Short Wave Magazine

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OCTOBER 1989

SWM SWM SWM SWM SWM SWM

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as previewed in Scanning

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by George Dobbs

REVIEWED
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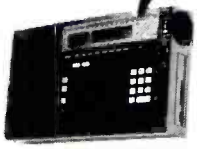

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All you have ever asked for in a handheld. This is the first handheld to cover the full military air band. Already sales in many countries are outselling all other brands. Now you can purchase it direct in the UK. Supplies are very limited but we are trying to get adequate stocks.

JUPITER BASE/MOBILE MONITOR

£379 + post

Just arrived, this is the base/mobile version of the handheld. 25 – 1300MHz and micro size makes it ideal for mobile. It comes complete with 230 Volt AC supply and mobile bracket. Also includes a switched attenuator and backlighted keypad.

SHORT WAVE LISTENER'S CONFIDENTIAL FREQUENCY LIST

The 1989 Short Wave Listeners Confidential Frequency List (previous editions published under the title UK Listeners' Confidential Frequency List) is now well established as the foremost economically priced guide to general world short wave frequencies. Published in the UK it is totally relevant to listeners resident in Europe, unlike some of the American publications costing much more! Superbly produced and laid out, you will find everything at your finger-tips. The first section contains some useful editorial and the main body contains world listings in frequency order. Large A4 format has been necessary to contain all the information and the manual runs to 160 pages! It's all there: broadcast, military, naval, air, shipping, press etc., with listings for CW, SSB, RTTY, TOR, FAX. Callsigns and time schedules are all included. Tremendous value, even the news media are 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!

£7.95 plus £1 post & packing.

VHF-UHF AIR-BAND FREQUENCY GUIDE

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 professionaly prepared and laid out. All the information is taken from official 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 very complete frequency listings. Entries are listed both alphabetically and numerically for cross checking. The list also includes company and airway frequencies. Essential reading for any airband enthusiast and a reference book that is great value. The news media and many sectors of the aircraft industry purchase it as a quick reference. What better recommendation! Now available from stock, this July 1989 edition is bang up-to-date.

£5.95 Plus £1 Post & Packing

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VC20 VHF conv. for R5000	**£167.00**
VC10 VHF conv for R2000	**£161.95**
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Sony 7600DS Short wave	**£159.00**
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Lowe HF 225 Short wave	**£395.00**
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VOL. 47 ISSUE 10 OCTOBER 1989

ON SALE SEPTEMBER 27th

NOVEMBER ISSUE ON SALE OCTOBER 26

|12| **Jupiter II Scanner**

Cover Alan Gardener gives us a preview of the new Jupiter II hand-held scanner in his "Scanning" column.

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Short Wave Magazine

REGULARS

SEEN & HEARD

GOOD LISTENING

A WORD IN EDGEWAYS

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

The Editor reserves the right to shorten any letters for publication but will try not to alter their sense. Letters must be original and not have been submitted to other magazines.

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 arguement 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 "standard" 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 realise 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 realised. 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 nore suitable.
Sensibly, most people check on the availability of software first and purchase a well-supported machine. Those who already have a PC for other uses 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 befriened 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 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 snootily 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.l. 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 by 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 raided 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, (one 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

WHAT'S NEW

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 l.e.d. tuning indicator and an l.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.l.) 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 rechargable 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.

WHAT'S NEW

Awards

The South Atlantic Award. This award is available to stations who have worked at least one station on each of the South Atlantic dependancies - Ascention, St. Helena and The Falklands - on any band and in any mode.

The Ascension Island Award. This award is available to stations who have worked at least three stations on Ascension Island on any band and in any mode.

The Air Bridge Award. This awards is available to stations who have worked one station in the British Isles, one station on Ascension Island and one station on The Falklands on any band and in any mode.

In order to qualify for these awards, applicants must list the relevant log entries and certify that the QSOs have taken place. There are no date limitations on any of the awards.

Applications for each award must be accompanied by 10 IRCs, US $5 or £2.50.

The Awards Manager. PO Box 2, Ascension Island, South Atlantic.

The Golf Delta Award. This is issued by the Isle of Man ARS. Contacts since 1 January 1980 qualify with one point for each GD station worked/heard. The club callsigns GD4IOM and GD0IOM are worth two points each.European h.f. stations require five points, outside Europe it's 3 points. Outside the UK v.h.f. contacts need 3 points, within the UK it's 5.

The award costs £2.00, US$5 or 12 IRCs. To claim, send a certified log entry (no QSL cards) to:

Mrs Anthea Matthewman GD4GWQ. 20 Terence Avenue, Douglas, Isle of Man.

Snippets from Sweden

Bolivia: The Radio Television Popular network resumed its activies 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 1989. The 3kW transmitter will operate 24 hours a day. English programmes from AWR on short wave are now broadcast at 0000 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 progamming 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: AIII 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 6.145MHz. 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% tolerence.

Electronic and Computer Workshop Ltd., Unit 1, Cromwell Centre, Stepfield, 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 full 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.

Media Network

On Thursdays, Radio Netherlands run Media Network with Jonathan Marks. Subjects to be covered in the forthcoming weeks are:

September 28: Vintage Radio. More from the expanding world of vintage radio collecting. Jonathan looks at the Wurlitzer and how the market for old radios seems to be changing. Also in this programme will be media news from Victor Goonetilleke in Sri Lanka.

October 5: This news edition of the programme includes a feature on commercial broadcasting in India. Arthur Cushen will have media news from the Pacific, including an update on the expansion at Radio New Zealand International.

October 12: American Forces Radio Europe: This will be the third and final part in the series on military radio in Europe. The American Forces have made quite an influence on radio broadcasting in Europe, even though their product is not targeted at the civilian audiences.

October 19: This news programme will examine the demise of some of the ethnic broadcasting in Holland. Also inlcuded will be Media News from Anndy Sennitt, Editor of *WRTH*.

October 26: A major commercial TV operation is scheduled to begin at the end of October/What impact has "TV=10" had on the rest of the broadcasting scene and can public broadcasting survive? Will the public stations simply try to compete? They will also report on the "Exodus from Hilversum".

Aircastle Products

We recently carried a series of advertisements for Aircastle Products. We would now like to hear from anyone who is experiencing diffculty in obtaining goods or refunds from this company. Please contact Roger Hall at PO Box 948, London SW6 2DS with the details.

WHAT'S NEW

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 1/5/8/9/10/12.5/20/25kHz, 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-2S! The step sizes are 0.5/1/5/9/10/12.5/15/20/25/3/0/50kHz 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 99 memories, a 10, 20 or 30dB attenuators and a 10dB pre-amplifier. The supplied modes are u.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-postion 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

Briticent International have just introduced a high-performance, low-cost, filtered mains plug which incorporates soilid-state transient suppresors 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. **Briticent 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, Clywd LL12 0PB.**

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 memebers of EUCW organisiations, using QRP

C - Other licensed amateurs, using any power

D - short wave listeners

Exchanges: Class A - RST/ QTH/ Name/Club/Membership number

Class B - same as class A

Class C - RST/QTH/Name/NM (= non member)

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 - 3 points for each complete logged QSO

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.

Special Offer

Radio Information Cassette - 1

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**

(2)

Name.....

Address.....

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.....Post Code.....

Radio Information Cassette - 1

If you do not wish to cut your copy of *SWM* you must send the corner flash with full details and remittance.
PW Publishing Ltd., Poole, Dorset (Reg. No. 1980539, England)

(1)

To: SHORT WAVE MAGAZINE, Cassette Offer (October), FREEPOST, Enefco House, The Quay, Poole, Dorset BH15 1PP

Please send me.....Radio Information Cassette - 1 @ £5.00

Name.....

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❑ I enclose cheque/PO (Payable to PW Publishing Ltd) £.....

❑ Charge to my Access/Visa Card the amount of £.....

Card No. ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Valid from ..... to .....

Signature.....Tel:.....

SWM OCT 1989 CASSETTE OFFER

TRADING POST

FOR TRADE Plessey PR155, several Eddystone 958/3, 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, Belguim. Tel: 00-322-6737115.

FOR SALE Grundig Satellits 650, £225 and 300, £75. Also Franklyn Spellmaster, £50. All in excellent working condition. Offers considered. J. S. Phillips. Tel: Bristol 241800. Carriage extra, could be delivered in Bristol area.

FOR SALE SEM multifilter £45 p/p. RX4 with TIF for Spectrum £35 p/p. DSB-80 3W d.s.b./c.w. h/b rig, GWO £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. ICK2L 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 585254 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 Gwendoline St, Treherbert, Rhondda, Mid-Glam CF42 5BW. Tel: 774053.

FOR SALE Grundig Satellit 400, eight months old, v.g.c., £145. Mizuho AX1 SkyChanger v.g.c., £30. Mizuho KX 3 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 post. Mr A. S. Harvey. Tel: Swindon 828456 weekends only.

FOR SALE AOR AR-2002 scanner (the market leader) current model, see any radio magazine for specification, absolutely mint and originally boxed, needs only to be seen and heard, £380. W. Cox G6MDV. Tel: Derby 675816.

FOR SALE Panasonic RFB60L receiver f.m., l.w., m.w., s.w., 1.615-29.999MHz, 36 memories, boxed with external antenna. Manual, *Waveguide*, good condition, £80. David Mills. Tel: Stourbridge 371996.

FOR SALE Grundig Satellit 600 professional, 60 station memory, £200. Sony Air 7 f.m./a.m./air/p.s.b. scanner, £150. Realistic PRO2021 scanner receiver, £130. Datong AD270 active indoor antenna, £25. All in excellent condition, buyer collects. D. H. Farr, 40 Homedee House, Garden Lane, Chester CH1 4HD. Tel: 47936.

FOR SALE JIL SX-200N scanner, 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 550131.

FOR SALE Yaesu FRDX-400SD with matching speaker and manual, mint, £170. Eddystone S870A, £20. A. Bairstow. Tel: Grimsby 823968.

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

WANTED Receiver Drake R4245 DSR2, RR3 or R7A Collins 651S1 or 851S1. Cash waiting. P. McAlister G3YFK. Tel: Shrewsbury 884858.

FOR SALE Akai GX-4000D 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: 453933.

FOR SALE JRC NRD-515 receiver. JRC NDH-518. 96 memory unit, ham gear PMX pre-selector. All mint condition with manuals and original boxes £850. E. Garratt. Tel: Kidderminster 68792.

WANTED Sony AIR-7 hand-held receiver or similar receiver for swap for a Sony ICF-2001D receiver. P. Gore. Tel: Bolton 398844 after 5pm.

FOR SALE Military surplus circuits manuals, 4 volume set £30 inc p/p. Also available Eddystone receiver service manuals, models 640, 670, 770R, 770U, 840A and 840C, £7.50 each inc p/p. M. J. Small, 10 Sibleys Rise, South Heath, Great Missenden, Bucks HP16 9QQ.

FOR SALE Realistic PRO-32A hand-held scanner covers airband. Complete with NiCads 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: Knott End 811648 (Blackpool area).

WANTED desperately needed to complete s.w. radio project. Denco i.f.t.s 18/465kHz, 14/470kHz, 18/1.6MHz 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: Clynder (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 conditon) 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, Dunscroft, Doncaster DN7 4BL. Tel: 840658.

FOR SALE Trio 9R-59DS communications receiver, very good condition, with Trio speaker, £70. Dave Miller. Tel: Stockport 061-456 2921.

FOR SALE Sony Air-7 portable scanner, l.w./m.w./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 Uniden Bearcat 175XL base scanner, coverage 66-88, 118-136 airband 136-174, 406-512 and discone antenna. Very good condition, £110 o.n.o. D. Anderson. Tel: 01-502 2340.

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 5RH. 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. Tandberg 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, apparent traders or for equipment which it is illegal to possess, use or which cannot be licensed in the UK will not be accepted.

SWM OCT 89 TP

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 "Listeners 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 580800 (4 lines) Fax 580020 Telex 377482

25 YEARS IN SHORTWAVE

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 Electonics 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 receives 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 ..... **£487**
Carr. £8 (Securicor)

The established favourite hand held scanner from AOR is the AR-800E. This mighty midget 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 flexy aerial for an attractive price of only £199.

AR-800E **£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 ..... **£235**
Carr. £8 (Securicor)

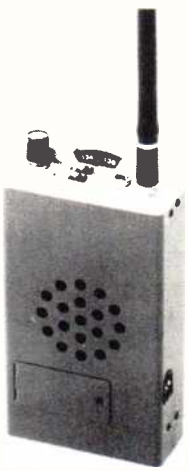
Signal Communications have always specialised in receivers for the airband, and we have often said that Mr. Hayakawa is one of those rare men who truly understand how to design VHF AM receivers. The audio quality which comes from any Signal airband receiver is outstandingly good, and the operating facilities are equally excellent. Top of the Signal 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 ..... **£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.



R-537 ..... **£69.51**
Carr. £8 (Securicor)

WIN-108..... **£175**
Carr. £8 (Securicor)

Shops in **GLASGOW** Telephone 041-945 2626, **DARLINGTON** Telephone 0325 486121, **CAMBRIDGE** Telephone 0223 311230, **BARRY** Telephone 0446 721304, **LONDON** Telephone 01-429 3256, **BOURNEMOUTH** Telephone 0202 577760
All branches are closed all day Monday.

AIRBAND

Godfrey Manning G4GLM

Returning from holiday in a Saab 340 (a new type to me) the crew demonstrated the "glass cockpit" navigation computer. This shows v.o.r. radials, relative to the aircraft's position, using a cathode ray tube display. Quite cleverly the equipment listens to the Morse identification of the v.o.r. and includes those letters on the display. The result is a labelled map of the current horizontal situation, without the aircraft having to contain a database of known nav aids. Like Morse decoding programs that readers of this magazine would be more familiar with, it does sometimes make mistakes and displays the wrong ident.

Frequency News

As usual, the Civil Aviation Authority (CAA) provides useful information in the *General Aviation Safety Information Leaflet* 7/89. There is a new air/ground facility on 123.05MHz at Wigtown (Baldoon). 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 tie (no guesses as to which airline sent him that) don't all rush as I'm sure that the gift was meant as a special privilege. Geoffrey has ascertained Bangkok to work on 6.556MHz and Portishead Radio (available for airline operational communications) to use 11.306MHz for initial calls.

Alan Jarvis (Cardiff) has noted the change from 121.2 to 125.0MHz 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 111.95MHz; I would like to point out that this is an i.l.s. localiser frequency (paired with a glideslope on 330.95MHz) so find a runway that hasn't got one yet, and watch out for the CAA calibrator HS748 aircraft.

Retired DC-9 pilot **Leslie Greville-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 14.280MHz, Thursday 21.380MHz, both ±QRM, 1500-1800Z standard time, 1400-1700Z daylight saving time. Monitoring on 14.280MHz is encouraged at all other times.

Can You Help?

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

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

Burtwell GW6DUV (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 1.5MHz and possibly dating from the pre-War period. I still don't know what it was doing at an aerojumble...

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 0786 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 7.37MHz ceramic resonator CX501 (between pins 29 and 30 of IC503) and replace it with a crystal in the 9-11MHz range. The guarantee would probably be invalidated 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 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 le 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; "Magec" 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!

Abbreviations

a.p.u.	auxiliary power unit
CAA	Civil Aviation Authority
d.m.e.	distance measuring equipment
i.f.f.	identification friend or foe
MHz	megahertz
RAF	Royal Air Force
r.p.m.	revs per minute
u.h.f.	ultra high frequency
v.h.f.	very high frequency
v.o.r.	very high frequency omnidirectional radio range
W	watt

You Write

Harry Longley G0JKT (Lancaster) is well known for putting technical magazine articles ("Airband" included) on to talking 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 Havilland 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-dit, dah-di-dit, 114.2MHz) 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 extreme 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 Battle of Britain Memorial Lancaster at the Cranfield Popular Flying Association Rally 1989

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 pin's in, beacon's on and rotating, you are clear start."

First, it is necessary to spin the engine by blowing air over its turbine. This air is supplied by the a.p.u. Once sufficient r.p.m. is reached, the fuel cock is opened and a spark (like from a car's spark plug, but bigger and continuous) ignites the fuel. The engine rotates even faster until it is self sustaining without the help of a.p.u. air.

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, excessive 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 engine(s). 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. □

SCANNING

Alan Gardener

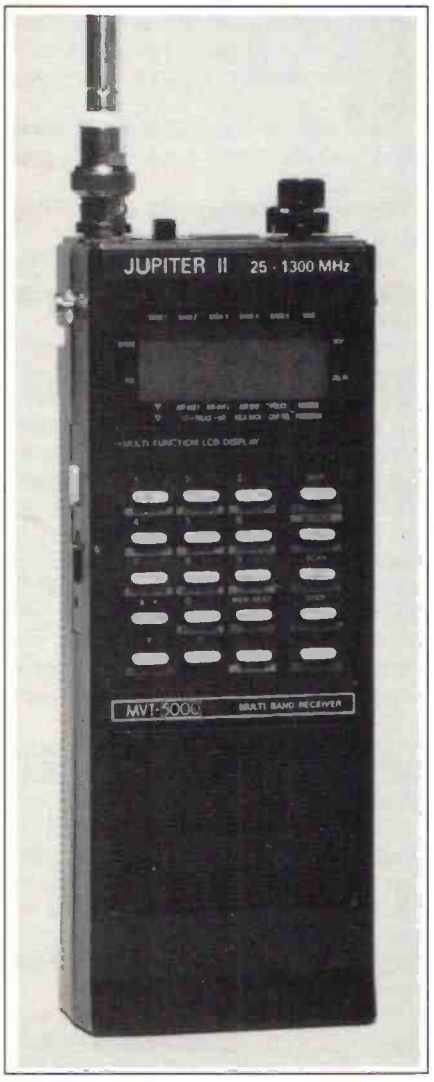
The Jupiter II

This month Alan takes a look at an interesting new hand-held and examines the characteristics of discone antennas.

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.



The Jupiter II

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 on 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 i.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 heaphones, 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 *SWM* 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

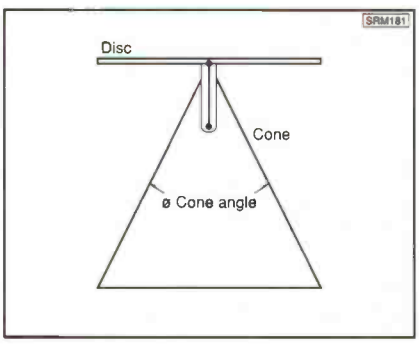


Fig. 1

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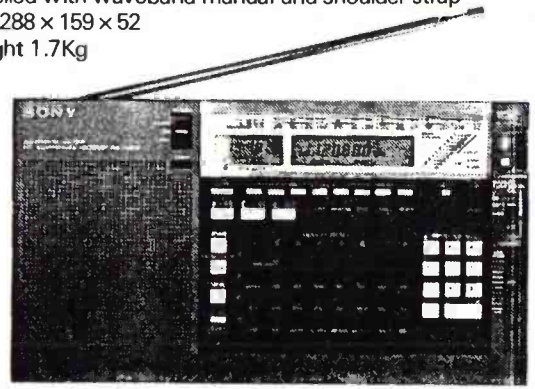

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SCANNING

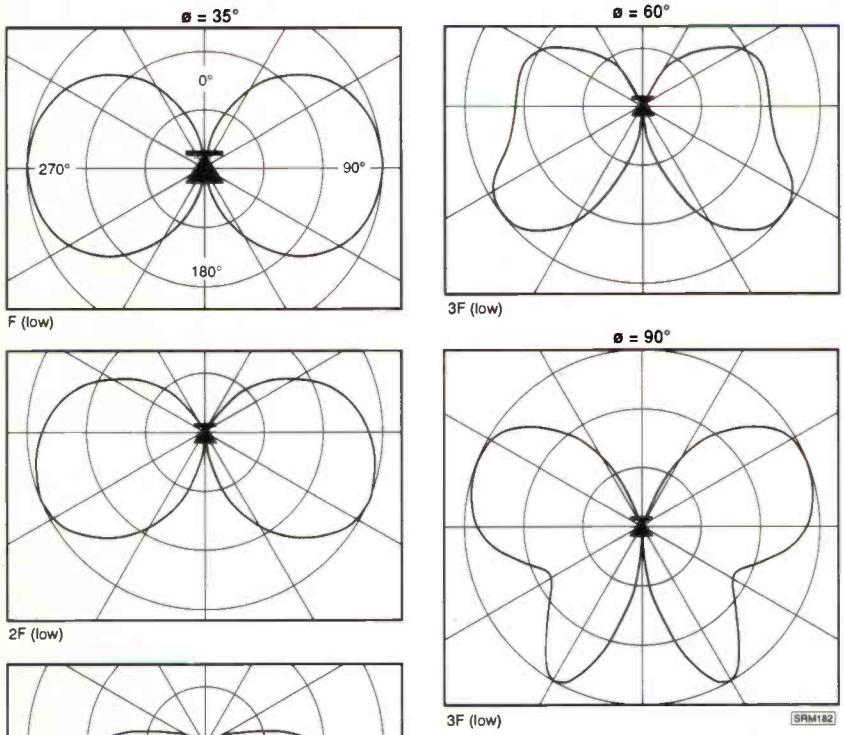

Fig. 2

typically a 10:1 ratio. The lowest operating frequency F(low) is usually set by the "Cone" elements which approximate to $\lambda/4$ at this frequency. If a discone is designed to have a F(low) of 100MHz it should be useable up to 1000MHz, providing that it is of good mechanical design and that high quality insulating materials are used in its construction.

In practice the performance tends to fall off above 2F(low) or 200MHz for the above example. Exactly why this occurred was a mystery to me - I had always assumed that it was due to poor design of the section where the "Cone" elements meet the top "Disc" in the models I had built or tested.

Recently, I looked at some of the early research papers relating to the design of discone antennas and came across an 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 8 of the spectrum explanation follows in next month's "Scanning". □

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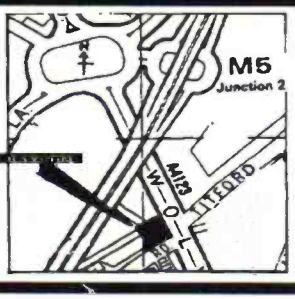

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Part 1

Getting the basics right is all important in the hobby of radio and electronics.

Perhaps one of the most unlikely places to discover the allure of short wave listening is Lincolnshire farm worker'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, we had plenty of countryside to explore 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 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.

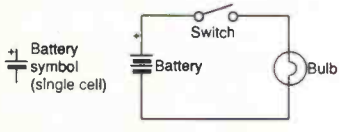
All my other hobbies were laid aside, not only was there the excitement of listening to interesting and often distant radio signals but I had begun to listen on radios I built myself and as I built them, I was beginning to learn the mysteries of how they worked. That was a long time ago, but I am still spending too much of my precious spare time building and using radio equipment. The intention of this series of articles is to help you share in some of that interest and excitement. To even be reading these words, you must be interested in short wave listening. So why not add to that interest by exploring what goes on inside a radio set through building radio equipment yourself?

This Series

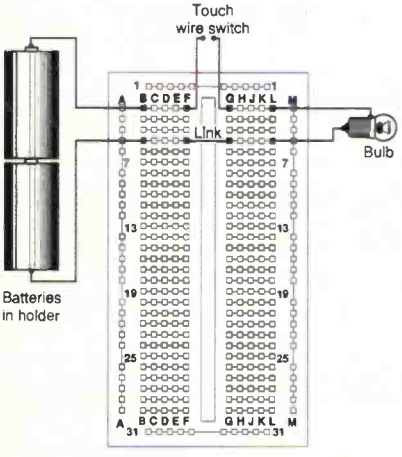
This series is for those who wish to learn about radio through practical construction rather than textbook theory. It will deal with the more fundamental electronic principles of radio but the accent will be on finding out through practical electronic construction. Most of the explanations will be descriptive and functional and wherever possible mathematics will be avoided. This is a learn as you build series. The main accent is on construction but each project will include simple explanations of the action of the circuits and components.

All the electronic components used in the series will be available from the major electronics mail order companies.

(A) A torch



(B) Circuit diagram



(C) Possible Veroblock layout

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.

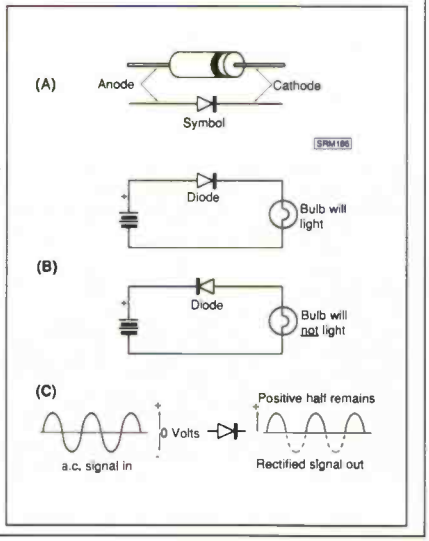
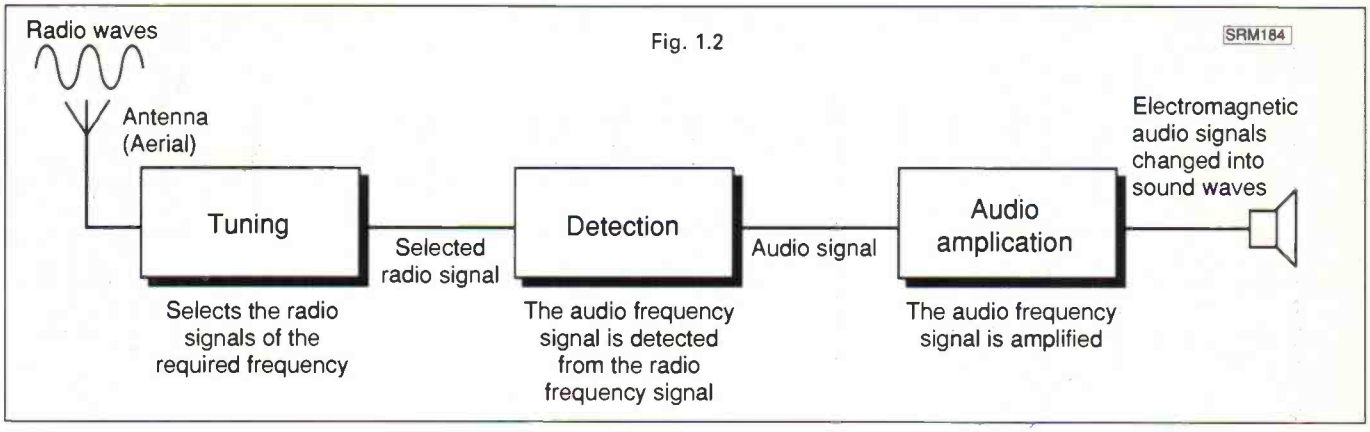


Fig. 1.2



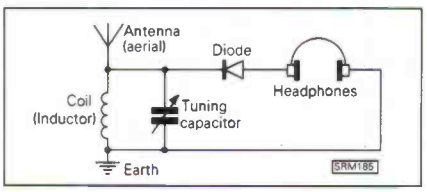
Wherever possible alternative suppliers will be named and it may be possible to obtain the components from local shops. The early projects will be built up using non-soldering techniques but later in the series soldering will be introduced.

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 beingsoldered 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 altenative 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.

RIGHT THE FIRST TIME

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 their next of kin. Does anyone know who held this callsign and where Mr Dunn may contact them? If so, write to him at **5 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 Electricks 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 complete 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 1863 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., as he rather admires this firm's products. He thinks these bridges were 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. Humphriss. 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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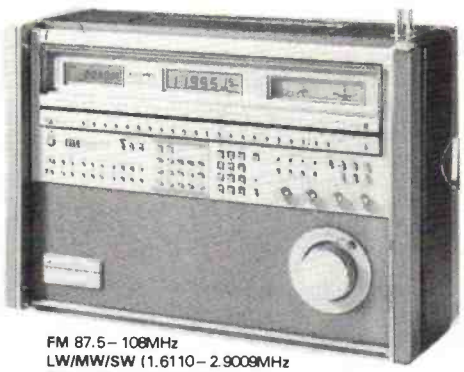

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HOT-RODDING THE ICF-2001D

Steve Whitt
Part 2

In this part Steve Whitt starts by looking at the restricted tuning range of this popular receiver following with the problems of receiver overload - their causes and how to overcome them.

When you purchase a 2001D it is very important to check which version you buy since there are six models on the market targetted 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 frquencies 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

Regretably, 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) 285 - 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 is "buyer beware", especially if you are buying a 2001D whilst travelling abroad or at an airport duty-free shop.

Receiver Overload

Receiver Overload is the most recognisable manifestation of the 2001D's rather limited dynamic range. In its unmodified form it cannot handle very strong signals or a large number of simultaneous medium strength signals without numerous spurious signals popping up all over the dial.

The user will notice this problem as soon as an external antenna of any significant length is plugged into the receiver. In certain areas of the world with very strong local signals, overload problems could occur just with the internal or whip antennas.

If a problem is suspected it should reduce or clear up as the whip is retracted since this will reduce the amount of signal received.

The radio designer is faced with a dilemma as regards the sensitivity of a receiver. On one hand a portable receiver should be able to work adequately only with its built-in whip antenna and therefore it must be designed to be sensitive to weak signals.

In contrast a short wave communications receiver doesn't need to be very sensitive since it is usually used with more efficient external antennas which provide bigger signals.

Sony have, not surprisingly, chosen the former design route for the 2001D. 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 of 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.

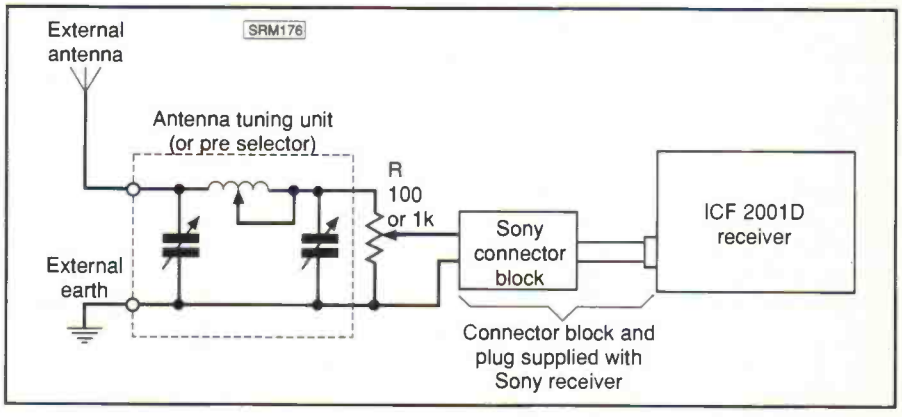

Fig 2.1: The use of preselection and attenuation.

HOT-RODDING THE ICF-2001D

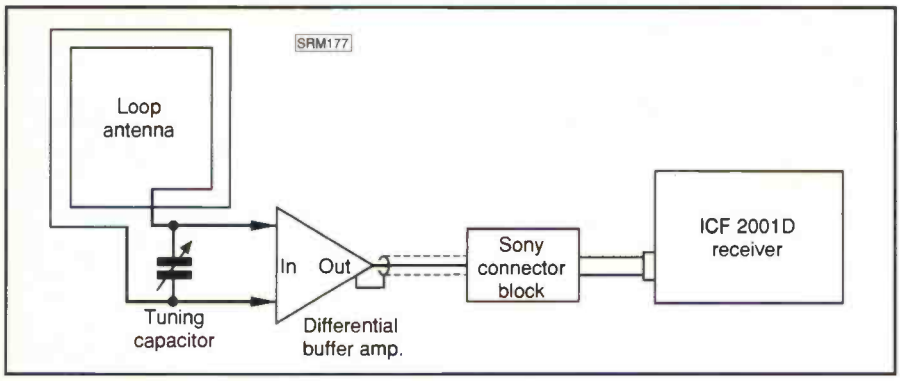

Fig. 2.2: Use of tuned loop antenna.

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 antennal 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	
a.m.	amplitude modulation
a.t.u.	antenna tuning unit
c.w.	continuous wave (Morse)
dB	decibel
DX	long distance
f.m.	frequency modulation
i.f.	intermediate frequency
kHz	kilohertz
l.s.b.	lower sideband
l.w.	long wave
m.w.	medium wave
MHz	megahertz
p.c.b.	printed circuit board
r.f.	radio frequency
s.s.b.	single sideband
s.w.	short wave
u.s.b.	upper sideband

Recommended Reading

[4] "The W-Q MW Loop" G.S.Maynard *Practical Wireless* November 1985.

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 heolding their rally at Drumsill House Hotel. Morse tests will be held.

October 15: The Bishop Auckland Radio Rally will be held in the Sunnydale Leisure Centre, Shildon, Bishop Auckland. ***Ernie G4TYF, 64 Gurney Valley, Bishop Auckland, Co. Durham DL14 8RW. Trel: (0388) 607500.***

October 15: ELHOEX89 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 336939.**

November 4: The 9th North Devon Radio Rally will be in the Bradworthy Memorial Hall, near Holsworthy. Doors are open from 10am to 5pm. All the usual attractions. Talk-in on S22. **G8MXI, 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.**

November 19: The MARS Birmingham Radio Rally will be held in the Stockland Green Leisure Centre, Slade Road, Erdington. Doors are open from 10am to 5pm. There is free parking and the entrance fee is 50p. More details from: **Pete Haylor G6DRN. Tel: 021-326 7515.**

* *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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BEHIND THE SCENES AT VOA

Peter Shore

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

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 Ismaning near Munich were overhauled 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 UK. 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 VoAs 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 claimed 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 500kW h.f. transmitters (each constructed from a pair of two 250kW units) and five other lower power units. In 1986, 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. tranmsmitter 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

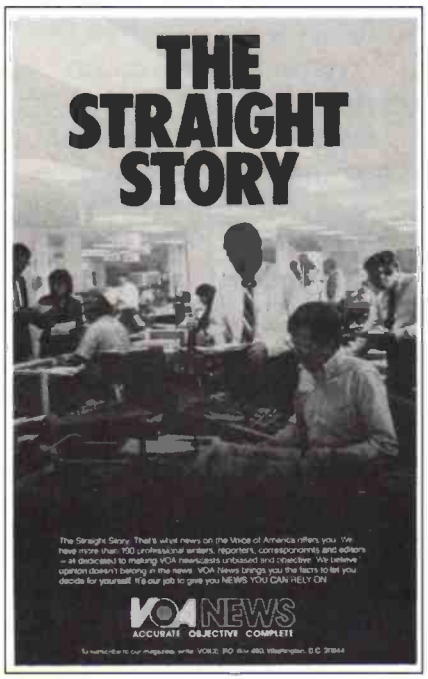
The Voice of America struggled on with ageing equipment and facilities until a review shortly after President Reagan came to power led to the appropriation of $1 billion for a major modernisation of VoA headquarters in Washington and of existing transmitter sites and relays, and for the construction 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;



Science Notebook; Book World and others. VoA Editorials, introduced in 1978 and made daily in 1982, reflect US government opinion and policy on foreign policy matters. Music is one of the mainstrays of VoA programming: every short wave listener has heard of Willis Conover's Jazz Hour, and other music programmes cover the complete range from Concert Hall on Sunday through Country Music USA to the latest pop music in Now Music USA.

The foreign language services also devote a good deal of air time to music: ten per cent of VoA output, in fact. Special English is another VoA speciality. First broadcast in 1959, it was designed for the millions of listeners for whom English was a second language. Special English has a vocabulary of 1500 basic words, spoken at about two-thirds of the normal delivery rate of ordinary English programmes.

VoA Europe is a 24 hour-a-day English language music format service, broadcast by satellite in stereo, with news picked up from the regular VoA h.f. broadcast output. It is carried on medium wave on 1.179MHz from Munich during the day time, and is also broadcast on cable

Abbreviations	
h.f.	highfrequency
kHz	kilohertz
kW	kilowatt
m.f.	medium frequency
MHz	megamertz
UTC	Universal Co-ordinated Time (=GMT)

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 forseeable 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)

1700-1730 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. □

MODIFYING THE REALISTIC PRO-2004

Bill Wilson

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 l.e.d. bargraph display. The design for such a display can be found in *Scanners 2* by Peter Rouse. The only problem with an l.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 l.e.d.s with their attendant drivers. Although this arangment 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 l.w./m.w broadcast radios. Those of you that read *Practical Wireless* will have come across this i.c. before, in the *PW* "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.

Adding an effective S-meter as well as an automatic tape recording switch to this popular scanner is a worthwhile exercise, posing few problems for the owner.

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 TP5 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 it shorting to the i.f. screening cover. This cover should be replaced 180 degrees to it 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 most 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 usable 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

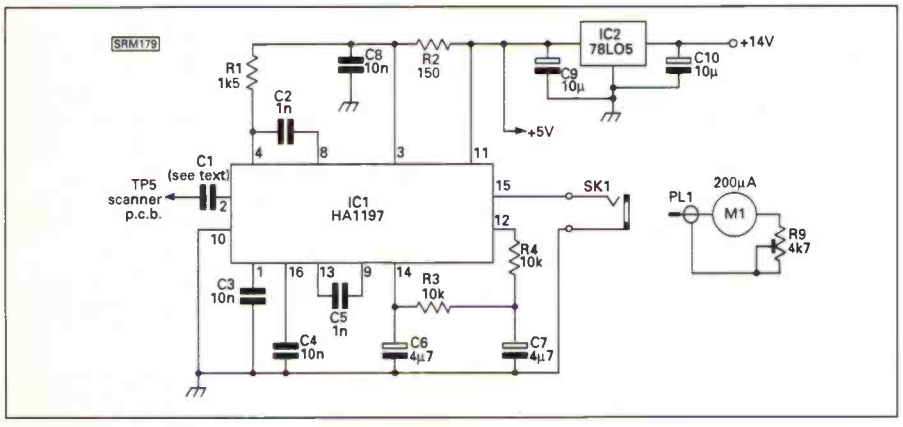


Fig. 1: The S-meter drive circuit.

Abbreviations	
A	ampere
a.g.c.	automatic gain controle
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	mirofarad
w.b.f.m.	wide band frequency modulation
Ω	ohm

MODIFYING THE REALISTIC PRO-2004

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 monitor 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 squelch 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, *SWM* May 1988.

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

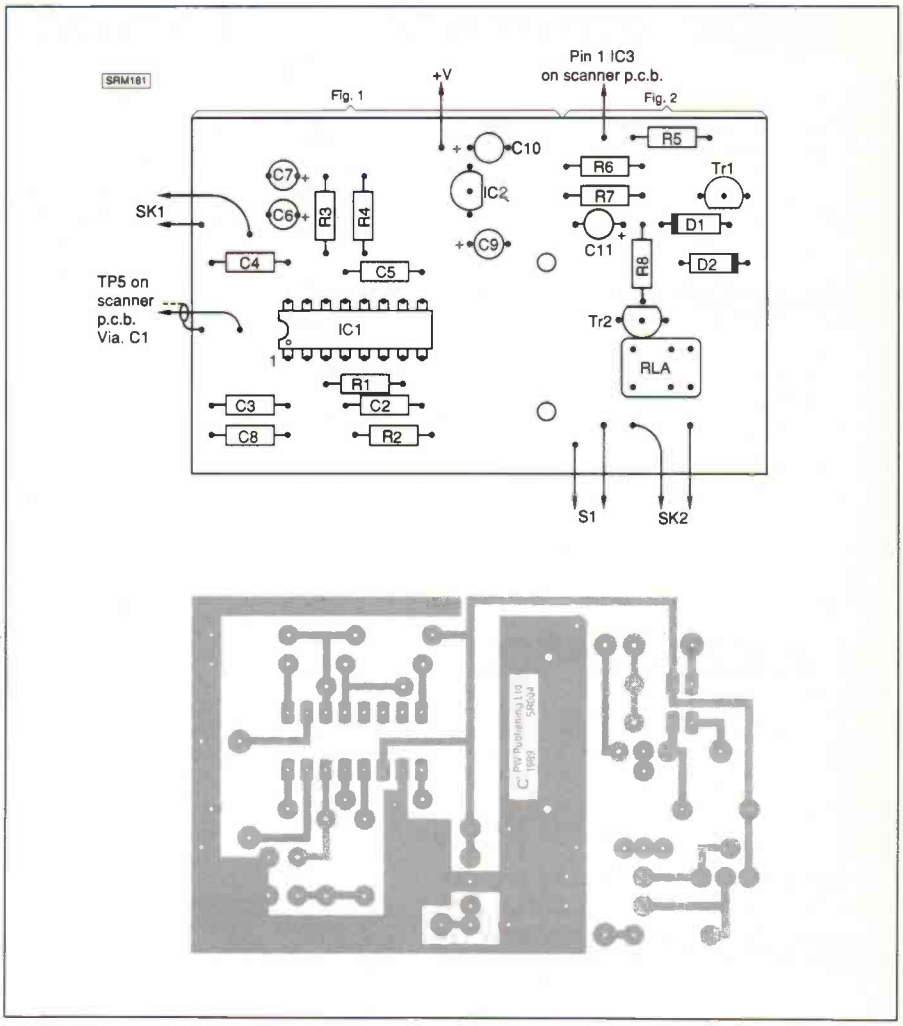


Fig. 2: Full-size p.c.b. track plan and component layout for the modifications described.

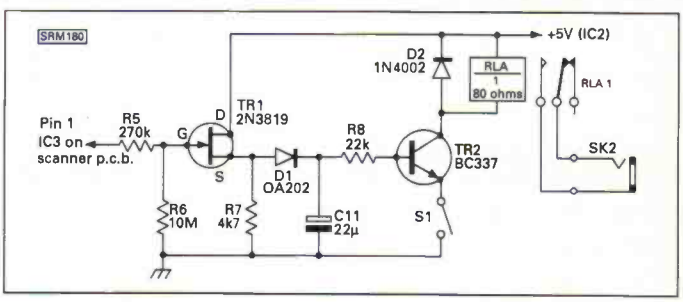


Fig. 3: Circuit of the automatic tape switch.

YOU WILL NEED

Resistors
0.25W 1% Carbon film

150Ω	1	R2
1.5kΩ	1	R1
4.7kΩ	1	R7
10kΩ	1	R3,4
22kΩ	1	R8
270kΩ	1	R5
10MΩ	1	R6

Potentiometers
Pre-set

4.7kΩ	1	R9

Capacitors
Miniature ceramic plate

8.2pF	1	C1
1nF	1	C2
10nF	3	C3,4,8

Tantalum bead 16V wkg.

4.7µF	2	C6,7
10µF	2	C9,10
22µF	1	C11

Semiconductors
Diodes

OA202		1 D1
1N4002	1	D2

Transistors

BC337		1 TR2
2N3819	1	TR1

Integrated circuits

HA1197	1	IC1
78L05		1 IC2

Miscellaneous
2.5mm jack sockets (2); Micro-min 6V relay (Maplin FM89W); Meter 200µA 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 & bolts 6BA (2); p.c.b.

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JANDEK DIRECT CONVERSION RECEIVER KIT

Dick Ganderton G8VFH

Part 2

With the modules built and inspected it is time to think about putting them all into a suitable case and testing the completed set.

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 Minffordd 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.

Specification

Front End

In & Out:	50Ω	Double-tuned

VFO

Output:	300mV 50Ω *(400mV)*
Harmonics:	*2nd -60dB; 3rd > -70dB*
Frequency:	*13.998 to 14.736MHz*
Power :	12V d.c. 15mA

Product Detector:

Conversion gain:	20dB (50µV to 15mV input)
VFO input:	300mV 50Ω

Low-pass Filter

	CW	SSB
-3dB cut-off:	1120Hz *(1117Hz)*	25kHz*(3.5kHz)*
-60dB:	2430Hz	5.4kHz
Input (max):	34mV p-p	34mV p-p

Measured parameters of review kits shown in italics.

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.

Abbreviations

BA	British Association (screw thread standard)
c.w.	continuous wave (Morse)
kΩ	kilohms
m	metre
MHz	megahertz
mV	millivolt
r.m.s.	root mean square
RX	receiver
s.a.e.	stamped addressed envelope
s.s.b.	single side band
v.f.o.	variable frequency oscillator
Ω	ohms

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 turning 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 £60, 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. □

F. C. Judd G2BCX

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 (dBd) 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

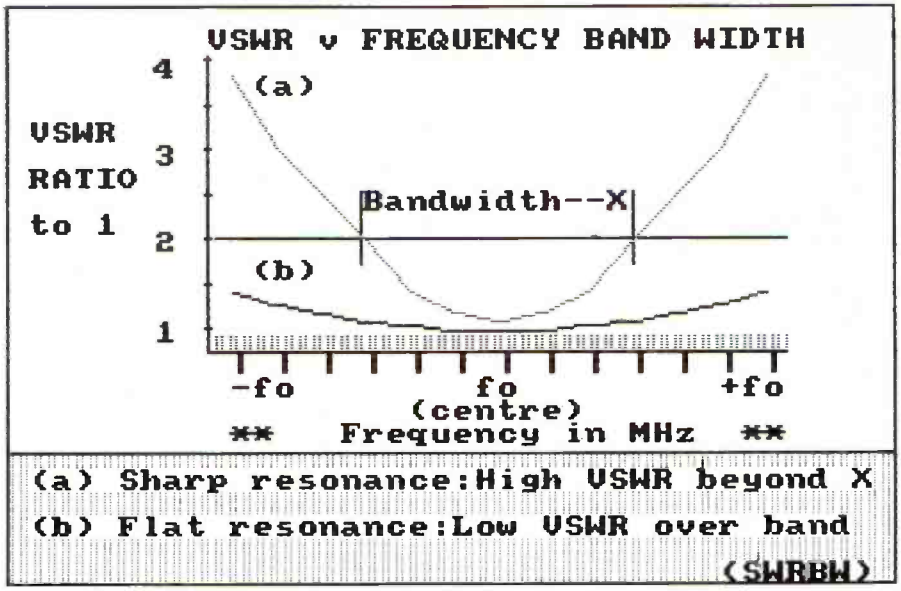


Fig. 9.1. Operational bandwidth *versus* v.s.w.r. See text for further details.

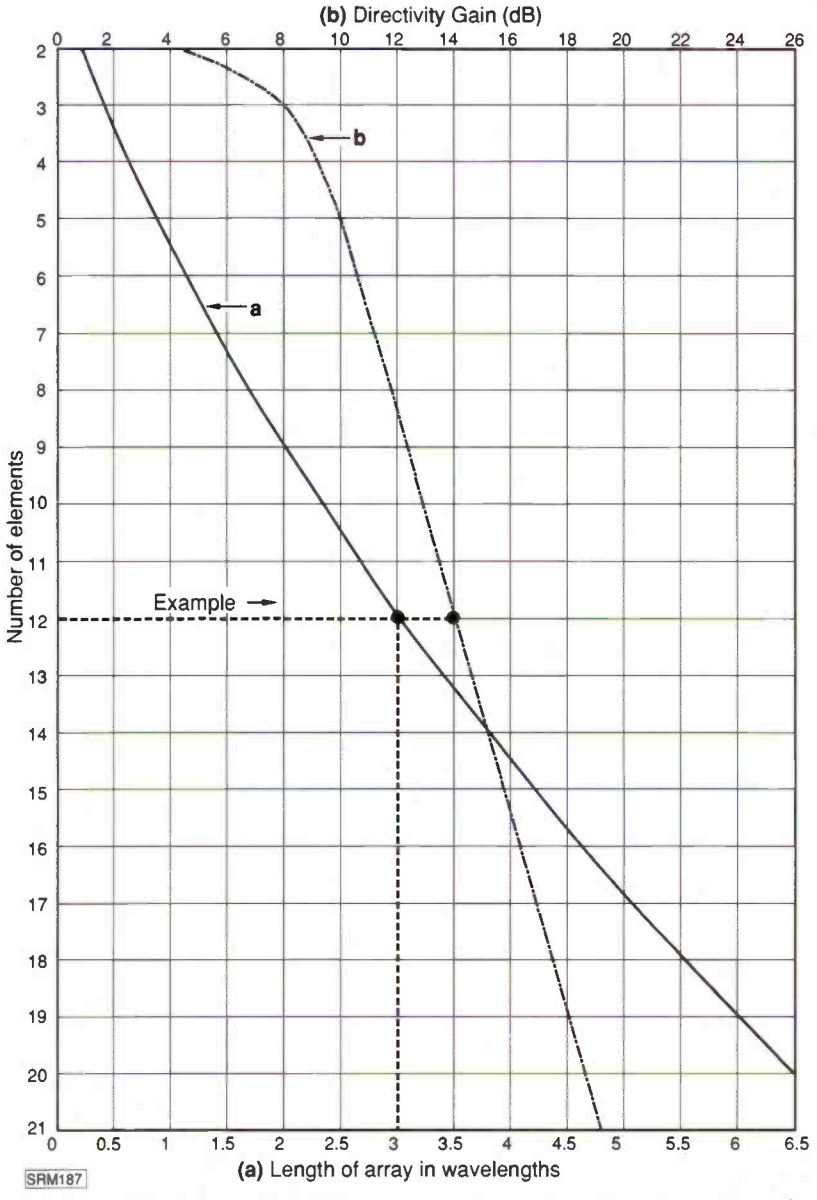


Fig. 9.2. Long Yagi data: directivity gain *v* antenna length and number of elements.

ANTENNAS

Part 9

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, but 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.

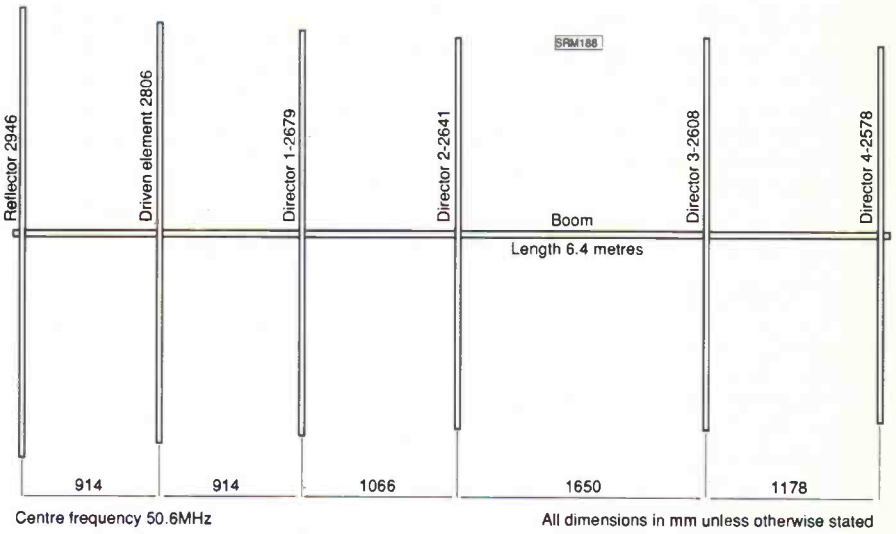


Fig. 9.3. Typical dimensions for a long Yagi parasitic beam antenna for the 50MHz band.

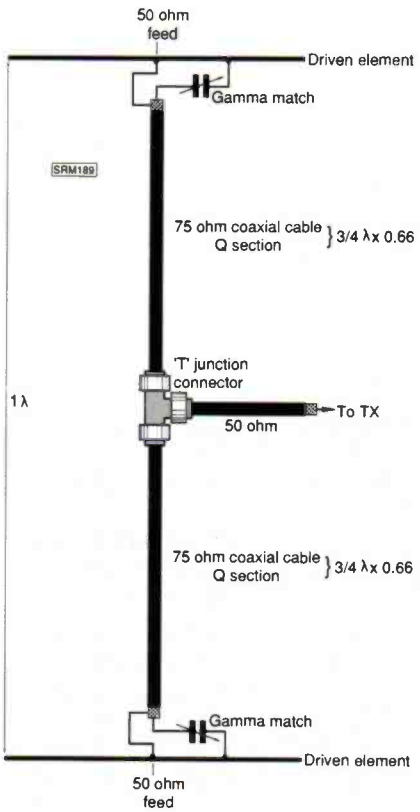


Fig. 9.4. One method of feeding two stacked Yagi beams. (Acknowledgements to *Practical Wireless*)

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 consideratiomns. 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 a number of 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	MHz	megahertz
dB	decibel	v.s.w.r.	voltage standing wave ratio
dBd	gain relative to a half-wave dipole	λ	wavelength
		Ω	ohms

ITC WORLD RECEIVER REVIEW

John Waite

The Polish built R-610 is a straight forward receiver covering all the main short wave broadcast bands in addition to the usual l.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 block countries.

If you're just starting to get interested in broadcast short wave listening and looking for a cheap way to start, the ITC Sabina R-610 could be ideal for you.

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 was 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 49m. 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 suprisingly good for a budget receiver. The sensitivity at 10µV for 26dB signals to noise was very good and the

Abbreviations	
a.c.	alternating current
a.f.c.	automatic frequency control
dB	decibel
Hz	hertz
l.w.	long wave
m	metre
mm	millimetre
m.w.	medium wave
v.h.f.	very high frequency
µV	microvolt

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 ferritte rod antenna for long and medium wave meant that the set could be rotated to effectively minimise interference from adjacent interfering stations.

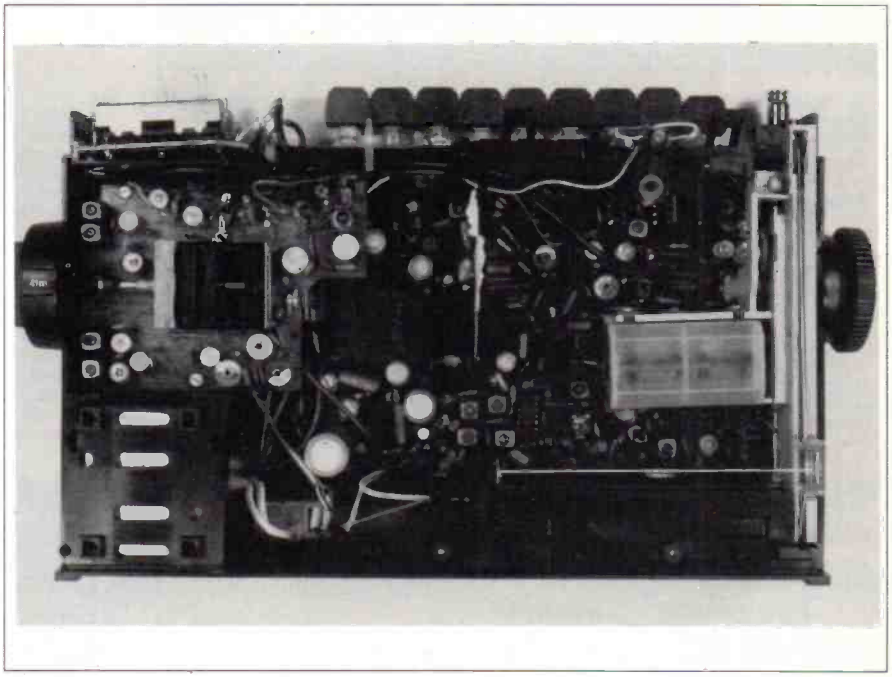
Moving on to the performance on short wave, as I mentioned earlier, this was divided up into seven separate sub bands, each switch selectable. This proved to be a very effective idea, as the tuning for each band became like the old fashioned band spread with each band alocated up to about 60mm of djal 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 dissappointing, 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.

Contruction

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 remined 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 v.h.f. 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
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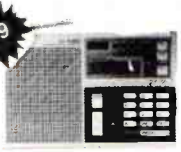

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GRASSROOTS

Lorna Mower

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 Stn on the 25th. Wednesdays, at the Whitchurch 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 WD5 0DR.

Brighton & District ARS meet 8pm, 1st & 3rd Wednesdays in Roast Beef Bar, Brighton Racecourse. Oct 4 is G4BWJ on his Experience as an RSGB Newsreader and The Radio Control of Model Aircraft and the 18th is a Surplus Equipment Sale. Harold Lunson G3WR on Brighton 501100.

Chelmsford ARS have their AGM on Oct 3. 1st Tuesdays, 7.30pm in Marconi College, Arbour Lane. Roy G3PMX on Chelmsford 360545 Home or 353221 Ext. 3815 Office.

Barnsley & District ARC meet Mondays at St. Marys Church Hall, Laithes Lane. Oct 9 is Rig Check G0COA. Ernie G4LUE on Barnsley 716339.

Trowbridge & District ARC meet Wednesdays fortnightly, 8pm in TA HQ, Bythesea Rd. Oct 11 is Visit & Talk from AMDAT of Bristol Packet Radio and the 25th is a Social Evening. Ian Carter G0GRI on Bratton 830383.

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 Toothill G4IFF on Ipswich 464047.

Wimbledon & District ARS 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.

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. Nick Lawlor 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 Market, Harford. Steve Sewell G4VCE on Mulbarton 78258.

Biggin Hill ARC have a Junk Sale on Oct 17. 3rd Tuesdays, 7.30pm at the Victory Social Club, Kechill Gdns, Hayes. 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 Brackenbury and the 26th is an Informal. Brian Shelton on 01-360 2453.

Loughton & District ARS have HF Night on the Air with G4ONP on Oct 6 and The Essex Data Group Roadshow, packet demo radio by G3XVV/G6OQJ on the 20th. Room 14 of Loughton Hall, Rectory Lane, 7.45pm. John Ray G8DZH on 01-508 3434 after 6pm.

Pembrokeshire RS meet Mondays, 7.30pm at the Further Education Centre, Tower Hill, Haverfordwest. 1st Mondays are Lecture nights and 2nd are Committee meetings. Oct 16 is their AGM. Martin Goodall GW8ZMU on Haverfordwest 764009.

Coventry ARS have Nights on the Air & Morse tuition on Sep 29/ Oct 13, their AGM on Oct 6 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 G4HHT on Coventry 610408.

John Puttock G0BWV on 01-644 9945.

Wirral ARS have their AGM on Oct 4 and an Equipment Sale for Members' funds on the 18th. 1st & 3rd Wednesdays, 7.45pm at Ivy Farm, Arrowe Park Rd, Birkenhead. Alec 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 G4OAA on Hoddesdon 464795.

Thornbury & District ARC have Packet Update GW1FJI 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 Naite, Oldbury-on-Severn, Bristol, Avon.

Nene Valley RC have What Makes An Archivist Tick on Oct 4 and G3RWL with an Amsat UK and Oscar talk. Wednesdays, 8pm in the Prince of Wales Public House, Well St,. Finedon. Paul Byles G6UWS on Wellingborough 71189.

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

Darenth Valley RS meet 2nd & 4th Wednesdays, 8pm at Crockenhill Village Hall, nr Swanley, Kent. Oct 11 is Spectrum Analyser G7AQK and the 25th is Short Wave Listening by Bob Treacher. Sheila Hillman G1NMX on Orpington 26951.

Dragon 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 ARS 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 ARS have These Things Do Happen G8HRI on October 10 and The World of Computers G0AJB on the 24th. 2nd & 4th Tuesdays, 8pm in St Johns Ambulance HQ, 61 Emcote Road. Mike Newell G1HGD 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 G3GEH 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 ARS meet Wednesdays, 7.30pm at 119 Green Lane. Kevin Jones G4FPY on Derby 669157.

Paisley (YMCA) ARC meet 2nd Wednesdays in the YMCA, 5 New St. Thomas Wylie GM4FDM on Johnstone 22749.

York ARS meet Fridays, 7.30pm in United Services Clubroom, 61 Micklegate. Keith Cass G3WVO at 4 Heworth Village, York YO3 0AF.

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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.

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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 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 tuned circuits were briefly outlined in a previous article in this series (*SWM* 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

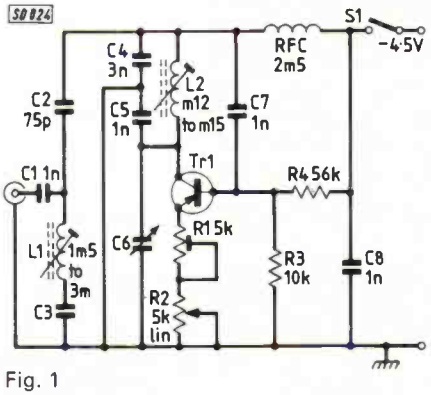

Fig. 1

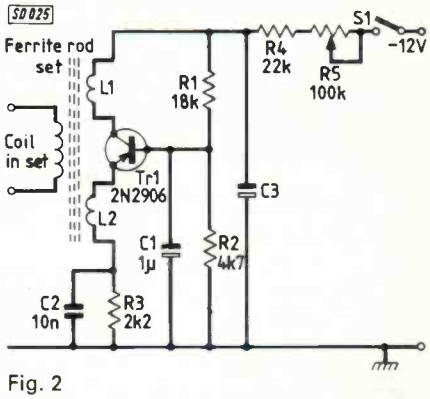

Fig. 2

SPECIAL NOTICE TO READERS

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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 1mH = 10^{-3}H and 1μh = 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. 1μF = 10^{-6} F, 1nF = 10^{-9} F and 1pF = 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: $XL = 2\pi fL$

π = 3.1416, f = frequency in hertz, L = inductance in henrys.

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

$XC = \frac{1}{2\pi fC}$

f = frequency in hertz, C = 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 nett 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: $Z = \sqrt{(R^2 + X^2)}$

Z = impedance, R = resistance, X = total reactance.

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 (fo) is given by: $fo = \frac{1}{2\pi\sqrt{LC}}$

where L = inductance in henrys, C = 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 (fo) 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 L/CR, which is called the **dynamic resistance (RD)**; this is very different in value from the effective resistance of the coil. It follows that the L/C 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: $Q = \frac{2\pi fL}{R}$ □

f = frequency (hertz), L = inductance (henries), R = resistance of the coil (ohms).

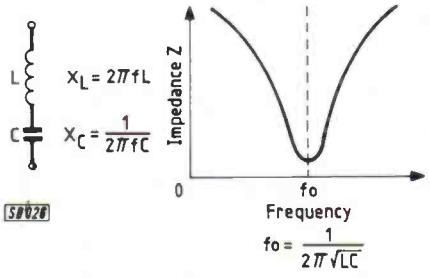

Fig. 3

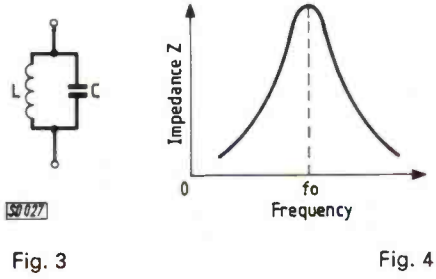

Fig. 4

YOU WILL NEED

	Fig. 1	
Resistors		
10kΩ	1	R3
56kΩ	1	R4
Potentiometers		
5kΩ preset	1	R1
Carbon		
5kΩ linear	1	R2
Capacitors		
Ceramic		
0.001μF	3	C1,7,8
Mica		
75pF	2	C2,3
Polystyrene		
0.003μF	1	C4
0.001μF	1	C5
Variable		
25pF	1	C6
Inductors		
1.5 to 3.0mH	1	L1
0.12 to 0.15mH	1	L2
2.5mH	1	RFC
	Fig.2	
Resistors		
18kΩ	1	R1
4.7kΩ	1	R2
2.2kΩ	1	R3
22kΩ	1	R4
Potentiometers		
carbon		
100kΩ	1	R5
Capacitors		
Ceramic		
0.01μF	1	C2
Electrolytic		
1μF 15V	1	C1
10μF 15V	1	C3
Semiconductor		
2N2906	1	Tr1

Notes:
L1,L2 consist of 10 turns each of 32s.w.g. enamelled 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.

SEEN & HEARD

AMATEUR BANDS ROUND-UP

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

Have YOU ever listened to any other mode than common-or-garden s.s.b. telephony? What about listening to 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 best since you knew "Milady" wouldn't authorise the extra expenditure....yes, we've all been through it!

However, old-timers like me, who is 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 was a runner. The computer - in this case a Spectrum - was up in the loft, kept by 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 - the volume control 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, all from the public domain. In effect, the total cost was - zilch!

As for the QRM from the computer, for a first try-out it 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 other 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 QRQ (high-speed) Morse sent on an electronic keyer. If you doubt your ability to send good Morse, if you can make the computer read it, ANY human op 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, we find Pat booked in NY6M/KH2, ZS3UM, 9M2AX, TL8RM, J28CY, OD/F1LIV, 8R1J, XT2CW, HL5BDS, J52US, S79MX, HZ1HZ, ZS8MI (Marion Is), 5H3TW, VK8XX, CX8BBH, FR4FD. Then, 21MHz produced CN8MC, KH6BGE, KH6IJ, KM0E/KH3, 3B8FK, SP8UFO/JW, BY4RB, JT1CD/9, HS0YDY, HI3/G3OLU, 3D2SO on Conway, KG6DX for Guam, PA0GAM/ST2, 3D2VT, VK9NS, FY5YE, NL7DU, FO0MGZ, XT2CW, TJ/IK1JLL. Up to 3.5MHz now, and here Pat tangled with XT2CW and FY5EW. On 7MHz he had CE0OGZ, TF9CW, VK2APK, VE2DWU/2, ZM2AGY, J52US, 9H3KO, OY/DF2PI, S79MX, XT2CW, CY0DXX, PJ2AM, H27T. That simply left 14MHz on which to find JT1CD/9, 3D2MK, FO0MGZ, HI3/G3OLU again, SP8UFO/JW again, TF6CW, CY0DXX (Sable Is), EL7X, V31BB, and XT2CW. All were booked in on c.w. incidentally.

Now we turn to **Ron Pearce** (Bungay). On the air, Ron's two-transistor home-brew receiver managed, on 14MHz VK3SBS, VK3AW, K2JFE, WD2AGU, N1TD, W2MIG; while on 21MHz JA2CC, JI1KEL and KV6G were found, all on s.s.b. of course. As Ron says, it's a great pity more s.w.l.s don't involve themselves in more of the hobby, by way of for example, home-brew, different reception modes, or whatever.

Graham Johnson (Nuneaton) had a bit of extra spare time last month, and used it to give his Panasonic DR49 a little exercise. On 28MHz, CT1BH was noted, which was pleasing as the receiver is felt to be a mite deaf hereabouts.(Be careful about this, Graham, as 28MHz is rather dead in mid-summer!) On 7MHz LX0SNJ, OZ1KLH, G0LVE, were pulled in, while on 14MHz, the crop included HG5C, FF10JX, C40A (Cyprus), SP6OJJ, RO5OO, PY2PE, OE5MEM, K3AQH, WA4TWG, HA3OV, KE2C, HK5MD, UA3AFU, SP9CTH, YT3LC, which left the 21MHz group, namely N5AN, Y22FI, WF2R, EA8AMT, UA6ECU, 4X6LD, W4XKP, UY0ILK, UL7GE/RW4L, VE2CB/2, OE1PPC, 4N0R, N3AZB, a JA4 lost in QRM, JH1HBR and HB0/PA3EPD.

D. L. McLean notes how 28MHz has been in it's "summer doldrums" but he did log in CE3BFZ, J79T, TR8SA, VP8BWT, WP4IGN, ZD8BOB, ZD8PJ, ZD9BV, ZL4LZ ZP5AA, ZP0Y and 5H3TW. These were all on s.s.b., as were the following on 21MHz: A41KB, AH6CS, BY1SQ, BY4AOM, BY4RSA, C40A, CO2QQ, DU6BOB, FG5CL, FO5IW, FO5LQ, FO5MA, FW/KA0OMX, GU/PA0EQT, FD1JYD/VE8 in Zone 2, King Christian Land, HC5EA, HK3IHP, HK3JJH, HK6IKV, HK6ISX, HL4GAV, HL5FNV, HL9TF, HL9TG, HL0Y/4, HV1CN, HZ1AB, ID9/IK4CFV, IG9ONU, J79T, J88AQ, JAs, JH1FNS/CE3, JT1KAA, KG4UN, KH6SB, KL7QK/P, KL7TC, KL7XD, NP4CC, OY/DL1SCQ, OY/DL2SCQ, OX/OZ1LLC, RA0AW, RZ6AWL/UF6O, SU1EP, T30BC, T32AF, TA4A, TA3/G4JVG, UA6HZ/JW, UA9FBH/UA9G, UA0BDU/UA1, UA0KBU, UA0QBB, UA0QBR, UA0QWA, UA0WZ, UA0ZCL, UW0LAP, V85GA, VP2EY, VP2V/G4LYM, VS6UZ, VU2RX, VU2TTC, XE1GAM, lots of YB/ YCs, ZC4BS, ZK1DD ZP5AA, 3B9FR, 3D2XV (Rotuma), 5W1HM, 5Z4BO, 6Z2DK, 6Z2WK 7J6CAW, 9M2ZZ and 9X5NH. Don also listened on 18MHz, on which band the antenna is a trapped "sloper" with which VE2, W1, W2, 6Z2E 9K2EC plus Europeans aplenty and ZB2IK.

The low bands, 1.8-7MHz tend to be left alone in summer, particularly Top Band where the summer static can be quite fiendish; but **C. Horrabin** (Padgate) had a session on 1.8MHz around 0300Z one evening in mid-July, to find AA1K and W2GD. On 3.5MHz, around 0200Z, KG4W and AI1N appeared, while on 7MHz there were K4LTA, OA4IU and N2NU. Of course, this is all c.w., as Colin regards s.s.b. as purely a "socialising" mode.

A G5RV antenna hoisted up to 6 metres a.g.l. does the work for **P. Lancaster**, and on 28MHz, N8AUM, running three watts to a CB conversion, VE3ACA, UA0WW, and K1SVC were logged;on 18MHz - Thank Heaven for some news of the WARC Bands!! - G3SFZ, 9K2EC, KU1G, and CT5BLV. On 24MHz there were, though only Europeans.

Now J. **Heys** (Hastings) who mentions only his 21MHz activity, as follows: from Africa ZS6UN, CQ9AF, J28DN, TJ1PD, 6W1HF, 6W1AAD, 5H3GB, 5Z4BI, TR8SA, ZD8RP, FH5EF, 9X5AA, 9X5KP, IG9ONU (Lampedusa), CN16MC, CN60AQ, 5Z4FO, ZS3UN/OH7NRW, ZD7VC, J52US, EL2GM, and S79MX. In Asia, there were the JAs, JY9SR, HS1BV, RJ7R, VS6UW, UZ0DWD, many YBs, TA2AP, TA3/G4JVG, VU2RX, VU2WAP, 4S7EA, YI1BGD, and some eight S. Koreans. As for the America, there were PYs aplenty, CX5DY, HK3RQ, HK5JPS, CO3JA/4 from Pinos Island, VP5/W4NPX, L1Y from Argentina for a special, LU2ZC for S. Shetland, VP8BZR from Mount Pleasant, Falkland Is, J79T. Going more to the north, there were various Ws, including West Coast VE and W signals, KL7HF, KL7XD, NL7DU, CI7GRN for another special, and 4U1UN. Rare Europeans included UA1OT in Franz Josef, IA5/IK4ITL for Elba, HG89HQ for a 'special from HA, F89/F1LYM for Monte Carlo and OX1O.

Earthing

E. H. Trowell has been using the summer weather to improve his earthing arrangements. For anyone who uses an antenna system which requires a ground, such as the end fed Marconi arrangement, as Ted says, attention to the earthing arrangements is probably FAR more rewarding than attempts to improve the "run" of the antenna part of the system. I can confirm this directly in terms of a local contact which has been progressively improved from impossibility on Sunday mornings up to being consistently 100 per cent solid copy with no other changes occurring at either end. To put it bluntly, the usual three-foot earth spike is all but useless, even when dosed with rock salt (which doesn't improve the plants either!). Let's put some numbers into the discussion now.

Imagine you have a vertical quarter-wave at ground level. It will have a feedpoint impedance according to the book, of 37Ω, and in practice it is lower than this, around 20Ω. Now imagine that in the earth line you have inserted a resistance of 100Ω. Approximately one sixth of the transmitted or received power is used, the rest being given over to soil heating! There are various ways to handle this problem. Buried radials help a lot. If you have say twenty, each of about thirty feet or more all connected to your earth spike and run around your garden a couple of inches down, you'll notice a marked difference. Add to that the earthing of any wire fences, plus some above ground quarter-wave radials for the chosen bands, and you are even better off.

Over and above that you could try this trick: Mow the lawn as closely as possible. Obtain and lay some wire netting (chicken-wire) over the mowed lawn, pinning each sheet down flat. Solder each sheet together at as many places as you can. Take a connection to your earth terminal from the earth mat. Now let the grass grow, and if you have done the job carefully, you will be able to mow at a reasonable level without damaging the mower, and the chickenwire will have become invisible, while the improvement in station reception will be quite marked. Quite as a side-issue, you may well find if you measure the earth resistance and do a sum, that you can use this earth as the safety one instead of the mains earth, and so remove quite a lot of noise carried in along the mains earth. However, don't forget that when you improve the actual earth, the constant represented by the wire joining shack earth terminal and the actual earth will become more important. For example if the lead measures 1 ohm and the r.f. station earth is 100Ω, clearly losses in the lead are fiddling. However, if you get the station earth down to one ohm, then obviously half your signal is now disappearing as heat in the earth wire! For this reason, my arrangement uses a couple of old flexible coaxial cable lengths, with all four (2 inners, 2 braids) joined together at top and bottom and direct to earth terminal and earth spike.

That's it for this time - space ran out!

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

DECODE

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

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 ERA Microreader. The receiver in use is a Yaesu FRG-7 which, although a little long in the tooth, works well for Les. He finds that the use of a b.f.o. for demodulation to be quicker than more modern receivers with carrier injection and separate sideband selection.

From Blackpool **M. Hoey** writes describing his set-up which comprises an Icom IC-R71E receiver fed by a trap dipole and a.t.u. There are some changes planned on the antenna front in the form of an ARA-30 active antenna. The decoder used is the very impressive Pocom AFR-1000 which gives fully automatic decoding of a wide range of utility signals and had proved very successful for M. Hoey.

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 I've had my knuckles wrapped! Anyway, back to business with Doug's comments. His short wave listening station comprises a Trio TS-430 transceiver with general coverage receive fed by a 43m long wire antenna. As the l.f. limit of the 430 is 150kHz Doug uses a *PW* Taw convertor to give access to the interesting spectrum below 150kHz. The Taw has been in use for some time and has performed very well indeed. In addition to the 430 he is the proud owner of a Icom IC-R7000 v.h.f./u.h.f. scanner and he has modified a Taw to gives the Icom coverage from about 3.5MHz again using the long wire antenna.

Utility station decoding is achieved using a Dragon computer and G4BMK software for RTTY, Packet and c.w. while FAX is handled by an ICS Electronics FAX-1.

Andrew Seed, Newton Abbot is new to the hobby and is suffering the sort of problems most newcomers experience. These revolve mainly around being unable to decode stations that sound to all the world like RTTY. Unfortunately, there is no easy answer if you want to discover new stations, as it is often very difficult to differentiate by ear between a true RTTY signal and a synchronous transmission of the same baud rate. The only solution if you get really frustrated is to get hold of a utility frequency list. By selecting RTTY transmissions from the list you can build up your experience before trying to find new stations.

Ken Longley of Dover has written with yet another common problem - reading material. It would seem that there is a serious shortage of technical literature for the newcomer. I have, in the past recommended RTTY the Easy Way from BARTG but it seems that this is not really what is required for the short wave listener. Unfortunately, at the moment, I don't have a solution (other than write one myself!). If you have any useful suggestions I would be very grateful if you'd drop me a line with the details.

To continue with Ken's letter, he is currently using a Kenwood R-5000 receiver and is also expecting delivery of an ERA Microreader to complete his decoding station. I shall look forward to seeing some reports!

Paul Kennett of Rickmansworth is another ERA user and he has recently upgraded his receiver from a Sony ICF-7600D to a Sony ICF-2001D. Paul feels the upgrade was well worth while. At present Paul uses the *Confidential Frequency List* by Fernell but asks if there is another publication which makes press transmissions easier to find. In my experience the Klingenfuss *Guide to Utility Stations* has a very useful section which contains a chronological list of press stations. By using this section, you can virtually always find an active press station at any time of day. I don't know of any other publication that covers this aspect of listening, but if you know different please let me know so I can pass on the news.

Computer Interference

I have made comments on this subject in the past, but judging by my mailbag it could do with another airing.

One of the first things to note about this subject is that there is very often no single answer and several areas have to be tackled to conrol a case of severe interference.

Let's start by examining the sources of this interference within the computer systems. It may surprise you to know that most of the interference comes from the video signal and monitor. The reason for this is quite simple in that the frequencies used are comparatively low - 50Hz and 16.625kHz. The waveforms used create a lot of harmonics and it is these that cause the unpleasant rasping buzz throughout the h.f. bands.

One simple tip here is to avoid colour monitors if at all possible as these are usually significantly noisier than monochrome monitors.

If you use a BBC computer the RGB monitor output is well known for being extremely noisy and should be avoided.

Another area that is vitally important to interference reduction is the type and positioning of the antenna. The most common type of antenna for the short wave listener is the long wire type. This description is rather vague and generally refers to any simple single wire antenna. The true long wire antenna should be significantly longer than the wavelength of the frequency in use. 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 receiver.

There are a variety of other areas that may need attention and I would recommend that you read the excellent article by Richard Wilmot in the March '88 edition of *SWM*. This article covers the subject very well and is based on his own practical experience.

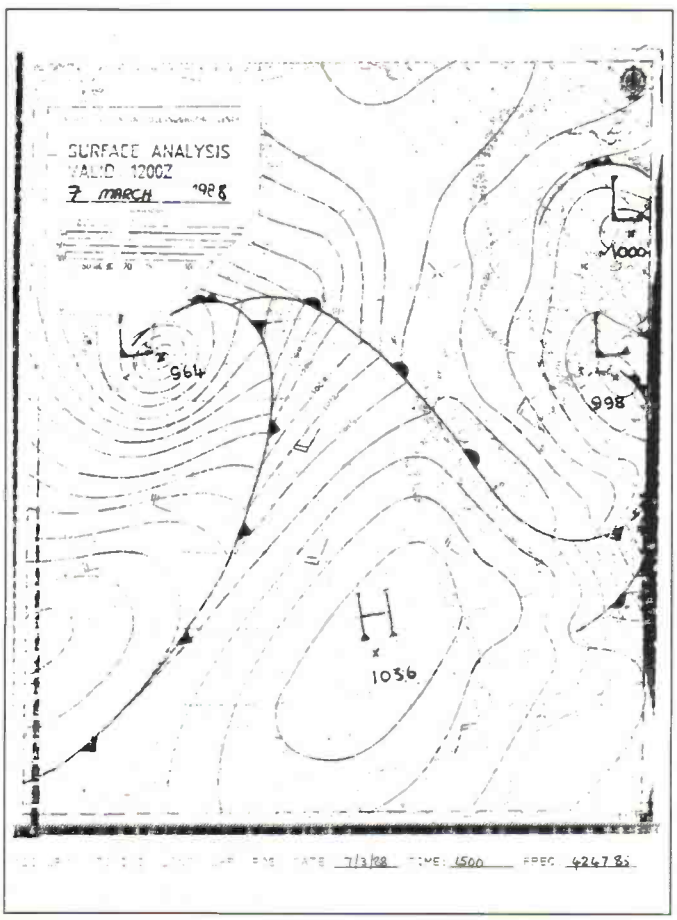

Fig. 1: Weather chart received by Ivor Cooper

Station Schedules

I have a variety of schedules for you this month, thanks to the efforts of **Jan Nieuwenhuis.**

The first concerns Algerie Press Service (APS) who use 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
1500UTC-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
7.4025MHz - JMG3
14.880MHz - JMG4
19.529MHz - JMG5
23.972MHz - JMG6

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

3.1925MHz - VVD53 (1430UTC-0040UTC)
7.58MHz - VVD57 (24hr)
12.075MHz - VVD62 (24hr)
19.4MHz - VVD69 (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
9.05MHz, 13.665MHz, 16.4575MHz and 22.472MHz - 0100UTC, 0400UTC, 0700UTC, 1300UTC and 2100UTC.

USCG Apra Harbour, Guam (NRV)
466kHz - 0100UTC and 0800UTC
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.

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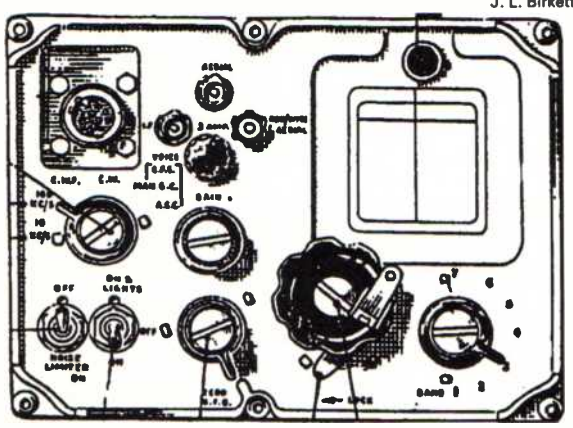

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SEEN & HEARD

Frequency List

My frequency list is still available by sending three stamps to the address at the start of this column. I will add though that we have been rather overloaded with correspondance of late so don't expect a reply by return of post! All contributions to the list are welcome too!

Now back to this months selection of frequencies which have been gathered from recent readers reports. The format used is the usual - frequency, mode, speed, shift, callsign, time and notes.

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

3.885MHz, FAX, 120, 576, DDH3, 0731UTC, Hamburg Meteo

10.633MHz, RTTY, 50, ?, SUC, 2115UTC, Cairo Air

11.175MHz, RTTY, 50, ?, 5HD, Dar es Salaam Air

11.44MHz, RTTY, 50, ?, EIP, Shannon Air

11.536MHz, RTTY, 50, ?, HMF49, 1925, KCNA Pyonyan

13.540MHz, FAX, 120, 576, LRO81, 2056, TELAM Buenos Aires

13.920MHz, FAX, 120, 576, AXM35, 0655, Canbeerra Meteo

18.055MHz, RTTY, 75, ?, DFZG, 1440UTC, MFA Belgrade

18.220MHz, FAX, 120, 576, JMH5, 1548UTC, Tokyo Meteo

18.355MHz, RTTY, 50, ?, 9MY63, 1530UTC, Kuala Lumpur Meteo

19.7475MHz, RTTY, 50, ?, 6VU79, 1907UTC, Dakar Meteo

21.837MHz, FAX, 120, 576, NPM, 1030UTC, USN Pearl Harbour

22.2525MHz, c.w., ?, ?, PPR, 0951UTC, Rio de Janeiro Radio

22.409MHz, c.w., ?, ?, JOR, 0948UTC, Nagasaki Radio

INFO IN ORBIT

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

Having had several requests for basic information on receiving satellite signals I thought it might be useful to have 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 polarisation 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 a right-circular crossed dipole is best but a simple dipole will still provide good signals. I have tried several antennas 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 wire or aluminium rods. Cut them to suitable lengths using the formula:

Dipole length (metres) = 143 divided by Frequency (MHz).

This is the total length of the dipole including the central cable connection, see Fig. 1.

So for a suitable UoSAT dipole we have 143/146 equals 980mm. For an APT satellite we have 143/137 equals 1040mm.

The number 143 is a constant that assumes the antenna to be high above the ground so take the figures as approximate and you should find that your home-made aerial works fine.

The dipole can be mounted using a small plastic or wooden fitting. If mounted in a straight line then it will have a nominal impedance of about 75 ohms and tv coaxial cable can be used for lengths of a few metres. For better results a pair of reflectors should be mounted behind the dipole and will have the effect of increasing the gain and reducing its impedance so that 50 ohm cable can be used. This will be a better match to your receiver, most of which have 50 ohm connectors fitted. The above forms of antenna are basic units and will produce a reasonable signal.

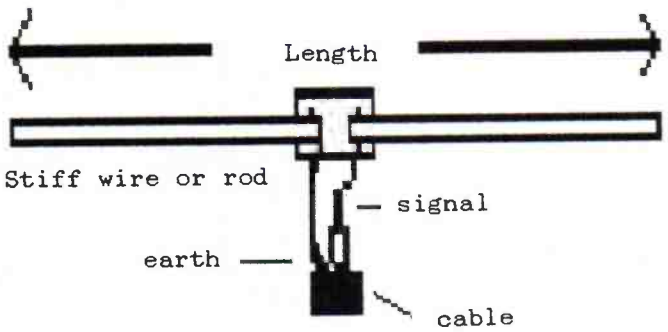

Fig 1: A cost-cutting dipole for satellite use

Many satellites are spin-stabilised producing circularly polarised transmissions so a crossed dipole can be a better antenna and consists of 2 ordinary dipoles connected with a carefully cut piece of suitable cable, and mounted at 90 degrees to each other.

A discone can also receive satellite signals - in fact I use one on a Tandy PRO-2004 scanner to listen to MIR and many other satellites but the combination isn't very sensitive because the discone has a low gain.

Yagis are multi-element antennas and therefore have a higher gain and a narrower beamwidth and are often used when signal strengths are lower, which is the case with satellites in highly elliptical orbits and careful positioning is necessary for optimum signal strength. Dishes are used for the highest frequencies such as Meteosat though a properly designed Yagi, loop-Yagi or helix will work very well.

Space doesn't permit me to illustrate and describe all of the types of antennas used for satellite reception but the above antennas will suffice for most purposes.

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 Housman 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 jettisoning of the stages and the radar tracking that follow the launch and looks forward to hearing more launch broadcasts. I shall also listen in 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 137.56MHz. 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 55 degrees, selected to bring it over the UK for some 5 or 6 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 shouldn't be there! Casting my mind back several years I remember that UK 6 was pointed in different directions by 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 in orbit - 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 136.23MHz. I haven't received any other reports on this but the signals continue regularly, forming a pattern. 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 have also heard signals 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 Navy satellite launched back in 1971.

I doubt whether many professionals are monitoring 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

SEEN & HEARD

might be unexpected satellite transmissions for inclusion here.

MIR

Readers are still monitoring radio transmissions while waiting for the station to be re-occupied. Alastair Turnbull 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 137.62MHz between noon and 3 pm 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 at 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 WEFAX 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 1500MHz to 71000MHz (1.5GHz to 71GHz - 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 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 sun-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.

Meteor 3/2 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 137.62MHz 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 Garriock 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.

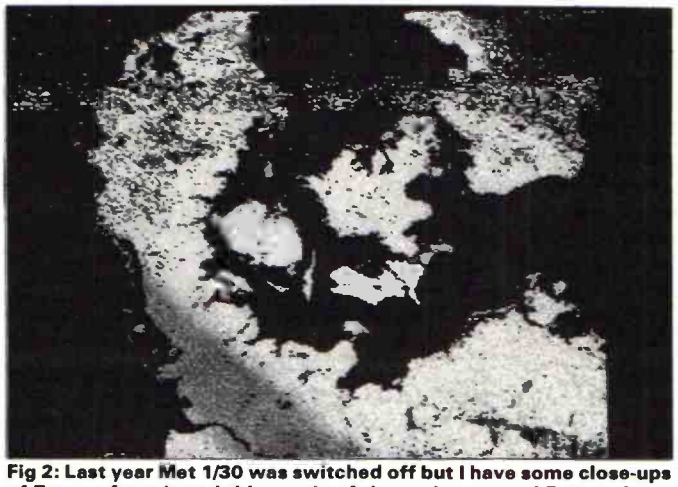

Fig 2: Last year Met 1/30 was switched off but I have some close-ups of Europe from it and this one is of the region around Denmark.

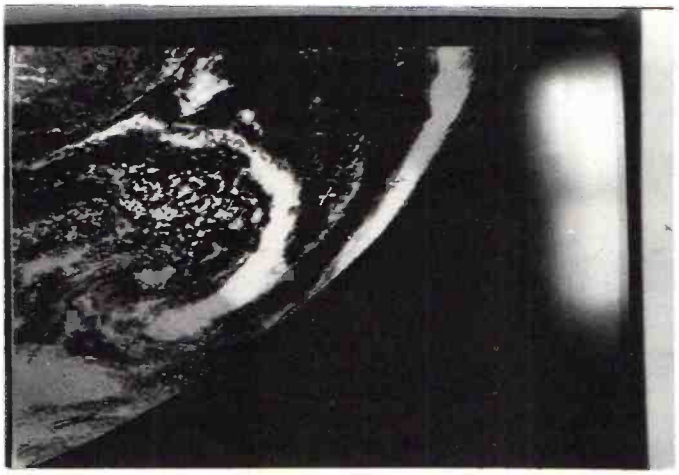

Fig 3: A more recent picture from Meteosat of a vigorous weather system near the southern tip of South Africa.

BAND II DX

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

How many times have the sudden sharp cracks of thunder static spoilt your reception of a rare piece of DX or has the content of your favourite radio or TV programme been interupted 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 and 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 this violent thunder storm 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/1.7 lens at infinity focus, knelt 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, "definately 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 Musique on 87.95MHz from Ajaccio, Corsica, plus idents 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 ident 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 66MHz band was open again around 0830 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 S1 and 9+ around 2330 on

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SEEN & HEARD

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 Merseyside. 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-openings. For instance at 2300 on July 17, I found 8 foreign voices between 87.5 and 103MHz plus Late Night West from Radio Bristol and a station announcement from BBC Radio WM. Both of these BBC stations were strong with me again at 0845 and 0710 on the 20th and 21st respectively, plus at least a dozen mixed continental voices each time.

Fig. 1

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 Pennine FM (102.5MHz) at 0800 on July 25.

"Normally for v.h.f. listening I use the radio's telescopic antenna, but recently I constructed a simple dipole from two telescopic antennas which I feed into the radio antenna socket via a coaxial cable," wrote **Leo Barr** from Sunderland. Leo uses a Matsui MR-4099 receiver and heard a variety of programmes from Denmark (Program III from Aiborg, Arhus, Olgod and Sdr.Hojrup), West Germany (DLF and NDR from Aurich) and Sweden (Program III from Sundsvall) on July 8 and West Germany (DLF and NDR Program II from Aurich) 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 driving between his home in Edinburgh and Laurencekirk and left his car radio set to a weak signal which was coming in waves. "As one would expect the signal was stronger on the highest parts of the road, but my greatest surprise was when the station clearly identified itself as West Sound," said George and added that this was coming from the Darvel transmitter (0.8kW) in Ayrshire on 96.7MHz. George also logged it on the 31st while travelling "in a valley" between Dundee and Perth.

TELEVISION

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

Back in the early 1950s most television sets were designed to receive only the BBC's transmissions on five channels in Band I. When the Independant Television Authority (ITA now IBA) began its service from Croydon in September 1955 they were allocated eight channels in Band 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 with its cover and one valve screening can removed, while other set-makers and dealers recommended a converter like the one made by EMI, 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 bring 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 ideas on the test-card on Ch. E2 with "ISR-P" on the right hand side. I have logged this test-card on three occasions, (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 loft 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, Figs. 3, 4, 5 and a music programme caption, most likely from the the USSR, Fig. 6. While Sporadic-E events were in progress, **John Woodcock** (Basingstoke) 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 1420 on July 4. Rana also received smeary 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, 8 and 9, Spain on the 6th and 8th and Scandinavia on the 9th. **Clive 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 that day I too logged that Swedish test-card, in colour, plus a variety of pictures up to Ch. R3. **Barry Bowman** (Prestwich) received his first signals from Spain (TVE1) at 1550 on July 15 and again at 1920 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 regionals Hemnes, 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 TVE 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, RAI's test card early on the 2nd and Spain on the 6th. During a very late Sporadic-E opening between 2300 and 2345 on August 10 I logged pictures and sound, possibly a concert, from an unidentified source on Chs. R1 and R2. These pictures were fading from very strong down to the noise. While in Laurencekirk at 2045 on July 22, **George Garden** (Edinburgh), using a horizontal dipole to feed his set, saw what looked like a pop concert frequently interupted by adverts around Ch. R2. However, just before one batch of adverts an ident card appeared with the word MOCKBA (Moscow) prominent and later, the caption RAVH2 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, **Edwina** and **Tony Mancini** (Belper) received captions, logos and test-cards from Czechoslovakia (CST-1 ISR-P), Hungary (MTV1), Italy (ice-skating, TGI and RAI), Norway (Hemnes, Melhus and Steigen), Poland (Domator and TVP1), Portugal (RTP1), Spain (Porla Mannana, TVE 1&2 and Telediario), Sweden (Kanal1 Sverige) Switzerland (+PTT SRG1), USSR (BPEMR) and West Germany (ARD1 and Grunten). From July 21 to

SEEN & HEARD

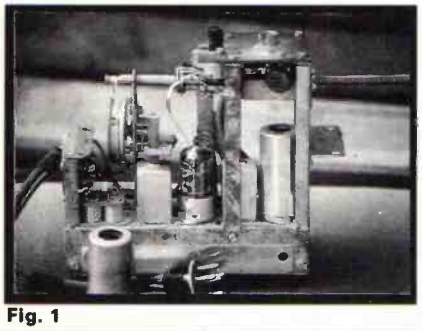

Fig. 1

Fig. 2

Fig. 3: Spain

Fig. 4: Spain

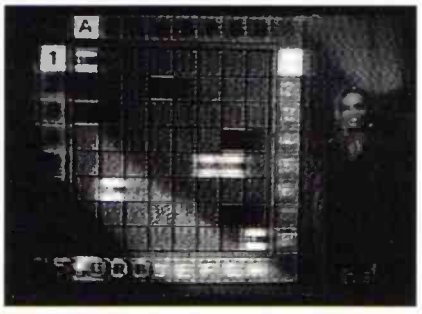

Fig. 5: Spain

Fig. 6: USSR

Fig. 7: Spain

Fig. 8: Spain

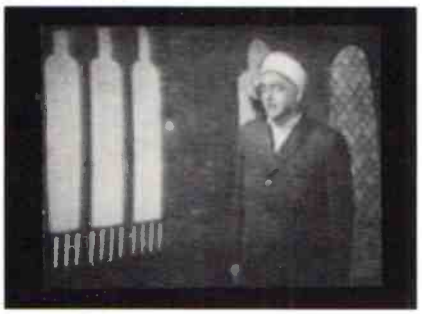

Fig. 9: Dubai

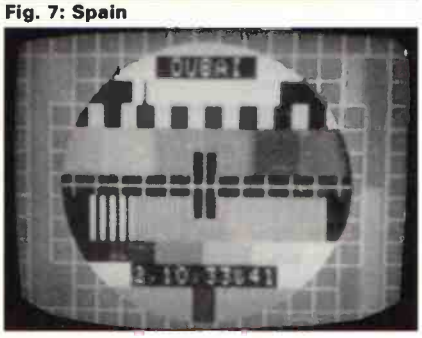

Fig. 10: Dubai

Fig. 11

Fig. 12

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 colur 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 0630 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 Danmark) 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 Clive Grey, adding, "RTE were kind enough to send me piles of information, transmitter lists, Aertel info and transmitter maps. RTE also told Clive that their Network 2 signal on Ch. 33, which swamped his reception of The Wrekin'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 prominant 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 exisiting 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","G0IOH DE OK3CKW","PSE KKKKK","RSV595" and "TNX FOR QSO", Fig.12. In Bedfordshire, **Max Wustrau G7BLH**, also using a Spectrum 48K, received pictures, on 14MHz, during contacts between G4HRB (UK) and SP7HIM (Poland), DL1NCH (Germany) and I1HJP (Italy) and DK7UD (Germany) and OK3CKW (Czechoslovakia), "CQ CQ" captions from Hungary (HA5VD), Italy (I1HJP) and Spain (EA3AJY) and a male photograph enscribed "NAME PAOLO".

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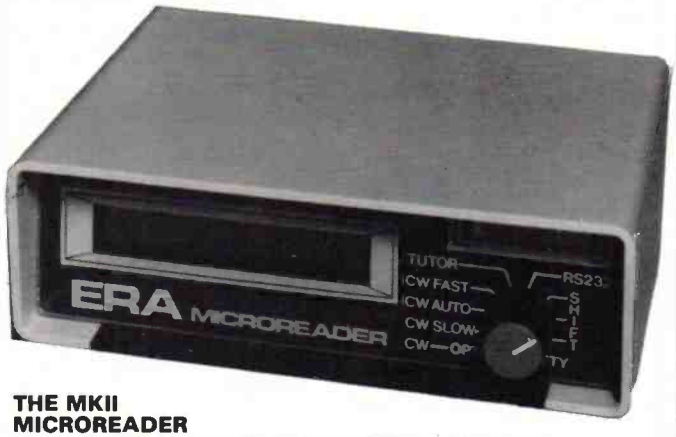

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The Microreader has all the necessary filtering and noise blanking included to allow reception even under bad conditions. This makes it suitable for use with lower cost or home made sets. Receivers such as the Lowe HF125/225 with their smooth tuning are ideal. Even the Sony 2001D with its 100Hz step size will still give very good results. A three colour bargraph tuning indicator makes precise station tuning simple, while shift indicators take the guess work out of RTTY.

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The Morse tutor can send and receive Morse. No more guessing what was sent at which speed. You see exactly what is being sent as it's sent and you may repeat it as many times as you like. The random characters are sent as ten groups of five characters with precise digital control over speed, spacing and type. Plug in a Morse key and see what your sending is really like. Even experienced CW operators find this feature extremely useful for showing up embarrassing keying faults (especially own name and callsign).

ERA Ltd. is a manufacturing facility and as such has no showroom. We do however accept personal callers who may like to find out more about the Microreader or try one on their own equipment without obligation. Due to limited parking during the week we must restrict this to Saturdays only, but please do ring us first.

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This is a good time to overhaul 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 hayard and replace it if in doubt. Examine the mast (if any) and its associated guys before raising the antenna. Don't forget to check the earth system too!

Long Wave DX

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

Surprising as it may seem, the BBC Radio 4 broadcasts on 198, shared by Burghead (50KW), Droitwich (400KW) and Westerglen (50KW), reached **Dick Moon** in George, S.Africa during the early hours of one morning! Low noise levels and excellent conditions enabled him to also hear broadcasts from France, Germany and the USSR - see chart.

The transmissions from "Atlantic 252", the new station in S.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 rating by **George 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+5dB by **Roy Patrick** in Derby, but only SIO 333 was noted in the Wirral by **Ian Bond**. Atlantic 252 welcome reports and will QSL.

MW Transatlantic DX

A marked improvement in the conditions was noted by **Mark Thompson** (Wakefield) which enabled him to add five new stations to his growing list of DX, namely CKVO, CFRB, CHUM, CKCW and CKLM. The station noted as WK*U on 1512 last month (where * appeared to be an A) has been heard again and it now seems likely that it is WKKU in Boston on 1510 (ex-WMRE). At 0100 Mark heard a Canadian station on 1200 and the DJ mentioned places in and around Ottawa. At 0145 the ident "Canadian All Hit Music Machine, Energy 1200" was heard, which may stem from CFGO.

The broadcasts from VOCM 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 Jeddah, 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 Alger, Algeria were also noted in the extensive log from **Mark Selby** in Aldershot. He rated their 600/300KW transmissions on 891 as 43343 at 2130 and on 981 as 54344 at 2235.

MW Local Radio DX

During a holiday in Saint Cast, Brittany **Bill Griffith** (London) was surprised to hear quite a number of the UK local stations during daylight. The report from **Philip Bartlett** indicates that some reach Co.Dublin quite well too!

A "Walkman" radio was used by **Ted Walden-Vincent** in Great Yarmouth to compile an impressive log for the chart! He says "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 1035 by Mark Thompson - could this be a combination of ILR 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 at 1438 by **Andy Cadier** in Folkestone; the Voice of the UAE in Abu Dhabi 25.900 (Ar 0600-1600) - SIO 444 by **John Coulter** in Winchester; also Radio For Peace Int,, Costa Rica 25.945 (Eng 1600-2400) - SIO 333 at 2100 by **Cyril Kellam** in Sheffield.

In Thumrait, Oman **Rhoderick Illman** rated the transmissions from Radio Yugoslavia, Belgrade 25.795 as 44444 at 1202; RFI via Issoudun, France 25.820 as 44433 at 1224; Radio Denmark, Copenhagen 25.850 as 44333 at 1308. In S.Africa, Dick Moon noted excellent reception of the BBC via Daventry, UK 25.750; Radio Moscow, USSR 25.780; also BRT Brussells 26.050 - all rated 55555. Radio DW Cologne, W.Germany 25.740 and RFI averaged 55454 and Radio Denmark was 34333. An improvement in the conditions was noted by **Alan Roberts** in Quebec. Radio RSA, the Voice of UAE and Radio Norway, Oslo 25.730 were audible during most days, but Radio Moscow, Radio Denmark and BRT were seldom heard. Best signal was Radio RSA at 25443.

Some of the **21MHz (13m)** broadcasts from Radio Australia have been reaching the UK although they are beamed to other areas. An information sheet received by **Edward Broadsmith** in Worcester indicates that a new service to Indonesia, Malaysia and Singapore has been established on 21.525 following recent test transmissions on that frequency. Transmission times are 0100-0900 via Carnarvon and 1300-1430 via Darwin. Their transmissions via Carnarvon have been frequently monitored around dawn by **Kenneth Reece** in Prenton and SINPO ratings ranging from 34323 to 45434 have been noted. Their transmissions via Darwin have been reaching the UK well too. In Northampton **Alan Smith** rated them as SIO 534 at 1300.

Many programmes in a variety of languages are beamed towards Europe during the day. Those noted stemmed from Radio Japan via Moyabi, Gabon 21.500 (Eng 0700-0800), rated as 44444 at 0753 by Andy Cadier; WCSN Scotts Corner, Maine 21.780 (Eng 1400-1600) - 55455 at 1400 by **Ken Whayman** in Bexleyheath; Radio Japan via Moyabi, Gabon 21.700 (Eng, Jap 1500-1700) - 54344 at 1503 by Mark Selby; Radio RSA Johannesburg, S.Africa 21.535 (Dan to Scandinavia 1730-1750) - SIO 544 at 1731 by **Jim Cash** in Swanwick; UAE Radio Dubai 21.605 (Ar, Eng 0615-1730) - SIO 333 at 1546 by **Ted Walden-Vincent**; WYFR via Okeechobee, Florida 21.615 (Eng , Ger, It 1600-1845) - 43333 at 1630 by **Sheila Hughes** in Morden; Radio RSA Johannesburg, S.Africa 21.590 (Eng 1800-1900) - 54444 at 1815 by **Chris Shorten** in Norwich; RCI Montreal, Canada 21.675 (Eng 1800-2100) - 34433 at 1830 by **Darran Taplin** in Tonbridge; Radio HCJB Quito, Ecuador 21.470 (Cz, Ger, Eng, Sw, Norw, Dan, Fr, Sp 1800-2230) - SIO 343 at 1930 by **Darren Beasley** in Bridgwater; Radio For Peace Int, Costa Rica 21.565 (Eng 1600-0000) - 25333 at 2050 by **David Wratten** in Cambridge.

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 0500-1735), noted as 43333 at 0730 by **Max Wustrau** in Bedford; Radio Finland via Pori 21.550 (Eng, Fin to USA 1100-1400) - 34443 at 1107 by **David Edwardson** in Wallsend; BRT Brussells, Belgium 21.810 (Eng to Africa 1530-1600) - SIO 455 at 1550 by **Kenneth Buck** in Edinburgh; RAI Rome 21.690 (It to USA 1700-1730) - SIO 333 at 1710 by **Philip Rambaut** in Macclesfield (see Fig.1.); WCSN Scotts Corner, Maine 21.640 (Eng, Fr, Ger to E.Africa 1800-2000) - SIO 333 at 1856 by **Julian Wood** in Buckie; RNE Madrid, Spain 21.460 (Eng, Sp to USA 1930-2315) - 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 transmission to Africa (1000-1215) as 43433 at 1115.

Long distance paths have been open in the **17MHz (16m)** band and many interesting signals have been heard. Perhaps the most remarkable report this time came from **Ron Pearce** in Bungay, who has been experimenting with a home built two transistor receiver. Listening at 0515,

Long Wave DX Chart

Freq kHz	Station	Location	Power (W)	DXer
153	DLF Donebach	Germany (W)	500	D,E,H,J,L,M,O,P,Q
153	Ufa	USSR	500	I*
162	Allouis	France	2000	D,H,I*,J,L,M,O,P,Q
171	Medi 1-Nador	Morocco	2000	L*
171	Kaliningrad	USSR	1000	L,P*
171	Moscow	USSR	500	O*
177	Oranienburg	Germany (E)	750	H,J,L,M,O,P*,Q
183	Saarlouis	Germany (W)	2000	D,H,I*,J,L,M,O,P,Q
189	Motala	Sweden	300	H,L*,O*,P*
198	BBC Droitwich	UK	400	D,H,I*,L,M,O,P,Q
207	DLF Munich	Germany (W)	500	D,H,J,L,O*,P*,Q
207	Azilal	Morocco	800	L*
207	Kiev	Ukraine	500	N
216	Roumoules	Monaco	1400	D,H,J,L,M,O,P,Q
216	Oslo	Norway	200	N*,P*
225	Konstantinow	Poland	2000	H,L,M,O*,P*
234	Junglinster	Luxembourg	2000	D,H,J,L,M,O,P,Q
234	Kishinev	USSR	1000	L*,P*
245	Kalundborg	Denmark	300	A,D,H,J,L,M,O,P,Q
254	Tipaza	Algeria	1500	H,J,L,O*,P*
254	Lahti	Finland	200	L*
254	Atlantic 252	S.Ireland	500	B,C,F,G,H,J,K,L,P
263	Burg (R.Volga)	Germany (E)	200	L,N*,O,P
263	Moscow	USSR	2000	H,J,Q
272	Topolna	Czechoslovakia	1500	H,J,L*,O*,P
281	Minsk	USSR	500	L*,N*

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

DXers:
A: Leo Barr, Sunderland.
B: Ian Bond, Wirral.
C: Simon Hamer, New Radnor.
D: Phil Hexter, Pontypridd.
E: Roy Hill, West Kilbride.
F: Simon Holland, Douglas, I.O.M.
G: Andrew Hyland, Darlington.
H: George Millmore, Wootton, I.O.W.
I: Dick Moon, George, S.Africa.
J: Fred Pallant, Storrington.
K: Roy Patrick, Derby.
L: Philip Rambaut, Macclesfield.
M: Mark Selby, Aldershot.
N: Tim Shirley, Bristol.
O: Phil Townsend, London.
P: Neil Wheatley, Lytham St.Annes.
Q: Max Wustrau, Bedford.

Local Radio DX Chart

Freq kHz	Station	ILR BBC	Power (kW)	DXer
585	R. Solway	B	2.00	I,J,K,M,O,R
603	Invicta Snd(Coast)	I	0.10	G*,H,N,O,P,S,T
603	R. Gloucester	B	0.10	E*,H,O,S,T
630	R. Bedfordshire	B	0.20	L,N,O,P,T
630	R. Cornwall	B	2.00	H
657	R. Clwyd	B	2.00	F,H,N,O,R,S,T
666	DevonAir R	I	0.34	D,E*,F,S,T
666	R. York	B	0.80	G,I,J,K,N,O,R,S,T
729	BBC Essex	B	0.20	F,L,N,O,P,S,T
738	Hereford/Worcester	B	0.037	E*,O,S,T
756	R. Cumbria	B	1.00	G,K,O,R
756	R. Shropshire	B	0.63	C,H,O,R,S,T
765	BBC Essex	B	0.50	H,L,M,N,O,P,S,T
774	R. Kent	B	0.70	H,L,N,P,S,T
774	R. Leeds	B	0.50	G,K,O,R
774	Severn Sound	I	0.14	E*,O
792	Chiltern R	I	0.27	F,H,N,O,P,T
792	R. Foyle	B	1.00	K
801	R.Devon	B	2.00	A*,O,E*,H,N,O,T
819	Hereford/Worcester	B	0.037	A,E*,O
828	2CR	I	0.27	O,H
828	R. WM	B	0.20	O
828	R. Aire	I	0.12	A,G,O,R
828	Chiltern R	I	0.20	E*,F,L,N,P,T
837	R. Cumbria	B	1.50	O,R
837	R. Leicester	B	0.45	E*,F,H,L,N,O,P,T
855	R. Oevon	B	1.00	O,H
855	R. Lancashire	B	1.50	C,J,K*,O,R
855	R. Norfolk	B	1.50	F,K,L,N,O,P,S,T
873	R. Norfolk	B	0.30	F,H,L,N,O,P,S,T
936	GWR (Brunel R.)	I	0.18	E*,F,H,N,O,S,T
945	R.Trent (GEM-AM)	I	0.20	F,K*,N,O,R,S,T
954	OevonAir R	I	0.32	D,H,N,O,T
954	R. Wyvern	I	0.16	E*,O,S,T
990	R. Aberdeen	B	1.00	I,K
990	Beacon R. (WABC)	I	0.09	M*,O,T
990	R. Devon	B	1.00	E*,F,H,N
990	Hallam R	I	0.25	O,T
999	Red Rose R	I	0.80	A,C,G,K*,O,R
999	R. Solent	B	1.00	D,F,H,L,N,S,T
999	R.Trent (GEM-AM)	I	0.25	O,S,T
1026	R. Cambridgeshire	B	0.50	F,L,N,O,P,S,T
1026	Downtown R	I	1.70	K,R
1026	R. Jersey	B	1.00	D,F,H,L,N
1035	R. Kent	B	0.50	H,L,M,N,P,S,T
1035	NorthSound R	I	0.78	A,I,K
1035	R. Sheffield	B	1.00	O
1107	Moray Firth R	I	1.50	A,K
1107	R. Northampton	B	0.50	F,H,L,N,O,S,T
1116	R. Derby	B	1.20	O,S,T
1116	R. Guernsey	B	0.50	D,F,H,L,N
1152	R. Broadland	I	0.83	O,Q,T
1152	R. Clyde	I	3.60	I,K
1152	LBC	I	23.50	H,L,N,P,S
1152	Metro R. (GNR)	I	1.80	G,I
1152	Piccadilly R	I	1.50	C,O,R
1161	R. Bedfordshire	B	0.10	J,T
1161	GWR (Brunel R.)	I	0.16	H
1161	R. Sussex	B	1.00	H,L,N
1161	R. Tay	I	1.40	A,I,K,O*
1161	Viking Gold	I	0.35	O,Q
1170	R. Orwell	I	0.28	N,T
1170	Signal R	I	0.20	C,R
1170	Swansea Sound	I	0.58	E*
1170	TFM Radio (GNR)	I	0.32	O
1170	Ocean Sound	I	0.12	O,H,L,N,O*
1242	Invicta Sound(Coast)	I	0.32	H,K*,L,N,O,P,S,T
1251	Saxon R	I	0.76	H,J,N,O,Q,S,T
1260	GWR (Brunel R.)	I	1.60	E*,F,H
1260	Marcher Sound	I	0.64	C,R
1260	Leicester (GEM-AM)	I	0.29	N,O,S,T
1260	R. York	B	0.50	K,O
1278	Pennine R	I	0.43	G,H,O
1305	R. Hallam	I	0.15	G,K*,O,T
1305	Red Dragon R	I	0.20	E*,F,H,K*
1323	R. Bristol	B	0.63	E*,K*,O,T
1323	Southern Sound	I	0.50	F,H,L,N,O,P,S,T
1332	Hereward R	I	0.60	H,K*,N,O,S,T
1332	Wiltshire Sound	B	?	F
1359	Essex R	I	0.28	F,N,O,P,S,T
1359	Mercia Snd(Xtra-AM)	I	0.27	O,S,T
1359	Red Oragon R	I	0.20	E*
1359	R. Solent	B	0.85	O,H
1368	R. Lincolnshire	B	2.00	O,Q,T
1368	R. Sussex	B	0.50	H,L,N,S
1368	Wiltshire Sound	B	?	S
1431	Essex Radio	I	0.35	F,N,O,P,S,T
1431	Radio 210	I	0.14	H,L
1449	R. Cambridgeshire	B	0.15	H,N,O,S,T
1458	R. Devon	B	2.00	H
1458	GLR	B	50.00	H,K*,L,N,P,S,T
1458	R. Newcastle	B	2.00	G,K,O
1458	GMR	B	5.00	C,K*,O,R
1458	Radio WM	B	5.00	E*
1476	County Sound Gold	I	0.50	H,J,K*,L,N,O,S,T
1485	R. Humberside	B	1.00	O,Q,T
1485	R. Merseyside	B	1.20	B,C,R
1485	R. Oxford	B	0.50	L,S,T
1485	R. Sussex	B	1.00	O,H,N
1503	R. Stoke-on-Trent	B	1.00	C,H,O,R,T
1521	R. Mercury	I	0.64	H,L,N,S,T
1521	R. Nottingham	B	0.50	O,T
1530	R. Essex	B	0.15	H,P,T
1530	Pennine R	I	0.74	B,O,R
1530	R. Wyvern	I	0.52	E*,O
1548	R. Bristol	B	5.00	E*,H
1548	Capital Gold	I	97.50	H,L,O*,S,T
1548	R. City	I	4.40	B,C,N,R
1548	R. Cleveland	B	1.00	O
1548	R. Forth	I	2.20	K
1548	R. Hallam	I	0.74	G,O
1557	R. Lancashire	B	0.25	B,O,R
1557	Chiltern R	I	0.76	K*,O,T
1557	Ocean Sound	I	0.50	D,H,N
1584	R. Nottingham	B	1.00	H,O,T
1584	R. Shropshire	B	0.50	O
1584	R. Tay	I	0.21	K
1602	R. Kent	B	0.25	H,L,N,O,P,T

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

DXers:
A: Leo Barr, Sunderland.
B: Philip Bartlett, Co.Dublin.
C: Scott Caldwell, Warrington.
D: Bill Griffith, Saint Cast, Brittany.
E: Phil Hexter, Pontypridd.
F: Sheila Hughes, Morden.
G: Andrew Hyland, Darlington.
H: David Middlemiss, Eyemouth.
I: Ike O'Doom, Aberdeen.
J: Roy Patrick, Derby.
K: Stewart Russell, Forfar.
L: Mark Selby, Aldershot.
M: Tim Shirley, Bristol.
N: Darran Taplin, Tonbridge.
O: Mark Thompson, Wakefield.
P: Phil Townsend, London.
Q: Ted Walden-Vincent, Great Yarmouth.
R: Neil Wheatley, Lytham St.Annes.
S: Louis Whitfield, Luton.
T: David Wratten, Cambridge.

he picked up the broadcasts to Pacific areas from Radio New Zealand in Wellington on 17.705 (Eng 2345-0145; 0145-0330*; 0330-0730; *Sat/Sun only) and rated them as SIO 333.

Some of the 16m broadcasts from Radio Australia have also been reaching our shores. Their transmission to C.Pacific area and W.USA via Shepparton 17.795 (Eng 2200-0800) was rated as 24542 at 0333 by David Edwardson. Particularly good reception of their transmission to S.Asia via Carnarvon 17.715 (Eng 0100-0915) was noted by Chris Shorten - their signal being a remarkable 44444 at 0545.

Quite a number of the broadcasts to other areas were also logged including Radio Japan via Yamata 17.765 (Eng to Asia 0300-0400), noted as 34443 at 0329 by Kenneth Reece; WSHB Cypress Creek, USA 17.855 (Eng, Sp to Pacific areas 0800-1000) - SIO 322 at 0800 by Alan Smith; Africa No.1, Gabon 17.630 (Fr to W.Africa 0900-1600) - 43333 at 0900 by Sheila Hughes; AIR via Delhi, India 17.387 (Eng to E.Asia 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, Rome 17.870 (to Asia, Pacific 1430-1510) - 32322 at 1507 by Andy Cadier; Radio Sweden, Stockholm 17.880 (Sw, Fr, Eng to USA 1430-1600) - SIO 333 at 1549 by Jim Cash; Radio Peace and Progress, USSR 17.595 (Eng to Africa 1630-1700) - SIO 333 by Philip Rambaut; RCI via Sackville, Canada 17.820 (Eng, Fr to Africa 1800-1930) - SIO 444 at 1815 by John Coulter; Voice of Israel, Jerusalem 17.630 (Eng to Africa 1900-1930) - 35433 at 1926 by **Richard Radford-Reynolds**; BBC via Limassol, Cyprus 17.755 (Eng to S.Europe, N.Africa 2000-2300) - SIO 222 at 2047 by Julian Wood; KVOH Rancho Simi, California 17.775 (Sp, Eng to C.America 1200-0100) - 24422 at 2106 by John Nash.

Also detailed were some of the many broadcasts to Europe: Radio Bucharest, Romania 17.850 (Fr, Eng 1130-1356), rated as 44444 at 1152 by **Graham Johnson** in Nuneaton; UAE Radio Dubai 17.775 (Eng 1330-1400) - SIO 433 at 1330 by Kenneth Buck; Radio Surinam Int. via RNB in Brazil 17.755 (Eng 1700-1750) - 33422 at 1700 by Mark Selby; also logged as 33433 at 1736 by Rhoderick Illman in Oman; Radio HCJB Quito, Ecuador 17.790 (Cz, Ger, Sw, Norw, Da, Fr, Eng, Sp 1800-2230) - 33333 at 2130 by **Eddie McKeown** in Co.Down; Voice of Israel, Jerusalem 17.630 Eng 2130-2200), heard by **Francis Hearne** in Bristol; VOFC Taiwan via Okeechobee, Florida 17.612 (Ger, Eng 2100-2300) - 44444 at 2231 by **Leo Barr** in Sunderland; Radio Moscow, USSR 17.655 (Eng to Australia, New Zealand 2100-0000) - 43333 at 2335 by **Garry Judd** in Ware.

Some of the **15MHz (19m)** broadcasts from Radio Australia have been reaching the UK at remarkable strength despite the fact that they are intended for other areas. Their transmissions to C.Pacific area via Shepparton 15.160 (Eng 2100-0700) have been particularly well received here - the 44444 rating noted at 2205 by Richard Radford-Reynolds being typical. Cricket commentaries are broadcast to Asia on 15.245 between 1530 and 1830 during play days and they have also been reaching the UK well. Mark Selby rated their transmission as 43334 at 1613. Potent signals have also been noted here during their transmissions to C.Pacific via Shepparton 15.240 (Eng 2100-0730). Sheila Hughes rated them as 44444 at 0700.

Many of the 19m broadcasts can be received well outside their intended target area. Some examples being Radio Japan via Yamata 15.195 (Eng to USA 0300-0330), rated as 43333 at 0300 by Chris Shorten; also on 15.270 (Eng, Jap to Australia 0500-1000) - 23332 at 0503 by Kenneth Reece; BBC via Kranji, Singapore 15.360 (Eng to E.Asia, Australia 0600-1130) - SIO 333 at 0615 by Alan Smith; Radio Moscow, USSR 15.595 (Eng to S.E.Asia 0900-1100) - 54444 at 1000 by Ken Whayman; Radio Finland via Pori 15.400 (Eng, Fin, Sw to USA 1100-1400) - SIO 222 at 1200 by John Sadler; Radio Korea, Seoul 15.575 (Eng, Kor to USA 1400-1600) - 42333 at 1415 by Max Wustrau; RBI via Nauen, GDR 15.240 (Eng to Asia 1445-1530) - 44433 at 1448 by Rhoderick Illman; Africa No.1., Moyabi, Gabon 15.475 (Fr, Eng to W.Africa 1700-2100) - 45444 by Roy Patrick; BBC via Limassol, Cyprus 15.310 (Eng to India, Sri Lanka 0900-1830) - SIO 322 at 1755 by Philip Rambaut; KUSW Salt Lake City, USA 15.650 (Eng to Alaska, Greenland 1600-2200) - 34433 at 1800 by Darran Taplin; BBC via Ascension Island 15.400 (Eng to Africa 1500-2300) - SIO 333 at 2015 by Ted Walden-Vincent; Radio RSA Johannesburg, S.Africa 15.365 (Eng to Africa, Middle East 1900-2000) - 45554 at 1910 by **John Parry** in Northwich; Radio Sophia, Bulgaria 15.370 (Sp, Port to C.America 2200-0200) - 43212 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. Those noted stemmed from UAE Radio Dubai 15.435 (Ar, Eng 0615-1645), rated as SIO 443 at 1330 by Kenneth Buck; RNB Brasilia, Brazil 15.265 (Eng, Ger 1800-1950) - SIO 333 at 1830 by Cyril Kellam; VOIRI Tehran, Iran 15.084 (Sp, Ar, Tur, Fr, Far 24hrs) - SIO 444 at 1421 by John Coulter; Voice of Vietnam, Hanoi 15.010 (Eng, Russ, Viet, Fr, Sp 1600-2130), heard at 2030 by **Scott Caldwell** in Warrington; Radio Damascus, Syria 15.095 (Ger, Fr, Eng 1805-2105) - SIO 333 at 2016 by Julian Wood; WWCR Nashville, USA 15.690 (Eng 1700-0200) - SIO 333 at 2025 by **Alf Gray** in Birmingham; WINB Red Lion, USA

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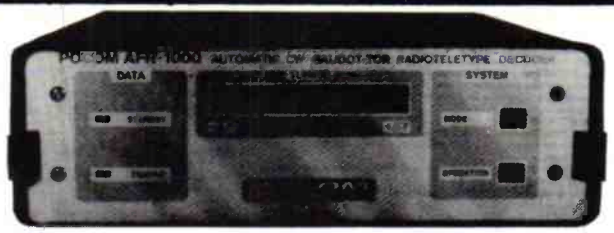

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Access

SEEN & HEARD

Tropical Band Chart

Freq kHz	Station	Country	UTC	DXer	Freq kHz	Station	Country	UTC	DXer
2.350	Sariwon/Hwanghae	Korea	0243	J	4.850	R.Tashkent	USSR	2353	J
2.415	PBS Zhejiang,Wenzhou	China	0053	J	4.865	PBS Lanzhou	China	2101	C,D
2.420	R.Sao Carlos	Brazil	0130	L	4.865	V of Cinaruco	Colombia	0318	C,G,J
3.200	TWR	Swaziland	2330	L	4.865	R.Mozambique	Mozambique	2110	H
3.210	R.Mozambique	Mozambique	0348	J	4.875	R.Tbilisi	USSR	0131	J
3.215	R.Orange	S.Africa	0240	C,J,L	4.880	SABC Radio 5	S.Africa	1925	H,I,J,N
3.220	R.HCJB Quito	Ecuador	0248	J	4.885	Em.Reg.Zaire	Angola	0515	J
3.225	RRI Tanjung Pinang	Indonesia	?	F	4.885	Voice of Kenya	Kenya	1940	C
3.230	ELWA Monrovia	Liberia	2055	H	4.890	RFI Paris	via Gabon	0411	J
3.240	TWR	Swaziland	0337	J	4.890	ORTS Dakar	Senegal	0400	J
3.250	RRI Banjamarsin	Indonesia	?	F	4.895	R.Bare, Manaus	Brazil	0415	J
3.255	BBC via Maseru	Lesotho	0340	J	4.895	Voz del Rio Arauca	Colombia	0137	C,J
3.270	SWABC 1, Namibia	S.W.Africa	0422	J,L	4.895	R.Ashkabad	USSR	2040	H
3.300	R.Cultural	Guatemala	0342	C,J	4.895	R.Moscow (Tyumen)	USSR	0030	J
3.330	R.Kigali	Rwanda	1950	C	4.900	SLBC Colombo	Sri Lanka	?	F
3.365	GBC Radio 2	Ghana	2145	B,H	4.905	R.Relogio, Rio	Brazil	0231	J
3.395	RRI Tanjungkarang	Indonesia	?	F	4.905	R.Nat.N'djamena	Chad	2040	H,J
3.915	BBC Kranji	Singapore	2249	B,F,I	4.910	R.Zambia, Lusaka	Zambia	2040	H
3.935	RRI Semarang	Indonesia	?	F	4.915	R.Ghana, Accra	Ghana	2005	B,D,H
3.955	BBC Daventry	England	2025	B,D,N	4.915	Voice of Kenya	Kenya	1940	H,J,N
3.965	RFI Paris	France	1754	B,N,P	4.920	R.Quito	Ecuador	0349	G,J
3.975	RRI Surabaya	Indonesia	?	F	4.920	R.Moscow B, Yakutsk	USSR	2040	H
3.980	R.Pakistan	Islamabad	1740	P	4.930	R.Moscow, Tbilisi	USSR	0135	J
3.980	VOA Munich	W.Germany	2136	B	4.935	Voice of Kenya	Kenya	2000	B,C,D,E,H,J,M,P
3.985	R.Beijing, China	via SRI Berne	2100	A,B,D,K,M	4.940	R.Kiev	USSR	2040	B,D,H,J,P
3.985	SRI Berne	Switzerland	1728	N,P	4.940	R.Moscow, Yakutsk	USSR	2145	K
3.990	BBC London	via Cyprus	2132	B	4.940	R.Continental,Barinas	Venezuela	0351	J
4.010	R.Frunze	USSR	2339	J	4.945	Caracol, Neiva	Colombia	0422	J
4.050	R. Frunze	USSR	2341	J	4.955	R.Cultura, Campos	Brazil	0334	J
4.080	R.Ulan Bator	Mongolia	2345	L	4.955	R.Marajoara, Belem	Brazil	0300	G
4.500	Xinjiang	China	2200	C,K	4.958	R.Baku	USSR	2040	H
4.735	Xinjiang	China	2207	C,K	4.965	SWABC Windhoek	S.W.Africa	0440	J
4.755	Caracol Neiva	Columbia	0530	L	4.970	R.Rumbos, Caracas	Venezuela	0357	C,J,P
4.760	ELWA Monrovia	Liberia	2000	D	4.975	R.Uganda, Kampala	Uganda	2010	B,C,D,H
4.765	R.Moscow	via Cuba	0450	J	4.980	Azad Kashmir R	Pakistan	?	F
4.770	FRCN Kaduna	Nigeria	1850	H,J	4.985	R.Brazil Central	Brazil	0431	B,C,J
4.775	RRI Jakarta	Indonesia	?	F	4.990	R.Bahai	Ecuador	0005	J
4.785	R.Baku	USSR	2050	H,J	4.990	AIR New Delhi	India	0010	J
4.790	R.Atlantida	Peru	0310	C,G,J	4.990	FRCN Lagos	Nigeria	1910	A,B,H,J
4.800	LNBS Lesotho	Maseru	1953	H	5.005	R.Nacional, Bata	Eq.Guinea	2040	D,H,K
4.805	R.Nac.Amazonas	Brazil	2234	C	5.010	PBS Nanning	China	2110	H
4.810	R.Yerevan	USSR	0118	J	5.015	R.Brazil Tropical	Brazil	0425	J
4.815	R.diff TV Burkina	Ouagadougou	2030	H,J,P	5.015	R.Moscow Arkhangelsk	USSR	2110	D
4.820	E.Prov.Huila	Angola	0406	J	5.015	R.Moscow Vladivostok	USSR	2040	H
4.820	R.Botswana	Botswana	0440	J	5.020	ORTN Niamey	Niger	2050	G
4.820	La Voz Evangelica	Honduras	0256	G,J	5.025	R.Rebelde, Habana	Cuba	0230	L
4.820	Khanty-Mansiysk	USSR	0018	J	5.025	R.Uganda, Kampala	Uganda	1825	H
4.825	R.Cancao Nova	Brazil	0255	G,J	5.030	R.Impacto	Costa Rica	0505	C,J,L
4.825	R.Ashkhabad	USSR	2352	J	5.035	R.Bangui	C.Africa	2040	D,H,J
4.825	R.Moscow Yakutsk	USSR	2050	H	5.035	R.Alma Ata	USSR	2240	C
4.830	Gaborone	Botswana	2050	H,J	5.040	Vos del Upano, Macas	Ecuador	0149	J
4.830	R.Tachira	Venezuela	0301	C,G,J	5.040	R.Tbilisi	USSR	1830	H,J
4.835	R.Atalaia	Brazil	0128	J	5.044	R.Impacto	Costa Rica	0245	G,J
4.835	RTM Bamako	Mali	2040	B,C,H,J,K	5.045	R.Cultura do Para	Brazil	0307	G,J
4.840	R.Valera, Trujillo	Venezuela	0346	G	5.045	R.Togo, Lome	Togo	2020	D,G,H,J
4.840	R.Bukavu	Zaire	2215	K	5.050	R.Tanzania	Tanzania	1835	H
4.845	R.Fides, La Paz	Bolivia	0535	J	5.055	Faro del Caribe	Costa Rica	0315	L
4.845	ORTM Nouakchott	Mauritania	2040	H,J	5.055	RFO Cayenne(Matoury)	French Guiana	0457	J
4.850	R.Yaounde	Cameroon	2040	C,D,H,J	5.057	R.Tirana Gjirokaster	Albania	2100	D,J,O,P
4.850	AIR Kohima	India	0055	J	5.075	Caracol Neiva	Colombia	0445	C,G,J,L

DXers:
A: Andy Cadier, Folkestone.
B: Jim Cash, Swanwick.
C: David Edwardson, Wallsend.
D: Sheila Hughes, Morden.
E: Rhoderick Illman, Thumrait, Oman.
F: Dick Moon, George, South Africa.
G: John Nash, Brighton.
H: Fred Pallant, Storrington.
J: Kenneth Reece, Prenton.
K: Mark Selby, Aldershot.
L: Tim Shirley, Bristol.
M: Chris Shorten, Norwich.
N: Darran Taplin, Tonbridge.
O: Ted Walden-Vincent, Gt.Yarmouth.
P: Max Wustrau, Bedford.
I: Richard Radford-Reynolds, Guildford.

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

Broadcasters using the **13MHz (22m)** band include WSHB Cypress Creek, USA 13.760 (Eng to C.America 0200-0600), rated as SIO 544 at 0544 by Alan Smith; Radio Jordan, Amman 13.655 (Eng to Europe 0530-1315) - 44444 at 0730 by Sheila Hughes; Radio Austria via Moosbrun 13.730 (Ger, Fr, Eng, Sp to Europe 0400-1700) - 54544 at 0830 by John Sadler; SRI via Schwarzenburg, Switzerland 13.635 (Eng, Fr, Ger, It to E.Asia 1045-1300) - SIO 444 at 1100 by Alf Gray; Radio Moscow, USSR 13.710 (Eng to ?) - 23333 at 1203 by Leo Barr; Radio Nederlands via Flevo 13.770 (Eng to S.Asia 1430-1525) - 32233 at 1448 by Mark Selby; Radio Pakistan, Karachi 13.665 (Ur to Middle East 1315-1545; Eng 1600-1615) - SIO 333 at 1602 by Kenneth Buck; WHRI South Bend, USA 13.760 (Eng to Alaska, Greenland, W.Europe 1700-0000) - 33433 at 1928 by Darran Taplin; Radio DW via Wertachtal, W.Germany 13.790 (Eng to W.Africa 1900-1950) - SIO 444 at 1944 by Jim Cash; Radio Baghdad, Iraq 13.660 (Fr, Ger, Eng to Europe 1800-2200) - 44444 at 2050 by Eddie McKeown; WYFR via Okeechobee, Florida 13.695 (Fr. Eng to E.USA 1200-2245) - SIO 222 at 2130 by Philip Rambaut; WRNO New Orleans, USA 13.720 (Eng to USA, C.America, Europe 2100-0000) - 34333 at 2200 by David Wratten; Voice of the UAE in Abu Dhabi 13.605 (Eng 2200-0000) - 54444 at 2215 by Chris Shorten.

The **11MHz (25m)** broadcasts to Europe from Radio Australia via Shepparton 11.910 (Eng 0400-0630) have been received well in the UK during most mornings. Listening at 0615 Darren Beasley rated their signal as SIO 433. Many other broadcasters beam their programmes to Europe during the day and some were noted in the reports: WYFR via Okeechobee, Florida 11.580 (Ger, Eng, It, Fr, Sp 0400-0630), rated as 55434 at 0559 by Mark Selby; Radio HCJB Quito, Ecuador 11.835 (Ger, Fr 0600-0700) - 53444 at 0613 by Max Wustrau; SRI via Beromunster, Switzerland 12.303 (Fr, Ger, It, Eng 1000-1230) - 34343 at 1157 by Leo Barr; RTV Sfax, Tunisia 11.550 (Ar 0600-1800) - SIO 444 at 1254 by John Coulter; Voice of Greece via Kavala 11.645 (Gr, Eng, Sw to N.Europe, USA 1500-1550) - 44545 at 1530 by John Nash; UAE Radio Dubai 11.790 (Eng, Ar 1630-?) - SIO 454 at 1630 by Kenneth Buck; Radio Kuwait, Sulaibiyah 11.665 (Eng 1800-2100) - 53333 at 1820 by Chris Shorten; Radio Portugal, Lisbon 11.740 (Port, Eng, Fr, It 1700-2130) - 43433 at 1910 by Darran Taplin; Radio Budapest, Hungary 11.910 (Hung, Eng, Ger 1900-2200) - SIO 333 at 2000 by Ted Walden-Vincent; Radio Beijing, China 11.500 (Eng 2000-2215) - SIO 433 at 2052 by **Phil Hexter** in Pontypridd; Radio Japan via Moyabi, Gabon 11.800 (Eng, Jap 2100-0000) - 32433 at 2115 by Richard Radford-Reynolds; AIR via Aligarh, India 11.620 (Eng 1845-2230), heard at 2200 by Francis Hearne; Radio Habana, Cuba 11.705 (Eng to Europe, Africa, Middle East 2200-2300) - SIO 433 at 2235 by Alf Gray.

A variety of languages are used during broadcasts to other 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; RBI via Nauen, GDR 11.890 (Ger, Eng to E.USA, E.Canada 0830-0930) - 44444 at 0923 by Garry Judd; FEBC Manila, Philippines 11.850 (Eng to S.Asia 1300-1600) - 44444 at 1415 by Rhoderick Illman; BBC via Kranji, Singapore 11.750 (Eng 0900-1615) - SIO 212 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) - SIO 222 at 1627 by Julian Wood; SLBC Colombo, Sri Lanka 11.800 (Si, Eng, Ur to Middle East 1645-?) - SIO 332 at 1900 by Jim Cash; SRI via Schwarzenburg, Switzerland 11.955 (Ar, Eng, Ger, Fr to Africa 1715-2000), heard at 1940 by John Sadler; Voice of Israel, Jerusalem 11.605 (Eng to USA 0000-0030) - 32243 at 0001 by Philip Bartlett; Radio Habana, Cuba 11.810 (Eng to USA 0000-0600) - 43443 at 0002 by David Wratten; RCI via Sackville, Canada 11.845 (Sp, Port, Eng to S.America 0030-0300) - 33433 at 0220 by Kenneth Reece.

Radio Australia beam their programmes to Europe in the **9MHz (31m)** band 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,

Equipment used

Leo Barr: Matsui MR-4099 + s.w. loop.
Philip Bartlett: Eddystone EC10 + random wire.
Darren Beasley: Steepletone MBR-7 + 20m random wire.
Ian Bond: Sony ICF-2001D + 5m wire.
Kenneth Buck: Home-built superhet + random wire.
Andy Cadier: Saisho S-500 + 40m random wire.
Scott Caldwell: Toshiba RT-SX1 + random wire.
Derek Carter: Matsui MR-4099 + randon wire.
Jim Cash: Sony ICF-2001D.
John Coulter: Yaesu FRG-7 + random wire.
David Edwardson: Trio R-600 + trap dipole 22m long.
Alf Gray: Codar Mkll + pre-selector + a.t.u. ex-army rod antenna.
Bill Griffiths: Sony ICF-2002.
Francis Hearne: Vega Selena B210 + built-in whip.
Phil Hexter: Lowe HF-125 + 30m random wire.
Sheila Hughes: Panasonic DR48 + 15m inverted L or Vega 206 portable.
Andrew Hyland: Stella ST-2400 + 25m random wire.
Rhoderick Illman: Sony ICF-7600DS + 23m random wire.
Graham Johnson: Panasonic DR-49.
Garry Judd: Saisho SW-2000 + built-in whip.
Cyril Kellam: Sony ICF-7600DS + AN-1 or 5m vertical wire.
Eddie McKeown: Tatung TMR-7602 portable + built-in whip.
George Millmore: Tatung TMR-7602 portable or Racal RA17L + loop.
John Nash: Kenwood R-5000 + random wire.
Ike O'Doom: Hatachi TRK-8200E.
Fred Pallant: Trio R-2000 + random wire in loft.
John Parry: Realistic DX-400 + 33m wire.
Roy Patrick: Lowe HF-125 + 20m wire.
Ron Pearce: Home-built 2-transistor RX.
Richard Radford-Reynolds; Sangean ATS-803A + 15m vertical wire.
Philip Rambaut: Int.Marine Radio R-700M + random wire.
Kenneth Reece: Icom R-9000 + delta loop.
John Sadler: DX-400 + SW loop.
Mark Selby: Panasonic RFB-40 + 60m random wire.
Tim Shirley: Trio R-600 + random wire.
Alan Smith: Matsui MR-4099.
Darran Taplin: Eddystone 680X + 6m wire with Global ATU.
Mark Thompson: JRC NRD-525 + 1m loop or 20m random wire.
Phil Townsend: Panasonic RF-1680L portable or Lowe SRX-30 + random wire.
Ted Walden-Vincent: Toshiba RT-VS3 Walkman Radio.
Ken Whayman: Panasonic RF-2200 + 10m dipole.
Neil Wheatley: Sangean ATS-803 + built-in antenna.
Louis Whitfield: Home-built Howes TRF3 + 6m random wire.
Julian Wood: Trio R-2000 + 19m random wire.
David Wratten: Trio R-2000 + 30m random wire.
Max Wustrau: Datong PC-1 convertor + FDK-750 144MHz transceiver.

SEEN & HEARD

Medium Wave DX Chart

Freq kHz	Station	Country	Power (kW)	DXer
520	Hof-Saale	Germany (W)	0.2	M*
531	Leipzig	Germany (E)	100	D*
540	BRT-2 Wavre	Belgium	150/50	I,L,P
549	DLF Beyreuth	Germany (W)	200	D*,L*,P
567	RTE-1 Tullamore	S.Ireland	500	C,D*,G,I,K,M,N,P
567	Volgograd	USSR	250	L*
576	R.DDR Schwerin	Germany (E)	250	K*
576	Stuttgart	Germany (W)	300	D*,L*,N
585	Orf Wien	Austria	600	K*,L
585	FIP Paris	France	8	I,N,P
585	RNE-1 Madrid	Spain	200	G*,H*
594	HRF Frankfurt	Germany (W)	400	D*,K*,L*,N
603	BBC-R4 Newcastle	UK	2	F,K
612	RTE-2 Athlone	S.Ireland	100	C,D*,J*,K,L*,N,O
621	RTBF-1 Wavre	Belgium	300	I,K*,L,P
630	Vigra	Norway	100	M*
648	BBC Orfordness	UK	500	G,I,K,L,P
657	BBC-Wales Wrexham	UK	2	C
666	Bodenseesender	Germany (W)	300/180	D*,K*,L*,N
675	Hilversum-3 Lopic	Holland	120	G,I,L,P
711	Rennes 1	France	300	I,L*
720	BBC-R4 Lisnagarvey	N.Ireland	10	K
720	BBC-R4 Lots Rd London	UK	0.5	I,L
729	RTE-1 Cork	S.Ireland	10	D
738	Paris	France	4	I,L*
738	Poznan	Poland	300	G*
738	RNE-1 Barcelona	Spain	250	G*,L*
747	Hilversum-2 Flevo	Holland	400	I,L,P
756	Brunswick	Germany (W)	800/200	I,L
765	Sottens	Switzerland	500	L*
774	BBC-R4 Enniskillen	N.Ireland	1	F
783	Burg	Germany (E)	1000	G*,L*
801	BRF via Munich	Germany (W)	420	L*
810	BBC-Scot.Westerglen	UK	100	F*,K,L*
837	R.Popular, Sevilla	Spain	10	L*
855	Murcia	Spain	125	L*
864	Paris	France	300	G
873	AFN Frankfurt	Germany (W)	150	C*,G*,K*,L*
882	BBC-Wales Washford	UK	70	I,K,L,P
891	Algiers	Algeria	600/300	L*,O*
900	Milan	Italy	600	L*
918	R.Intercont. Madrid	Spain	20	L*
927	BRT-1 Wolvertem	Belgium	300	I,L,N,P
936	Radio Bremen	Germany (W)	100	L*
945	Toulouse	France	300	L*
963	Pori	Finland	600	F*,L*
972	NDR/WDR Hamburg	Germany (W)	300	D*,G*,L*
981	Alger	Algeria	600/300	F*,L*,O*
999	Hoyerswerda	Germany (E)	20	D*
1008	Hilversum-5 Flevo	Holland	400	I,L,P
1017	Wolfsheim	Germany (W)	600	I,L*
1044	DDR-1 Burg	Germany (E)	250	L*
1044	Sebaa-Aioun	Morocco	300	O*
1062	Kalundborg	Denmark	250	L*
1071	Brest	France	20	I,L
1098	Bologna	Italy	60	L*
1107	AFN via Munich	Germany (W)	40	G*,O*
1116	Bari	Italy	150	O*
1125	La Louviere	Belgium	20	I
1125	BBC Llandrindod Wells	UK	1	O
1125	Zagreb	Yugoslavia	200	B*
1134	Zagreb	Yugoslavia	300	A*,L*,Q
1143	AFN via Stuttgart	Germany (W)	10	G*
1143	Kaliningrad	USSR	150	L*
1161	Toulouse	France	100	L*
1179	Bacau	Romania	200	L*
1179	Solvesborg	Sweden	600	G*,K*
1188	Kuurne	Belgium	5	I,L
1197	VOA via Munich	Germany (W)	300	K
1197	BBC-R3 Bournemouth	UK	0.5	I
1206	Bordeaux	France	100	L*
1206	Wroclaw	Poland	200	G*
1215	Tartu	USSR	50	L*
1233	Liege	Belgium	5	I
1233	Prague	Czechoslovakia	400	L*
1251	Siofok	Hungary	135	L*
1269	Neuminster	Germany (W)	600	G*,K*,L*
1278	RTE-2 Dublin/Cork	S.Ireland	10	K*,O
1287	Litomysl/Liblice	Czechoslovakia	300/200	G*,L*
1296	BBC Orfordness	UK	500	I,K*,L*,P
1305	Marche	Belgium	10/5	A
1314	Kvitsoy	Norway	1200	L*
1341	BBC-Ulst.Lisnagarvey	N.Ireland	100	I,K
1350	Nancy/Nice	France	100	I,L*
1359	RBI Berlin	Germany (E)	250/100	F*,G*
1368	Manx Radio, Foxdale	IOM	20	K*
1386	Kaunas	USSR	1000	G*,L*,M*
1395	R.Tirana via Lushnie	Albania	1000	G*,L*
1404	Brest	France	20	I
1422	Heusweiler	Germany (W)	600	L*
1431	Dresden	Germany (E)	250	L*
1440	Marnach	Luxembourg	1200	C,E,I,K,L*
1449	BBC-R4 Redmoss	UK	2	K
1458	R.Tirana	Albania	500	C*
1467	TWR Monte Carlo	Monaco	1000/400	A*,G*
1476	Wien-Bisamberg	Austria	600	K*
1503	Stargard	Poland	300	G*,L*
1503	Pamploma	Spain	2	R*
1512	BRT Wolvertem	Belgium	600	B*,G,I,K*
1512	Jeddah	Saudi Arabia	1000	O*
1521	Kosice	Czechoslovakia	600	L*
1530	Vatican Radio, Rome	Italy	150/450	A*,F*,L*,N*,O*
1539	DLF Mainflingen	Germany (W)	700	F*,I,L*,R*
1566	Sfax	Tunisia	1200	O*
1575	RBI via Burg	Germany (E)	250	L*
1593	Langenberg	Germany (W)	400/800	L*

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

W.Pacific via Shepparton 9.620 (Eng 2000-2130) have also been audible here. Listening at 2000, Darran Taplin logged them as 44423.

There are many other broadcasts to Europe. They include AWR via Sines, Portugal 9.670 (Eng 0800-0900 Sundays) - 44444 at 0800 by Sheila Hughes; VOIRI Tehran, Iran 9.022 (Tur 1700-1800) - SIO 444 at 1700 by John Coulter; Radio Sweden via Horby 9.615 (Sw, Eng, Ger 1600-1800) - 53434 at 1725 by Max Wustrau; Voice of Greece, Kavala 9.425 (Gr 1700-2000) - SIO 455 at 1810 by Kenneth Buck; Radio Budapest, Hungary 9.835 (Hung, Eng, Ger 1900-2200) - 54554 at 2000 by Ken Whayman; Vatican Radio, Rome 9.645 (Pol, Ger, It, Eng, Fr, Sp, 1900-2110) - SIO 333 at 2005 by Ted Walden-Vincent; Radio Jordan, Amman 9.560 (Eng 1420-2200) - 33223 at 2008 by **Louis Whitfield** in Luton; Radio Pyongyang, N.Korea 9.345 (Eng, Fr, Russ, Kor, Sp, Ger 1300-2150) - SIO 333 at 2012 by Phil Hexter; Voice of Vietnam, Hanoi 9.840 (Eng, Russ, Viet, Fr, Sp 1600-2130) - SIO 444 at 2036 by John Sadler; Voice of Turkey, Ankara 9.825 (Ger, Eng, Fr 2000-2300) - 43333 at 2040 by Eddie McKeown; AIR via Delhi, India 9.910 (Eng 2000-2230) - 54444 at 2110 by Chris Shorten; BRT via Wavre, Belgium 9.925 (Eng to Europe, USA 2100-2130) - SIO 342 at 2114 by Jim Cash; Radio Yugoslavia, Belgrade 9.620 (Eng to Europe, S.Africa, S.Asia, USA 2100-2145) - SIO 211 at 2115 by Alf Gray; Radio Tirana via Lushnje, Albania 9.480 (Fr, Russ, Eng 1800-2300) - 54444 at 2130 by David Wratten; RBI Berlin, GDR 9.730 (Ger, Fr, Eng, It, Sp 1445-2245), heard at 2200 by Francis Hearne.

Throughout the day and night there is plenty to interest the Dxer. Logs mentioned KUSW Salt Lake City, USA 9.815 (Eng to Alaska, Greenland 0300-0500), rated as 35433 at 0316 by Kenneth Reece; WHRI South Bend, USA 9.495 (Eng to C.America 0000-0800) - 54333 at 0715 by Mark Selby; Radio Nederlands via Bonaire, Ned.Antilles 9.715 (Du, Eng to New Zealand 0730-0825) - SIO 343 at 0800 by Cyril Kellam; SRI via Schwarzenburg, Switzerland 9.560 (It, Eng, Ger, Fr to Australia, Pacific area 0745-1030) - SIO 444 at 0859 by Darren Beasley; WSHB Cypress Creek, USA 9.495 (Eng to Alaska, Greenland 1000-1400) - 34433 at 1010 by John Nash; SLBC Colombo, Sri Lanka 9.720 (Eng 1200-1630) - 33433 at 1438 by Rhoderick Illman; VOA via Tinang, Philippines 9.760 (Eng to S.Asia 1100-1700) - SIO 222 at 1630 by Alan Smith; Radio Polonia, Warsaw 9.525 (Eng, Fr, It, Sp, Ar to W.Africa 1630-2030) - 44444 at 1639 by Andy Cadier; Africa No.1., Gabon 9.580 (Fr, Eng to C.Africa 1700-2100) - 55444 at 1937 by Richard Radford-Reynolds; SRI via Schwarzenburg, Switzerland 9.885 (Pol, Eng, Sp to Africa 2030-2200) - 42343 at 2107 by Leo Barr; RCI via Sackville, E.Canada 9.755 (Fr, Eng to C.America 2230-2330) - 33322 at 2309 by Graham Johnson. In S.Africa, Dick Moon heard Radio Solomon Islands, Honiara 9.545 (Eng to Solomon Isles 1900-1130).

Some of the **7MHz (41m)** broadcasts to Europe stem from WYFR via Okeechobee, Florida 7.355 (Russ, Ger, Eng, Sp 0400-0730) - 45444 at 0630 by Kenneth Reece; Int. Red Cross Geneva via Schwarzenburg, Switzerland 7.210 (Eng, Fr, Ger, Sp 1100-1230, last Sunday of month only) - 55555 at 1100 by Sheila Hughes; RCI Montreal via Daventry, UK 7.235 (Fr, Eng, Ger, Hung, Cz, Uk 1700-2030) - SIO 555 at 1836 by Jim Cash; AIR via Delhi, India 7.412 (Hi, Eng 1845-2230) - 34433 at 1901 by Darran Taplin; Radio Australia via Carnarvon 7.205 (Eng 1430-2030) - 44544 at 1905 by Richard Radford-Reynolds; Radio Prague, Czechoslovakia 7.345 (Eng, Ar, Fr, Sp, Port 1500-2125) - 43333 at 1920 by Mark Selby; RTV via Sfax, Tunisia 7.475 (Ar 1800-0000) - 44554

Abbreviations	
Abbrv	Language
Ar	Arabic
Cz	Czechoslovakian
Dan	Danish
Du	Dutch
Eng	English
Far	Farsi
Fin	Finnish
Fr	French
Ger	German
Gr	Greek
Ha	Hausa
Hi	Hindi
Hung	Hungarian
It	Italian
Jap	Japanese
Kor	Korean
Norw	Norwegian
Pol	Polish
Port	Portuguese
Russ	Russian
Si	Sinhala
Sp	Spanish
Sw	Swedish
Tur	Turkish
Ur	Urdu
Viet	Vietnamese

DXers:
A: Leo Barr, Sunderland.
B: Andy Cadier, Folkestone.
C: Scott Caldwell, Warrington.
D: Phil Hexter, Pontypridd.
E: Roy Hill, West Kilbride.
F: Simon Holland, Douglas, I.O.M.
G: Sheila Hughes, Morden.
H: Cyril Kellam, Sheffield.
I: George Millmore, Wootton I.O.W.
J: Ike O'Doom, while in Aberdeen.
K: Stewart Russell, Forfar.
L: Mark Selby, Aldershot.
M: Tim Shirley, Bristol.
N: Darran Taplin, Tonbridge.
O: Mark Thompson, Wakefield.
P: Phil Townsend, London.
Q: Ted Walden-Vincent, Great Yarmouth.
R: Max Wustrau, Bedford.

SEEN & HEARD

at 1950 by John Parry; IBRA Radio via Cyclops, Malta 7.225 (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 by 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 Africa 0400-0450), 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 Wratten; Voz 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.Asia 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 1545-2345) - 22332 at 1547 by Max Wustrau; BBC via Daventry, UK 7.325 (Eng to C.America 2200-0330) - 44444 at 2248 by Leo Barr; Radio Kiev, Ukraine 7.400 (Eng 2330-2359) - 32133 at 2350 by Philip Bartlett.

While monitoring the 6MHz (49m) 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 0430-0730) as SIO 534 at 0535; Philip Rambaut logged VOA via Greenville, 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 49m broadcasts are to Europe. Those noted were VOA via Woofferton, UK 6.040 (Eng 0400-0700), heard at 0645 by Francis Hearne; RBI Berlin, GDR 6.040 (Eng 0745, Fr 0900, Sat/Sun only) - SIO 333 at 0755 by Alf Gray; RIAS Berlin 6.005 (Ger 24hrs) - 55444 at 1355 by John Nash; Radio Nederlands via Flevo 5.955 (Du, Eng 1430-1525) - 34443 by Louis Whitfield; RFI via Allouis, France 6.175 (Fr, Eng 0500-2200) - 55555 at 1600 by Ken Whayman; Radio Sweden via Karlsborg 6.065 (Sw, Eng, Sp, Port 1600-2230) - 43443 at 1700 by Sheila Hughes; VOA via Woofferton, UK 6.040 (Eng to Europe 1700-2200) - 44444 at 1759 by Andy Cadier; Radio Australia via Carnarvon 6.035 (Eng 1530-2030) - 53544 at 1855 by Richard Radford-Reynolds; BRT via Wavre, Belgium 5.910 (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 Wratten; Radio Pyongyang, N.Korea 6.576 (Russ, Fr, Kor, Sp, Ger, Eng 1500-2150) - 34553 at 2010 by John Parry; Radio Austria Int., via Moosbrunn 6.155 (Ger, Eng, Fr, Sp 0400-2300) - 44433 at 2205 by Graham Johnson; Radio Mediterranean via Cyclops, Malta 6.110 (Eng 2100-2330) - 32222 at 2230 by Mark Selby; Radio Polonia, Warsaw 6.135 (Eng, Ger, Fr 1830-2355) - 44434 at 2233 by Leo Barr.

Transatlantic DX Chart

Freq kHz	Station	Location	Time (UTC)	DXer
		USA		
1010	WINS	New York, NY	0115	A,B
1050	WEVD	New York, NY	0245	B
1210	WCAU	Philadelphia, PA	0400	B
1510	WKKU	Boston, MA	0412	B
		Canada		
590	VOCM	St.John's, NF	0112	A,B
680	CIYQ	Grandfalls, NF	0237	B
710	CKVO	Clarenceville, NF	0355	B
930	CJYQ	St.John's, NF	0230	B
1010	CFRB	Toronto, ON	0300	B
1050	CHUM	Toronto, ON	0350	B
1200	CFGO	Ottawa, ON	0405	B
1220	CKCW	Moncton, NB	0242	B
1570	CKLM	Lavel, PQ	0315	B
		C.America & Caribbean		
1610	Caribbean Beacon	Anguilla	0342	B
		South America		
1220	R.Globo	Rio, Brazil	0250	B

DXers:
A: Tim Shirley, Bristol.
B: Mark Thompson, Wakefield.

Station Addresses

BBC Radio Kent, 30 High Street, Chatham, Kent, ME4 4EZ.

ILR Beacon Radio, P.O.Box 303, 267 Tettenhall Road, Wolverhampton, WV8 0DQ.

Radio Station CJYQ, P.O.Box 6180, St.Johns, Newfoundland, A1C 5X8, Canada.

Radio Station CIYQ, P.O.Box 810, Grand Falls, Newfoundland, A2A 2U4, Canada.

Voice of Turkey, P.O.Box 333, Yenisehir, Ankara 06-433, Turkey.

Iceland State Broadcasting Service, P.O.Box 120, Reykjavik, Iceland.

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