normally for v.h.f. listening I use the radio's telescopic antenna, but recently I constructed a simple dipole from two consecutive antennas which I feed into the radio antenna socket via a coxial cable,” wrote Leo Barr from Sunderland. Leo uses a Matsui MR-4999 receiver and heard a variety of programmes from Denmark (Program III from Alborg, Arhus, Olgod and Sdr.Hajrup), West Germany (DLF and NDR from Aurich) and Sweden (Program III from Sundsvall) on the 21st. Leo's log entry for the DLF station on the 8th reads “A perfect, noiseless stereo signal, news and current affairs program in German language.” Just shows how good tropo-conditions were for v.h.f. reception on the 8th.

On July 29 George Garden was between his home in Edinburgh and Laurencekirk and left his car radio to a weak signal which was coming in waves. “As one would expect, it would appear from the highest parts of the road, but my greatest surprise was when the strongest signal appeared to be from Sound,” said George and added that this was coming from the Darvel transmitter (0.8kW) in ayrshire on 985kHz.

**Back in the early 1960s most television sets were designed to receive only the BBC’s transmissions on five channels in Band I. When the Independent Television Authority (ITA now IBA) began its service from Croydon in September 1959 they were allocated eight channels, Bands I, II and III. All the new sets were made with 13 channel turret tuners and for the existing sets a converter was required. Some manufacturers produced a converter for their own sets, such as the Bush Model 184 seen in Fig. 1 which could be obtained at a later date. The converter can removed, while other set-makers and dealers recommended a converter like the one made by EMJ, Fig. 2, which could stand on top of the receiver. Next a Band III antenna was added to the existing mast and fed separately to the converter, or in the case of the new 13 channel sets a diplexer box was used to both feeders together or a combined Band I/III antenna was fitted and a single feeder used.

The Origin of “ISR-P”

“In the August edition you were asking for test-cards on Ch. E2 with "ISR-P" on the right hand side. I have logged this test-card on this occasion but always on Ch. R1), on June 15 and 26 and on July 27. I believe it is Polish in origin,” writes Andy Smith from Plymouth. Thanks for the gen Andy, I’m sure you are right about Ch. R1, these two frequencies, Chs. E2 and R1 (48.25 and 49.75MHz), are so close together that a mistake is easy, especially when the band is busy. I see from another report that "ISR-P" is on a Czechoslovakian test card which confirms your Ch. R1, but leaves our puzzle temporarily unsolved. Andy uses a 50MHz dipole and a wideband amplifier feeding a D100 converter for Band I and some mounted rotatable antennas for Bands II, III, IV and V.

**Band I**

During his first year as a TVDXer Malcolm Hince (Tupsley) watched programmes from Spain, France, Denmark and a music programme caption, most likely from the USSR, Fig. 6. While Sporadic-E events were in progress, John Woodcock (Basingsstoke) received a programme caption, Fig. 7 and an advert, Fig. 8, from Spain on May 18 and in India, Lt Col. Rana Roy (Meerut) received a programme from Dubai TV, Fig. 9, at 1730 on June 9 and their test-card, Fig. 10, at 1400 on July 4. Rana also received smears F2 type pictures and distorted sound from South East Asia between 1500 and 1700 on May 4, 1715 to 1815 on the 21st and 1800 to 1915 on the 30th. He saw similar pictures from Malaysia during the evenings of the 8th, 9th and 23rd and multiple images from the USSR around 1700 on May 28, 29 and June 2 and 3.

While Sporadic-E openings were in progress on several days in June, Rana watched Arabic cartoons, football, prayers and Teletext from Dubai and a documentry on farming, films, news and test-cards from the USSR. John Woodcock also received pictures from Spain and the USSR at 1900 on July 24, Italy and Spain at 1500 on the 27th, Italy on August 2, 4 and 9, Spain on the 6th and 8th and Scandinavia on the 9th. Olve Grey (West Kirby) saw a clear picture from Spain around 1500 on July 13 and pictures from Italy, Norway (Melhus) and Sweden (Kanal 1 Sverige) during the afternoon of the 22nd. At 0930 on the 24th he logged that Swedish test-card, in colour plus a variety of pictures up to Ch. R3. Barry Bowman (Prestwich) received his first signals from TV(E1) in Spain on July 15 and again at 2012 on the 21st. During the big opening early on the 22nd he received pictures from Germany (BR1, Grunten), Italy (RAI), Spain, Sweden, and Yugoslavia (JRT1). Neil Purling (Hull) saw a Spanish film and a test-card from Italy around 0920 on the 14th, test-cards from the Norwegian regions Hennes, Melhus and Steigen and programmes from Spain early on the 15th, ice skating from Italy and news from the USSR with the BPEMR logo at 1523 and 1800 respectively on the 21st, a test-card from Italy (RAI1) at 0917 on the 22nd, programmes from Spain and the TV-E Madrid clock caption at 1930 on the 23rd and 1330 on the 25th and logos from Italy and Portugal (RTP) around 1845 on the 27th. Signals from Spain were again prominent in many parts during the Sporadic-E opening which lasted most of the day on August 6. In Newcastle-Upon-Tyne, Brian Renforth received pictures from West Germany and Spain on July 21, Italy, Hungary, Spain, USSR and Yugoslavia plus a subtitled film The Adventures of Sherlock Holmes from an unidentified source on the 22nd, Spain on Ch.E4 “with two transmitters floating over each other causing a fluttering effect with the second image displaced 2.5in to the left” on the 23rd, news from the USSR on August 1, R4, Switzerland (RTS) on the 15th and Spain on the 6th. During a very late Sporadic-E opening between 2300 and 2345 on August 10 I logged pictures from Italy and the USSR in pink light on a paper-covered concert, from an unidentified source on Chs. R1 and R2. These pictures were very bright and displaced 2in to the noise. While in Laurencekirk on 2045 on July 22, George Garden (Edinburgh), using a horizontal dipole to feed his set, saw what looked like a pop concert frequently interrupted by adverts around Ch. R2. However, just before one pitch of an advert an ident card appeared with the word MOCKBA (Moscow) prominent and later, the caption RAVH filled the middle of the screen in bold type. He also saw the word “RING” or what looked like “PUNC RING” during a long shot view of the stage.

During a number of Sporadic-E openings between July 15 and August 9, E2, E3 and E4 were the preferred frequencies for obtaining pictures by this author. He also received captions, logos and test-cards from Czechoslovakia (CST-1 ISR-S, Slovakia), Yugoslavia (Slovenia) a v.h.f. signal from Italy, NDR from the USSR (BSR DLF, TGI and RAI), Norway (Hennes, Melhus and Steigen), Poland (Doromat and TVP1), Portugal (RTP1), Spain (TVE) and Yugoslavia (Kanal 15E and Telediario), Sweden (Kanal 1 Sverige) Switzerland (APT SRG1), USSR (BPGF), etc. a varying amount of TV in the 31st while travelling “in a valley” between Dundee and Perth.

**TELEVISION**

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

Fig. 1

The busy schedule of programme transmission in the summer months is in evidence as Andy Smith in his monthly report details the signals from different countries and their effects on his receiver. The table presents a snapshot of the transmissions on Band I, covering the period of the 19th-22nd July.

Band I

**Faraday, Greyfriars, Storrington, West Sussex RH20 4HE**

Ron Ham
23 Simon Hamer (New Radnor) added Albania (RTSH), Greece (EPT), Finland (YLE) and Iceland (RUV) to a good haul of Band I DX. His log for the first week in August contains such scoops as Czechoslovakia (Bratislava), Greece, Nigeria (NTA) and an unidentified Arabic station. He also caught a glimpse of Denmark (DR) via meteor trail reflection on the 4th.

**Tropospheric**

Rana Roy received colour pictures in Band III from Agra, Bhatinda, Jalandhar and Kasauli during tropospheric openings on May 3, 20, 21 and 25, June 1, 8, 11, 15, 16, 17, 18 and 30 and July 1. 'These stations usually came up in the morning between 0830 and 0845 with test cards followed by Breakfast TV,' said Rana, who also logged Pakistan's Lahore TV "fairly clear and sometimes in strong colour" on May 20, June 1, 8, 11, 15 and 30 and July 1. I logged strong negative pictures from France on a couple of spots in Band III at 0710 on July 21 and Brian Renforth identified pictures from Emley Moor and Denmark (TV2 Denmark) on Ch. E35 on the 24th. The Mancini's logged France (Canal+) on three spots in Band III on July 25, 26 and 27, with the addition of Ireland's RTE on August 3 and 6.

'I've received confirmation of my reception of Irish TV's two channels from Cairnhill on 40 and 43," said Olive Grey, adding, "RTE were kind enough to send me piles of information, transmitter lists, Aerial info and transmitter maps. RTE also told Olive that their Network 2 signal on Ch. 33, which swamped his reception of The Wrek's transmissions during an opening in May, came from Three Rock, near Dublin. While the tropo-openings were in progress on July 23 Simon Hamer received pictures in Band III from Belgium (BRT1 and RTBF1), Ireland (RTE) and Luxembourg (RTL Plus) and in the u.h.f. band from France (TDF), Holland (NED 1&2) and Ireland (RTE 1&2). He logged RTE 1&2 again on August 3.

**Satellite Reception**

"The satellite front seems to be hotting up with two German test-cards sitting prominent on Astra no i.d. as yet so we're not sure who it will be," wrote Edwina and Tony Mancini, adding "A new Eutelsat is due to be launched to replace the existing one which is nearly out of power so we may see some more on that next year. Astra 2 is due to go up in April and that should be carrying most of the German stations that are now on Intelsat. NRK are now on test with Televerket on the Intelsat F12 and due to open shortly."

**SSTV**

Ian Armstrong (Millom), received slow scan television pictures on the 14MHz band from Czechoslovakia, Fig. 11, and Spain on July 18. Ian is enjoying the challenge to resolve a good picture from the "twittering" audio signals that enter his Spectrum computer from his receiver. Among the captions he copied were "CQ CQ CQ DE EA3BUG PSE K", "G10N DE OK3KW", "PSE KKKK", "RSV 695" and "TXN FOR QSO", Fig. 12. In Bedfordshire, Max Wustrau G7BLH, also using a Spectrum 48K, received pictures, on 14MHz, during contacts between G4HRB (UK) and SPTHIM (Poland), DL1IN (Germany) and I1HJP (Italy) and DK7UD (Germany) and OK3CKW (Czechoslovakia), "CQ CQ CQ" captions from Hungary (HA5DV), Italy (I1HJP) and Spain (EA3AJV) and a male photograph inscribed "NAME PAOLO".
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Short Wave Magazine October 1989
This is a good time to overview an outdoor antenna installation as a little effort now may well avoid problems when the worst of the winter weather arrives.

Lower the antenna and inspect it for signs of serious corrosion. Make quite sure that any solder joints are in good condition. Check the condition of the winders and insulators. Examine the mast (if any) and its associated guys before raising the antenna. It would be a good idea to check the earth system too.

Long Wave DX

Note: l.w. & m.w. frequencies in kHz; s.w. in MHz. Time in UTC.

It would seem, the BBC Radio 4 broadcasts on 198, shared by Burghhead (50KW), Droitwich (400KW) and Westerglen (50KW), reached Dick Moon in George, S.Africa during the early hours of one morning! Low noise levels and good conditions enabled him to also hear broadcasts from France, Germany and the USSR - lovely.

The transmissions from “Atlantic 252”, the new station in St.Ireland on 254 have been attracting the attention of many listeners, but reception in some areas of the UK is rather poorer than had been expected. The SIO 333 ratings by Gorge Millmore (I.O.W.) and Fred Pallant (Storrington) is typical in the south. In the north, 43343 was quoted by Andrew Hyland in Darlington and S9+5d by Roy Patrick in Derby, but only SIO 333 was noted in the Wirral by Ian Bond. Atlantic 252 welcome reports and will OSI.

MW Transatlantic DX

A marked improvement in the conditions was noted by Mark Thomsen(Wakefield) which enabled him to add five new stations to his growing list of DX, namely KVQJ, CFBG, CHUM, CKCW and CKLM. The station noted as WKU on 1512 last month (where * appeared to be an A) has been heard again and it now seems likely that is WKU in Boston (15 ex-WMRE). At 0145 the ident “Canadian All Hit Music Machine, Energy 1200” was heard, which may stem from CFRC as it may seem.

The broadcasts from VCCM in St John’s, Newfoundland 590 were heard around 2300 one night in Bristol by Tim Shirley, but that was exceptional. A reception report sent by Tim to CJCB in Sydney, Nova Scotia (1270kHz) has resulted in a parcel-containing a verification letter, four base ball hats, a china mug and some stickers.

Other MW DX

Many interesting stations were logged, the most distant stemmed from Jedda, Saudi Arabia on 1512, which Mark Thompson rated as SIO 232. He also picked up some of the broadcasts from Algeria, Tunisia and Morocco.

Two of the broadcasts from Algeria, were also noted by the extensive log from Mark Selby in Aldershot. He rated their 600/300KWH transmissions on 891 as 43343 at 2130 and on 981 as 54244 at 2235.

MW Local Radio DX

During a holiday in Saint Cast, Brittany Bill Griffin (London) was surprised to hear quite a number of the UK local stations. The “Midland” was heard, by Ted Walden-Vincent in Great Yarmouth to compile an impressive log for the chart! He said “There must be lots more, but I have not found them yet.”

With so many new names being used by the broadcasters things are becoming confusing! The ident “Supersound” was heard at 0225 on 1761 by Mark Thompson - could this be a combination of LRF NorthSound and WestSound?

Short Wave DX

The conditions prevailing in the 25MHz (11m) band have been generally good, but solar flares caused some ionospheric disturbances. The direct broadcasts to Europe stem from Radio RSA Johannesburg, S.Africa 25.790 (Eng 1400-1600), rated as 44444 as 1438 by Andrew Hyland in Folkestone. The voice of the UAE in Abu Dhabi 25.900 (Ar 0600-1800) - SIO 444 by John Cotter (UK) Radio Denmark was 34333. An improvement in the conditions was noted by Alan Roberts in Quebec. Radio RSA, the Voice of UAE and Radio Dubai, Moscow were audible during most days, but Radio Moscow, Radio Denmark and BRF were heard once.

When the conditions are suitable some of the many broadcasts to areas outside Europe become audible in the UK. The latest reports mentioned the BBC via Limassol, Cyprus 21.470 (Eng to Africa 0500-1730), noted as SIO 333 at 1710 by Philip Rambaut in Bedford; Radio Finland via Porto 21.550 (Eng, Fin to USA 1100-1400) - 34443 at 1107 by Dick Moon in Wallsend; BRT Brussels, Belgium 21.810 (Eng to Africa 1530-1600) - SIO 465 at 1550 by Kenneth Buck in Edinburgh; RAJ 21.690 (It to USA 1700-1730) - SIO 333 at 1710 by Philip Rambaut in Macclesfield (see Fig 1.2); WCSN Scotts Corner, Maine 21.640 (Eng, Fr to E Africa 1800-2000) - SIO 333 at 1856 by Julian Wood in Buckie, RNE Madrid, Spain 21.460 (Eng, Sp to USA 1930-2130) - 54454 at 2104 by John Nash in Brighton. Listening in Oman, Rhoderick Illman picked up one of the many broadcasts from Vatican Radio, Rome on 21.480. He rated their transmissions to Africa (1000-1215) as 43343 at 1115.

Long distance paths have been open in the 16m (25MHz) band since many interesting signals have been heard. Perhaps the most remarkable report this time came from Ron Pearce, who has been experimenting with a home built two transistor receiver. Listening at 0515,
### Local Radio DX Chart

<table>
<thead>
<tr>
<th>Freq kHz</th>
<th>Station</th>
<th>IRL</th>
<th>Power (kW)</th>
<th>DXer</th>
</tr>
</thead>
<tbody>
<tr>
<td>52</td>
<td>R. Solway</td>
<td>1.0</td>
<td>0.25</td>
<td>O</td>
</tr>
<tr>
<td>603</td>
<td>Invicta SoundCoast</td>
<td>0.5</td>
<td>0.14</td>
<td>O</td>
</tr>
<tr>
<td>603</td>
<td>Gloucester</td>
<td>0.1</td>
<td>0.08</td>
<td>P, N</td>
</tr>
<tr>
<td>603</td>
<td>Risca</td>
<td>0.1</td>
<td>0.24</td>
<td>N</td>
</tr>
<tr>
<td>603</td>
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<td>0.1</td>
<td>0.45</td>
<td>N</td>
</tr>
<tr>
<td>603</td>
<td>3C</td>
<td>0.1</td>
<td>0.40</td>
<td>N</td>
</tr>
<tr>
<td>603</td>
<td>Devonshire</td>
<td>0.4</td>
<td>0.34</td>
<td>N</td>
</tr>
<tr>
<td>603</td>
<td>York</td>
<td>0.4</td>
<td>0.97</td>
<td>P, N</td>
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<td>Essex</td>
<td>0.2</td>
<td>0.92</td>
<td>P, N</td>
</tr>
<tr>
<td>603</td>
<td>Hartofd/Worcester</td>
<td>0.03</td>
<td>0.95</td>
<td>P, N</td>
</tr>
<tr>
<td>603</td>
<td>Shropshire</td>
<td>0.93</td>
<td>0.84</td>
<td>P, N</td>
</tr>
<tr>
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<td>BBC Essex</td>
<td>0.56</td>
<td>0.55</td>
<td>P, N</td>
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<td>Kent</td>
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<td>0.95</td>
<td>P, N</td>
</tr>
<tr>
<td>603</td>
<td>Southwark</td>
<td>0.5</td>
<td>0.61</td>
<td>P, N</td>
</tr>
<tr>
<td>603</td>
<td>Thames Sound</td>
<td>0.14</td>
<td>0.97</td>
<td>P, N</td>
</tr>
<tr>
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<td>Holborn</td>
<td>0.97</td>
<td>0.82</td>
<td>P, N</td>
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<td>603</td>
<td>London</td>
<td>1.0</td>
<td>0.78</td>
<td>P, N</td>
</tr>
<tr>
<td>603</td>
<td>Devon</td>
<td>1.0</td>
<td>0.23</td>
<td>P, N</td>
</tr>
</tbody>
</table>

**Note:** Entries marked * were logged during daylight only.

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**Seen & Heard**

he picked up the broadcasts to Pacific areas from Radio New Zealand in Wellington on 17.705 (Eng 2345-0145; 0145-0300; *Sat-Sun only) and rated them as SIO 333. Some of the 16 broadcasts from Radio Australia have also been reaching our shores. Their transmission to CPacific area and W.USA via Shippton 17.795 (Eng 2300-0000) was rated as 24542 at 0333 by David Edwardson. Particularly good reception of their transmission to Japan via Haromamoon 17.715 (Eng 0100-0915) was noted by Chris Shorten - their signal being a remarkable 44444 at 0545.

Out of a dozen of the broadcasts to other areas were also logged including Radio Japan via Yamata 17.880 (Eng, Sp to Pacific areas 0800-1000) noted as 34444 at 0329 by Kenneth Reece; WSHB Cypress Creek, USA 17.955 (Eng, Sp to Pacific areas 0800-1000) - SIO 333 at 0200 by Alan Smith; Africa No.1, Gabon 17.630 (Fr to W.Africa 0900-1600) - 43333 at 0900 by Sheila Hughes; AIR Delhi, India 17.337 (Eng to E.Africa 1000-1100) - SIO 333 at 1045 by Ted Walden-Vincent; Radio Yugoslavia, Belgrade 17.740 (Eng to Africa 1200-1250), heard by John Sadler in Bishops Stortford; Vatican Radio, Roma 17.870 (by Roger Illman in Oman; Radio HCJB Quito, Ecuador 17.790 (Fr, Ge, Sw, Norw, Da, Fr, Eng, Sp 1800-2200) - 33333 at 2130 by Eddie McKeown in Co.Down; Voice of Asia, New Zealand 17.630 (Eng to Australia, New Zealand 1500-2000) - 43333 at 2355 by Daran Taplin; BBC via Ascension Island 15.400 (Eng, Sp to Brazil, S.Africa 1500-2300) - SIO 333 at 2055 by Ted Walden-Vincent; Radio RSA Johannesburg, S.Africa 15.365 (Eng to Africa, Middle 1900-2000) - 44444 at 1910 by John Parry in Northwich; Radio Sophia, Bulgaria 15.370 (Sp, Port to C.America 2200-0200) - 4312 at 2333 by Garry Judd; Radio Korea, Seoul 15.575 (Eng, Kor, Port, Sp to E.USA 2300-0400) - 43333 at 0100 by Derek Carter in Cambridge.

Surprisingly few of the many broadcasts to Europe were mentioned. Most were noted stemmed from UAE Radio Dubai 15.435 (Ar, Eng 0615-1645), rated as SIO 443 at 1500 by Kenneth Buck; RNR Brasilia, Brazil 15.265 (Eng, Ger 1900-1950) - SIO 333 at 1830 by Cyril Kellam; VOIR Tehran, Iran 15.084 (Sp, Ar, Tu, Fr, Ru, Eng, Sp 1400-2200) - 4214 at 1421 by John Coulter; Voice of Vietnam, Hanoi 15.010 (Eng, Russ, Viet, Fr, Sp 1600-2100), heard at 0200 by Scott Caldwell in Warrington, Lancashire, Syria 15.095 (Fr, Eng 1605-2105) - SIO 333 at 2016 by Julian Wood; WYCR Cleveland, Ohio 17.000 (Eng, Sp to Brazil, S.Africa 0900-1600) - SIO 333 at 2025 by Al Gray in Birmingham; WNB Red Lion, USA
The SW-reception system of the future on professional level for the serious DX-er!

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15.185 (Eng 2003-2245) - 23333 at 2225 by David Wratten.

Equipment used:
- Leo Barr: Matsui MR-4099 + w. loop.
- Philip Bartlett: Edystone ECTO + random wire.
- Darren Davidson: Icom IC-7000.
- Bill Benham: Sony IC-2000 + 5 wire.
- Andy Cadier: Sangean S-500 + 400 random wire.
- Colin Caldwell: Toshiba TR-STX1 + random wire.
- Detar Carter: Matsui MR-4099 + random wire.
- John Coulter: Yeasu FRG-7 + random wire.
- Michael Eades: Trio R-600 + trap dipole 22m long.
- Alan Higgin: Codex Mill + pre-selector + a few ex-army rod antennas.
- Francis Weaver: Vega Selena B210 + built-in w.
- Phil Hixter: Lowe HF-125 + 30m random wire.
- Sheila Hughes: Panasonic DR48 + 15m random wire.
- Andrew Nyland: Stel ST-2420 + 25m random wire.
- Rhoderick Illman: Sony IC-7000DX + 25m random wire.
- Graham Johnson: Panasonic DR-49.
- Gerry Jud: Sangean SW-2000 + built-in w.
- Cyril Kallam: Sony IC-7000DXS + AN-1 or 7m vertical w.
- Eddie McKeown: Taitung TM-7802

Tropical Band Chart

<table>
<thead>
<tr>
<th>Freq</th>
<th>Station</th>
<th>Country</th>
<th>UTC</th>
<th>DXer</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.300</td>
<td>Savannah/Myrtle Beach</td>
<td>USA</td>
<td>0234 J</td>
<td>4.890 S</td>
</tr>
<tr>
<td>2.450</td>
<td>TGR San Carlos</td>
<td>Mexico</td>
<td>0110 L</td>
<td>4.990 Y</td>
</tr>
<tr>
<td>2.520</td>
<td>The Moluccas</td>
<td>Indonesia</td>
<td>0248 J</td>
<td>5.990 Y</td>
</tr>
<tr>
<td>2.700</td>
<td>Radio Free Asia</td>
<td>China</td>
<td>0522 J</td>
<td>5.990 Y</td>
</tr>
<tr>
<td>2.900</td>
<td>Radio for Business</td>
<td>Indonesia</td>
<td>0520 J</td>
<td>6.990 Y</td>
</tr>
<tr>
<td>3.000</td>
<td>Radio Policy</td>
<td>China</td>
<td>0520 J</td>
<td>7.990 Y</td>
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<tr>
<td>3.500</td>
<td>Radio Free Asia</td>
<td>China</td>
<td>0520 J</td>
<td>8.990 Y</td>
</tr>
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<td>3.800</td>
<td>Radio for Business</td>
<td>Indonesia</td>
<td>0520 J</td>
<td>9.990 Y</td>
</tr>
<tr>
<td>4.000</td>
<td>Radio Policy</td>
<td>China</td>
<td>0520 J</td>
<td>10.990 Y</td>
</tr>
<tr>
<td>4.400</td>
<td>Radio for Business</td>
<td>Indonesia</td>
<td>0520 J</td>
<td>11.990 Y</td>
</tr>
<tr>
<td>4.800</td>
<td>Radio Policy</td>
<td>China</td>
<td>0520 J</td>
<td>12.990 Y</td>
</tr>
</tbody>
</table>

DXers:
- A: Andy Cadier, folklorist.
- B: Jim Cash, Swindon.
- C: David Edwardson, Wallingford.
- D: Sheila Hughes, Menston.
- E: Rhoderick Illman, Tidworth.
- F: Dick Mountain, Swindon.
- G: John Nash, Brighton.
- H: Fred Searl, Alderley Edge.
- J: Kenneth Reece, Pretoria.
- K: Ken Sadler, Alderley Edge.
- L: Al Lawson, Worthing.
- M: Chris Shortt, Norwich.
- N: Darran Taplin, Tonbridge.

Mark Selby; Radio HCJB Quito, Ecuador (1100-1300) - S0444 at 0613 by Max Wustrau; SRA via Beromunster, Switzerland 12.303 (Fr, Ger, it, Eng 1000-1230) - 34333 at 1157 by Leo Barr; RTX Sfax, Tunisia 11.550 (Ar 0600-1800) - S044 at 1254 by John Coulter; Voice of Greece via Kavala 11.645 (Gr, Eng, Sw to N.Europe, USA 1500-1650) - 44445 at 1530 by John Nash; UARadio Dubai 11.790, (Eng, Ar 1630 - T) - S0454 at 1630 by Kenneth Breede; Radio Kuwait, Saluabiyah 11.665 (Eng 1800-2100) - 53333 at 1820 by Chris Shortt; Radio Portugal, Lisbon 11.890, (Eng, Fl, it 1700-2130) - 43433 at 1910 by Darran Taplin; Radio Budapest, Hungary 11.910, (Eng, Ger, Eng 1900-2200) - 222000 at 2000 by Tedwald-Vlinden; Radio Beijing, China 11.500 (Eng 2000-2215) - S0433 at 2052 by Phil Hendy; Voice of Japan via Moyabi, Gabon 11.800 (Eng, Jap 2100-0000) - 32433 at 2116 by Richard Raidward-Redlins; AIR via Alligator, India 11.620 (Eng 1845-2300), heard at 2200 by Francis Weaver; Radio Habana, Cuba 11.705 (Eng to Europe, Africa, Middle East 2200- 2300) - S0433 at 2235 by Alf Gray.

A variety of languages are used during broadcasting to different areas, but they often include segments in English. Those noted stemmed from KNLS Anchor Point, Alaska 11.715 (Eng to Asia 0800-0900) - 23212 at 0800 by Sheila Hughes; RBVIA Nauen, GDR 11.890 (Ger, Eng to E.USA. E.Canada 0330-0900) - 0923 at 0900 by Richard Raidward-Redlins; EBC Milano, Philippines 11.850 (Eng to S.Asia 1300-1600) - 44444 at 1415 by Rhoderick Illman; Radio Habana, Cuba 11.750 (Eng to Europe, Africa, Middle East 2200- 2300) - S012 at 1546 by Philip Rambaut; Radio Austria int., Vienna 11.780 (Ger, Eng to S.E.Asia 1400-1700) - 54554 at 1555 by Andy Cadier; RFI Paris via Moyabi, Gabon 11.705 (Eng to W.Africa 1600-1700) - S022 at 1627 by Julian Wood; SLBC Colombo, Sri Lanka 11.800, (Eng, Ur to Middle East 1645-T) - S032 at 1900 by Jim Cash; SRA via Schwarzmuhlen, Switzerland 11.955 (Ar, Eng, Fr to Africa 1715-2000), heard at 1940 by John Sadler; Voice of Israel, Jerusalem 11.650 (Eng to UARadio Dubai, 0000- 0300) - 32433 at 0015 by Philip Bartlett; Radio Habana, Cuba 11.810 (Eng, USA 0000-0600) - 04343 at 0002 by David Wratten; RCI via Sackville, Canada 11.845, (Sp, Port, Eng to Africa, Middle East 0000-0300) - 34333 at 0220 by Kenneth Reece.

Radio Australia beam their program to the Pacific with 99MHz (21m) beam via Shepparton on 9.655 (Eng 0700-1030) and reception has been quite good - the 35543 rating noted by David Edwardson being typical. Their transmissions to E.Asia,
<table>
<thead>
<tr>
<th>Station</th>
<th>Frequency (kHz)</th>
<th>Country</th>
<th>Power (kW)</th>
<th>DXr</th>
</tr>
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<tbody>
<tr>
<td>532</td>
<td>Hof-Salee</td>
<td>Germany (W)</td>
<td>9.2 M*</td>
<td></td>
</tr>
<tr>
<td>531</td>
<td>Leipzig</td>
<td>Germany (E)</td>
<td>10 D*</td>
<td></td>
</tr>
<tr>
<td>542</td>
<td>BRT-2, Wavre</td>
<td>Belgium (W)</td>
<td>150 L</td>
<td></td>
</tr>
<tr>
<td>567</td>
<td>DLF Berl,aur</td>
<td>Germany (W)</td>
<td>200 D<em>L</em>P</td>
<td></td>
</tr>
<tr>
<td>565</td>
<td>RTE 1, Tullamo</td>
<td>Finland (S)</td>
<td>500 C<em>D</em>G<em>U,M</em>P</td>
<td></td>
</tr>
<tr>
<td>571</td>
<td>Valparaiso</td>
<td>US</td>
<td>275</td>
<td></td>
</tr>
<tr>
<td>576</td>
<td>R DDR, Schwarz</td>
<td>Germany (E)</td>
<td>250 K*</td>
<td></td>
</tr>
<tr>
<td>577</td>
<td>Stuttgart</td>
<td>Germany (W)</td>
<td>50 D<em>L</em>P</td>
<td></td>
</tr>
<tr>
<td>571</td>
<td>Sofia</td>
<td>Austria</td>
<td>200 K*</td>
<td></td>
</tr>
<tr>
<td>585</td>
<td>FIP Paris</td>
<td>France</td>
<td>8 L*P</td>
<td></td>
</tr>
<tr>
<td>585</td>
<td>RNE-1, Madrid</td>
<td>Spain</td>
<td>250 D<em>L</em>P</td>
<td></td>
</tr>
<tr>
<td>584</td>
<td>HR Frankfurt</td>
<td>Germany (W)</td>
<td>400 D<em>L</em>P</td>
<td></td>
</tr>
<tr>
<td>602</td>
<td>BBC, Newcastle</td>
<td>UK</td>
<td>200 D<em>L</em>P</td>
<td></td>
</tr>
<tr>
<td>612</td>
<td>RTE 2, Athome</td>
<td>Ireland</td>
<td>100 C*</td>
<td></td>
</tr>
<tr>
<td>621</td>
<td>RTF 1, Wavre</td>
<td>Belgium</td>
<td>300 L</td>
<td></td>
</tr>
<tr>
<td>630</td>
<td>BBC, Dorfense</td>
<td>UK</td>
<td>500 G<em>L</em>P</td>
<td></td>
</tr>
<tr>
<td>657</td>
<td>BBC, Wajes, Wae</td>
<td>UK</td>
<td>100 C</td>
<td></td>
</tr>
<tr>
<td>668</td>
<td>Holmenender</td>
<td>Belgium</td>
<td>300/200 V,D<em>L</em>P</td>
<td></td>
</tr>
<tr>
<td>675</td>
<td>Hilversum, Lopik</td>
<td>Holland</td>
<td>120 D<em>L</em>P</td>
<td></td>
</tr>
<tr>
<td>730</td>
<td>BBC, L-C, Louland</td>
<td>Norway</td>
<td>10 K</td>
<td></td>
</tr>
<tr>
<td>730</td>
<td>BBC, L-C, Londond</td>
<td>UK</td>
<td>8.5 L</td>
<td></td>
</tr>
<tr>
<td>730</td>
<td>RTE 1, Cork</td>
<td>Ireland</td>
<td>9 L</td>
<td></td>
</tr>
<tr>
<td>738</td>
<td>Paris</td>
<td>France</td>
<td>4 L*</td>
<td></td>
</tr>
<tr>
<td>738</td>
<td>Poznan</td>
<td>Poland</td>
<td>300 G</td>
<td></td>
</tr>
<tr>
<td>738</td>
<td>RNE, Barcelona</td>
<td>Spain</td>
<td>250 D<em>L</em>P</td>
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<tr>
<td>747</td>
<td>Hilversum, Lavo</td>
<td>Belgium</td>
<td>100 L</td>
<td></td>
</tr>
<tr>
<td>765</td>
<td>Bergen</td>
<td>Norway (W)</td>
<td>200 L</td>
<td></td>
</tr>
<tr>
<td>780</td>
<td>Soltenen</td>
<td>Germany</td>
<td>500 L</td>
<td></td>
</tr>
<tr>
<td>774</td>
<td>BBC, Enskilien</td>
<td>Ireland</td>
<td>400 D<em>L</em>P</td>
<td></td>
</tr>
<tr>
<td>785</td>
<td>BBC, Berlin</td>
<td>Germany (W)</td>
<td>400 D<em>L</em>P</td>
<td></td>
</tr>
<tr>
<td>801</td>
<td>BBC, Munich</td>
<td>Germany (W)</td>
<td>100 D<em>L</em>P</td>
<td></td>
</tr>
<tr>
<td>818</td>
<td>BBC, Westfalen</td>
<td>UK</td>
<td>100 C<em>L</em>P</td>
<td></td>
</tr>
<tr>
<td>837</td>
<td>Roussel, Pelle</td>
<td>France</td>
<td>4 L</td>
<td></td>
</tr>
<tr>
<td>855</td>
<td>Murcia</td>
<td>Spain</td>
<td>125 L</td>
<td></td>
</tr>
<tr>
<td>864</td>
<td>Paris</td>
<td>France</td>
<td>100 K</td>
<td></td>
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<tr>
<td>877</td>
<td>AFN, Frankfurt</td>
<td>Germany (W)</td>
<td>150 C*</td>
<td></td>
</tr>
<tr>
<td>885</td>
<td>BBC, Waises, Wae</td>
<td>UK</td>
<td>100 C*</td>
<td></td>
</tr>
<tr>
<td>887</td>
<td>Alger</td>
<td>Algeria</td>
<td>800/300 G*</td>
<td></td>
</tr>
<tr>
<td>900</td>
<td>Milan</td>
<td>Italy</td>
<td>60 L*</td>
<td></td>
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<tr>
<td>918</td>
<td>Intercon, Madrid</td>
<td>Spain</td>
<td>20 D*</td>
<td></td>
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<tr>
<td>922</td>
<td>BRT-1, Wartem</td>
<td>Belgium</td>
<td>100 L*P</td>
<td></td>
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<tr>
<td>940</td>
<td>Tuul, polsh</td>
<td>Poland</td>
<td>20 L*P</td>
<td></td>
</tr>
<tr>
<td>963</td>
<td>Poznan</td>
<td>Italy</td>
<td>100 L</td>
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<td>971</td>
<td>Northenova, Hamburg</td>
<td>Germany (W)</td>
<td>200 D<em>L</em>P</td>
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<tr>
<td>981</td>
<td>Alger</td>
<td>Algeria</td>
<td>500/350 P<em>3</em>F<em>O</em></td>
<td></td>
</tr>
<tr>
<td>999</td>
<td>Reuters, Vienna</td>
<td>Germany (E)</td>
<td>20 D*</td>
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<tr>
<td>1008</td>
<td>Hilversum, Lavo</td>
<td>Belgium</td>
<td>400 L</td>
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<td>1017</td>
<td>Woldheim</td>
<td>Germany (W)</td>
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<tr>
<td>1044</td>
<td>DDR, I-Burg</td>
<td>Germany (W)</td>
<td>25 L</td>
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<tr>
<td>1044</td>
<td>Saba, Aliaou</td>
<td>Morocco</td>
<td>30 C</td>
<td></td>
</tr>
</tbody>
</table>

**Note:** Cities markedwere logged during darkness. All other entries were logged during daylight.
at 1950 by John Parry; IBA Radio via Cyclops, Malta 7.226 (Eng 2045-2115) - 54555 at 2045 by Eddie McKeown; Radio Peace and Progress, Moscow 7.420 (Eng, Ger 2100-2159), heard at 2100 by Andy Cadier; Radio Polonia, Warsaw 7.270 (Ger, Fr, Eng 1900-2355) - 54444 at 2230 to Ken Whayman; also on 7.125 (2100-2355) - 31331 at 2251 by Garry Judd.

Broadcasts to other areas include Radio DW via Julich, W.Germany 7.150 (Eng to Africa0400-0450), noted as 54444 at 0415 by Chris Shorten; Voice of Nigeria, Lagos 7.255 (Eng, Fr, Ha to Africa 0500-2200) - 22332 at 0500 by David Whitfield; Vox del Cid, Costa Rica 7.380 (Sp to C.America 0000-1200) - SIO 322 at 0619 by Philip Rambaut; Voice of Malaysia, Kuala Lumpur 7.295 (Eng to S.Africa 0900-1600) - 44422 at 1400 by Rhoderick Illman; Radio Korea, Seoul 7.550 (It, Fr, Kor, Ar, Ger, Eng, Sp, Port to E.Africa, Middle East 1450-2345) - 22332 at 1547 by Max Wustrau; BBC via Daventry, UK 7.325 (Eng to C.America 0200-0300) - 44444 at 2248 by Leo Barr; Radio Kiev, Ukraine 7.400 (Eng 2330-2359) - 31233 at 2350 by Philip Rambaut.

While monitoring the 6MHz (40m) band Kenneth Reece noted the BBC via Ascension Island 6.005 (Eng to Africa 0300-0700) as 22432 at 0513; Alan Smith rated the BBC via Antigua, W.Indies 5.975 (Eng to C.America 0430-0700) as SIO 333 at 0535; Philip Rambaut logged VOA via Greenvile, USA 6.080 (Eng to W.Africa 0600-0700) as SIO 433 at 0614; Chris Shorten heard Radio HCJB Quito, Ecuador 6.130 (Eng to S.Pacific 0700-1030) - 13232 at 0700.

The majority of the 40m broadcasts are to Europe. Those noted were VOA via Woolferton, UK 6.040 (Eng 0400-0700), heard at 0645 by Francis Hearne; RFI Berlin, GDR 6.040 (Eng 0745, Fr 0800, Sat/Sun only) - SIO 333 at 0755 by Alf Gray; RIAS Berlin 6.055 (Ger 24hrs) - 55444 at 1355 by John Whittle; Radio Nederlands via Flovo N.595 (Du, Eng 1430-1525) - 34433 by Louis Whitfield; RFI via Alloius, France 6.175 (Fr, Eng 0500-2200) - 55555 at 1600 by Ken Whayman; Radio Sweden via Karlsborg 6.085 (Sw, Eng, Sp, Port to Europe) - 43343 at 1700 by Sheila Hughes; VOA via Woolferton, UK 6.040 (Eng to Europe 1700-2200) - 44444 at 1759 by Andy Cadier; Radio Australia via Carnarvon 6.035 (Eng 1630-2030) - 55344 at 1855 by Richard Radford-Reynolds; BRT via Waver, Belgium 6.910 (Du, Eng, Fr, Ger, Sp 1700-2130) - 53444 at 1905 by Max Wustrau; Radio Prague, Czechoslovakia 5.930 (Fr, Eng, Sp Port 1730-2125) - 44444 at 1908 by David Wharten; Radio Pyongyang, N.Korea 6.516 (Russ, Fr, Kor, Sp, Ger) - 45555 at 2010 by John Parry; Radio Austria Int., via Moosbrunn 6.155 (Ger, Eng, Fr, Sp 0400-2300) - 44433 at 2253 by Leo Barr.

**Transatlantic DX Chart**

<table>
<thead>
<tr>
<th>Frequent Station</th>
<th>Location</th>
<th>Time (UTC)</th>
<th>DXer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1610 WINS</td>
<td>New York, NY</td>
<td>0115</td>
<td>A,B</td>
</tr>
<tr>
<td>1950 WEVD</td>
<td>New York, NY</td>
<td>0240</td>
<td>B</td>
</tr>
<tr>
<td>1216 WCAU</td>
<td>Philadelphia, PA</td>
<td>0400</td>
<td>B</td>
</tr>
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