Short Wave Magazine

ISSN 0037-4261

£1.45

MAY 1987

New Series
AERONAUTICAL RADIO

Build The DX 160/80 Loop Antenna
+
Panasonic RF-B60 Receiver Reviewed

NEW

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Telex: 337675 TELPES G

VISA

Access

Instant finance available subject to status. Written details on request.

VOL. 45 ISSUE 2 MAY 1987
ON SALE APRIL 23rd

|32| Aeronautical Radio

Cover Concorde and the Sony AIR-7 airband receiver introduce our new series on Aeronautical Radio. Pan Am's B747-100 (above) is the type of aircraft carrying the equipment described.

|20| COMING SOON
Valves and Receivers. The history of valves used in receivers over the last fifty years or so.

EDITOR: Dick Ganderton C.Eng., MIERE, G8VFH
ART EDITOR: Rob Mackie
FEATURES EDITOR: Charles Forsyth
ADVERTISEMENT PRODUCTION: Steve Hunt

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ADVERTISEMENT MANAGER:
Roger Hall G4TNT (01-731 6222)

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Short Wave Magazine

REGULARS

SEEN & HEARD

GOOD LISTENING

A WORD IN EDGEWAYS

Sir
My congratulations to SWM after 50 years of splendid service to the amateur and experimenter.

I wonder how many more, like myself, started with the first issue. My school had a Radio Society and in 1938, using a design based on one or more SWM articles, I built a 10W c.w. 80m TX and RX. I remember cutting out the wooden chassis in the school workshop!

The illustrations of early pages in the March issue brought back many memories. Now retired, I was a professional designer of communications equipment for most of my working life and still maintain a hobby interest.

I look forward to reading SWM for many more years.
STEVE DORMAN G3ABP
E. LOOE
CORNWALL

It's good to see that you appreciated the nostalgic look at *SWM*. We hope that you will enjoy many more copies of the magazine. ED

Sir
It is with dismay and sadness that I read of the changes forthcoming in SWM. It was because of the fine techincal articles that I had originally entered a subscription. It sounds to me that the intent is to go for quantity of readership rather than quality of content in the publication.

In any event I will, for the present, keep my subscription to SWM and give it a chance to prove its place.
JAMES OWENS
BOULDER
COLORADO
USA

By now you should have discovered that we think content is important. Hang on in there! ED

Sir
I have just read Short Wave Magazine. GREAT!! I am just a listener not an engineer or whatever and have no interest in building my own set. The new SWM is for me for ever!!
MIKE SHEPHERD
CWMBRAN
WALES

Sir
I would like to say how much I have enjoyed the April issue of SWM.

Best wishes for the future! I also look forward to the new PW.
C. M. LINDARS RS32010
WALLINGTON
SURREY

Sir
Yes, I like the "new" magazine, it has interesting articles, and I certainly hope to construct the Antenna Tuning Unit.

My one complaint — rather faint print on smooth, shiny paper — a job to read in artificial light! Alright for young eyes, perhaps, but when one has almost reached the "three score years and ten" mark, the eyes are not so bright as they once were.

Anyway, thank you for a great magazine — keep up the good work. My regular order for it has gone into my newsagents — as well as for PW — that's been in for years.
H. E. CHAMBERLAIN
NEWARK-ON-TRENT
NOTTS

Sir
You have done it. You have bridged the gap, the gap that everyone said could not be bridged. Congratulations. You must be on to a winner and deserve to be.
I started reading the new SWM but had to keep putting it down so that I could stretch it out and make it last longer.

The way you have set the adverts out every few pages, not all at the beginning and end, is good.

I must tell you about one advertiser, Johnsons Shortwave Radio. I rang them up on Saturday afternoon, was given the most courteous, professional service and we did the deal over the phone. They also found a circuit for a radio that I wanted repairing. They did not keep me hanging around on the phone but told me that they would phone me back — which they did.

Thank you Johnsons and thank you Short Wave Magazine.
S. B. FRENCH
RYDE
ISLE OF WIGHT

FIRST WORD

REACTION

I would like to thank all of you who have taken the trouble to let me know what you think of the re-vamped *Short Wave Magazine*. From the letters received and the face-to-face chats at the various rallies at which *SWM* and *PW* have had stands, it would seem that by and large we have started off in the right direction. Your comments and ideas for future articles are always welcome — how else can I be expected to find out exactly what you expect to find in *SWM?*

Certainly I am sure that you will find Godfrey Manning's excellent series on Aeronautical Radio, starting in this issue, of great interest. There are a large number of seemingly ordinary people who enjoy spending a pleasant Sunday afternoon on the airport observation platform with the family watching the aircraft come and go and listening to the radio conversations between aircrews and control tower. Being able to listen-in to instructions from the control tower and reports from the aircrews obviously enhances their enjoyment.

This new series of articles will explain to the layman just what is going on. As the series unfolds you will find out about the equipment and how it works, the language used between ground and aircraft and what sort of information the aircrew need to be able to fly safely around the crowded skies.

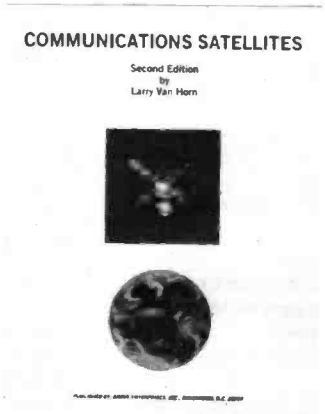
Later on we will be looking at the range of receivers and scanners available in the High Street for listening in on the "air-bands', as well as trying to unravel the legal implications of the Wireless Telegraphy Act and how it affects the many thousands who listen, quite openly, to this interesting traffic.

Antennas are an area that is always popular with the home constructor and this month we present a loop that is simple and cheap to build and will give good results up to about 4.6MHz giving coverage of the amateur bands at 1.8 and 3.5MHz as well as being capable of getting down into the medium wave broadcast band. I am interested, by the way, in just how far you would like the magazine to get into home construction. What about receivers for instance, and how complex should they be?

DICK GANDERTON

BOOKCASE

COMMUNICATIONS SATELLITES
by Larry Van Horn
Published by Grove Enterprises Inc., Brasstown, NC 28902.
Available from Interbooks, Lynton, Stanley, Perth, Scotland PH1 4QQ
215 x 280mm, 255 pages. Price £14.80 including UK P&P (paperback)



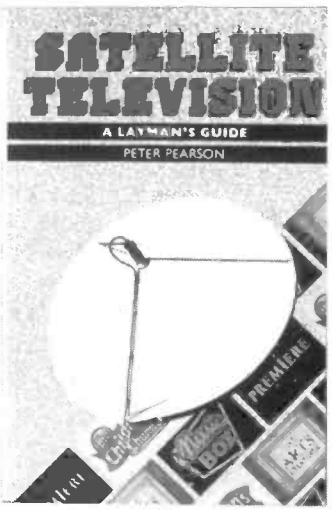
This book is a must for those who are interested in finding out what can be heard on what satellite. It covers spy and surveillance satellites, US and Russian manned space missions, military tactical and scientific satellites, oceanographic and weather orbiters, deep space probes, navigational and communications satellites, private and broadcast satellites.

This is basically a "dictionary" of space communications and includes chapters on channelisation band plans, transponder identification, international satellites and even a history of earth satellite development.

The bulk of the book is informative text, essential if you want to understand more about what is "flying around up there". The end section (Appendix B) is a frequency cross reference. The systems are listed in ascending frequency order and gives you the country or agency, transmitter location, mode and system details. This would allow the reader to quickly identify the source of unknown transmissions from space. Ground tracking networks are also listed.

The illustrations and tables are included for better understanding of space technology. Special chapters provide insights into satellite operation.

SATELLITE TELEVISION A Layman's Guide
by Peter Pearson
Published by Argus Books Ltd., 1 Golden Square, London W1R 3AB.
152 x 233mm, 73 pages. Price £4.95 (paperback)
ISBN 0-85242-906-1

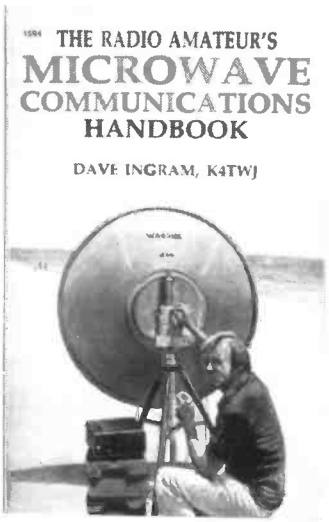


Satellite televison is the latest rage, if you're not into it then you're missing out — or are you?This book sets out to explain what is satellite TV and how will it change your life?

The language in the book isn't really very technical, although obviously it requires some sort of technical explanation as to how the system works. There are chapters that cover the transmission of the signals to and from the satellite, the satellites themselves, the terminal you need to receive the signals, cost, who makes the programmes, the type of installation and what you might see. There is also a glossary of technical terms which is useful when wading your way through manufacturers "bumpf".

The list of acknowledgements is quite impressive and shows that the book had a good source of background information and photographs.

THE RADIO AMATEUR'S MICROWAVE COMMUNICATIONS HANDBOOK
by Dave Ingram K4TWJ
Published by TAB Books Inc. Available from John Wiley & Sons Ltd. Baffins Lane, Chichester, Sussex PO19 1UD. Tel: 0243 784531.
132 x 210mm, 183 pages. Price £11.45 (paperback)
ISBN 0-8306-0594-0



The first thing to remember is that this book is written by an American for a mainly American market. Involvement with amateur microwaves need not be highly technical or overly expensive — at least that's what this book says.

It covers topics like the amateurs' microwave spectrum, the electronic techniques needed for microwaves, klystron operation, 23cm DX, a quick and easy 10GHz set-up, power supplies for microwave systems, fast scan TV at 2.3GHz and linking home computers via microwaves to mention but a few.

Operational concepts of all different types of microwave set-ups are outlined in this book, which is really meant to encourage experimentors to "have a go". As the author says in the book, "the Golden Age of Radio is very much alive and well. It lives in the highly specialised areas of modern communications technology".

RADIO BEACON HANDBOOK
by Dr Jürgen Trochimczyk
Published by Wilhelm Herbst Verlag. Available from Interbooks, Lynton, Stanley, Perth, Scotland PH1 4QQ.
142 x 207mm, 251 pages (paperback).
ISBN 3-923 925-00-X

Dr. Jürgen Trochimczyk

Handbuch der Funknavigationshilfen

Radio Beacon Handbook

Wilhelm Herbst Verlag

This book is a list of just about all known long and medium wave beacons of the world. It is divided into ten sections (Europe, USSR, Africa, Near & Middle East, Asia, Pacific, Antartica, North America, Central America & Caribbean, South America) with seven columns in each section. The stations are listed alphabetically by their call and the other columns are frequency in kHz, Country. Name/Airport/Lighthouse, Co-ordinates, Range/Power and Field.

The book deals with all kinds of radio beacon, directional and non-directional, which operate in the lower frequency range (150-1900kHz) as well as navigation aids for air and sea traffic. As all the details about each station are included on one line of text, abbreviations must be used. These are listed in the front of the book and a copy of the list is useful when using the book during s.w.l.ing.

The Preface and Abbreviations list has been written in seven different languages, so most people should find one they understand.

WHAT'S NEW

Space Symposium

AMSAT-UK/UoS are holding their space symposium between July 17 and 19 at the University of Surrey, the programme has been arranged (provisionally) and includes social evenings, lectures on all aspects of satellite operation, tours of the UoSAT Mission Control centre, AMSAT-UK meetings, AMRAC meetings as well as lectures on packet radio.

There will be available two large areas for trade and information stands and display. Many well-known names should be there, Dr M Sweeting, Jeff Ward and members of the UoSat Team, Dr L Labutin UA3CR, Dr A C Gee G2UK, as well as representatives of AMSAT-UK, AMSAT-NA, Aust, NZ, Sweden, Belgium, Norway, DL, ESA and IARU. Other groups such as AMRAC. RIG and BARTG will also be there. If you wish to attend, or require more details then you should write to AMSAT-UK HQ, don't forget to enclose an s.a.e.

Ron Broadbent G3AAJ
AMSAT-UK
94 Herongate Road
Wanstead Park
London E12 9EQ

Media Network

This is a weekly survey of communication developments compiled with the assistance of 130 monitors spread across the globe.

April 30: "Who's Listening Anyway?" the programme looks at the subject of audience research, and how major international broadcasters are measuring their listeners. Even figures of 120 million listeners worldwide quoted by some broadcasters isn't too much when compared with the world population. How do you find out what the scattered but loyal shortwave audience wants?

May 7: "Secret Celebration". Media Network becomes six years old as from this programme. They hope to dream up an off-beat way to celebrate it. They are looking forward to receiving telegrams of congratulations from heads of state around the world, but since that is unlikely, they'll be looking at new publications instead.

May 14: "QRZ, QSL, QRT?" The public image of the amatuer radio operator sometimes leaves a lot to be desired. The "hams" sometimes have a reputation for putting up large antennas, causing TV interference, and talking in strange codes. The VERON, the Dutch National Amateur Radio Society, has succeeded in breaking down these cliches. The national TV Teletext service carries a regular column about amateur radio. Media Network visit the headquarters in Arnhem, and look at how one million QSL cards are processed each year. We also look at the role of the club station PA0AA.

May 21: "News Update". A current affairs orientated edition, with Andy Sennitt looking at the news received by the WRTH editorial office, now in Amsterdam.

May 28: "Back to the Future". They look at developments towards satellite radio. What ever happened to France's DBS plans?

Stolen

The Hastings Electronics and Radio Club had their club room broken into early on March 16. The following items were stolen.

1: Icom IC-251E. Serial No. 03528 with MuTek front-end board fitted.

2: Icom desk mic IC-SM2. Serial No. 20501.

3: FT-101ZD, Yaesu h.f. TX/RX. Serial No. not known but all bands fitted.

4: Zetagi s.w.r. bridge.

5: Large brass Morse key on mahogany base, with brass plate engraved "In memory of John Taplin".

6: M600 Altari headphones.

Any information then either contact G4FET QTHR or Hastings CID.

QTI-TNA

QTI-TNA the talking newspaper for blind radio amateurs worldwide took delivery of a Telex 1-3 mono high speed copier at the end of February.

This machine, which copies both sides of a C90 tape in just over two mins in batches of three, cost £1700 and is the second new copier that the Association has bought. The funds were raised over the past four years at rallies and through the good offices of the Worked All Britain Group, RNARS, RAFAS and many other clubs and individuals.

The copier will be known as the Rod Young copier in memory of the first treasurer of QTI who died unexpectedly on February 27 this year.

QTI-TNA is a registered charity providing a fortnightly magazine to visually handicapped amateurs and s.w.l.s in IARU Region 1 and a monthly technical magazine worldwide.

Donations and new members are always welcome.

The magazine is now searching for a volunteer skilled in physics and maths to read those articles involving complex formula and Greek letters!

QTI-TNA
2 Cartmel Walk
North Anston
Sheffield S31 7TU
Tel: 0909 566301

For Trio Read Kenwood

One of the most intriguing pieces of news to come our way for some time is the announcement that the radio gear sold in the UK under the Trio label will, in future, be known as Kenwood. This brings the UK into line with the rest of the world concerning the use of the Kenwood trademark of the Trio-Kenwood Corporation.

This change has been made possible following agreement between the Trio-Kenwood Corporation and Thorn-EMI who market a range of domestic equipment under the Kenwood banner.

Of course, the radio equipment sold in the UK will continue to be the special versions needed to cope with differences in the requirements of the UK market, such as different bands, band limits or repeater shifts.

We have talked to Lowe Electronics at Matlock who are the official distributors in the UK for Kenwood equipment. They emphasised us that it is now more important than ever to purchase your Kenwood gear from an authorised dealer to ensure that you get the necessary technical and after-sales service, as in the past, as well as ensuring that you get the correct model for the UK market.

Cirkit Help Line

Many people in our communities who would like the benefit of the use of an economical kit or project find themselves at a disadvantage when it comes to construction.

The elderly may have failing eyesight, a handicapped person, restricted or no limb movement.

To help these people overcome this problem, Cirkit is using the IBM System 36 computer it operates to create a "constructor" database from clubs or individuals who are competent builders and testers in their own right.

This listing will be issued free of charge to anyone who requests it. They would hope to sort the list by geographical location so that the list is as local as possible to the user of this service.

If you can help please give details of your address, name and telephone number and the area of expertise, i.e. computer, r.f. general.

Cirkit Distribution Ltd
Home Constructors Help Line
Park Lane
Broxbourne
Herts EN10 7NQ

WHAT'S NEW

DXCC Countries Guide

Geoff Watts, well known as the editor of The *DX News-sheet* from 1962 to 82, has just sent in details of his latest publication, the *DXNS DXCC Countries Guide*.

The booklet lists DXCC countries alphabetically, with present and past prefixes back as far as 1945, plus a reference list of previous names of countries to help you keep up with those frustrating country name changes that seem to take place so regularly. It also contains other useful notes and a list of deleted countries with full information.

Geoff reckons that it will be most useful to DXers who have retired and are again taking up radio as a hobby after a long period of inactivity and are possibly thinking of applying for the DXCC Award.

Those on the Honour Roll may wish to begin working islands instead of countries. The list gives the IOTA reference number of all those islands on the DXCC list, well over the one hundred necessary to claim the basic IOTA CC-100 Award and get onto the IOTA Honour Roll.

Also included is a comprehensive Oblast listing for those interested in obtaining the USSR R-100 Oblast Award.

The 11 page booklet costs £1.00 in the UK or $2.00 (6 IRCs) overseas airmail.

Geoff Watts
62 Belmore Road
Norwich
NR7 0PU

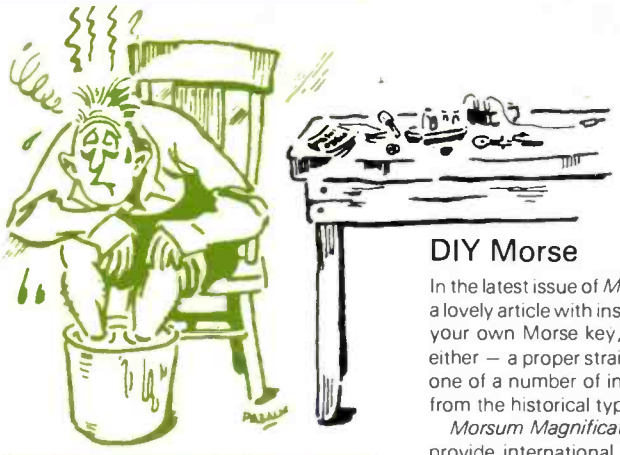
Cancelled

The Milton Keynes Amateur Radio Exhibition on May 30/31 has been cancelled. Due to the vagaries and anomalies concerning the Sunday Trading Act and the legality of Sunday trading at exhibitions, the club have sought legal advice, the outcome of which was that if they proceed and hold the exhibition on a Sunday, the club, the exhibition hall management and the exhibitors can be liable to prosecution by the county and/or the local council.

The club has reluctantly accepted this advice and have decided not to hold this year's exhibition on a Sunday and cancelled the event.

However, all is not lost, they plan to hold next year's exhibition on a Friday/Saturday during late May or early June, details of which will be released later.

Stuart Lightfoot G0GOF
7 Woburn Road
Marston Moreteyne
Bedford
MK43 0NH
Tel: Bedford 767904



AMRAC

AMRAC, the Amateur Radio and Computer Club have just revised their membership subscriptions. From May 1 the subscriptions will be: UK – £8, Europe – £10 and the rest of the world – £12.

AMRAC produce a bi-monthly 40-page newsletter *AMRAC User*, which covers all the latest news, ideas and technical items on Packet radio, as well as AMTOR and RTTY. In addition to the newsletter the club also produce a "hot news sheet" in the alternate months to ensure members are kept right up-to-date.

AMRAC is keen to encourage the formation of local AMRAC groups which hold regular meetings and promote digital communications at a "grassroots" level. Such groups have already been formed in Hampshire, Thames Valley and Essex. It is hoped that many more will be formed around the country.

For more details send an s.a.e. to the secretary.

Phil Bridges G6DLJ
9 Hollydene Villas
Hythe
Hants SO4 5HU

DIY Morse

In the latest issue of *Morsum Magnificat* there is a lovely article with instructions on how to make your own Morse key, not the old nail file type either – a proper straight brass key. That is just one of a number of interesting articles ranging from the historical type to the informative.

Morsum Magnificat is published quarterly to provide international in-depth coverage of all aspects of Morse telegraphy, from its earliest concept to the present time. It is for all Morse enthusiasts, amateur or professional, active or retired. It brings together material, which would otherwise be lost to posterity, providing an invaluable source of interest, reference and record, relating to the traditions and practice of Morse.

The UK subscription is £6 per annum. If you are interested, cheques should be made payable to *Morsum Magnificat*.

Tony Smith G4FAI
1 Tash Place
London
N11 1PA

ASTRID's Alive

Some 18 months ago a new satellite earth station was launched onto the market. Astrid, an accronym for Automatic Satellite Telemetry Receiver and Information Decoder, was originally designed to let BBC-B and Spectrum 48K home computer owners access the educational scientific satellites UoSAT 1 and UoSAT 2. This enabled them to display the masses of scientific news and data from these interesting satellites.

ASTRID's designer, Steve Webb has now set up his own company, SRW Communications Ltd., to manufacture and market the unit.

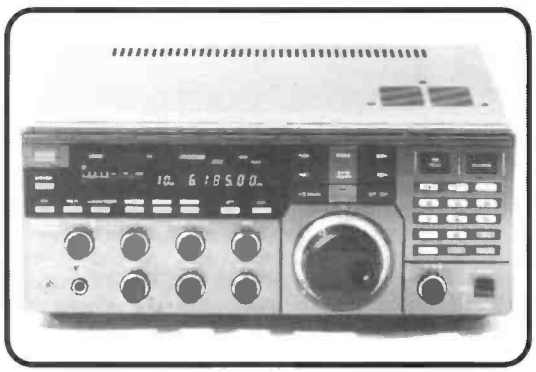
The price is still £129.57 plus VAT and it now works with all the Spectrum range (48K up), all the BBC range and also the Amstrad range. For the Amstrad computers you do need the correct Amstrad serial port and some extra software.

Extra software is now available for the BBC and Spectrum computers and graphs can be produced from the "whole orbit data", the telemetry can be fully decoded without using "look-up" tables and satellite orbits can be predicted and displayed over maps. On Spectrums even the UoSAT 1 pictures can be displayed.

ASTRID is a complete, ready to operate system which includes everything to set up your own satellite earth station. However, alternative antennas to the standard dipole are available including a special circularly polarised 2-element antenna priced at £35 plus VAT.

SRW Communications Ltd
Astrid House
The Green
Swinton Malton
N. Yorks YO17 0SN
Tel: (0653) 697513

SHORT WAVE RECEIVERS



		Price	Carriage
HF125	General coverage receiver made in Britain by Lowe Electronics, 30 kHz to 30 MHz	£375.00	£7.00
Options			
K125	Optional frequency entry keypad	£59.50	
D125	FM and synchronous AM detector	£59.50	
P125	Portable pack, includes internal nicads, charging system and active whip antenna	£69.50	
R2000	KENWOOD general coverage receiver 150 kHz to 30 MHz	£637.26	£7.00
Options			
VC10	VHF converter, adds 118 to 174 MHz	£170.76	£2.50
YG455C	500 Hz CW filter	£116.62	£1.00
R5000	KENWOOD general coverage receiver, 100 kHz to 30 MHz	£895.00	£7.00
Options			
VC20	VHF converter, adds 108 to 174 MHz	£176.32	£1.00
YK88C	500 Hz CW filter	£48.59	£1.00
YK88CN	270 Hz CW filter	£57.62	£1.00
YK88SN	1.8 kHz SSB filter	£49.29	£1.00
YK88A1	6 kHz AM filter	£50.68	£1.00
SP430	Matching speaker	£43.04	£2.50
VS1	Voice module	£34.02	£1.00
NRD525	JAPAN RADIO COMPANY general coverage receiver, 90 kHz to 34 MHz	£1195.00	£7.00
Options			
CMK165	Optional VHF/UHF Converter, adds 34-60, 114-174, 423-456 MHz	£391.35	£7.00
CMH530	Internally fitted RTTY demodulator	£102.19	£1.50
CMH532	Internally fitted RS232 interface	£91.75	£1.50
CC232	Cable for CMH532 interface	£60.25	£2.00
CFL231	300 Hz crystal filter	£126.37	£1.00
CFL232	500 Hz crystal filter	£126.37	£1.00
CFL233	1.0 kHz crystal filter	£126.37	£1.00
NVA88	Matching loud speaker	£62.86	£2.50

DATA DECODING EQUIPMENT

(read RTTY, CW or AMTOR using a UHF television or monitor)

CD600	Decoder for CW/RTTY/TOR/AMTOR	£215.14	£7.00
CD660	Decoder for CW/RTTY/ASCII/TOR/AMTOR	£264.97	£7.00
CD670	As CD660 but with built-in dot matrix two line display	£327.77	£7.00

VHF/UHF CONVERTERS

(use your short wave receiver to listen to VHF/UHF signals, check with us before you buy that your receiver is suitable).

MMC5028S	6 metre converter, uses 10 metre IF	£37.95	£1.25
MMC14428	2 metre converter, uses 10 metre IF	£37.95	£1.25
MMC14428HP	as MMC14428 but higher specification	£47.84	£1.25
MMC43228S	70 centimetre converter, uses 10 metre IF	£44.85	£1.25

HEADPHONES

HS7	KENWOOD miniature head phones	£16.66	£1.00
HS6	KENWOOD lightweight headphones	£25.68	£2.00
HS5	KENWOOD de luxe headphones	£39.57	£2.00

WORLD CLOCK

CWTC	CASIO world time clock	£15.95	£1.00

AERIALS AND ACCESSORIES FOR SHORT WAVE LISTENING

HF5	80-10 metres vertical aerial	£83.39	£7.00
HF5R	Radial kit when HF5 mounted on chimney etc	£54.81	£7.00
TRAPKIT	Trap dipole kit, inc. 7MHz traps	£22.51	£2.50
KX3	MIZUHO aerial tuning unit	£67.28	£2.50
AL1	Lightning and static protector	£34.71	£1.00
CS201	2-way 50 ohm coax switch 0-500 MHz fitted with SO239 sockets	£21.90	£2.50
CS201G	As CS201 but with N-type sockets	£35.01	£2.50
CS401	4-way version of CS201	£69.09	£2.50
CS4	4-way coax switch BNC connectors	£30.39	£2.50
CX3A	3-way coax switch 0-30 MHz only	£7.35	£1.50

COMPONENTS FOR BUILDING SHORT WAVE AERIALS

		Price	Carriage
CUWIRE	25 metres of 14 SWG copper wire	£8.50	£1.50
CPC	Centre piece insulator for dipole aerial	£4.96	£0.75
UR43	50 ohm coaxial cable	£0.30	
UR67	50 ohm coaxial cable	£0.85	
PL259	Coax plug for UR67	£0.66	£0.50
REDUCER	Reducing sleeve for PL259 for use with UR43	£0.15	£0.50
TWIN 300	300 ohm twin feeder	£0.20	
TWIN 75	75 ohm twin feeder	£0.20	
EIS	Small ceramic egg insulator	£0.61	£0.50
EIL	Large ceramic egg insulator	£0.79	£0.50

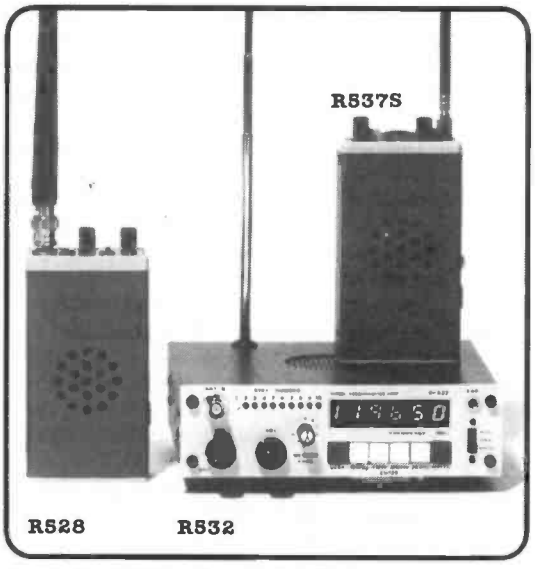
VHF/UHF MONITORING RECEIVER

AR2002	Scanning receiver from AOR covering 25-550 MHz and 800-1300 MHz	£487.30	£7.00
Options			
RCPack	RS232 Interface for computer control	£255.63	£2.00
RCAD	RC Pack adapter for use with AR2001	£25.45	£1.50
MB2001	Mobile mount	£11.34	£1.00

AERIALS, CABLE AND CONNECTORS FOR VHF/UHF RECEIVERS

REVCONE	Discone aerial, 30-500 MHz	£31.50	£7.00
D130	Diamond wide coverage aerial, 25-1300 MHz	£79.34	£7.00
UR43	50 ohm coaxial cable	£0.30	
UR67	50 ohm coaxial cable	£0.85	
BNCPLUG	50 ohm connector for UR43 cable	£1.50	£0.50
PL259	Standard coax plug for UR67	£0.66	£0.50
REDUCER	Reducing sleeve for PL259 for use with UR43	£0.15	£0.50

AIRBAND RECEIVERS



R537S	Airband receiver, tunable 118-136 MHz plus 2 crystal controlled channels crystals extra .	£69.51	£2.00
Options			
RB537	Rubber helical aerial	£4.60	£0.50
R528	Scanning airband receiver, 6 channels crystal controlled, crystals extra	£125.36	£2.00
Options for both R537S and R528.			
PS9	Mains adaptor	£8.50	£2.00
R537L	Soft case	£3.68	£0.50
RX22	Rechargeable nicad battery	£6.98	£1.00
CH122	Charger for RX22 Nicad	£8.50	£2.00
CRYSTAL	Plug-in crystal (state frequency required)	£4.60	£0.50
R532	Synthesised airband receiver, 100 memory channels, covers 110-139.995 MHz	£224.05	£7.00
Options			
PS12	Mains adapter	£8.50	£2.00
BP532	Rechargeable nicad battery pack	£32.68	£2.00
CH532	AC Charger for BP532 battery pack	£8.50	£2.00
LC532	Soft case	£9.86	£1.00
BNC6	Telescopic whip for portable use	£7.46	£0.50
RB144	Rubber helical aerial for portable use	£5.44	£0.75

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LAB	Airband ground plane	£18.42	£2.50
MG125	Car aerial, magnetic base	£16.42	£2.50
HG3FA	5/8 REVCO mobile whip	£7.50	£7.00
SCC	Base for HG3FA	£6.50	£1.00
SCCB	As SCC but with quick release .	£7.80	£1.00
2065	5/8 ground plane adjustable 118-180 MHz	£31.50	£7.00
UR43	50 ohm coaxial cable	£0.30	
UR67	50 ohm coaxial cable	£0.85	
BNCPLUG	50 ohm connector for UR43 cable	£1.50	£0.50
PL259	Standard coax plug for UR67	£0.66	£0.50
REDUCER	Reducing sleeve for PL259 for use with UR43	£0.15	£0.50

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GRASSROOTS

Lorna Mower

When club officials send in info on their club, the thing most newsletters and letters forget to say is when and where the club meets and who do you contact. It takes ages to look up the details so please, please send full details and make my life easier!

I have been told that the **Taunton & District ARC** are now fully operational at the County Hall Emergency planning HQ, The Crescent Taunton. They meet on the first and third Fridays at 7.30pm. For more details you should contact Peter G0EYR on 0823 75973 or Geoff on 0823 51526.

May 14 heralds a quiz night for the members of **Northampton Radio Club,** with the 21st as a walking v.h.f. d.f. evening. The club meets at Kingsthorpe Community Centre, Kingsthorpe, Northampton at 2000 each Thursday. If members or visitors want more details then Peter Saul G8EUX on 0327 51716 is the contact.

Maths with Maurice is the unusual sounding lecture scheduled for May 12 at the **Bury Radio Society**. Their news letter provides a very interesting read, they have technical features, historical features and for sale to mention but a few. The club meets every Tuesday at 8pm in the Club Room, Mosses Youth and Community Centre, Cecil Street, Bury. M Sivien, their hon sec., can be reached on 061-764 5018 for more details.

The **Stamford & District RS** are celebrating their 30th anniversary this year and they would like to hear from any past members with information about the very early days of the club. Nowadays they meet on the 1st and 3rd Wednesdays at 7.30pm in either the Southgate Public House (Cellar Bar) or the Rugby Club in Stamford. To avoid turning up at the wrong venue, contact David Bradberry G4OZM on 0780 54433 for more details.

The **Edgware & District RS** have had a committee change according to their *Edgware Ham News*. The Hon. Sec., is now Ian Cope G4IUZ and he can be contacted on Hatfield 65707. On May 28 they have a constructors' contest scheduled. Meetings are held on the 2nd & 4th Thursdays, 8pm at the Watling Community Centre, 145 Orange Hill Road, Burnt Oak, Edgware.

Another interesting sounding lecture is being held by the **Itchen Valley ARC** on May 22. It is called "The Hurdles of a London Tourist Board Guide" by Maurice G4IPQ. The club meets at the Scout Hut, Brickfield Lane, Chandlers Ford, Eastleigh, Hants on the 2nd and 4th Fridays. All meetings are at 1930 for 2000. You can obtain more details about the club from Maurice Cheesman G4IPQ on Southampton 736784.

The **Denby Dale & District ARS** have a full programme ahead of them this year. There is a Cheese & Wine Evening on April 29, Magnetic Recording by Tom G6DLA on May 6 and a Darts Match on May 13. I mustn't forget to mention their rally on June 21 (more details in the Rally Calendar). Jim Nicholson G6MOZ, their Secretary, on 0484 686573 can probably supply more club details.

There is a lovely cartoon in the newsletter from the **Wirrall ARS,** two children using the antenna at the top of a very high tower as a fairground ride – the parent sunbathing at the base "Peace, perfect peace"! The club meets 1st and 3rd Wednesdays at 8pm at Ivy Farm, Arrowe Park. Oh yes, congrats to B O'Brien for winning the construction contest with his a.t.u.

The **Sutton and Cheam RS** have an interesting newsletter it includes a section called "Members' News" – very interesting. The club usually meet on 3rd Fridays at 7.30pm in the Downs Lawn Tennis Club, Holland Avenue, Cheam. Geoff Plucknett G4FKA on Epsom 21349 will have all the details.

Colin Mills G0AAO is the Secretary for the **Pontefract & District ARS** and says he'll be pleased to answer any queries. They meet in the Carleton Community Centre, Carleton Road, Pontefract every Thursday at 7.30pm. On the cards in the near future is club equipment on June 4 and the History of Amateur Radio by Ray Price G3VID on June 11. You can contact Colin on Pontefract 43101.

A talk by a Crime Prevention Officer is scheduled for May 13 at the **Trowbridge & District ARC**. They meet in the Territorial Army Centre, Bythesea Road, Trowbridge at 8pm alternate Wednesdays. Ian Carter G0GRI can be reached on 0380 6656 for more details.

The **South Bristol ARC** have a busy time between now and their rally on September 6. May 13 is a DX Broadcast TV Evening by Ron Gardner and May 20 is a Radio Exchange & Mart organised by Dave G4WUB. The club meets every Wednesday at the Whitchurch Folkhouse, East Dundry Road, Whitchurch – Len Baker G4RZY on Whitchurch 834282 has all the details.

The **Stourbridge & District ARS** are just building up to their 50th year (it starts in Jan 88), and they have recently chosen the committee to get them there. One item that caught my eye in their news letter was 'Tomorrow has been cancelled", a really clever piece. "It was a dreary grey day. As I journeyed to work a huge ball of many trillions of tons of white hot exploding hydrogen nuclei heaved itself over the edge of the world. It hesitated for a moment, supporting itself on its elbows. Looking out over a grey mist enshrounded world, for one brief split second it almost didn't bother. Realising that if it didn't it would only have to do it twice next time, as it had been forced to do last time it rested, it continued on its remorseless journey. Several hours later it quietly dropped back over the edge realising that no-one had seen it or even cared if it was there". How many committee members know the feeling! Anyway the club meets 1st and 3rd Mondays at 8pm in the Robin Woods Centre, School Street, off Envill Street, Stourbridge.

The away leg of the quiz versus the Maidenhead Club is scheduled for the **Reading and District ARC** on June 4. The club normally meets on Tuesdays at 8pm in the White Horse, Emmer Green, North Reading, contact Steve Coleman G4YFB on Reading 867820 for more details.

Chilton ARC have G5RV scheduled for the June 24 slot in their programme. They meet at the Sir William Ramsey School, Science Block, Rose Avenue, Hazlemere on the 2nd and 4th Wednesdays at 8pm. Further details from Chris Dunn G4KUI on 04946 3372.

Stan Meadows G1UGA is the Secretary for the **Greater Peterborough ARC** and says that the club meets every 4th Thursday at 7.30pm. The venue for the club is the Stanground Junior School, Peterborough. G1UGA can be contacted on 0733 69822.

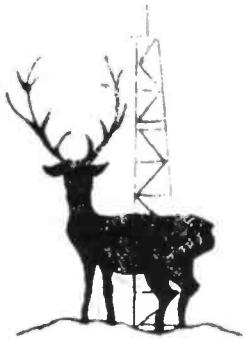
Tuesday May 5 is a lecture on The New Transceiver by George Fare G3OGQ for members and visitors of the **Warrington ARC**. They meet Tuesdays at 8pm in the Grappenhall Community Centre, Bellhouse Lane, Grappenhall. Paul Forster G0CBN has all the details 0925 814005. Other meetings are a junk sale on May 19 with Ron Staples G3MMD as the auctioneer and May 26 is an open forum.

The **Torbay ARS** have a new secretary, he is John Dart and can be contacted on 0803 51995. the AGM is scheduled for April 25, and it is "Working with Animals" by Robert G1VCX booked for May 30. They meet on Friday evenings at 7.30pm at the ECC Social Club, Ringslade Road, Highweek, Newton Abbot.

A bit further round the coast is the home of **Exmouth ARC**. They meet fortnightly at the 6th Exmouth Scout Hut, Marpool Hill, Exmouth, Michael Newport G1GZG at 30 Maristow Avenue, Exmouth, will tell you the next dates. Still in Devon, the

GRASSROOTS

Exmoor Radio Club meet in the Physics II Lab, South Molton School and Community College, South Molton, North Devon. They have meetings most Thursday evenings, but



their temporary secretary John Stacey will be able to tell you more on 07695 3382.

Op-amps and active filters by Andrew G8OMH are on the menu on May 13 for those at **Stockport RS,** as well as an informal natter night on the 20th and pre-NFD planning on the 27th. The club meets on Wednesdays at 8pm in the Blossoms Hotel. Contact Mel G4FFW on 061 224 7880 for more details.

The **Verulam ARC** have a different contact name for a while, Hilary G4JKS on St Albans 59318 will help with latest details about the club. They meet at the RAF Association HQ, New Kent Road, St Albans every 2nd and 4th Tuesday. May 12 is an activity evening and the 26th is called "Wonderful World of Propagation" by Ray Flavell G3LTP. Visitors are always welcome they say.

Robert Senft G0AMP has relinquished his post of Honarary Secretary to the **Biggin Hill ARC,** and Geoffrey Milne G3UMI has stepped into his shoes. The club meets at a new venue, the Victoria Club, Kechill Gardens, Hayes, so contact G3UMI QTHR as to how to get there.

The **Rolls Royce ARC** have got a Club Fox Hunt down for May 6 starting at 7pm and then a talk by Ron G3YEE on 'Scopes and Amateur Radio on June 3. Other meetings are every Monday at 7.30pm or a Morse class, every Wednesday is Shack night at 7.30pm and Sunday mornings 11.30am, is Construction class. All meetings are at the Rolls Royce Sports & Social Club. More from Les G4ILG on 0282 812288.

The **Mid-Sussex ARS** meet every Thursday at Marle Place, Leylands Road, Burgess Hill at 1945. They have their own fully equipped shack and visitors are welcome. April 30 is an informal evening and May 14 is the club construction contest. Chris G0GMC on 07918 2937 can supply further details for those interested.

Bury St Edmunds ARS have a new meeting place now, it's the County Upper School, Beetons Way, Bury St Edmunds. All new members are welcome at the 3rd Tuesday Meetings at 7.30pm. May 19 heralds the third in the series of Marconi lectures, but Chris G1FUU on 0359 50271 has all the details.

D. H. Wood has been elected as secretary for the **Morecambe Bay ARS** following their AGM. The club meets every Tuesday evening at the Trimpell Sports & Social Club, Out Moss Lane, Morecambe at 7.30pm. You can contact D. H. Woods on 0524 52042 for the latest news of the club.

Members of the **Wakefield and District RS** have an interesting little newsletter to read. Their meetings for the next few weeks are, April 28 a talk on Egypt by G4AAU, May 5 a bring a buy sale, May 12 a quiz night and May 19 a film about Sellafield. The Club meets on Tuesday in the Ossett Community Centre, Prospect Road, Ossett with D. J. Bryan on Leeds 820198 able to tell you more.

York ARS have a home-brew night scheduled for May 8. Keith Cass G3WVO at 4 Heworth Village, York has all other details for meetings. The club meets Fridays at 7.30pm in the clubroom United Services Club, 61 Micklegate, York. This year is the club's 40th anniversary and they will be holding a series of special event stations with anniversary QSL cards, and they would especially like to hear from anyone who has been "mixed-up" with York ARS.

The **Coventry ARS** have a couple of d.f. evenings lined up, the first is on May 1 at it's a 144MHz d.f. contest, the second is on the 29th when it is the (indoor) direction finding game. The club meets on Fridays at 8pm in Baden Powell House, 121 St Nicholas Street, Radford, Coventry. Robin Tew G4JDO has all the latest details on Coventry 73999.

The ever popular junk sale is on the programme for the **Midland ARS** on May 19, with foxhunting tips by G8FTU and G8DEJ on June 16. The club meets every week night in Unit 5, Henstead House, Henstead Street, Birmingham. If you want more details then contact Tom Brady G8GAZ on 021-357 1924.

May 12 brings a video called "Other Man's Shack" for those at the **Chester & District RS** meeting. Then there is Clandestine Radio by Gordon Adams G3LEQ on the 26th. The club meets at the Chester Rugby Union Football Club, Hare Lane, Vicars Cross, Chester at 8pm on Tuesday evenings. If you want more details contact Dave Hicks G6IFA on Chester 336639.

The **Chelmsford ARS** meet on the 1st Tuesday at 7.30pm in the Marconi College, Arbour Lane, Chelmsford. Andrew Mead G4KQE on 0376 83094 can tell you more. Ken Willis G8VR is talking about "How to work v.h.f. DX by Meteor Scatter" on May 5.

April 29 brings a lecture on Kite Antennas by R Withers G4IBL for members and visitors to the **Nene Valley RC.** The club meets Wednesdays in the Prince of Wales, Well Street, Finedon. M. P. Byles on 0933 71189 has all the details.

A club constructional contest is on the cards for May 11 if you belong to the **Surrey Radio Contact Club.** This meeting is being held one week earlier than normal due to the Bank Holiday. The club meets on the 1st and 3rd Mondays at 7.45pm in the TS Terra Nova, Mess Deck, 34 The Waldrons, South Croydon. You should contact John Simkins G8IYS on 01-657 0454 if you want to know more.

The talk by Denis Walker G3OLM on a Bonsai Aerial Farm must be popular as it is "doing the rounds". This time it's on April 28 at the **Dorking & District RS.** They meet on 2nd and 4th Tuesdays at 8pm, with various meeting places available. Contact J. Greenwell G3AEZ on Newdigate 77236 to sort out such details as venue.

An unpleasant piece of news from the **Hastings Electronics & RC,** their premises were broken into and a number of pieces of equipment were stolen (What's New holds more details). Not very nice for the club, they meet 3rd Wednesdays at 7.45pm in the West Hill Community Centre, Croft Road, Hastings. Dave Shirley G4NVQ on Hastings 420608 has the latest news.

The annual foxhunt for the **Keighley ARS** is being held on May 26. Their meetings start at 8pm at the Victoria Hotel, Cavendish Street, Keighley. For any further details please contact Kathy G1IGH on Bradford 496222.

DEADLINE DATES

Issue	Deadline
July '87	May 21
August '87	June 20
September '87	July 23

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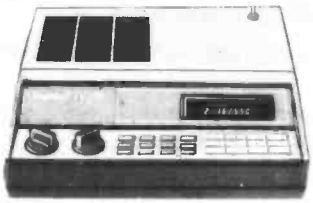

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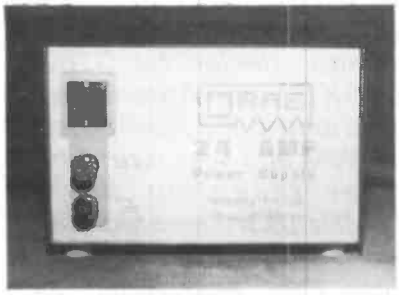

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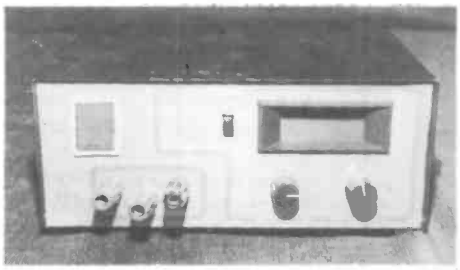

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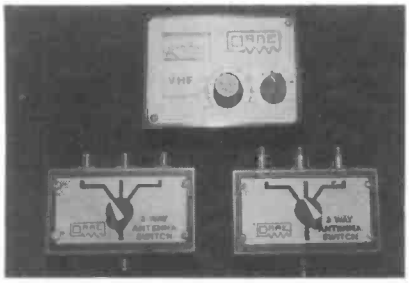

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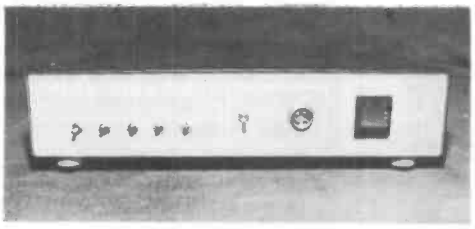

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BUILD THE DX 160/80 LOOP ANTENNA

Richard Q Marris G2BZQ

Loop antennas are deservedly popular with listeners for several reasons. They are cheap and easy to make and their excellent directional properties give just the sort of results that are needed by effectively nulling out unwanted stations. A previous design by G2BZQ, the DX 80 Loop Antenna, was described in the April 86 issue of SWM and was intended to cover reception on the 3.5MHz (80m) amateur band. The results obtained were more than acceptable with continuous coverage of frequencies in the range 2.3 to 6MHz. In this article he describes a development of the original design to cover 1.5 to 4.6MHz.

The DX80 Loop Antenna used a novel construction giving a neat and tidy, yet simple, design. Covering 2.3 to 6MHz it more than fulfilled the original design criteria. The circuit, if it warrants such a title, is reproduced in Fig. 1 to show its simplicity and the polar diagram of loops of this type is shown in Fig. 3. You are recommended to read the original article if full constructional details and specification interest you.

More sophisticated, complicated and expensive methods of coupling the loop to the receiver had been tried with minimal practical improvements in performance and they were consequently abandoned in favour of the simple arrangement used.

Thoughts of producing a similar loop to cover the amateur Top Band (1.8MHz) had prevailed for some time with a view to replacing other Top Band loops. During the thinking process some rough and ready experiments with turns of wire around a cardboard box it became obvious that a similar design could be produced to cover both Top Band and the 3.5MHz band! It was also evident that the construction could be simplified even more than that used in the DX80, the variable capacitor could be replaced by a selectivity/coupling switch and fixed capacitor arrangement to give lower costs, fewer controls and easier assembly. And, if desired a simple m.w. facility could be added.

The result is the DX160/80 covering 1.5 to 4.6MHz, the circuit of which is shown in Fig. 4a, together with front view in Fig. 4d. It is a "spiral" loop as opposed to the more usual "box" construction, and is only 712mm high by 610mm wide.

Description

As can be seen from Fig. 4d the assembly takes the form of a crossboom affair, mounted on a simple base together with a small panel carrying the controls.

The circuit, Fig. 4a, consists of a 6-turn loop winding, L1, tuned in a semi-balanced circuit by C1, a two-gang, 500pF per section, good quality, air-spaced, receiving type, variable capacitor. The coupling loop consists of 1 turn of wire coupled to the RX by a coaxial feeder cable. The coupling/selectivity is controlled by adding extra capacitors into the circuit using switch S1. These capacitors should be ceramic disc or silvered mica types.

The polar diagram is shown in Fig. 3 and it can be seen that the maximum signal is received off the ends with the minimum, or null, at 90° to this.

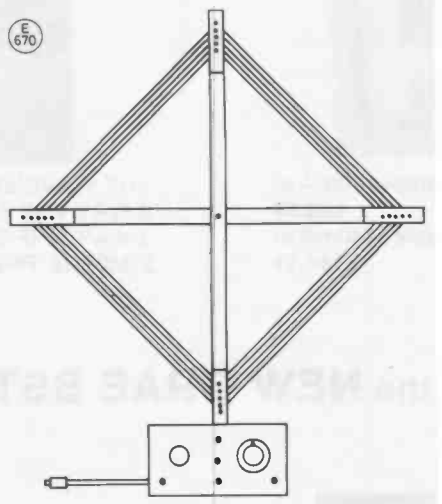


Fig. 1 THE "DX 80 LOOP" - GENERAL ILLUSTRATION

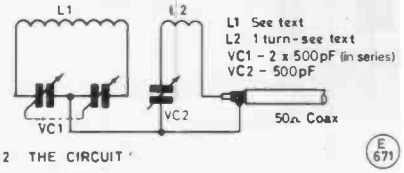


Fig. 2 THE CIRCUIT

Construction

The constructional details of the "X" boom unit are shown in Fig. 4d. A piece of wood 15 x 30 x 712mm is dovetailed and glued to a second piece 15 x 20 x 610mm to form the "X". If thought necessary additional strength can be added by drilling and bolting the joint. The wooden assembly should be finished with a quick-drying spirit-based wood stain.

A 7-way plastics terminal block, cut from 12-way, 5A Tandy 61-7009 terminal strip, is screwed to the end of each arm. Other makes of terminal strip can be used provided they are 18mm wide. 2.5mm holes are drilled in each arm as detailed in Fig. 4d exactly 4.8mm in from the edge of the wood.

The 64 x 127mm control panel should be made from a non-metalic material such as Paxolin, glass fibre, hardboard or even plywood. Perforated Paxolin board should be avoided as the prototype used this material at first and it broke up after the switch had been operated a few times!

The panel requires two holes to suit the variable capacitor, C1 and switch, S1. The positioning and size of these holes will depend on the components used, of course. Two more holes will have to be drilled in the panel to allow it to be screwed to the boom-arm, immediately under, and hard up against, the bottom terminal block.

The base is a simple unit but must, of course, be heavy enough to prevent the loop tipping over. Pieces of 15 x 38mm wood were used as shown in Fig. 4c and the completed base was stained in the same manner as the boom.

At this stage it is a good idea to have a "dummy run" and screw the base unit to the "X" boom before winding the loop, a job which can only be carried out with the boom separated from the base.

Winding the Loop

The main loop consists of 6 turns of pvc-covered 1/0.6mm copper wire having an outside diameter of 1.2mm. Other pvc-covered wire can be used, but could affect the final frequency coverage of the antenna. The winding is started with a tail 150mm long secured, with screws, in the outer hole of the bottom block. The winding is carried out clockwise for six complete turns finishing at the inner hole of the bottom block with a 150mm long tail. This means that all seven holes are used in the bottom block but only six in the other three blocks. The fixing screws in the top and bottom blocks are then tightened carefully to clamp the wire leaving it free in the right and left arms.

The coupling loop, L2, is a single turn of the same wire wound through the 2.5mm holes previously drilled through the four arms. Start at the bottom with a 150mm

BUILD THE DX 160/80 LOOP ANTENNA

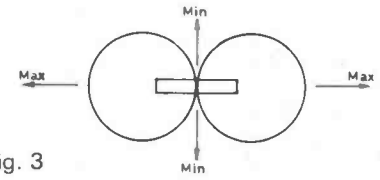


Fig. 3

long tail and thread the wire through the hole in each arm finishing through the extra hole, but in the opposite direction, leaving a 150mm tail again.

Fit the variable capacitor and switch to the panel before screwing the panel to the vertical boom arm. Trim the tails of the main loop, L1, to length as required and solder one to each of the fixed plates of C1. The switch, S1, is a small 4-pole, 3-way rotary wavechange switch wired as shown in Fig. 4b to give the total capacitance values shown in the table.

A length of 50ohm coaxial cable about 1200mm long, is secured to the cross-bar of the base unit with cable cleats and the centre core is soldered to the bottom tail of L2, which should be cut back to suit. The other end of L2 is connected to the frame of C1 together with the common ends of C2, 3 and 4. The other ends of these capacitors are soldered to the switch contacts as shown. An optional earthing connection, E, is shown on the circuit diagram and the author uses about 3m to the nearest water pipe. This actually increased the noise level masking any marginal increase in signal strength.

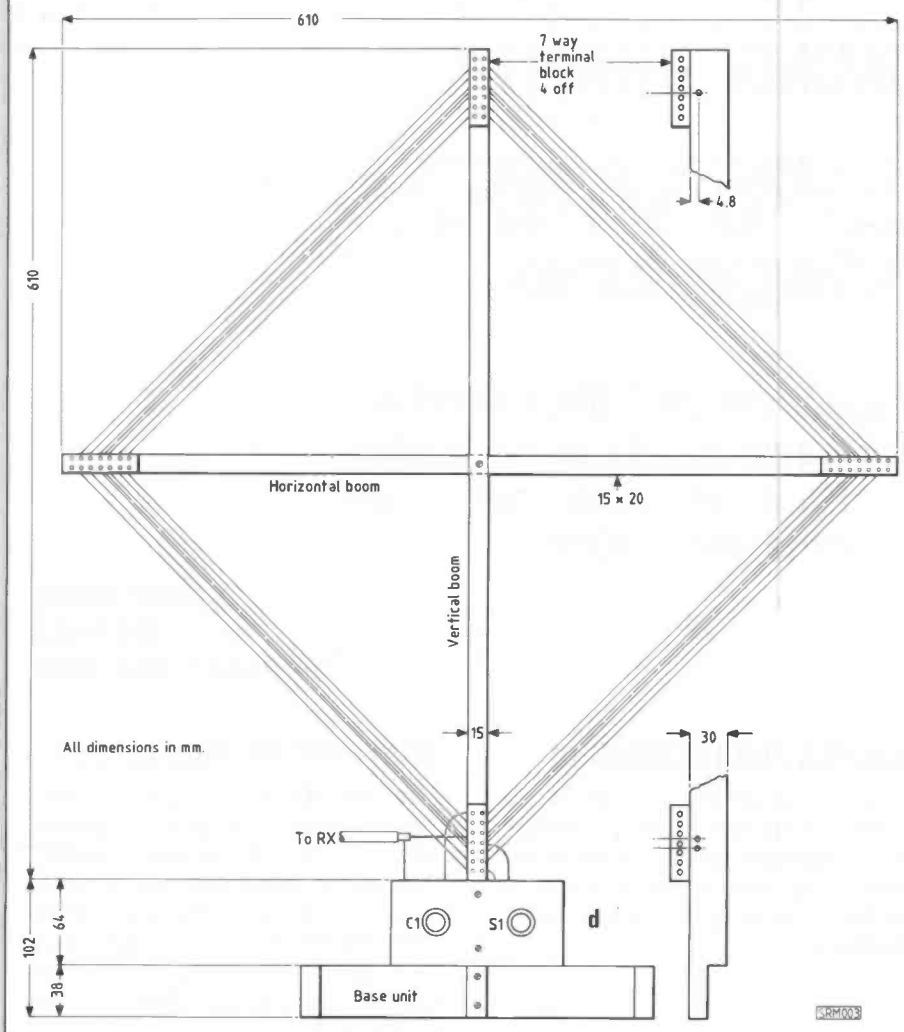
Testing

Testing the DX160/80 Loop is simple. After plugging the coaxial line into the RX, switch S1 to WIDE-BAND – all the capacitors in circuit. Testing is best carried out during the evening when there is plenty of on-air activity.

If you are using an amateur bands RX adjust to 1.800MHz, turn C1 for resonance, indicated by an increase in noise level. Readjust the RX tuning slightly until a convenient signal is heard and adjust C1 for maximum signal. Rotate the loop for maximum signal and then turn it through 90° when the signal should be greatly reduced or even eliminated. Repeat this procedure at 2.0, 3.5, 3.8 or 4.0MHz depending on the coverage of the RX.

For those using a general coverage RX it will be found that it is just possible to resonate broadcast stations at the top end of the m.w. band at around 1500kHz. The other extreme of the loop's frequency range should be around 4.6MHz depending on the exact construction of the loop and the lowest obtainable capacity of C1. The minimum capacitance value of this type of tuning capacitor tends to vary a few picofarads depending on the type and make, so that the highest frequency of the loop can vary from unit to unit.

When using the loop in place of the normal RX antenna it will be noticed that there is a considerable reduction in noise level, it is possible to rotate the loop



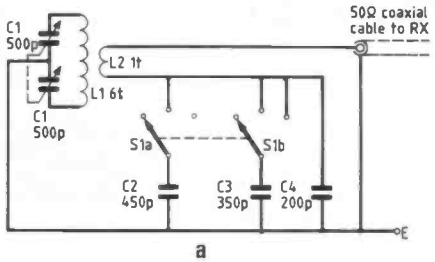
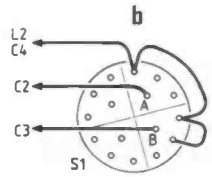
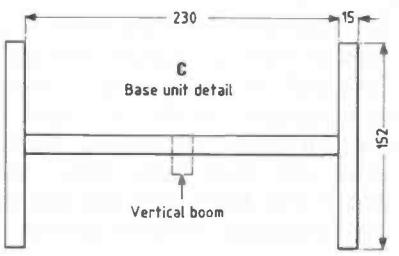


Fig. 4





BUILD THE DX 160/80 LOOP ANTENNA

slightly to greatly reduce, or even eliminate, QRN in general and noise from domestic electrical wiring and appliances in particular. Keep the loop at least 500mm away from the wall. Walls have a nasty habit of containing hidden electrical wiring!

The QRM from interfering stations can be reduced or eliminated by simple slow rotation of the loop for optimum results. Using S1 it is possible to reduce QRM by narrowing the bandwidth, useful for c.w. Loops will not, of course, eliminate QRM if the offending station is on the same, or reciprocal, bearing as the wanted station.

Using a good RX with adequate r.f. amplification, the results with the DX160/80 Loop are impressive. If an RX with only mediocre r.f. amplification is used then it would be a good idea to place an r.f. pre-amplifier between the loop and the RX input.

Medium Wave Facility

It is possible to add a m.w. facility to the loop to enable the user to listen to some light entertainment or news on a communications RX, although this is unlikely to be of much use for m.w. DX work!

The l.f. end of the loop actually just "clips" the h.f. end of the m.w. band. This can be extended by winding a few turns of thin pvc-covered wire around a short piece of ferrite rod. A little experimentation will get it right for you. It can be mounted vertically, using Terry-Clips, onto the upright boom just above the bottom terminal block. The extra coil is inserted, electrically, between the top end tail of L1 and C1 using a small switch or shorting lead so that it may be shorted out when using the loop for its intended purposes.

The purpose of the loop was to give a dual-band receiving antenna of compact proportions to sit on the table alongside the receiver. It should also eliminate, or greatly reduce, QRM/QRN and assist in reducing the dreaded noise from electrical wiring and appliances in a block of flats. □

YOU WILL NEED

Capacitors

Variable		
500 + 500pF	1	C1a,b (see text)
Ceramic disc		
200pF	1	C4
350pF	1	C3
450pF	1	C2

Oddments

Rotary switch 4p.3w.; 50Ω coaxial cable 1200mm; pvc-covered 1/0.6mm copper wire; Wood for arms and base (see text); Material for panel; Plastics 5A terminal blocks (see text).

Copies of *Short Wave Magazine* April 1986 are available direct from the Editorial Offices price £1.45 inc. postage.

Table 1

Switch Position	Capacitor	Total Capacitance
Narrow Band	C4	200pF
Inter-mediate	C4 + C3	550pF
Wide Band	C4 + C3 + C2	1000pF

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After many months of research and development RWC LTD are pleased to announce their latest HF modification for the Yaesu FRG9600 which now includes LF/HF/VHF/UHF coverage from 100kHz to 950MHz and improved 'S' Meter and a typical receiver *sensitivity now >2μV pd HF, >1.5μV 60-950MHz all @ 12dB SINAD. (Please contact us for detailed specifications).

We have fitted a High performance HF Front-End made for us by AKD. The new HF section **is fitted internally** with switching circuits and a small toggle Switch on the rear apron to enable band change whereby the display changes to read actual frequency (100kHz-60MHz). The standard SO239 antenna connector has now been changed for an 'N' connector for coverage from 60-950MHz and an SO239 connector fitted for HF coverage 100kHz-60MHz. (UHF extended coverage is now standard as per our original MK2 modification up to 950MHz).

As an 'N' connector is now fitted to all RWC FRG9600s for VHF-UHF coverage it is possible to use a wide-band discone antenna such as the ICOM AH7000 which is supplied with low-loss coaxial cable and 'N' connectors. A dipole or long-wire antenna can be used for HF coverage with very good results. **This facilitates use of two antennas for all bands.**

All modifications are Fully Guaranteed for twelve months from date of purchase/modification providing our modifications seals are unbroken.

* We reserve the right to change specifications due to continuous development and modification of this product.

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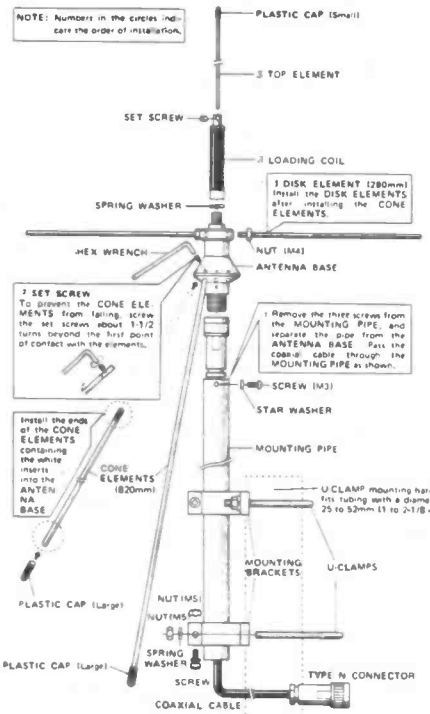

SPECIFICATIONS

Frequency coverage	Receive	25 to 1300MHz
	Transmit	50, 144, 430, 900, 1200MHz bands
Input power rating		200 watts
Input impedance		50 ohms
Supplied connectors		Type N
Supplied coaxial cable		5D-2V (50 ohm)
Type of antenna		Discone
Length		1.7 meters
Weight		1kg

Icom AH7000 @ £82.50 (inc free carriage UK mainland).

YAESU/RWC FRG9600 Options

PA4C ac adaptor £16.50 inc post.
FIF232C RS232 computer interface @ £75.00 inc post.
Raycom GP900 900-950MHz 3dB, base station ant @ £22.00 inc post.
AM-FM wide & narrow IF filters POA.
RWC 9600 MK2 owners HF mod @ £99.00 inc carriage (send unit).
FRG9600 existing owners VHF Mod only extended up to 950 MHz, "N" connector, improved sensitivity and "S" meter @ £40.00 return carriage paid.
YAESU FRG9600 Service Manual (inc Cat Prog) @ £12.50 inc post.
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KIT REVIEW

Wood & Douglas TVUP2 Receive Converter

This is an interesting kit which converts a amateur fast scan TV signal in the 430MHz band into a form suitable for demodulation by a conventional broadcast TV receiver.

If you've ever wondered whether amateur TV would interest you, then this kit, reviewed by Mike Richards G4WNC, could show you what's about without it costing too much.

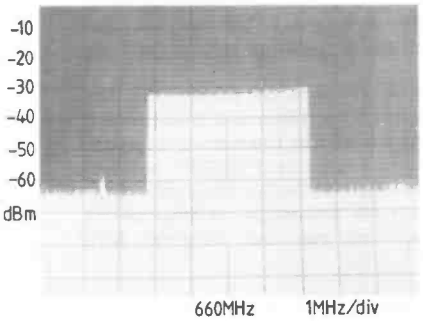
Construction

The kit arrived well packed and complete and all the components were up to Wood & Douglas's usual high standard. The p.c.b. is a double-sided glass fibre board with the top being the ground plane. All holes were of the correct size and spacing which saves the constructor having to open up holes to make components fit. The first job, as always, was to read the instructions supplied and check all the components. The instructions were detailed enough to enable a reasonably experienced constructor to continue without problems. Those less experienced may need to consult someone with more practice as the soldering of double sided boards needs to be carefully done.

The first items to be fitted were the trimmer capacitors which needed the earth legs soldering on both sides of the p.c.b. Useful tip here is to tin the leads just before insertion as this ensures that a good joint can be formed quickly. This avoids excess heat on these sensitive components. The next stage was to fit the resistors, capacitors and p.c.b. pins. To ensure correct placement of these components a set of diagrams is included in the instructions. The inductors, all of which were ready wound and stripped, were fitted next followed by the active devices.

The mixer uses a 3SK88 m.o.s.f.e.t. which should be handled with care as it is static sensitive. A simple way to achieve a reasonable degree of static protection is to use a static discharge lead as illustrated in Fig. 1. This lead is connected between earth and a conductive wrist band i.e. a metal watch strap, and discharges any static build up. One important word of warning when using this lead is that you should ensure that your bench is protected by a sensitive Residual Current Circuit Breaker (r.c.c.b.), they may be expensive but how much is your life worth?

Fig. 2.



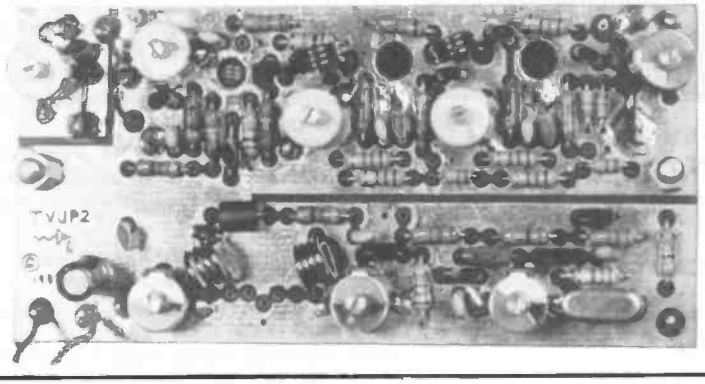
To complete the construction, the kit should be mounted in a well screened enclosure, a die cast box being ideal. The construction time for an experienced kit builder is about 2 hours.

The alignment instructions were designed to use the minimum of test equipment i.e. multimeter and a 430MHz signal source. To aid alignment, recommended starting positions were given for all the trimmer capacitors, which helps speed up the task. First of all the oscillator is tuned by adjusting for a peak in the current consumption. This is followed by tuning the tripler for maximum local oscillator drive which is measured by monitoring the mixer current. Final adjustment is achieved by using a 430MHz signal source either off-air or a signal generator for the lucky ones.

The converter circuit is identical to the receive section of Wood & Douglas' popular ATV2 TV transceiver. The 50Ω antenna input is coupled to a BFR91 common emitter tuned r.f. amplifer, input protection is supplied by two back-to-back silicon diodes connected across the input. The output of this stage is passed to a further BFR91 r.f. amplifer which is then coupled to a dual-gate m.o.s.f.e.t. mixer. The local oscillator uses a Miller Pierce configuration with a 78.125MHz crystal. The oscillator output is fed to a common base tripler to produce the final local oscillator frequency of 234.375MHz. This output is fed to the mixer gate two via a loosely coupled bandpass filter to reduce the harmonic content of the local oscillator. The final output from the mixer is passed to the TV via another loosely coupled filter to further reduce any spurious output.

The unit was put through its paces in the *Practical Wireless* test lab and was found to match the advertised specification on all counts. The photograph in Fig. 2 shows the output spectrum centred on 660MHz with an input frequency of 437MHz ± 2.25MHz. The vertical scale is 10dB per division and the horizontal scale is 1MHz per division. The conversion gain of the kit was a very respectable 30dB. Test equipment used for these measurements was a Marconi TF2017 signal generator, Marconi TF2370 spectrum analyser and Marconi TK2373 frequency extender. The completed kit consumed 17mA from a 13.2V supply. A MUTE facility is also provided which changes the 30dB conversion gain to a 30dB loss which is very useful in the presence of strong local signals or if the unit is used with an ATV transmitter.

As can be seen from the measured performance, the high conversion gain means that even a relatively insensitive television receiver becomes quite usable for amateur television reception. The kit was very well planned and the construction and alignment instructions were suitable for the enthusiast with a few kits under his belt. If after building the kit, you have problems with the alignment it can be returned to Wood & Douglas to be repaired and aligned for which they charge £4.85 plus parts.



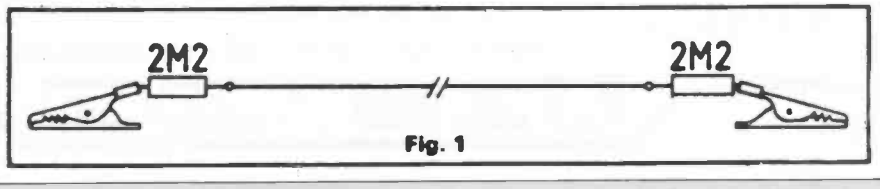


Fig. 1

SPECIFICATION

Input Frequency	436MHz (±4.5MHz)
Output Frequency	Channel 36 (nominal)
De-sensing Input Attenuation	-60dB
Power Supply	12V @16mA
Conversion Gain	≃30dB
Noise Figure	<3dB

The TVUP2 ATV Receive Converter costs £28.75 inc VAT in kit form or £38.40 ready built and tested. The kit is available from **Wood & Douglas, Unit 13, Youngs Industrial Estate, Aldermaston, Berks RG7 4PQ. Tel: 07356 71444.** Many thanks for the review kit.

I'm running out of Coffee Bernie

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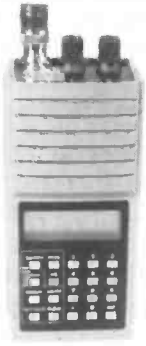

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BANDSCAN

with Peter Laughton

The hottest news in the world of short wave broadcasting is the recently held World Administrative Radio Conference on High Frequency Broadcasting which has recently ended in deadlock and confusion. Bandscan looks at some of the effects of the conference on short wave broadcasters worldwide.

Other items of interest this month are about the Voice of America, BBC Radio 648, Radio Netherlands' new transmitter site and the Westlink Amateur Radio Video Project.

WARC — Well Advanced Radio Chaos!

May 17 is World Telecommunication Day, as proclaimed by the United Nations specialised agency, the International Telecommunication Union. It is marked annually to commemorate the founding of the Union in May 1965 with 20 States. The ITU now has 162 member states, Antigua and Barbuda joining on February 4. Clearly, the larger the Union has grown, the more difficult it has become to co-ordinate world telecommunications. At a recent conference, where a decision taken in Europe will affect communications as far as the Pacific, things appear to have been deadlocked.

Between Monday February 2 and Sunday March 8 just over 700 people gathered in Geneva Switzerland for Part II of the World Administrative Radio Conference on High Frequency Broadcasting. Approximately 140 countries actually use short wave, but at the start of the conference only about 90 turned up. The participation improved as the conference proceeded.

The frequency that an international broadcaster currently picks to beam to a particular part of the world is decided by tradition and a bit of diplomacy. A station chooses a channel, sends a note about it to the ITU in Geneva, and they in turn publish the *White Book*. This comes out a few months before the season it represents, attempting to show the state of the short wave broadcast bands. If two or more stations decide to use the same channel, and that happens a lot at the moment, it is up to those affected to sort out a solution amongst themselves. Currently there are a lot of frequencies where no solution is found, and that spot becomes a "Tower of Babel". The situation is complicated by the fact that many countries, such as USSR, register more frequencies than they actually use.

Computer Planning

In 1984, the first part of the WARC conference laid down some ideal specifications, such as the current selectivity and sensitivity of the average receiver. It also decided to look at another way of planning how the short wave broadcast spectrum is divided up. A team of six renowned experts devised a computer planning method. Although we're oversimplifying, it basically asks each country to send in a list of broadcasts it would like to make. A computer in Geneva would then sort out how many frequencies the station would get at the time requested, and exactly what those frequencies should be.

Trial runs of the computer method have now been made, and the results demonstrated at WARC 87. The software programmers had worked hard. Yet the computer plan showed that it was impossible to fit everyone's requirements into the space allocated. Either overall reception quality would have to be reduced drastically (nothing better than SIO 333!), or countries would have to agree to switch some of their facilities off. Stations with 40 or more transmitters were being told by the computer plan that as many as half of their transmissions would have to be scrapped if the new system were adopted. Smaller short wave users, on the other hand, were told that they would have to hop to new frequencies every 30 minutes, often in the middle of a broadcast. Bearing in mind that many transmitters (especially in Latin America) are crystal controlled, this news wasn't greeted warmly by developing countries.

Working Groups in Square Brackets

The conference was divided into several committees. Most of the attention concentrated in Committee 4 looking at

technical standards, and Committee 5 examining the computer planning of the bands. Initial discussion took place in working groups who sent their reports to the committee, and the committee in turn reported to the open session. It was much easier to change a proposal in a working group than in front of the plenary session with 800 people around you. If agreement could not be reached in a working group, then the text of the disputed area was put into square brackets, and then passed on to the committee level to be resolved there.

By the end of February, nearly all of the text from the four working groups in Committee 5 was written between square brackets! The conference was at the point of failing. At the last moment the chairman of the committee came up with a Global Compromise. It involved developing further both the computer planning method and the current procudure (the so-called Article 17). By 1992, both systems should be running alongside each other. Then a new conference can decide how much, if any, of the short wave broadcast spectrum should be sorted out by computer, and how much by an improved version of what we are doing now. This decision would take effect in 1994 at the earliest.

Failure

The word failure wasn't used officially to describe the conference. But privately many delegates expressed reservations about the chances of reaching an ideal agreement five years from now. There has been a marked lack of trust between North and South during WARC HF 87, and that threatens to spill over into other conferences too. The Geneva disarmament talks being held at the time of WARC softened the relationship between two large users of the spectrum – the USA and USSR. Jamming was not discussed at the conference at all, it being regarded by most delegates as a political, not a technical, problem. But the conference was not all bad news.

The idea of gradually switching over to single-sideband (s.s.b.) is now accepted. Broadcasts using s.s.b. take up half the space that standard a.m. transmitters occupy on the radio dial. But the switch to this more efficient method of mass communication is a long term process. Listeners have to buy new radios with synchronous detectors, broadcasters have to buy new transmiters or modify existing facilities. WARC agreed that stations can switch over to s.s.b. as from have to buy new transmitters or modify should be capable of broadcasting in either a.m. or s.s.b. By the year 2015, all short wave stations should be transmitting in single-sideband. Until then, stations will probably opt for a reduced carrier a.m. This can be received on standard receivers currently in use, without too much added distortion. So no mad rush on new receivers as yet, though a new challenge is now created for receiver manufacturers to take up.

Broadcasters point to the fact that only 10 per cent of the spectrum is allocated to their needs. They hope that the bands will be further expanded, pointing to the fact that other users of the s.w. spectrum are switching to satellite. But it remains to be seen if military and point-to-point stations are willing to give up the chance for back-up services on short wave should the satellite fail. With all of short wave's imperfections, a lot of people still care about it.

Save Your BRT Stickers

The Flemish speaking Belgium Radio and TV Service will shortly change its logo to the VRT – Vlaamse Radio and TV. A few years ago, the French speaking counterpart Radio Television Belge spent several million francs adding the letter "F" to its logo to become RTBF – Radio-Television Belge de la Communaute Francaise. With the cultural differences between the French and Flemish communities apparently widening. Flemish politicians in Belgium feel the need for a VRT. Currently the BRT external service is the only way non-French and Flemish speakers can get daily news from the country. A small dedicated team in the Belgium capital put together an excellent half-hour programme called *Brussels Calling*. One of the producers, Frans Vossen, also puts together a DX programme called *Radio World*. RTBF on the other hand is content with relaying French programmes to Africa.

Marshall Music

The Marshall Islands are on short wave! The bad news is that the station WSZO is not going to "boom in like a local', at least here in Britain. A 10 kilowatt unit started broadcasting at the beginning of March on 4940kHz. It was immediately heard in the rest of the Pacific around sign-off at 1000UTC. The short wave transmitter is needed to improve reception in the outer islands, but the general manager was surprised to get reports from Melbourne, Australia within days of going on the air.

Amateurs Join the Professionals

The Westlink Amateur Radio group in California USA are currently preparing a non-profit video production about amateur radio. The idea is that the finished product can be offered as documentary to TV stations. This is being organised by former NBC award winning TV broadcaster Roy Neal. They've now launched an appeal to radio societies around the world for any video material that features amateur radio in action in their country. Whether it's PAL, SEECAM or NTSC colour format doesn't matter. Even if you don't have the material yourself, the organisers would be interested to learn of the title of any presentation you may have seen at a club or on television so they can contact the producers. Westlink hope that this initiative will help to reverse a downward trend in the interest of amateur radio in North America. By making it themselves, Westlink can concentrate on promoting the positive sides of amateur radio, rather than the "QRZ, QSL, QRT" impression that some people have. Suggestions and comments please to: Westlink Video Project, 28197 Robin Avenue, Saugus California 91350 USA.

463m BBC World Service 648kHz

BBC Radio 648

As from the middle of May, the BBC is planning to improve the continuity of its medium wave service to Europe. Currently the frequency of 648kHz jumps abruptly between the English "World Service", and the French and German services. This is especially annoying during peak listening periods. By creating BBC Radio 648, they hope to iron out the language changes giving a more uniform connected sound. Maybe something can also be done about the rather abrupt change-over between Radio 4 on 200kHz and BBC World Service which occurs when the former signs off.

VOA Expanding/contraction

The Voice of America recently concluded a new agreement with the Greek government to continue using its facilities in Kavala and Rhodes. The ten 250 kilowatt transmitters in Kavala are particularly important to VOA's Russian service. Meanwhile, VOA's recently confirmed director Richard Carlson is constantly having to defend the US$1.3 billion modernisation programme. This ambitious project will considerably improve VOA's audibility in important target-areas – especially Latin America. Yet budgets are reviewed on an annual basis. Cutbacks have already been made to English programmes from VOA. The 0700-0800UTC release to Europe has been scrapped for instance, and programmes in Slovene, Hausa, and Swahili have also been hit. VOA-Europe, the satellite radio service started in October 1985, has been saved from being scrapped altogether. But the budget is now US$1.2 million instead of 3.1 million.

Sweet Dreams

The latest *White Book* from the ITU in Geneva contains some more registrations from Burkina Faso, formerly Upper Volta. For the last couple of years this country has registered channels but has never actually been heard on them. No-one is sure if they ever will. One of the latest is 6045kHz between 0800 and 0000UTC. The power is listed at 50kW. That would make for a nice catch in Europe.

Royal Opening

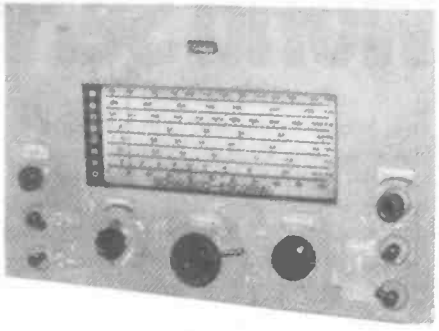
As part of the 40th anniversary celebrations, Prins Claus of The Netherlands is expected to officially open the new Radio Netherlands Flevo transmitter site at 1130UTC on May 19. Special QSL cards have been promised by the station for reception reports on programmes put out that day. The Flevo transmitter site has been in a testing phase for the last two years, but now it seems it is time for a royal seal of approval.

Link-ups Increase

The upward trend for special link-ups seems to continue. One of the best so far this year was a live programme between NHK Radio Japan, and Radio Australia in Melbourne. Listeners who reported on the programme have recently received an attractive commemoration card. Radio Beijing and BBC Radio Manchester also did a swap to celebrate the Chinese New Year at the end of January. This was the first time that an English exchange had taken place between the English section of Radio Beijing and another station. □

Restoring a Communications Receiver from Nazi Germany

Chas. E. Miller



Part 2

In the final part of this tale, Chas E. Miller explains how he overcame the problems that arose when the set went up in smoke, and how he modified valves to fit into side-pin holders.

Alignment

The (hopefully) final task was to check the r.f. alignment and adjust as necessary. For this job I used the Marconi TF867, which needs, as they say, no introduction from me but which deserves my praise as being not only accurate, but so darned convenient in the way its frequency ranges are arranged.

I found that in the *Escorial* the large ceramic formers beneath the chassis were for the three higher ranges, with the other four having smaller formers mounted in the above-chassis box. With almost any receiver it is soon possible to establish a sequence for the various trimmers, padders, etc., and the *Escorial* proved to be no exception. All but one of the flat, rotary trimming capacitors consented to being adjusted, and I tolerated a small discrepancy on the 545kHz – 1500kHz range rather than risk a breakage. All the other bands could be brought to very acceptable standards of alignment, which brought much relief as well as pleasant surprise, since I had feared that more iron-dust cores might have to be repaired.

I have now assembled the *Escorial* into its cabinet and have it on a bench near to hand whilst I am working so I may operate it frequently and with great facility. Curiously enough, one of the first radio programmes I received at length was a half-hour of 1930s style music from a Dutch station – much the kind of thing that the set may be expected to have reproduced in its war-time days.

Superior

As was mentioned before, s.s.b. may be resolved satisfactorily, and the short wave performance in general is excellent. The superb tuning mechanism in conjunction with the large dial and comparatively narrow coverage of each band endow an almost band-spread effect. Accurate tuning is aided by the meter above the dial, which needed no more than the freeing-off of its needle to be put into working order. The sound quality is extremely good, as might be expected from a push-pull stage rated (according to valve-data books) at around 8W. In short, the *Escorial* is as good for general listening as it is for long-distance work. Tuning drift appears to be negligible and the logging scale makes it possible to re-tune to s.w. stations with no difficulty.

This is altogether a very superior example of the valve communications receiver, not at its heyday, but before that point. One has only to briefly compare the general appearance and performance of the *Escorial* with many so-called communications RXs of its period to realise that it stood head and shoulders above the majority.

It was worth that day of shivers to obtain it!

Post Script

Was the malevolent shade of Adolf Hitler peering over my shoulder when I iterated Winston Churchill's remarks regarding him and his regime? At any rate, only an hour or so after the article was completed the *Escorial* went up in a cloud of smoke! I had left it running in anticipation of the arrival of an interested friend, and although it had previously been run for hours at a time, in the short time that I was absent from the workshop the mains-transformer went into the self-destruct mode. We actually smelled the smoke, but did not connect it at once with the RX, until we entered the workshop and found it full of evil fumes. There was nothing to be done but to stand the set outside and hope that the wind would eventually disperse the stink of burned insulation.

In the meantime I tried to locate a transformer that would act as a replacement. The main problem was that the old 4V valves are notoriously heavy on heater current, a typical triode consuming around 0.65A and an output pentode perhaps as much as 2A. I had, therefore, to assume that the *Escorial* would require some 10A total, especially when the dial lamps were taken into account. A transformer capable of delivering this current is hard to find nowadays, since 4V valves have not been used in this country for some 35 years, and even then they were in a minority compared to 6.3V and series-run types. I have a number of transformers offering 4V, but only for rectifier heater purposes at about 2A maximum, and everyone else I contacted seemed to be in the same boat. The chances of having the original transformer re-wound appeared sufficiently remote to make me consider an emergency alternative.

Transformer

In my searching I turned up a transformer that had come from a local jumble sale, rated at 12V 50VA on its secondary. Since three times 4 is 12 the prospect of a series/parallel heater arrangement appeared. To set up a system of this kind one has to know the heater current of each valve with some accuracy, so I set about measuring the values with the aid of the 4V transformer winding mentioned above. I found that the two output valves drew 1.5A each, and that all the other valves close to 0.65A (some a little under, some a little above, but near enough for the figure to be accepted as nominal). This suggested that the r.f. and i.f. sub-chassis, with their three valves each, could be wired for series operation without too much trouble, leaving the remainder of the valves to make up a third chain. The configuration that came to mind was to have the two AL4s in series to take 8V at 1.5A, followed by the a.f. and b.f.o. valves connected in parallel to draw as close to 1.5A as possible at 4V. This would necessitate discarding my EF9 b.f.o. valve and its replacement by a 4V type. In the absence of anything else suitable, I opted for a Mazda VP41 (0.65A) re-based to fit the original valve-holder on the *Escorial*. This was done by removing the base from a defunct P-base valve and fitting on to extended base leads on the VP41. Possibly someone very brave might have gone as far as actually to remove the VP41 base altogether and to use the wires coming from the glass bulb, but I was not inclined to tempt fate in this manner! In the event the results are not too bad as regards appearance, whilst the VP41 works extremely well in this rather unusual role. But I anticipate. The AC2 and the VP41 draw a total of 1.3A, leaving only another 200mA to be dissipated by a shunt resistor of 20 ohms.

A. KELLY

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432-19T/	19 Ele	2.2m	14.2 dBd	£40.94	A
ATV					
432-17X	17 Ele Crossed	2.2m	13.4 dBd	£56.55	A
432-17T	17 Ele Long	2.9m	15.0 dBd	£45.08	A
2M					
144-5	5 Ele	1.8m	9.2 dBd	£22.48	A
144-7T	7 Ele	1.6m	10.0 dBd	£27.77	A
144-8T	8 Ele Long	2.45m	11.0 dBd	£35.95	A
144-14T	14 Ele	4.5m	13.0 dBd	£53.72	A
144-19T	19 Ele	6.57m	14.2 dBd	£64.26	A
144-6X	6 Ele Crossed	2.5m	10.2 dBd	£45.71	A
144-GP	Ground Plane		Unity	£16.57	B
4M					
70/3	3 Ele	1.7m	7.1 dBd	£34.64	C
70/5	5 Ele	3.45m	9.2 dBd	£52.60	C
6M					
50/2	2 Ele		4.7 dBd	£32.00	A
50/3	3 Ele	2.39m	7.1 dBd	£39.95	A
50/5	5 Ele	4.77m	9.2 dBd	£59.90	A
CK50	50/2-50/3 Conversion kit			£11.50	B

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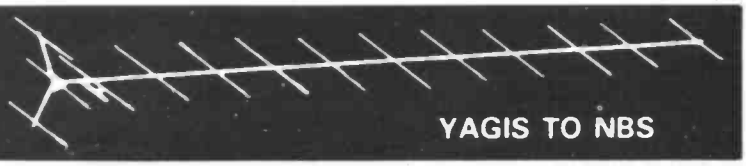


YAGIS TO NBS

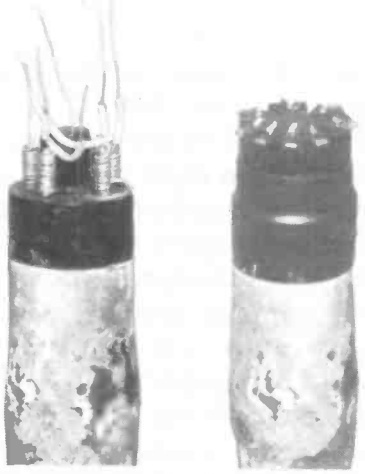
Restoring a Communications Receiver from Nazi Germany

Heaters

It proved possible to modify the heater wiring in such a manner as to make restoration to original fairly simple should a genuine transformer become available. Once the job had been accomplished I tried a trial run with heater supplies only, to check their voltages under working conditions. Fortunately all were within the close tolerances demanded by valves not really intended for series operation. The other transformer mentioned was then wired in to provide the AZ1 with heater and anode voltages. It was then possible to check the performance of the set and to much relief it was found to be back to what it had been before the burn-up. I naturally endeavoured to find out what had triggered the failure, but could determine nothing specific. An h.t. short is the most common cause of transformer breakdown, but none was evident, and I was forced to the view that the primary may have broken-down, to earth. Shorting of the l.t. windings is a less likely event.

Dial Lamps

Turning my attention to the dial lamps, to my surprise I found them to be two long "festoon" types, rated at 15V at 0.2A each. Presumably there must have been a special l.t. winding on the original mains transformer to supply them. One was a little blackened, the other pristine, which is laudable since they are patently original. They give ample light when connected across the 12V supply. The lamp illuminating the tuning meter was changed from a 4V type to an 8V at 0.45A type, of which I happen to have a plentiful supply. This operates happily on the 6.3V winding on the h.t. transformer. It proved to be quite impossible to make out any voltage rating on the miniature festoon lamps fitted to the band-indicator light, but they too seemed to accept 6.3V without protest. However, in the interests of making them last as long as possible (where should I obtain spares?) it was decided to fit a series resistor to drop the supply to around 4V.



Two of the stages involved in modifying a conventional valve base to a side-pin type.

Inter alia, I discovered that the output transformer has been replaced at some time, and as a matter of course I tested the wiring to see if it had been carried out properly. I found that the anodes of the two output valves had different, incorrect loads. In putting this to rights, with the aid of a reputable transformer, a very useful increase in a.f. gain and sound quality was obtained.

The only remaining work to be done to realise the *Escorial's* full potential was the re-tuning of the b.f.o. to compensate for the different internal capacities of the VP41 as compared with the EF9.

I am prepared to accept that purists may carp at this method of restoring the set to use, and can make only this defence: As a pioneer motorist said of his gear-box, "ces't brutal, mais ca marche"! □

AERONAUTICAL RADIO

Godfrey Manning BSc MB BS G4GLM

Aeronautical radio falls into two categories: communication ("com") and navigation ("nav"). The latter can either rely on ground aids or else be self-contained within the aircraft. The table in Fig. 1.1 summarises the radio facilities that will be dealt with in this series.

Communications

Here we will deal with the first group, communications. Military users can be found in the ultra high frequency (u.h.f.) band (225-400MHz) and will not be further considered here.

Civil flying over the United Kingdom (UK), Europe and most populated land masses uses the very high frequency (v.h.f.) band for communications. Only when overflying remote areas, such as the North Atlantic, is high frequency (h.f.) required. The v.h.f. com band occupies 118 – 135.975MHz giving 720 channels with 25kHz spacing, using conventional amplitude modulations (a.m.) with both bands sidebands. VHF signals are most commonly propagated along a line of sight, the limiting factor for terrestrial transmissions being the curvature of the earth: the radio waves can't "see" beyond a theoretical horizon. Aircraft have the advantage of altitude when in flight, and much longer straight-line air/ground paths are possible than ground-to-ground routes.

Most airliners carry at least two, and sometimes three, v.h.f. transceivers or "boxes". In light aircraft each set might be built as a single unit, but airliners more commonly banish their transceivers to a radio rack that is either behind the flight deck or under the floor in an electronics bay. All that is left on the flight deck is a remote controller (one per transceiver), a station box (one per crew member) and a headset socket (one per crew member). Most airlines provide for a supernumerary crew member for training and other purposes and in this case an extra station box and headset is needed. There will also be a flight deck loudspeaker and hand-held microphone to enable the uncomfortable headsets to be removed during cruise (above 10000 feet, when the crew member's hands are free). Lastly, allowance must be made for loss of cabin pressure in which case the crew switch rapidly to breathing from oxygen masks (Fig. 1.2) if the aircraft is above 10000 feet. The oxygen masks must also contain a microphone which switches into circuit automatically (in place of the usual headset) when the mask is donned. If serated smoke goggles are provided, then again an internal microphone is needed as these too cover the crew's mouths to provide oxygen. The standard NATO type headset socket has 4-poles. The push-to-transmit (p.t.t.) switch is typically a flat paddle attached to the control column such that it lies easily under the pilot's thumb whilst the controls are being held. Often this is pushed one way for transmit, and in the opposite direction for talking to the other crew members by intercom.

Even the radio enthusiast, despite the benefit of technical knowledge, can feel that the flight deck of an aircraft is a secret place. For most passengers the job of a pilot is positively bewildering! This series of articles, will, I hope show you how the many applications of radio are used in flying. Most of us encounter flight as fare-paying passengers and it is typical airline equipment and techniques that these articles are about. A few lucky ones get the chance to fly light aircraft as a hobby, the principles are the same but the gear often less complicated.

The Antenna

The last item of equipment is a fin-type antenna for each transceiver. The antenna is fitted to the outside of the aircraft, and you can look at this when you next board a flight (Fig. 1.3). Sometimes antenna are "suppressed" into a less conspicuous shape; this suppression describes the mechanical configuration (i.e., the equipment does not protrude much from the line of the fuselage skin) and has nothing to do with electrical interference! The aim is to reduce drag by streamlining. Antennas are normally seen sticking out of the midline top or bottom of the fuselage, but are sometimes found atop the tail fin (e.g. on the BAC One-Eleven). The aluminium alloy fuselage makes a good ground-plane. Connection is by coaxial cable which mates with a socket that protrudes into the fuselage from the antenna itself.

Fig. 1.1

Communication and use of selective calling		**HF VHF UHF**	**Pre-recorded broadcast Two-way**
Navigation	Dependent on ground aids	Direction finding/homer Non-directional beacon VHF omni-directional radio range Distance measuring equipment & TACAN Instrument landing system ←	Localiser Glide slope Markers
		Airways fan markers Omega Decca Radar ←	Primary Secondary Cloud-collision
	Self-contained	Radio altimeter Doppler	

Fig. 1.2

AERONAUTICAL RADIO

Part 1

Fig. 1.3

Remote Controller

Looking more closely at the remote controller (Fig. 1.4) it is seen that the channel selection is made via two knobs (concentric, in the example shown). The larger knob in our case changes the frequency by 1MHz increments and the smaller one by 25kHz steps. The selected frequency is shown in a window above the knobs, but with the third decimal place omitted. This particular example also includes the navigation receiver controller (to the right of the com section) and one difference here is that the channel spacing is 50kHz. In the example shown, the com set is on the Heathrow tower frequency of 118.7MHz which is appropriate for the final stages of an approach. The nav set, by the way, shows 109.5MHz which is the instrument landing (i.l.s.) frequency for Heathrow runway 28 left. One further feature that may be operated from the controller is squelch which mutes the receiver's background hiss in the absence of a signal. This is less tiring to listen to over long periods of time. Constant hiss can eventually cause "ringing in the ears" (tinnitus) which might possibly become a permanent affliction.

The function of the station box (Fig. 1.5) is to enable the crew to switch their headsets (and the cockpit loudspeaker) between the various radios. The captain might remain listening on Heathrow Tower (using v.h.f. com set No. 1) whilst the first officer briefly switches to a navigation aid to check that it is correctly tuned in (perhaps the runway 28L i.l.s. using nav set No. 1). When the first officer is satisfied, he will also switch back to the tower frequency (leaving the nav set connected to the instruments but without listening to it himself). During a typical landing, the first officer might converse with the tower controller; the captain (who is handling the aircraft) listens in too.

The headsets also enable intercom discussions between crew members, again controlled by the station box. Finally, the crew members have their own individual volume controls for each listening channel on their station boxes.

Having a combination of two transceivers and rapid switching between them enables easier liaison with air traffic control (a.t.c.) Modern aircraft are becoming simpler to fly, thanks to more automated systems; the third crew member (flight engineering officer) who was previously needed on larger aircraft types is now increasingly redundant. The pilot's greatest problems at present are in the environment outside the aircraft; other traffic and rapidly repeated changes of a.t.c. instructions, including frequency selection, are amongst these. If on a complex and busy approach, say, the likely frequency settings are known in advance then one pilot can fly the aircraft whilst the other sets up the transceivers and talks to a.t.c. on one of them. It is routine to set up the next anticipated frequency in advance on the other box; a quick flick of the switch enables frequency changing (when instructed by a.t.c.) without loss of time. As a safety feature, the previous frequency is still selected on the first box at this moment and so if a wrong frequency change is made, contact is not completely lost. Further safety accrues from the redundancy of two complete transceivers, antennas, etc., (i.e. complete replication: not just switching between two v.f.o.s on one set).

Fig. 1.4

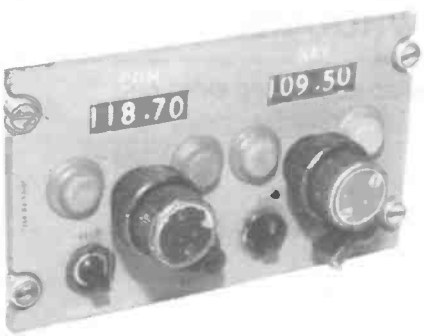


Fig. 1.5

Two Services

There are two types of service for aeronautical communications. Pre-recorded messages are broadcast continuously on certain frequencies. A complication is that some are also obtained whilst listening to a tuned-in navigation beacon. In general, reports of current/recent weather are broadcast and the VOLMET ("volume meteorological reports") are an example of this. London VOLMET South transmits continuous reports in a cycle on 128.6MHz for Heathrow, Gatwick, Luton, Bournemouth, Stanstead, East Midlands, Brussels, Cardiff and Jersey with an identification message at the start of each cycle. The message was previously recorded on a continuous tape loop but is now computer-digitised speech. Another continuous transmission is the automatic terminal information service (a.t.i.s.) for either arrival or departure. These give weather, which runway is in use, and other information about arrival or departure operations such as any beacons that are off the air. Heathrow arrival information, for example, is on 133.075MHz.

Most communication is two-way air/ground. Not all a.t.c. services have a controlling role, in fact some are information only. Control implies that the ground station has authority to tell the aircraft what to do; there will be good reason for this, such as the controller having the entire traffic pattern in view on a radar screen. Some services are just advisory, such as in the flight information regions. Here, pilots are told about other traffic in the area and are expected to work out avoiding action for themselves. In the wide-open spaces this works satisfactorily; as there is no obligation to speak to the ground station, it is also not possible

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for control instructions to be issued since the "controller" doesn't necessarily know the position of all aircraft in his areas. This is clearly not suitable for congested areas such as defined airways and the airspace surrounding terminal and larger airfields so here contact with the controller, who does give pilots instructions, is mandatory.

Special Interest

Two frequencies are of special interest. The first is 121.5MHz, which is the international distress frequency. At the London a.t.c. centre (based at West Drayton, near Heathrow) the distress and diversion (D&D) cell monitors this frequency. If no major emergency is in progress, pilots in mild distress can use this (e.g. to ask for directions if lost). Pilots and the D&D cell both appreciate the chance to practice, so "Practice Pan" calls are often heard for direction-finding purposes. "Mayday" signifies real immediate danger to life but "Pan" is a less urgent degree of distress. If a Mayday call is made on any frequency, all other traffic must cease to use that frequency until the emergency is over. Using the v.h.f. communication frequencies for direction finding (as in a practice or real Pan call) is where com and nav overlap and is described in more detail later. The other noteworthy frequency, the easily-remembered 123.45MHz, is often used unofficially by pilots to informally pass useful information between themselves (especially on the longer-haul routes).

Technique

The technique used for aeronautical radiotelephony is closely defined. In the UK, for example, numbers are stated digit by digit (0 is pronounced "Zero") and in a rather exaggerated way (e.g. 9 is pronounced "Niner"). The decimal point is stated as "decimal" so the London VOLMET frequency is "Wun Too Ait Decimal Six". Letters of the alphabet are given using the same standard phonetics as are already familiar to radio amateurs and s.w.l.s (e.g. "C" is read as "Charlie" and "Q" as "Quebec" etc.). Sometimes this is taken to absurd lengths; visual meteorological conditions (v.m.c.) implies visibility adequate for not having to rely on instrument navigation, but pilots insist on describing this as flying in "Victor Mike Charlie". The phonetics (Fig. 1.6) are standardised world-wide by the International Civil Aircraft Organisation (ICAO), so when spelling something (in any country) there is a maximum of only 26 sounds to differentiate. For this reason, radio amateurs would also be advised to stick to the standard phonetics and stop inventing their own as the fancy takes them! Also, these phonetics are claimed to be easily distinguishable even when spoken by a variety of foreign accents.

Another internationally-agreed convention is the use of Q-codes. Radio amateurs are familiar with many of these

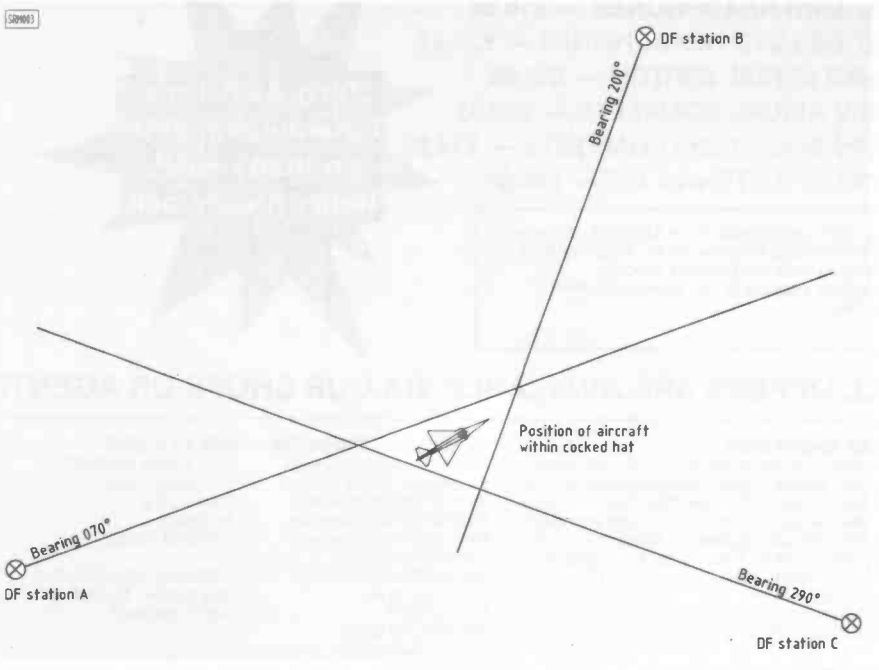
A	Alpha	S	Sierra
B	Bravo	T	Tango
C	Charlie	U	Uniform
D	Delta	V	Victor
E	Echo	W	Whiskey
F	Foxtrot	X	X-Ray
G	Golf	Y	Yankee
H	Hotel	Z	Zulu
I	India	1	Wun
J	Juliet	2	Too
K	Kilo	3	Tree
L	Lima	4	Fow-er
M	Mike	5	Fife
N	November	6	Six
O	Oscar	7	Seven
P	Papa	8	Ait
Q	Quebec	9	Nin-er
R	Romeo	0	Ze-ro

(e.g. QSY which is code for changing frequency) although a special subset tends to be required for aeronautical purposes. Two codes commonly heard relate to altimeter setting but it is not within the scope of this article to describe non-radio instruments so only a brief description is given here. The pressure altimeter is really a barometer that measures the pressure of air outside the aircraft; as this pressure decreases with height above sea level, altitude can be computed. Unfortunately this means that before taking a reading from a pressure altimeter the instrument must be corrected for the current day's atmospheric pressure (in millibars or, when in the United States, inches of mercury). The altimeter has an adjustment knob and a pressure subscale that indicates the setting as selected by this knob. If the aircraft is on the runway and the QFE pressure (as given to the pilot by the controller) is set on the subscale, the altimeter will always read zero and after take-off height relative to the aerodrome is indicated. Setting the QNH will instead cause the altimeter to indicate height above sea level, be it whilst on the ground or in flight.

What does one hear whilst sitting with the pilot on the flight-deck? Most information exchanged with the controller seems to be numerical. The aircraft has an identifying callsign, e.g. "Speedbird 123" will be British Airways flight 123 or, in the case of a private service the aircraft's registration will be used – such as Golf Bravo Golf Lima Mike for G-BGLM (all British aircraft registrations begin "G-"). Other parameters are aircraft speed in knots (nautical miles per hour), heading in degrees, (always given as three digits such as zero niner zero for due east) and altitude. Altitude is normally given in feet, but higher-flying aircraft refer to flight levels (f.l.s) which are just the altitude divided by 100 (e.g. 10000 feet = FL100). Other numerical information concerns estimated time of arrival at a given navigational point, often given as just minutes after the current hour, but distances are rarely needed except distance to touchdown which is sometimes given to the pilot on approach. Weather information obviously includes QFE/QNH but also wind as direction and speed in knots; temperature and dew-point; runway visible range in metres and cloud given as oktas (eighths) cover at each height.

A typical call might be: "London, Speedbird 123 passing three thousand for five on 1014, estimating Brookman's Park at one five". This aircraft is climbing through 3000 feet on its way too 5000 feet (from which point further clearance will be needed from the controller before climb can be resumed) and as a safeguard, the current QNH setting in use is stated by the pilot. The time of arrival at the next radio beacon (Brookman's Park) is given as 15 minutes past the hour.

Fig. 1.7



Direction Finding

Direction finding (d.f.) is really a navigational facility that uses the communication frequencies. The relative bearing of the aircraft from the d.f. station is measured whilst listening to the aircraft's com transmission. The v.h.f. d.f. (v.d.f.) or homer station might be called by the aircraft in order to find out the QDM: "What magnetic heading must I steer in order to reach you, if there is no wind?" The pilot must transmit his callsign, or count, for several seconds in order for the bearing to be taken. If several receiving stations are linked together, such as by the D&D cell, then an actual position can be found. Two receivers can each work out a bearing, with the aircraft being at the point where the lines cross. But there is bound to be a slight error; if three bearings are taken, it is most unlikely that they will cross and the resulting enclosed triangle is called a "cocked hat". The smaller the triangle, the closer the agreement between the bearings and so the more accurate the position report (Fig. 1.7). Some aircraft also carry a homer receiver. The signal from two antennas is compared to produce a deflection on a meter needle that indicates that the ground station is either to the left, to the right, or ahead of the aircraft.

Use of the h.f. band is only necessary for long-range flights and many short-haul airliners do not carry an h.f. set. The h.f. antenna is sometimes a long wire stretched from the top leading edge of the tail fin down to a short pylon mounted on the front roof of the fuselage. An alternative is a long boom, resembling a jousting lance, protruding horizontally forwards perhaps from the top of the tail fin (e.g. Boeing 707) or from one wing-tip (e.g. Boeing 747 "Jumbo"). Because of the vagaries of propagation, the aircraft will always be given two alternative frequencies on which to attempt contact. Even then contact may well be indistinct so here more than ever strict procedure must be adhered to, e.g. "Shanwick, Speedbird 123 on 8879, position". The aircraft is making a call on 8879kHz. After establishing contact, current position is given along with an estimate of time to the next reporting point; other information might include temperature and wind as measured by the aircraft at that position.

Selcal

A useful addition to an aircraft's communications equipment, especially for long flights is selective calling (selcal). Each aircraft is allocated a four-letter code, e.g. AM-DH, to which its selcal receiver is pre-set to respond. To call the aircraft, the ground station transmits the necessary code to activate the receiver; on the flight deck, a chime sounds and a light flashes to alert the crew members by making them listen to all other aircraft's transmissions on a long flight, whilst trying not to miss a call meant for themselves.

In this first part I have given an insight into the use of radio for communications by aircraft. Subsequent parts will describe the multiplicity of airborne navigational equipment. Visitors to my small collection of such items are welcome by prior arrangement. Also, donations of unwanted, old or broken aircraft equipment, instruments and manuals are always appreciated, no matter how small and insignificant they may appear. □

London's Gatwick Airport with the main runway (upper left) and emergency runway to its right
(Photograph Gatwick Airport Ltd)

PANASONIC RF-B60 RECEIVER

Peter Shore

The Panasonic RF-B60 has recently entered the market in the United Kingdom. It includes features which are becoming common-place on receivers of this size and in this price range, including digital tuning and display, direct-entry tuning and memory system. Peter Shore had the opportunity to test the receiver here in the UK.

The RF-B60 covers v.h.f. f.m. from 87.5 to 108MHz, long wave 155-519kHz, m.w. 522 – 1611kHz and short wave continuously from 1615kHz to 29.999MHz (except for models sold in West Germany which range only to 26.100MHz).

The set has a most sophisticated tuning system which allows one of three possible methods to be employed. A large rotary tuning knob with two faces, one on the front and another on the right hand side of the set, allows for conventional tuning, whilst a calculator type keypad enables frequencies to be input directly. There are 12 keys on the pad, marked from 1 to 9 together with 0, a decimal point and a final key marked M for memory. To input a frequency, it is necessary to depress the small key marked FREQ alongside the main key board, followed by the frequency in either kHz or MHz and then the ENTER key: if the combination is correct, the receiver tunes in the selected channel in less than a second. The digital display shows the numbers as they are keyed in, and displays the final tuned frequency.

Alternatively, individual broadcast metre bands may be selected, using the same keypad – the number 1 key doubles as 120m, through to 13m on the M key. Once again the sequence is the same -press the METER key, followed by the numeric key and then ENTER. The set is then tuned to a frequency towards the lower end of the metre band.

The RF-B60 may also be tuned using two arrow keys adjacent to the keypad. These will tune the receiver in 5kHz steps on shortwave, 9kHz (or 10 for North America) steps on medium wave and long wave, and 100kHz steps on v.h.f. f.m.

These two keys double as controls for scanning. If either arrow key is held down for more than around one second, the receiver will tune automatically along the band, stopping on the first strong signal. Once the upper or lower limit of a broadcast band is reached, the set will start to scan from the other end of the band again. If the scanning mode is used when the set is outside a broadcast band, it will scan until the next broadcast band is found, and then run within that band.

Other features include a dual-time clock, enabling local time and perhaps GMT to be stored; an alarm facility to switch the receiver on at a pre-programmed time and a sleep facility.

A total of thirty-six memory channels are provided, nine on each of medium wave, long wave, f.m. and short wave. Storage of frequencies is straightforward – depress the M key, followed by the numeric key to which one wishes to assign the frequency. To recall a frequency, it is simply necessary to select the appropriate waveband followed by the numeric key. A handy flip-up lid on the top edge of the set conceals a compartment with a station reminder sheet enabling the stored frequencies to be recorded for easy reference.

The large digital display is easy to read and contains a good deal of operating information, including the currently selected band, and the frequency in MHz on v.h.f. f.m. and short wave and in kHz on long wave and medium wave. The display also shows whether the alarm or sleep functions are selected, whilst a colourful lower segment contains a signal-strength meter with a turquoise background and an orange coloured box detailing which number memory, if any, is selected.

The clock is displayed when the set is switched off, or may be shown during operation by depressing the appropriate key. Dual time is recalled by the operation of a further button.

Using the Set

Operation of the Panasonic RF-B60, is, as has been suggested previously, very straightforward, and the designers are to be congratulated for using such intelligent software for the digital tuning and memory features. Audio quality is excellent and is far better than that of the Sony ICF7600D, the Panasonic's closest competitor. A two position tone control – high and low – will alter tonal quality to some extent, by attenuating the higher audio frequencies. I found some of the minor controls a little fiddly in operation, and could prove to be problematic for those with arthritic fingers. Similarly, the absence of a raised "blip" from the 5 key on the key pad makes operation in the dark less easy, and will therefore hinder operation by a visually handicapped listener. There is also no back light for the digital display.

The scan facility is useful, in particular in its ability to operate outside the specified broadcast bands.

There is no variable bandwidth control and the 5.5kHz filter can make listening difficult where two strong signals are broadcasting on adjacent 5kHz channels. No sideband or product detector is provided and the RF-B60 cannot therefore be used for listening to amateur transmissions. Similarly if broadcasters commence testing s.s.b. transmission techniques following the decisions taken at the recent WARC-HFBC, satisfactory reception could be difficult using this radio.

The built-in whip antenna seems to be adequate for day-to-day listening, although there is provision for the connection of a short external antenna. Headphones may be connected to the set, and a 6V d.c. adaptor (optional) may be used instead of the four AA size batteries. Two more AA cells provide memory and clock backup.

A HOLD switch is a useful feature enabling a frequency to be locked, to prevent accidental detuning, and also acts as a main power switch preventing the set from becoming accidentally switched on in luggage when travelling resulting in a set of flat batteries on arrival at your destination!

PANASONIC RF-B60 RECEIVER

PANASONIC UK LIMITED
300-318 Bath Road, Slough, Berks SL1 6JB

Performance

We carried out tests on the RF-B60 by injecting a test signal through the external antenna socket, and measuring the a.f. output through the headphone socket.

Sensitivity

Fair for a set of this type on shortwave, but poor on long wave and medium wave.

The r.f. signal required to produce a S + N/N ratio of 15dB at output. Carrier modulated with 1kHz tone to depth of 30 per cent:

SW + 32dBμV at 1.6MHz
+ 21dBμV at 3MHz
+ 21±14dBμV above 3MHz

Selectivity

The selectivity was very good on short wave for a set of this type.

6dB points at ± 3.1MHz
60dB points at ± 6.35MHz
Attenuation at ± 5kHz = 29dB
Attenuation at ± 10kHz = 71dB

The DX/LOCAL switch attenuates signal at 26dB which is useful for night-time listening on 49 metres in Europe.

The signal strength meter cannot be used for serious measuring for whilst covering a total range of 40dB or so, most of this is taken up by the 30dB interval between readings of 4 and 5!

Image rejection and i.f. rejection are both good for a single conversion receiver with an i.f. of 450kHz.

Battery consumption is fairly heavy and using conventional batteries, the life is around 2-3 hours, whilst alkaline batteries appear to last for more than 12 to 15 hours. If battery voltage falls below a certain level, the set will not operate.

SPECIFICATIONS

Price	£169.95
Frequency Range	FM 87.5 – 108MHz LW 155 – 519kHz MW 522 – 1611kHz SW 1615kHz-29.999MHz. (26.100MHz in FRG)
Power Source	Battery 6V (4 x AA for radio) 3V (2 x AA for memory back-up) Optional 6V d.c. adaptor (RD-9496E)
Power Output	550mW (r.m.s. max)
Dimensions	198 x 118 x 33.5mm
Weight	650g without batteries

Conclusions

The Panasonic RF-B60 is an extremely well built set, with tidy electronics inside. It is well equipped and logically thought out and proves a pleasure to use. It is aimed at the travel market, or at the broadcast listener who wishes to listen to conventional broadcasting on the short wave bands, or it may suit the ardent listener who wishes to supplement his current receivers. It is a direct competitor for the Sony ICF-7600D (2002 in North America) which is comparably priced and has s.s.b. but has only 10 memory channels and has been on the market since late 1983. Lack of s.s.b. could be a drawback for the enthusiastic listener, but is insignificant to count against the set at this time.

With attractive styling and good build quality, and excellent shortwave performance, the Panasonic RF-B60 represents good value for money. □

QTO LONDON

Leonard Moss

I suppose that I first became interested in radio whilst at school. Physics has always been my best subject, and out of amusement I had made one or two crude pieces of apparatus such as shocking coils and a crystal set from odds and ends, and what I could afford from my limited pocket money. I also had a compelling desire to go to sea.

Coming from a family with nautical connections, both Naval and Mercantile, this was perhaps not surprising. The pages of *Boys Own* and the two-penny "bloods" of that period half a century ago, all abounded with sea stories. However, it was the work of a now long-forgotten author, Percy F Westermann, and his book *The Wireless Officer* which finally decided my future career. I was determined to emulate the character in the book, and become a ship's radio officer.

Needless to say my parents were none too happy with my chosen career, much preferring that I went into the bank or some other "respectable" occupation. After several long discussions they finally agreed that if I matriculated in the coming July examinations, then they would send me to one of the radio schools who offered courses of instruction for would-be marine radio operators. The exam results appeared in the September. Much to my surprise and satisfaction I found that I had obtained the requisite number of credits to enable me, in theory at least, to gain university entrance. Nothing was further from my mind.

College Days

On a cold cheerless day the following January, I reported for classes at a well known radio school in London, one of half a dozen other youngsters bent on following the same career. I will not go into the details of the course, but how well I remember the hours of lectures we had in electricity and magnetism, a.c. theory, and the theory of radio itself. All the while we had long sessions of Morse practice, and we became more proficient in wireless procedure and traffic handling. In this age of the transistor it may seem rather quaint to recall that all our instruction was based around the spark transmitter and the elementary valve equipment of that era. We were left in little doubt that if we were to be ready for the PMG Second Class examination in fifteen months, then we were going to have to get weaving. The gospel according to Lord Louis, namely the *Admiralty Handbook of Wireless Telegraphy* and the thrilling chapters of the *Post Office Handbook for Wireless Operators* were going to be our sole reading from then on.

Our class took the second class examination in the following spring and when the results were promulgated I found that I had been successful. Having now got my Second Class ticket I could have applied for employment straight away, but acting on sound advice I decided to stay on at school and go for my First Class ticket. This necessitated raising my Morse speed to 25w.p.m. and also a more comprehensive knowledge of radio theory. Almost two years after starting the course I presented myself at Post Office Headquarters in St Martins le Grand for the two day first class examination. An agonising wait of three weeks followed, till one morning the postman delivered a registered package containing my brand new First Class ticket together with an Official Secrets Act form to sign and return forthwith.

Now that I had my ticket I could not wait, and immediately set about seeking employment. A few weeks later I was called to London for interview and medical examination by the Marconi Company, who at that time supplied most of the shipping companies with radio personnel. That evening I returned home with my head in the clouds. I had a job, and in my pocket was a list of the items of uniform and kit that I would require.

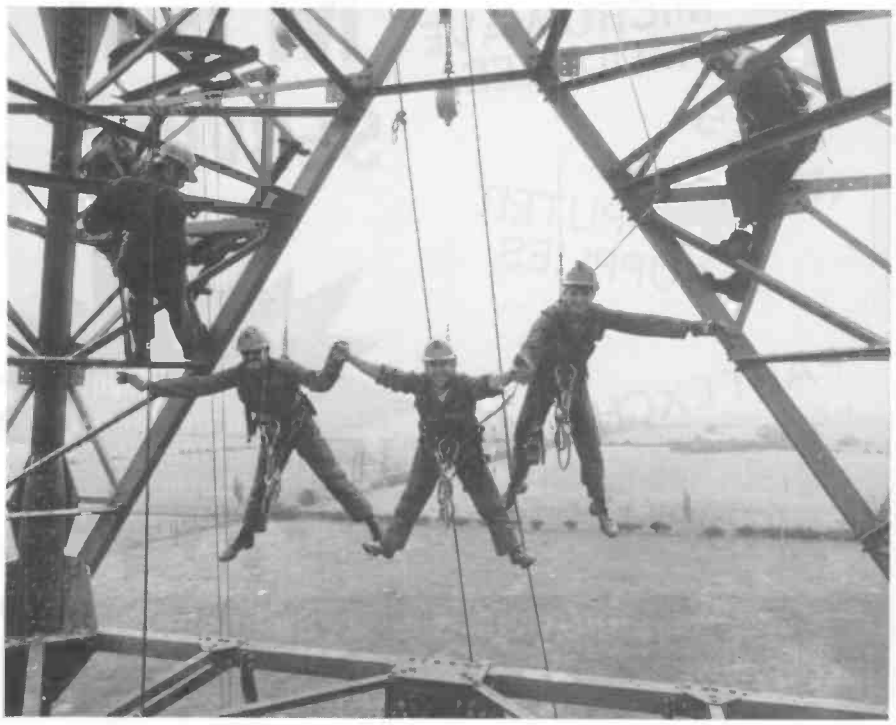
My First Job

My first ship was the *Corfu*. A twin-funneled, twin-screw, turbine steamer of 14000 tons belonging to the P & O Company. At that time she was almost new and was engaged in the Company's China and Japan mail service. I joined her in the Royal Albert Dock in London as 3rd RO. Guided by a helpful Goanese steward I made my way along alleyways and stairways redolent with the smell of polish and that indefinable aroma of spices so peculiar to ships in the Far Eastern trades. On entering the wireless room I met the two men who were to be my mentors for the next few months.

The 1st RO, MacNab, was a Scotsman and the 2nd, an Ulsterman named Boyle. Both of them were much older than me. Although I was unaware of it at the time, fortune has smiled on me in the choice of my seniors. During the coming months these two men were to transform me from a callow greenhorn into something approaching an operator.

Looking round I saw the *Corfu* was well equipped with radio gear. She had one and a half kilowatt tranmitters for m.f. and h.f. and long wave (144kHz), an all-wave receiver with crystal emergency. All ships were fitted with the ultimate stand by, the crystal. She had a quarter kW quenched gap spark set, and direction finding equipment, as well as an extensive public address system. These transmitters were a far cry from the sophisticated equipment of today. They were what might be termed "power oscillators". They had three valves. Two MR4 type diode rectifier valves, each about the size and shape of a large melon, and an MT6 oscillator valve of similar shape but somewhat larger. All the filaments lit up brightly when in use.

Early next morning we left the dock and slipped down river to Tilbury to embark passengers. As the junior I had been allocated the afternoon watch (noon to 4pm) and the middle (midnight to 4am).



QTO LONDON

Part 1

MacNab had run over the gear with me several times, and had given me a list of the various things that I would be required to do on watch, including the traffic lists from various coast stations to be copied, and the press broadcasts that I would have to copy from Rugby radio, etc.

On the Air

Soon after lunch it became obvious that the ship was on the point of departure. Full of enthusiasm I made my way to the wireless room and switched on the receiver, donned my headphones, and tuned in to 500kHz. I had begun my first radio watch. I noticed MacNab standing just inside the door. After a few minutes he asked me, "Well what about it?" I must have looked puzzled. He went on, "Did they never teach you anything in that school? What about a TR to the nearest coast station?" Immediately I was seized with panic. Never before had I actually sent on the air. The nearest coast station was North Foreland/GNF, and obviously MacNab believed in chucking his juniors in at the deep end straight away.

With sweating palms I started up the transmitter, and remembered somehow to check that the antenna switches were in the right position. Tentatively I put my fingers on the key and and made my first call on the air. GNF GNF GNF de GRNW GRNW GRNW TR +K. Nothing happened – at least so it seemed to me. In the cacophony of bleeps, whines, grunts and rasps of 500kHz I could not make out any answer MacNab said nothing. I tried again. Again the same result. I looked at MacNab who said, "Well? He's answered you twice already". In the wild discord I had been aware of a loud "whanging" signal making a short transmission at tremendous speed. That must have been GNF answering me. Cautiously I tried again this time concentrating like mad. Somehow I managed to read GRNV de GNF K K K. Slowly I sent GNF de GRNW TR CORFU NW QTO LONDON BND GIBRALTAR QRU QRU? AR. I received a terse acknowledgement. I sat back in the chair sweating. MacNab with a faint grin on his face remarked, "Not to worry lad, they can always tell first timers and try to take the mickey a bit. You'll soon get used to it". He stayed with me for the rest of the watch, and before I went off I had actually worked Portishead/GKU on long wave, and another P&O ship on 27m.

That night I kept the middle watch unaided, and managed to copy the Rugby press on 16kHz quite well. I had to copy the press longhand, and I realised I would have to learn to receive direct on to a typewriter as my colleagues did. I became aware for the first time how many variants there were on the Morse code. It took me some little time to work out that ERERTS was in fact FFB Boulogne Radio amongst others.

The ship called at Gib, Marseille, Malta and Port Said, and by the time we were going south through the Canal and working the Suez Canal coast station at Ismailia SUQ I was feeling a little more confident. Being a passenger ship we handled a fair amount of private traffic, most of it in the form of SLTs (ship letter telegram). This was a cheap rate message then 5 shillings for 20 words, as against the normal full rate charge of one shilling per word. SLTs were only permitted in the direction ship to shore, and had to be cleared direct from the ship to a coast station in the country of destination. No intermediate relays were allowed. Hitherto we had been clearing our traffic to the UK on long wave, but on entering the Red Sea with its high level of static we switched to h.f. The 8MHz band (36m) seemed to be the most popular.

Shipboard Tricks

In the Red Sea with the temperature increasing by the hour the swimming pool became very popular. One morning I learned by "scuppergram" that "It had been sold". On enquiring what had been sold, I was told, "the swim suit with the soluble seams". Apparently this was an old gag. The hairdressing shop on board stocked a supply of smart bathing suits (obtainable in Japan) whose seams were not really stitched, but held together with soluble glue. This glue would dissolve after a few minutes immersion in water. The staff in the shop, shrewd judges of human nature, had sold one of these swim suits to the prettiest passenger, and the one most likely to take the whole thing in good part. Unfortunately when the great revelation took place later that afternoon I was on watch, and so I missed the lady's pink embarrassment, and her threats to shoot everyone in the shop.

One afternoon I picked up a message from a Greek ship about 310km away requesting medical assistance. Being a passenger ship and having a doctor on board I told him to go ahead. The lengthy message in quaint English contained a list of the gruesome symptoms of a certain anti-social disease. It specified a course of treatment which seemed to be even more horrendous than the symptoms.

Tooth-ache

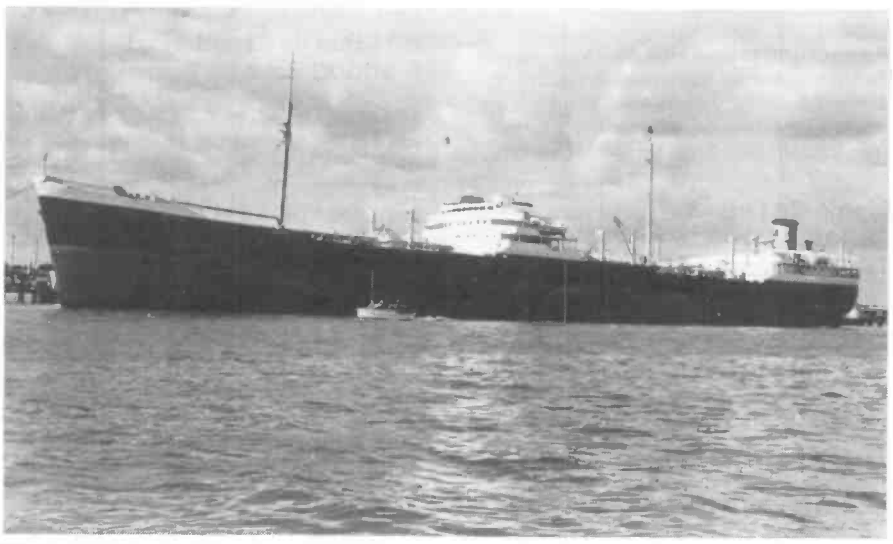
Soon after leaving Aden I developed a rather severe tooth-ache. On arrival in Bombay I was sent ashore for dental treatment by boat, the ship having to lie at anchor meanwhile waiting for a berth. The launch landed me at "Gateway Steps". It is nice to think back that I entered India for the first time at the famous "Gateway of India". Sadly the lower walls of this white marble monument were badly defaced with the crimson splotches of betel juice.

As the voyage progressed via Colombo, the exotic island of Penang, Singapore and on to Hong Kong, I thought back to the geography lessons at school, and the reference made to the parts of the map coloured red. Unfashionable though the idea of the Empire may be today, it left a lasting impression on a youth seeing the world for the first time. Since leaving the UK every place at which we had called with the exception of Marseille had been either a British possession or under British influence.

It was at this time that I first heard Japanese Morse. I was listening to a

What are British Telecom's antenna riggers doing dangling from a radio mast in an article by a marine Radio Officer? Well, the mast from which they are dangling is one of the 245m high Rugby masts and they are showing off the safety harnesses that protect them so far above ground. *(BT Picture Library)*

One of the ships that the author served on was the *SS Volsella,* a small "case oil carrier" belonging to the Shell Company and operating in the Far East. The Shell Photographic Library could only find a print of a later tanker carrying the same name.



QTO LONDON

couple of ships obviously chatting. I could not make anything of the exchanges which seemed to consist of a jumble of accented letters run together. Later I told Boyle what I had heard, remarking that I "couldn't read a thing". His reply, "Neither can anyone else except another Japanese" set my mind at rest. The Japanese use this code between themselves to suit their form of picture writing.

Approaching Shanghai activity on 500kHz was intense. Hundreds of ships plied these waters, most of them British owned. Shanghai Radio XSG seemed to be going non-stop, always with a beautifully handled bug key. I found out later that many of the ships that I could hear working were not at sea at all, but miles inland on passage up and down the Yangtse. Ashore in Shanghai I paid my first visit to "Jack's Palace", reckoned to have the longest bar in the world. At that time Shanghai was probably one of the most cosmopolitan cities in the world. It was said that all the box office girls in the Grand Cinema in Nanking Road were either Princesses or Baronesses, just a few of the many White Russians who had made their homes in the city after the revolution.

After leaving Shanghai and making our way through the straits of Tsushima, scene of Russia's humiliation at the hands of the Japanese in 1904, we entered the beautiful Inland Sea of Japan making for Kobe and Yokohama.

Time Ashore

The turn-round in Yokohama took ten days. During this time I was able to see something of the place, and on a couple of occasions made the hair raising taxi trip to Tokyo. At night it was a sea of flashing neon signs, bars and cabarets abounded, each with its compliment of tiny fluttering kimono clad hostesses. The stores were crammed with all manner of goods, most at ridiculously low prices, and even then the number of radio shops seemed to be legion.

The homeward trip was largely a repetition of the outward voyage. By this time my typing had improved, and I was taking the press much more easily. Even the subscription press with its mass of cypher covering the stock exchange reports and the sports results was much easier to get down on a typewriter. Being homeward bound the radio traffic increased. Most of the passengers were Colonial civil servants and "box wallahs" returning to the UK on leave, and who wished to inform friends and relatives in the UK of their arrival and plans.

On arrival in London I went home for a few days with orders to join another P&O ship *Ranpura* as 3rd RO at the end of the week. She was an older ship than *Corfu* and slightly larger at 16500 tons. She was bound for the Far East, but this time I had been told that it might be necessary for me to transfer to another ship abroad, most likely in Singapore or Hong Kong. *Ranpura's* main m.f. transmitter was a 2kW rotary spark set along with valve transmitters for h.f. and l.f. The wireless room was at the after end of the officer's accommodation, and on joining I was soon informed just how unpopular an operator could become by using the spark set unnecessarily at night, or during the sacred afternoon siesta period. For the uninitiated I should explain that on pressing the key, a spark set emitted a loud crashing noise from the disc discharge, not unlike the noise made by a circular saw cutting through a tough piece of timber. Under tropical conditions with all doors and port-holes open, this din was not looked upon favourably by those bent on a "gentle folding of the arms". □

LISTEN OUT FOR

GB6HF. The Houghton-le-Spring Amateur Radio club are holding a special event station to celebrate Houghton Feast. It marks the dedication of the Church to St. Michael. It dates from very early days. Present day events include: a carnival, fairground, cycle racing, roasting of an ox, special church services and the special event station.

Operation will be on 3.5 and 144MHz from October 2 to 11. RAYNET will also be covering the charity cycle race as part of the week long event.

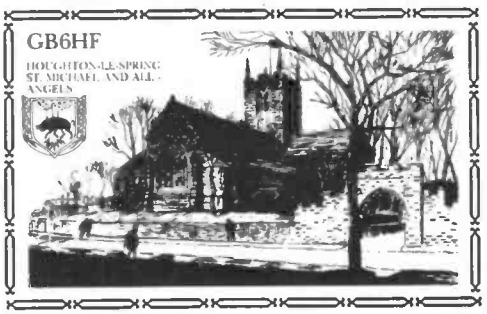
GB2SEM. On May 9/10 the Southern electricity Museum will be the venue for a special event station. In previous years the collection has been known as the Wedgewood Collection with a callsign to match. The museum and station will be open from 10am to 5pm on both days and talk-in will be available for visitors.

Southern Electricity Museum
Old Power Station
Bargates
Christchurch

GB2SMC. Between August 8 and 23, it is planned to operate a special event station in connection with the celebrations for the 850th Anniversary of the founding of St Magnus Cathedral in Kirkwall in 1137.

The primary mode will be s.s.b. on the h.f. bands 3.5 to 28MHz. There might be v.h.f. activity on 144MHz.

Bill GM3IBU
QTHR



GB2WWW. This station is being run by the Vale of Evesham RAC to draw attention to the work of the Worcestershire Nature Conservation Trust during Worcerstershire Wildlife Week. There will be operation on h.f. and v.h.f. from Woodnorton, near Evesham. A QSL card will be issued for all contacts.

Martin G6TRS
PRO VERAC
Tel: Worcester 27793

Have you Got a Special Event Station we should know about? If so, write and tell us

TO6JUN. To commemorate the landing of the US Allied troops in Normandy in June 1944, the amateurs from a radio club in La Manche will be operating a radio station on Utah Beach where the landing took place.

The station will work from May 28 to June 9 using c.w. and s.s.b. on the h.f. bands from 3.5 to 28MHz.

They hope that an English special event station will be operating on v.h.f. during June 6-8.

A QSL card will be sent for any QSO, via the bureau or direct in exchange for an IRC.

A. Morio F5AM
QSL Manager
631 Rue de Carentan
F-50000 Saint Lo France

GB4SVC. On May 16, the Spen Valley ARS will be running this station from North Yorkshire, on the summit of Pen-y-Ghent. This is in IO84 and WAB SD87NY. Pen-y-Ghent is one of the three peaks and is 680m a.s.l.

On May 16, operation will be on 144 and 430MHz multimode and 28MHz f.m. They will also be active on the evenings of the 15th and 16th when h.f. will also be used from the "base camp" at Little Stainforth. Talk-in for any visitors will be on S23. Skeds can be arranged by contacting G3SVC.

Spen Valley ARS G3SVC
Old Bank Working Mens Club
Old Bank Road
Mirfield
W. Yorks.

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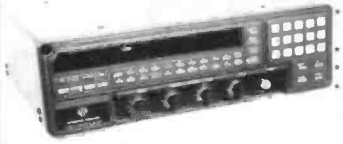

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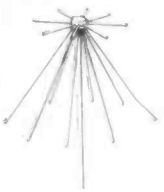

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FRG 9600 £525.00

All-mode scanning receiver providing features never offered before, covering 60 through 905 MHz continuously, with 100 keypad-programmable memory channels.

R5000 £895.00

The frequency range is continuous from 100 kHz to 30 MHz and its modes of operation are USB, LSB, CW, AM, FM and FSK. An optional VHF converter (VC20) extends the frequency range to include 108 to 174 MHz.

R2000 £637.26

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IC-R71E HF Receiver £825.00

100kHz-30MHz CW/SSB/AM/RTTY/FM (optional). Direct frequency entry. 32 memories. Scanning. Remote control and 12 volt DC option.

IC-R7000 VHF/UHF £957.00

Continuous coverage receiver. 25MHz-2000MHz. FM/AM/SSB modes. Direct frequency entry. 99 memories. Scanning, remote control option.

AR2002 £487.30

The frequency range is from 25 to 550 and from 800 to 1300MHz. Modes of operation are wide band FM, narrow band FM and AM. The receiver has 20 memories, memory scan and a search mode which checks frequencies between user designated limits and a push button keypad for easy frequency entry and operation. A front panel knob allows the listener to quickly step up or down in either 5, 12.5 or 25kHz steps from the frequency initially chosen. A socket for the optional RS232 interface (RC PACK) is provided on the rear panel.

LOWE HF-125 £375.00

Coverage is continuous from 30 kHz to 30 MHz and operating modes are AM, USB, LSB and CW with an optional FM and synchronous AM board. A comprehensive range of bandwidth filters are standard: 2.5, 4, 7 or 10 kHz. There is a 400 Hz audio filter for CW reception. Controls are very simple and the frequency tuned is displayed on a large back-lit liquid crystal display. Power requirements are 12 V d.c. at around 250 mA and internal NiCad batteries give around 10 hours portable operation. The lithium battery gives back-up for the 30 memories for some ten years.

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SEEN & HEARD

AMATEUR BANDS ROUND-UP

Justin Cooper
c/o Short Wave Magazine, Enefco House,
The Quay, Poole, Dorset BH15 1PP

As promised, we start with a reference to the HPX Ladder. The Rules are printed this time, and we think that they have stood the test of time pretty well, with the small corrections made when people have misunderstood various bits. Nonetheless, we have taken this opportunity to recheck and amend them slightly. The exercise, then, is to hear prefixes as defined in the Rules, and to log them. When you have collected 200, you can then list them up and send them in as an entry. As you hear more of them, you can send in further lists each month as updates. We don't call for QSL cards, but we do call for entrants to take a careful look at their collections and to "flag up" any they see as being in any way odd or unusual. Usually, such a call is mentioned by several people, and between us we can usually sort out the facts. Sometimes they are pirates, sometimes odd prefixes for some special event or other, sometimes the result of a reorganising of a country's licensing arrangements, sometimes just plain mis-hearing — bear in mind that "fractured English" under a pile of other stations is not as easy to understand as Oxford English in a quiet room, before you laugh.

The main section of the Ladder is all-mode telephony; that is what it says. Most of the signals on the h.f. bands are s.s.b., but at v.h.f., f.m. is used to some extent, and you might trip over the odd a.m. signal: all are acceptable in this section. The c.w. and RTTY sections are self-explanatory.

All-Time Post War HPX Ladder

Name	Prefixes
'Phone Only	
B. Hughes (Harvington)	3249
E. M. Gauci (Sliema, Malta)	3083
Mrs. R. Smith (Nuneaton)	2615
E. W. Robinson (Felixstowe)	2533
H. M. Graham (Chesham)	1895
M. Ribton (Gillingham)	1769
M. Rodgers (Harwood)	1755
P. Oliver (Paisley)	1730
F. Dunn (Chester)	1541
N. Henbrey (Northiam)	1513
N. E. Jennings (Rye)	1416
P. Davies (Market Drayton)	1371
Mrs. A. Sitton (Stevenage)	929
B. Patchett (Sheffield)	950
A. P. Lincoln (Aldershot)	888
R. G. Williams (Borehamw'd)	768
S. Field (Barningham)	735
A. Vest (Durham)	605
N. Fox (Wakefield)	595
S. Wilson (St. Andrews)	559
CW Only	
F. Dunn (Chester)	1994
N. Melville (Edmonton)	999
J. J. Sales (Lancaster)	400
RTTY Only	
N. E. Jennings (Rye)	683
A. P. Lincoln (Aldershot)	535
W. J. Prior (Lochcarron)	464
N. Henbrey (Northiam)	334

Starting scores, 500 for Phone, 200 for c.w. or RTTY. Entries in accordance with HPX Rules.

Annual HPX Ladder

Starting Date: 1 January 1987

Name	Prefixes
Mrs. A. Sitton (Stevenage)	372

200 Prefixes to have been heard for an entry to be made in accordance with HPX Rules. At score 500, transfer to the All-Time list is automatic.

The Letters

First, thanks to those correspondents who have continued to support, and a welcome to new readers and correspondents.

Various readers have noted, or implied, that conditions have been pretty fair; about all we can say is that two major authorities have now gone on record that they think the old cycle finally concluded last autumn, albeit it is also fair to say that other authorities haven't as yet committed themselves. The reason for this of course is that we look at "smoothed" numbers in order to take out the day-by-day random variations, and as this is a process of averaging, we don't know for sure when a peak or a null occurs for six months or more after the event. What really matters from our point of view is this: the rise from null to peak is a shorter period of time than from peak to next null. So — we take advantage of what there is to be had!

Angela Sitton (Stevenage) is now G1XEO — congratulations! — and after the initial flurry of v.h.f. activity she has begun to spend more time at the receiver again, particularly on c.w., ready for her second bite at the Morse test, which she will take (at the NEC, one assumes) on March 27. All we can say, is good luck Angie; hope the noise level at NEC doesn't prove too much of a handicap.

What would happen if I retire from the HPX Ladder but at a later date decide to come back and re-enter, enquires Bernard Hughes (Havington). A good question! We see no reason why you shouldn't come back in at the same score, provided you haven't moved to a far distant spot in the meantime, which we have always regarded as 300km for those concerned. If you move more than 300km, it's a new start, just as it is for DXCC.

What a nice letter from **E. W. Robinson** (Felixstowe), provoked by last month's fiftieth anniversary issue. He started to listen in 1922 at the age of 12, when a cousin built a receiver — in those days you even made some of your own components — and they listened to the Savoy Orpheas band playing from the Savoy Hotel. Then there was his own first one-valver, and onwards to an AR88 picked up last year and refurbished to look smart and work well again, plus of course his long-time friend, the Eddystone EA12. Of course there have been breaks in that time — some twenty years before 1968 for instance were not active — but the pleasure has never ceased.

The next letter is from **N. Henbrey** (Northiam) who sends a "Nil" report for this time, as far as his HPX score is concerned.

Luciano Marcquardt (Hereford) is now G1VDW but continues his interest in the h.f. bands and the Ladder; although Luciano goes up by 34, there is a little irony in that the most interesting signals noted didn't count! Of course, one expects this to happen as you get near the top of the list, as you will have most of what there is to hear; but at a score of 500-odd, it's just plain bad luck!

The requirements of one's logging system vary from person to person; for **Philip Davies** (Market Drayton) it is complicated by the existence of a 1959/64 listing. Philip intends that this listing will eventually be reduced down to a collection of obsplete prefixes of the period, and so as he hears anything that appeared in that old list, he has an addition and a subtraction to do — it's nice to know, we were beginning to lose faith in Market Drayton arithmetic!

Your deadlines for the next three issues are May 18, June 17 and July 20.

HPX RULES

1: The object is to hear and log as many prefixes as possible; a prefix can only count once for any list, whatever band it is heard on.
2: Only calls issued for amateur radio operations may be included. Undercover and pirate callsigns will not be credited, nor any MARS stations be claimed.
3: The object is to hear prefixes not countries, thus there is no discrimination between say MP4B and MP4K which count as one prefix.
4: The /P, /M and /MM suffixes create a new series; thus G3SWM, G3SWM/P, G3SWM/M and G3SWM/MM all count as prefixes, and where it is known to be legal, /AM also.
5: When the prefix is changed, both the old and the new may be counted; thus VQ4 and 5Z4 both count.
6: G2, G3, G4, etc., all count separately, as do GW2, GW3, etc., and in the same way K2, W2, WA2 all count separately even though they may be in the same street.
7: Send your HPX list, in alphabetical and numerical order showing the total claimed score. With subsequent lists, it is sufficient to quote the last claimed score, the new list of prefixes, and the new total. Give your name and address on each sheet, and send to: LADDERS, Short Wave Magazine, Enefco House, The Quay, Poole, Dorset BH15 1PP. If possible to arrive before the deadline for that particular month.
8: Failure to report for two consecutive listings, i.e. four months, will result in deletion from the Table, although there is no objection to a "nil" report to hold your place.
9: 200 prefixes must be heard to gain entry onto the yearly table, and at 500 prefixes entry to the "all time" table is automatic. There is a c.w. only table, a 'phone only table and an AMTOR/RTTY table.
10: The prefix list is based on those shown in current *Radio Amateur Prefix-Country-Zone List* published by Geoff Watts, 62 Belmore Road, Norwich NR7 0PU.

SEEN & HEARD

Thoughts

The most important part of any amateur radio or s.w.l. station is in fact the operator, and all the technical wonders of the latest rigs will not alter that situation in the foreseeable future. For example, a good c.w. operator will be able to hear Morse that is demonstrably below the noise level of the receiver. At a S/N ratio of 1:1, one can look at the noise from the audio output on an oscilloscope and can guess that you can see a difference when the audio signal is present or absent even though you cannot identify the difference. However, to the ear the audio is clear enough. Reduce the input signal further still until it is only just copyable, and the oscilloscope now shows no difference visually when the signal is on or off. If the letter being sent is repeated many times in succession, machines can "get it out" by signal-reinforcement techniques; but when the signal is in fact Joe Blow banging away on his straight key no letters will be repeated, but copy at the far end will be around 100 per cent. No machine system can come near that — AMTOR is probably the best, in its error-correction mode. No system using the spoken word can even attempt the feat. The joke of it is that the machine-compatible systems, such as RTTY, throw away their man-compatibility while achieving a poorer result, although it is admitted that there are the odd operators who can recognise odd letters sent by RTTY. Why is there this prejudice against Morse? Basically, Morse has to be learned in a ritual manner in order to achieve the test reaction correctly. However, by that time, one has become obsessed by the need for 100 per cent perfect copy, and has totally forgotten that when operating on phone the odd word lost in QRM is hardly noticed, let alone worried about. Thus the operator has become scared of using Morse, by his fear of losing the odd letter. On the other hand, the chap who uses his Morse every day on the air soon learns that he doesn't care about the odd letter missed, and that he doesn't need to write it all down. By now, complete words are being heard and copied as such, rather than as collections of letters. On the sending side, he will have realised very early on that the better the Morse, the easier the copy, and will have taken steps to be sure his station radiates the best possible Morse, so will probably have gone to a keyer which guarantees correct spacing of dot, dash and space. While a hand key can send every gradation of Morse, from perfect through to "left foot" stuff, the electronic keyer will send either perfect symbols, or utter gibberish — nothing between, and even the gibberish consists of perfect dots, dashes and spaces! And, of course, we should remember that the "digital" modes that everyone reckons to be so "modern" are only electronic ways of switching a carrier on and off, which is what a Morse key does.

Safety

Members of RSGB will have seen a recent note on earthing, and in particular as it applies to modern houses, wired to current IEE regulations. In essence these houses have their earth line coupled back through the electricity board system neutral lead to earth at the power station; and in addition, all metalwork in the building is also coupled to this. Nominally, there is a perfect balance to the neutral, and it is to a large degree true in practice. However, if the neutral line is broken for some reason, it is theoretically possible for the voltage to rise from zero to 240V; but of course, since everything metallic is bonded together, the occupant of the house is at no risk.

Obviously, to rupture the neutral while leaving the other phases would be some trick for Murphy to achieve . . . but it could possibly happen. What, therefore, does it mean in terms of an s.w.l. or transmitter station?

Either you will be using the "mains earth" as the station earth, or you will have an outside earth, to a spike, or metal water-pipe or whatever. (Note at this point, that the reason for changing to the current method was the increasing numbers of plastic water pipes!) What we must do is this: first we must make our station earth as good as we possibly can; that means that connecting the live side of the mains to the station r.f. earth MUST result in blowing of a 13A fuse. Secondly, we must look at the mains leads of our station and ensure the earth wires are DISCONNECTED. Thirdly, we must go out and buy an r.c.c.b. (residual current circuit breaker) and install it. There are types that one plugs into the mains socket, and into which one puts the mains plug, rather along the style of a two-way adaptor. Fourthly, we must achieve the impossible by a spacing of two metres from any metalwork which is already bonded to the mains earthy line as already described. If you can't meet that requirement, you must now bond the mains earth and the r.f. earth together with a fat lead (at least 10mm square), and make all the run of the r.f. earth as fat as possible — and don't forget that the radials of a vertical antenna come into this category, particularly if they are draped over the roof, r.f. isolation should be achieved by fitting a ferrite ring to the lead joining the two earth systems together; RSGB imply up to four turns might be got on to the ferrite ring, but we have to admit to a mite of worry about what that would do about the sharp leading edge of the fault condition, and its effect on the receiver. Its object of course, is to choke off any noise on the mains earth from the r.f. earth.

And, of course, check that your r.f. earth system is OK at regular intervals.

As to what the risk is if you don't act as we have described? Nothing, probably until such times as a fault occurs in the electricity board distribution system. If a fault of the nature described occurs, all the equipment in the station would be at risk, due to the possibility of a high fault current trying to find its way back home by way of the station r.f. earth. That could turn out very expensive, and in addition could result in a secondary fire problem. Electricity is vital to our hobby, but it should be treated with care. Enough said!

Antennas

One frequently reads, in the letters that s.w.l. So-and-So has been playing with antennas. This is a very interesting topic to both the listener and the transmitting amateur. However, even if the author has the technical equipment to establish with certainty that his design is correctly matching in "like the book says" there is often clear evidence to indicate that the evaluation process has been misunderstood. It is one thing to be sure, say, that an indoor dipole on 14MHz is in fact resonant at 14.175MHz exactly, and that the feeder is operating with a known 1:1 VSWR. It is quite another to establish that this latest creation is better than its predecessor. If you receive one of the DX sheets, most of which give predictions, or you can receive the local RSGB News you can establish at least an opinion as to conditions (Below Normal, Low Normal, High Normal, Above Normal) and apply that as a "loading factor" in comparative tests. You must take into account the state of the sunspot cycle; obviously an accurate comparison of two antennas for which data was obtained for one at minimum, and the other at solar maximum would be hideously difficult. Ideally then, your antenna should be up for at least a year if it is to have a good evaluation. At the very least, there must be a couple of months, with consistent daily activity. Perhaps the best method is to do what G6XN sees as the best method, and that is to confine yourself to the early morning long path to Australia. The columnar method follows G6XN but adds a monitoring, simultaneously on a separate receiver using its built-in whip antenna. This enables us to assess the "conditions" factor a little more carefully.

That's it for now; deadlines for your letters for the next few months are in the box, apologies to those not mentioned this month — domestic crisis at J.C. — I'll deal with those next month.

DECODE

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

As this is still a very new column I am writing without the benefit of readers' reports so it's blow your own trumpet time again, still you can all get your own back next month, I hope.

Monitoring on the h.f. bands has shown that the majority of packet is on the 14MHz band, between 14.103MHz and 14.107MHz. The band occupancy is quite high with the following selection of stations demonstrating that packet is truly international: 9K2DZ (Kuwait), SK2GJ (Sweden), 9H1J (Malta), AA4VV (USA), VE1AJM (Canada), LA5WBA (Norway) and IK0DVF (Italy). Packet on v.h.f., particularly the repeaters (144.650MHz), is still very busy with many amateurs taking advantage of the on-air mailboxes. I think that the whole packet scene needs some urgent regulatory clarification to enable some of the exciting aspects of this mode to be realised i.e. international gateways, etc.

RTTY and AMTOR

Activity has been fairly uneventful over the past month on the amateur scene. As with packet, the 14MHz band has the most activity although 3.5MHz is

SEEN & HEARD

quite busy with UK and European traffic. The frequencies to monitor are 14.070MHz to 14.100MHz and 3.580MHz to 3.600MHz. As a general rule amateur RTTY and AMTOR will be found just above the c.w. segment of most bands. On the commercial RTTY front there is a large amount of information transmitted in the form of coded weather data. This data is normally sent as 5 digit groups of numbers at 50 baud with a frequency shift of 425Hz. A typical transmission is one of the Bracknel signals on 4.489MHz. The information is rather tedious to decode unless one has a computer program to help. I am aware of one program for the BBC micro which produces charts from this data but would be interested to hear from other readers who successfully decode this data.

FAX

As mentioned in last month's column the majority of FAX stations are broadcasting weather charts of various types. For those of you with receiving equipment, one of the most common problems is difficulty obtaining clear pictures. It seems as though you can't win as weak signals suffer from noise and QRM while the strong signals often show bad smearing or ghosting. The smearing and ghosting appears to be mainly due to multipath propagation which is almost impossible for the s.w.l. to overcome. The only solution is to find another signal which is free from multipath. To that end experience has shown that signals from the Russian meterological station on 6.88MHz usually produce a clean picture during the early evening. If you have any favourite signals that produce clean pictures please write and let me know.

A note for all RIG (Remote Imaging Group) members don't forget the AGM at the VHF Convention at Sandown Park on April 26.

Book of the Month

This month's book is *Guide to Fasimile Stations* distributed by Interbooks.[1] This 128 page publication is from the same stable as the impressive *Guide to Utility Stations* reviewed last month. The publication is in its 6th edition and has been completely revised using monitoring data collected during 1985 and 1986 making this probably the most up-to-date FAX listing on the market. The book starts by giving information about professional FAX receiving equipment which is very impressive but very expensive, still its nice to know how the other half live! The next two sections deal with the techniques of FAX transmission and the regulations covering the various transmission modes. This is followed by a very comprehensive chapter detailing all the current weather satelites. Individual stations details are contained in three chapters one in frequency order the other in callsign order and the third is the *''Radio Times''* of FAX and contains lists of the charts to be sent and the times of transmission of all the main stations. The book is rounded off with a chapter showing typical FAX charts and compares the results from different receiving systems. This publication has proved to be a great time saver in the shack as one can see at a glance what information is scheduled to be sent and tune into the most desirable.

The book is available from Interbooks[1] price £9.95 + 65p post and packing (UK only). Thanks are due to Interbooks for the review sample.

Packet & The Amstrad

There appears to be a great deal of interest in using the Amstrad PCW8256 and 8512 for packet radio. The simplest way to achieve this is to use a commercial TNC (terminal node controller), serial interface and a terminal emulation program. There are a wide variety of serial interfaces available but I can recommend the unit produced by Peartree Computers[2] as being very good value for money. An additional advantage of the Peartree interface is that it is connected to the Amstrad via a ribbon cable which means that extra sockets could be added later to handle other accessories without removing the serial interface. Most of the other interfaces actually clamp over the expansion port and need to be removed before others can be attached. The terminal emulation program is simple as it is supplied as standard on side one of the LocoScript disk. The program is called MAIL232.SYS and should be moved onto your main CP/M disk and the name changed to MAIL232.COM. To run the program load CP/M in the usual way and type MAIL232 <RETURN>. The emulator should now be set up to match your TNC by pressing f1 and changing the speed and format using the cursor positioning keys and the + key. The most common settings are 1200 baud transmit and receive, even parity, 1 stop bit and handshake off. To leave this section press the EXIT key. Next you need to enter the emulator by pressing f7 and positioning the cursor over VT52 emulation and then pressing enter. Your keyboard and screen will now behave as a dumb terminal i.e. everything you type will be sent out on the serial interface and all data entering the serial interface will be displayed on the screen. The physical connection between the serial interface and the TNC is achieved using 25-way D connectors as shown below.

Amstrad pin No	TNC pin No
1	1 Protective ground
2	2 Computer output
3	3 Computer input
7	7 Signal ground

This should get you working on packet but obviously a dedicated program would be more versatile. It should be possible to use the Amstrad without a dedicated TNC should suitable software be available, to that end I am examining various sources of public domain software and will keep you informed of progress.

Radio Programmes

You may think I am trying to take over the m.w. DX column but you would be wrong. Radio Sweden International has a lot to offer the computer enthusiast. The station is an independent division of the Swedish National Radio Company and is financed directly by the Swedish Government. They produce a regular programme called *Sweden Calling DXers* on Tuesdays and the English version is broadcast to Europe on 1.179MHz at 1600, 2100 and 2300UTC (GMT). If you are outside Europe I would suggest you contact Radio Sweden[3] for a full schedule. As well as radio programmes they publish a very useful A5 booklet entitled *The DXers Guide to Computing*. This 34 page booklet is packed with lots of useful contact points and suppliers of computer related information. The booklet is also backed up by regular updates which contain all manner of interesting information including computer programs. To obtain your copy of the guide send an international money order for £2.00 to Radio Sweden International.[3]

Another station providing support is Radio Netherlands International. They produce a weekly programme called *Media Network* which is transmitted every Thursday. The programme covers radio communication in general with an increasing slant towards the use of computers. For English speaking European listeners the schedule is:

UTC (GMT)	Frequency
1130-1225	17.605, 9.715, 5.995MHz
1430-1525	5.966MHz
1830-1925	6.020MHz

Radio Netherlands also publishes a wealth of information which is available free of charge. The main publication for the computer enthusiast is *INFO-DUTCH* which is an acronym of INFormation Of Direct Use To Computer Hobbyists. This 22 page booklet lists sources of software and includes bulletin boards. There are many other publications available including receiver reviews and a very comprehensive booklist. All the above are available on request from Radio Netherlands International.[4] If you have access to Prestel, messages for Radio Netherlands can be left on their mailbox No 019996700.

Well that's about it for this month but don't forget to send me your reports or comments as all are welcome.

Deadline Dates

Issue	*Deadlines*
July	May 21
August	June 20
September	July 23

Addresses

(1) Interbooks, Lynton, Stanley, Perth PH1 4QQ, Scotland.
(2) Peartree Computers, St Georges House, 14 George Street, Huntingdon, Cambridge, PE18 6BD.
(3) Radio Sweden International, S-105 10, Stockholm, Sweden.
(4) Radio Netherlands International, P.O. Box 222, 1200 JG Hilfersum, The Netherlands.

INFO IN ORBIT

Pat Gowen G3IOR
17 Heath Crescent, Hellesdon, Norwich, Norfolk NR6 6XD

Getting started on satellites, and weather satellites in particular, is not really the easiest of tasks. On normal modes of radio communication, one only needs to tune around on a normal radio receiver, and keep attentive to all that one hears to keep up to date with what is happening over a wide area. Satellites are a little more specific, as they maintain a strict schedule of format, pass times, and keep to defined frequencies (as pointed out last month). The very terminology used in satellite work can be very complex for the starter, so a guide for the beginner from a more experienced tracker is invaluable.

One such enthusiast is John G6SVJ of Uttoxeter in Staffordshire, who despite only starting on weathersats four months ago, is now fully captivated and getting good results. John's interest was first stimulated by reading the excellent series of four articles by Terry Weatherley G3WDI, entitled "Weather Satellites — What's up There" that ran from September to December 1986 inclusive in *Practical Wireless*. As the method outlined involved the purchase of a BBC computer, a little beyond the reach of the G6SVJ pocket, the project was temporarily shelved. The second article that John read was written by Adrian G6ZOJ, in *Oscar News* No. 54, and this provoked action by writing to the author, who kindly provided a wealth of information, including a recommendation to join the Remote Imaging Group, better known as the "RIG" (see footnote).

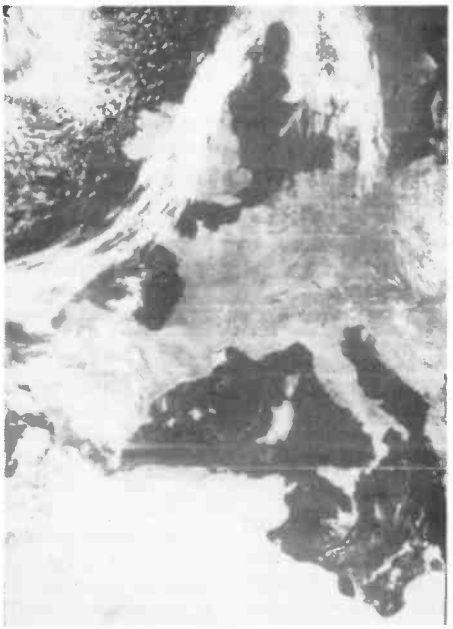
To get started on weathersats, only four pieces of equipment are needed:

1: An f.m. receiver capable of covering from 137MHz to 138MHz, with a bandwidth of 50kHz.

2: An antenna, ideally a cross polarised Yagi with azimuth and elevation capability, although a simple crossed dipole with a pre-amplifier is adequate for good pictures.

3: A frame store which basically decodes the signals received and produces a video output.

4: A means to view the results with, e.g. a video monitor. The type used with surveillance cameras will do adequately, as the output is composite video, or, alternatively, a black and white TV receiver run from a black and white modulator, such as the one rescued from an old ZX81 computer that John used.



The three p.c.b.s needed can be supplied by the Remote Imaging Group, and consist of:

Board 001 — the electronic module.

Board 002 — the memory module. (The pair are available together for just £15.00.)

The "LOK" board — this gives visible or infra-red selection of NOAA images, the 2400Hz tone needed for the Soviet Meteor satellites, the picture shift when in the zoom mode, and the north-south switch, which allows the picture to be viewed the correct way up, i.e. as on a Mercator's Projection map.

John built his system from these, which meant a lot of very fine soldering with extreme caution to ensure that no bridged connections resulted, as there were over 50 i.c. sockets plus resistors, capacitors, etc. On board 002, the memory module, some of the i.c. sockets needed to be soldered to the top of the board, and "turned pin" sockets were recommended. (A source of these at only 8p for a 16-pin socket is Linway Electronics, Telephone 01-573 3677). All of the components are available from the major stockists, and complete kits of components for all three boards are held by Martelec Ltd. of Farnborough, Telephone 0252 515666. (As many improving modifications may be made to the frame store it is recommended that back copies of the RIG newsletters be sought, as it is at the building stage that these changes are best applied.)

The setting up of the boards merely necessitates the use of a d.c. voltmeter and a frequency counter, and whilst an a.f. generator and an oscilloscope are useful for setting up the LOK board, they are not vital.

John first tested his system by playing in a tape made of a NOAA-9 pass into his completed frame store, and was delighted to see pictures as it passed over Turkey, the Black Sea, and on up over Roumania, Hungary, Czechoslovakia, Poland, the GDR, Bylorussia, Denmark, Sweden, and Norway. The next step was to organise a suitable receiver.

A number of receivers are on the market, with kits by Cirkit, Martelec and Timestep. Ready built and aligned boards are available from Maplin and the RIG also do their own receiver.

John decided on the Martelec kit, which he found easy to build, with a further advantagae that they will perform the alignment service for those who do not possess the necessary equipment. He added a scan facility, and fitted crystals for 137.3, 137.4, 137.5, 137.62 and 137.850MHz, as the 137.5 and 137.62MHz are for NOAA-10 and 9 respectively, whilst the other frequencies cover the Russian Meteosat range.

Some receivers have a facility allowing the remote switching of a tape recorder, which enables images to be taken when one is absent at work or asleep during the early hours. In any one 24 hours some nine passes ranging from 3 minutes to 14 minutes duration for NOAA-10 alone, this giving some 94 minutes of running time for the tape-recorder. This is just for one satellite. If we add NOAA-9 and the Meteor series, then to have a timer to switch the receiver to the tape recorder for required passes is an essential, otherwise we end up with a long tape which is soon filled with small sections of short duration passes.

For an antenna, a right-hand circularly polarised crossed dipole with reflectors was employed, made from a design by G1NSV. (Commercially built antennas for satellites are available from Maplin, Halbar and Jaybeam amongst others.) A 137MHz pre-amplifier available from the RIG was added to give sufficient gain, but a standard 144MHz pre-amplifier will serve well if gently re-peaked to the lower frequency satellite board.

John is now involved in a further step in the world of weather satellite reception by tackling the geosynchronous Meteosat, which works out a little more demanding in equipment and antennas than does the 137MHz system for NOAA. The antenna consists of a 1.4 metre dish including a 1700MHz pre-amplifier, which then feeds a 1700 to 137.5MHz down converter into the receiver. Whilst the cost comes to some £200, John feels that the superb quality of the 24 hours per day picture availability justifies the outlay. His system came from LMW Electronics of Leicester, Telephone 0533 386364. The frame store controls provides:

. . . A North-South switch to enable correct picture orientation regardless of the satellite pass direction.

. . . A Synchronisation switch that is set to an internal 2400Hz tone when receiving Meteor signals (as the Russian satellites do not have their own sync tone) or set to external when Meteor signals are being fed in via a stereo tape recorder. (When recording Meteor a stereo tape deck is necessary, the signal being fed to one channel, and the 2400Hz tone from the output socket on the rear of the frame store to the other channel.) A third position is provided for NOAA signals, the internal tone preventing the picture slipping should the signal be lost due to sudden interference, etc.

. . . Infra-red or visible light pictures at the push of a switch, as NOAA gives both these types of pictures.

. . . A clock switch, which starts

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- MSA20 Antenna kit

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Antenna	£17.45
Preamp	£10.95

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J. C. Hornby, 21 West Wools, Portland, Dorset DT5 2EA tel: 0305 822753 TTNS YMD 016

and stops the picture scrolling.

. . . A zoom switch, times 0.5 to give the capability of viewing both types of picture at the same time, or times 1 to view Meteosat pictures or either infra-red or visible light pictures from NOAA or Meteor, or alternatively times 2 to permit viewing the pictures in greater detail.

. . . An APT/WEFAX switch, giving either the APT used for the NOAA and Meteor signals, or the WEFAX used with Meteosat signals to give automatic start and stop to the pictures.

Modifications such as times 4 zoom, true and inverse video, a saving of four pictures, a test scroll, an SSTV modification and various others may be added to the system if desired.

The framestore picture consists of 256 pixels by 256 lines with sixty-four grey levels, this giving very good quality pictures, even allowing landmarks such as Portland Bill to be seen in detail when in the "zoom" mode. The screen display is final, that is to say it cannot be "zoomed" or changed in any way once it is displayed. For this reason it is best to record on tape any passes which may need to be viewed in greater detail. Furthermore, as the NOAA satellites send their visible and infra-red pictures in alternate lines, a tape means that both pictures may be kept on file to later be studied at leisure.

To make a "hard copy" of the screen display is rather more difficult, as it involves the use of photographic paper and development in conjunction with a photo fax unit. Here again the tape recorder lends itself to later study of the pictures with minimal effort in maintaining records.

The first picture (Fig. 1) comes from Dave G8XOC of Stoke Ferry, near Kings Lynn, Norfolk, and shows NOAA-9 picture with the more typical cloud sweep across the Irish Sea, and a clear central Europe permitting the Alps to be seen.

Your pictures, both satellite and equipment, hints, tips, will be welcomed by this column, as was the input from John and Dave.

Addresses

Membership of the Remote Imaging Group is only £4.00 per annum (though an addition as a donation is more than welcome) and provides an information packed magazine, with lots of advice, hints and tips for weathersat fans. Send to Mr. Des Watson, Norton, Gote Lane, Ringmer, Near Lewes, East Sussex, BN8 5HX.

OSCAR News is the official journal of AMSAT-UK, and provides a wealth of topical information and assistance to users and followers of all satellites, particularly the OSCAR and RS amateur communications and the UoSAT experimental series, an annual colloquium, and on the air nets. Membership forms are available for a s.a.s.e. sent to the Secretary, Ron Broadbent, G3AAJ, AMSAT-UK, London, E12 5EQ.

Deadline Dates

Issue	*Deadlines*
July	May 21
August	June 20
September	July 23

BAND II DX

Ron Ham

Faraday, Greyfriars, Storrington, West Sussex RH20 4HE

Over 25 years ago, when Band II was relatively quiet, I installed a GEC v.h.f. receiver for an elderly blind lady. An outside antenna was added to ensure good signal strength and the set's own large tuning knob enabled her to count the number of turns required to find BBC Radios 2, 3 and 4 with comparative ease. This all worked well until a tropospheric opening occurred and, for a couple of days, a variety of continental stations mingled with the signals from the BBC and added confusion to the system. However, this particular lady was able to cope with the problem and wanted to know more about the cause.

Receivers

The present day solid-state receivers are far more sensitive than those early valve sets. There are also many more national and local stations, throughout Europe, now occupying the band with more to come, such problems are much worse. That old saying, "one man's meat is another's poison", really applies in this case, because, when atmospheric conditions are right for DXing they can also cause great hardship to the hundreds of people whose radio is more like a friend than a normal piece of household gear. Unlike most other aspects of radio communication for the enthusiast, Band II DXing need not be expensive. Although a super stereo receiver, complete with mast-head pre-amp and rotatable multi-element Yagi, may well be the DXers dream, useful results and good entertainment can be achieved with a modest portable, especially when used at a good location or away from home on high ground.

Like many other enthusiasts, I often carry a Plustron TVR5D (Fig. 1) in my car and, with its own telescopic antenna, I can check the prevailing conditions in Band II as well as on the TV bands, I have known a slight increase in activity between 88 and 104MHz to herald an extensive tropospheric opening which, within a few hours, reached high into the television bands.

On February 22, while on the "Black Nixen", near his QTH in New Radnor, Simon Hamer tried his Sharp car radio with a rotatable antenna and logged BBC Radios Bristol, Derby, Essex, Gwent, Kent, Lancashire, Leeds, Lincolnshire, London, Manchester, Merseyside, Norfolk, Northamptonshire, Oxford, Shropshire, Solent, Stoke-on-Trent, Sheffield, Sussex and WM.

Simon found that conditions were really good and he soon identified signals from Belgium (BRT 1 and 2), France (TDF Frequence Nord and Culture), Holland (NOS-1) and Ireland, Radio Telefis Eireann (RTE FM1 and 2). He also added ILRs Beacon Radio, Broadland, BRMB, Capital Radio, Chiltern Radio, City, GWR, LBC, Ocean Sound, Marcher Sound, Mercia Sound, Mercury, Piccadilly Radio, Reading, Red Dragon Radio, Red Rose Radio, Southern Sound, Trent, Wyvern and 210 from Hannington for the Andover and Basingstoke areas.

Sean Regan (Halifax) has learnt that future plans for Band II allocates 88 to 94.6MHz to 3 national services for the BBC, 97.7 to 99.8MHz for a 4th BBC national, 99.9 to 101.9MHz for Independant National Radio and 105 to 107.9MHz to supplement the coverage of each service. BBC and Independant local radio stations should then be found between 94.6 to 96.1MHz, 103.5 to 104.9MHz and 96.1 to 97.6MHz, 102.0 to 103.4MHz, respectively.

Sporadic-E

Early in the 1986 Sporadic-E season, on May 16, Edwina and Tony Mancini (Belper) received pictures, on Ch. R1 — in Band I from Soviet Television and their report was acknowledged with a Radio Moscow QSL card.

While an intense Sporadic-E is in progress, sound signals from the USSR can also be heard in Band II

SEEN & HEARD

on Chs R4 and 5 (91.75MHz) and (99.75MHz) respectively.

I checked my records and found that signals on these channels were heard around 1220 on that day and, following a report, a listener may well earn one of these cards. However, do beware and listen carefully for an ident, because, stations in Czechoslovakia, Hungary, Poland and Romania also transmit on Chs. R4 and 5 and what we actually receive, depends mainly on the extent, intensity and position of these sporadic clouds of gas which can manifest suddenly within the "E" region of the ionosphere.

Tropospheric

The atmospheric pressure, measured at my QTH with a Short and Mason Barograph, was predominantly high and fluctuating around 30.2in (1022mb) between March 2 and 18. Such readings are good for the DXer, because, signals in Band II normally increase their range when the pressure is high and more so when it is about to fall. On most days throughout this period, I could hear fairly strong signals from stations in Belgium, France and Holland and UK locals from Bristol to Essex. Although a standard barometer will provide the immediate pressure reading and, with a slight tap, it will show if the prevailing pressure is steady or beginning to rise or fall, more detailed information about the movement of the systems can be obtained from the weather map published daily in some national newspapers or by watching the television weather forecasts.

Your deadlines for the next three issues are May 21, June 20 and July 23.

TELEVISION

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

The majority of v.h.f. tuner dials fitted to combined v.h.f./u.h.f. receivers are enscribed with the European channel numbers; E2 to E4 for Band I and E5 to E12 for Band III. So, with this in mind, I produced the table in Fig. 1 to show new DXers where to find a particular country in Band I.

Computer buffs may like to know that I used an Electric Studio Light Pen, in conjunction with my Amstrad PCW8512, to prepare both the chart and text used in Fig. 1.

Very often an opening occurs too late to be mentioned one month (Sporadic-E and the like is no respecter of deadlines), but we always catch up on the news as soon as possible. Every event contains something of interest so don't be deterred by the date, write to me as soon as possible and I will use what I can.

One such opening manifested at the end of January when Noel Smythe (Caerphilly) received pictures from Belgium, France, Holland and W. Germany in Bands III, IV and V. On the 31st, he logged test cards from Belgium's BRT and RTBF-1 and Germany's ARD-1. "PTT NED-1 was blanking out BBC-2 and the BRT test card on Ch. 43 was followed by Laural and Hardy in *Way Out West*," said Noel. He also received TVS and counted 11 French stations in the u.h.f. band.

"At one time, just after 0805 on the 31st, I found the NED test-cards (Figs. 2 and 3) on eight different channels across the band," wrote Peter Lincoln (Aldershot). He added, "it was lucky that both the BBC2 and CH4 transmitters were off the air at the time". Around this time, he also received test cards from Belgium (Fig. 4), W. Germany (Fig. 5) and a presenter, possibly from Holland (Fig. 6). "My trusty TV receiver (Fig. 7) began life as a 4.5in Hitachi portable with a clock timer. This feature was never used so it seemed a good idea to add a signal level meter which would help when rotating the antenna for maximum signal strength," said Peter. He also uses this set up to receive amateur TV transmissions in the 432MHz band.

Band I

During the 1986 Sporadic-E season in India, Major Rana Roy received a programme caption (Fig. 8) and the familiar HOBOCTN news ident (Fig. 9) from the USSR at midday on May 26 and June 6, respectively. Rana also logged Russian pictures on May 9, 10 and 12 and Arabic TV on the 11th.

By the time you read this epistle, the 1987 season will probably be upon us. You may have already seen the first signs of increasing activity at the lower end of Band I and possibly identified stations from some of those countries listed in Fig. 1. Obviously no one can waste good time watching a blank screen, so, if you would like an early warning of Sporadic-E and you have a scanning receiver, just commit the television channels, E2 (48.25MHz) and R1 (49.75MHz) to the scanner's memory and leave it running while you are in earshot. When you hear a low pitched variable buzz, (picture synchronising pulses) then switch on the TV receiver and look for pictures on the "buzzing" channel.

Between February 15 and 27, Simon Hamer (New Radnor) received pictures from Austria — ORF-FS1; Czechoslovakia — RS-KH; Italy — RAI-1; Norway — Kongsberg and Poland — TVP. Further minor Sporadic-E events produced signals from Sweden — TV1 Sverige on March 7; Germany — ARD/BRI test card with Kreuzberg caption on the 8th; Finland — YLE-TV1 and programmes from the USSR with cyrillic captions on the 9th as well as Czechoslovakia, Denmark — DR and Italy on the 11th.

Despite the time taken to build a new shack and install the gear, Edwina and Tony Mancini (Belper) remained active from February 18 to 28 and from March 9 to 11. During both periods they received pictures from Austria, Czechoslovakia, Denmark, E. and W. Germany, Holland, Norway, Poland, Sweden, Switzerland and the USSR and among the German and Norwegian regionals, identified by their test cards, were Grunten and SWF/BADN and Bremanger, Gamlem and Melhus, respectively.

Fig. 1.

Selected Band I (40-68MHz) Channels.

E2	R1	Ia	E3	R2	E4	Band I
48.25	49.75	53.75	55.25	59.25	62.25	MHz
Belgium	Austria*	Italy	Belgium	Czechos.	Denmark	
Germany	Czechos.		Denmark	Hungary	Finland	
Portugal	Hungary		Finland	Poland	Germany	
Spain	Poland		Germany	USSR	Holland	
Sweden	USSR		Iceland	Romania	Iceland	
Sutzrlnd			Portugal		Italy(Ib)	
	*Ch.E2a		Spain		Spain	
			Sweden		Sweden	
			Sutzrlnd		Yugoslav	
			Yugoslav			

COUNTRIES TO LOOK FOR DURING THE SPORADIC-E SEASON; May to August inc.

Tropospheric

During the lift on February 22, Simon Hamer logged test cards and/or programmes from stations in Belgium — BRT-1 and RTBF-1 and France — TDF *Canal Plus* in Band III.

The high barometer reading on the 28th prompted George Garden (Edinburgh) to take his JVC receiver and amplified loop antenna to his regular DX hunting high spot, Cairn O' Mounth, to check the u.h.f. band. "This was the first time that I received strong sound and a good, but flaky colour picture, from Border TV at Selkirk," said George. He later tuned to Ch. 41 and, with his antenna vertical, logged the Tay Bridge satellite transmitter at Dundee. "On placing the antenna in the horizontal plane, co-channel interference was seen and by carefully adjusting its direction and holding it above the car roof, I received a b/w picture of the CH4 programme, *Brookside Omnibus*. On checking the station and programme schedules, I found that this fitted nicely with the Emly Moor transmitter in Yorkshire, which I have not received up there before," wrote George.

Noel Smythe received Belgium's RTBF-1 test card on Ch. E8 at 1425 on February 18 and again at 1945 on March 8. He also logged *Canal Plus* from France, on Ch. 5, almost daily from February 18 to 28 and daily from March 6 to 12. "RTE Dublin came up on Ch. 41 for a couple of seconds and knocked out HTV picture at 1730 on March 6," reports Noel.

Slow Scan Television

Readers familiar with the h.f. amateur bands, may already know that the twittering tones, which they frequently hear, around 3.74, 7.04 and 14.234MHz are slow scan television pulses. When

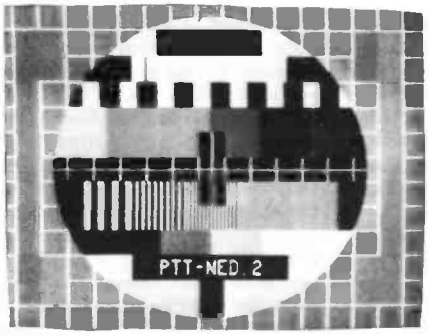

Fig. 2: Dutch

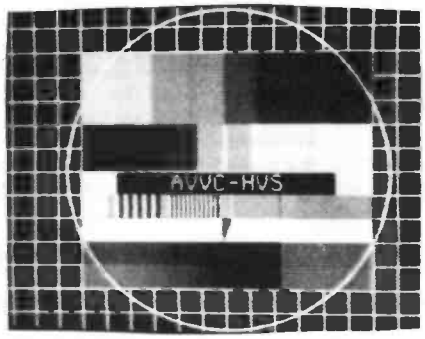

Fig. 3: Dutch

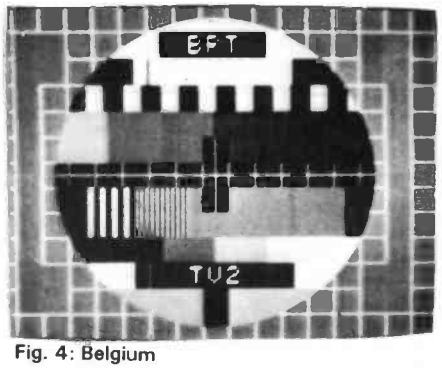

Fig. 4: Belgium

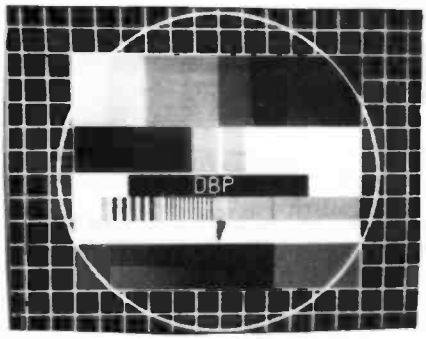

Fig. 5: W. Germany

Fig. 6: Holland?

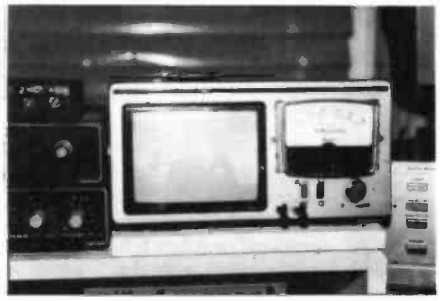

Fig. 7: Hitachi portable

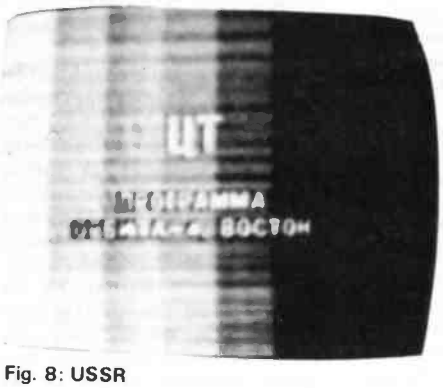

Fig. 8: USSR

Fig. 9: USSR

Fig. 10: Iceland SSTV

Fig. 11: CQ from Paraguay

Fig. 12: UK SSTV

Fig. 13: Norway SSTV

decoded by a dedicated convertor or micro-computer connected to a receiver, a sequence of pictures are seen being pieced together. Long distance SSTV signals are usually copied around 21.33 and 28.6MHz when these bands are open.

Peter Lincoln has received pictures, in this mode, from many countries including Iceland (Fig. 10) and Paraguay (Fig. 11).

Signals from England and Norway (Figs. 12 and 13) feature among those copied by **Allan Sancto DD5FM/G6BWH**, at his QTH in W. Germany.

"The Sunday morning activity on 3.730 or 3.735MHz, depending on the QRM, continues, mostly with colour SSTV", wrote **Richard Thurlow G3WW** (March). He told me that G3IAI has added a Robot 1200C and 800C keyboard to his system and that GM3SBC is using this mode again. "The Fenland SSTV Net has expanded its colour content, G6SXB uses a Volker Wrasse SC-1 (24 and 48 seconds) and G0BDD has ROBOT 450C and 800C equipment," explained Richard. He continued, "Lately we were joined by G1LXI (Hitchin), G4BEL (Haddenham) and G8MIW.

The Fenland Net operates on Mondays between 2000 and 2300 and Richard often gets enquiries, over the air, about SSTV from interested amateurs and computer users and says that more enthusiasts seem to be building the G3WCY SSTV converter and G4ENA transmitting sections. "Local builders are having very good results," said Richard. He reports that BATC's new publication, *The Slow Scan Companion,* is good.

During the month prior to March 13, **Les Hobson G0CUI** (Rotherham) exchanged pictures, on 14MHz, with PT9FH in Brazil and N3AUJ, WA4SCJ, WD0FNL, W2GQC and W8ASF in the USA.

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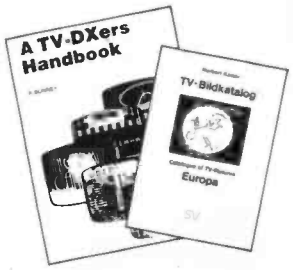

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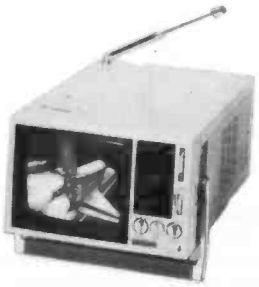

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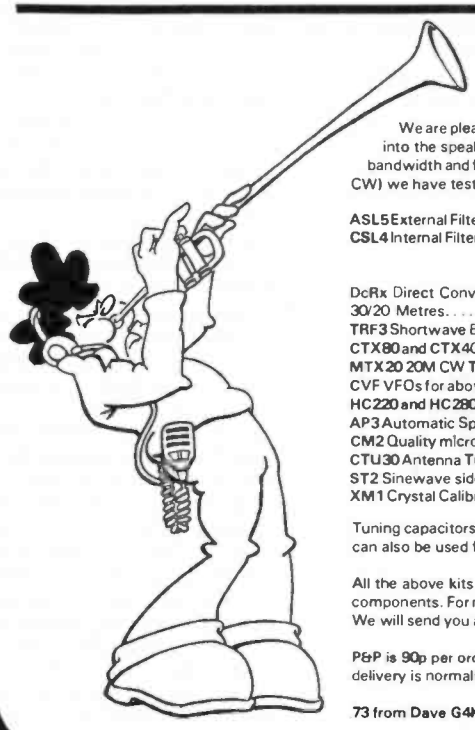

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CTU30 Antenna Tuner, with balun, all HF bands up to 30W.	£24.90	£29.90
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SEEN & HEARD

LONG MEDIUM & SHORT

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

It is good news indeed that so many listeners have written in support of the new *Short Wave Magazine* which is now dedicated to the listener. Many interesting reports for this section of "Seen & Heard" have been received here during the month, so may I take this opportunity of thanking everyone concerned. I do hope that other readers will send along a report of their reception. This series is not run as a DX race but as a guide to reception conditions, what you can expect to hear and what other readers are in fact hearing, so every report is of interest and will help to make this the best ever magazine for the listener.

Long Wave DX

(Note: l.w. m.w. frequencies in kHz, s.w. in MHz: Time UTC)

Writing from Wallsend, **David Edwardson** says that he has been interested in the l.w. band for some time but has always been disappointed at the performance of his Trio R600 receiver below 500kHz. He recently decided to build the *PW* "Taw" v.l.f/l.f. convertor and has been amazed at the improvement when using it ahead of the Trio – some 20dB increase in signal strength. Some idea of his reception during darkness can be ascertained from the SIO ratings noted in brackets – DLF Donebach, W. Germany 153 (454); Allouis, France 162 (444); Motala, Sweden 189 (343); BBC Droitwich 200 (555); Roumoules, Monaco 218 (444); Oslo, Norway 218 (454); Kalundborg, Denmark 245 (454); Tipaza, Algeria 254 (333) and Topolná, Czechoslovakia 272 (454).

The news that there is to be a new long wave station located in County Meath, S. Ireland has certainly come as a surprise to many people – it seems that RTE and Radio Luxembourg have joined forces and intend to put the station on the air by the middle of next year. Broadcasting popular music, it will operate on 254kHz and is expected to cover the whole of S. Ireland and most of the UK – as most DXers will appreciate, it will no doubt reach many other places too! A 1500kW transmitter in Tipaza, Algeria also operates on that frequency and since their signals are often good in the UK there may well be some interference problems.

Using a car radio connected to a 4m wire antenna, **Paul O'Connor** checked the l.w. band in Birmingham at 1730 and picked up Allouis, France (2000kW) on 162 with SINPO 43444 and Saarlouis, W. Germany (2000kW) on 183 which rated 33343. **Tim Shirley** has been adding a few more to his list in Bristol including Nador, Morocco 171 at 1700; Leningrad, USSR (150kW) 200 at 0300; Konstantynow, Poland (2000kW) 227 at 2359; Kishinev, USSR (1000kW) 236 at 0100; Kalundborg, Denmark (300kW) 245 at 2000 and Orenburg, USSR (15kW) 272 at 0230 – the reception of some of these stations is subject to confirmation by QSL.

MW Transatlantic DX

The conditions at night for the reception of transatlantic signals on the m.w. band have been exceptionally good and dedicated DXers have logged many new stations in the UK. The signals from some areas have still been audible around 0700! Some of the signals arriving here before midnight from eastern USA and Canada have been so good that it has been possible to receive them on a simple transistor portable receiver with built-in ferrite rod antenna.

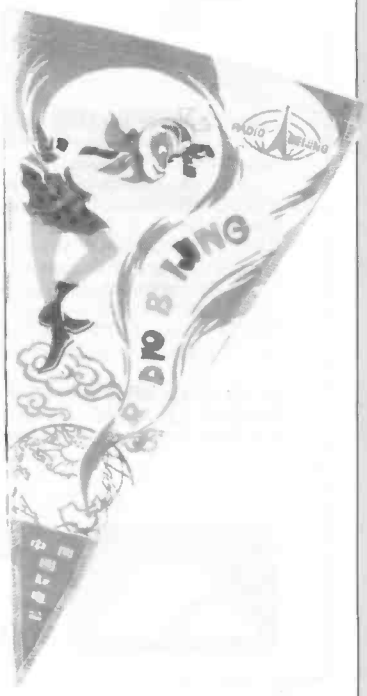
Using a Grundig Transonette 60A portable with just the internal ferrite rod antenna, **Clive Mayhew** picked up three stations from NF around 0100 in Stoke-on-Trent – CJYQ in St. John's 930 (SIO 233); CKYQ in Grand Bank 610 (SIO 333) and VOCM in St. John's 590 (SIO 323). At 0145 he received NYs WINS 1010 at SIO 333 – also logged by Paul O'Connor while checking the band with his car radio plus 4m wire antenna.

Living in a high rise block of flats can present problems for most DXers. However, **Martin Scholes** has just discovered that by connecting his Sony ICF-2001 receiver to the communal TV antenna system at his flats in Telford it is possible to hear the Caribbean Beacon, Anguilla on 1610 at 0130! He can also faintly hear CJYQ on 930. He hopes this news will encourage other listeners without "proper" antennas to have a go at transatlantic DXing – he has another tip too, if your receiver has a tone control then make more use of it to enchance the broadcasters voice.

The Caribbean Beacon 1610 has also been logged for the first time by **Roy Spencer** who uses a loop antenna with his realistic DX-400 receiver at his first floor flat in Nuneaton. A simple loop antenna is probably the ideal answer for flat dwellers and could well solve the problem of a suitable m.w. antenna for other DXers too.

Writing from Findochty, **Alastair Ross** says "I have been finding m.w. conditions extremely good and just wish I had a good antenna to take full advantage of them." He tried using a TV antenna with his Yeasu FRG-7 receiver and managed to receive weak signals from the Caribbean Beacon on 1610 at 0300. He then changed the antenna to a 10m vertical and reception so much improved that he was able to hear CJYQ 930 and WINS 1010 at good strength too – so remember Alastair's tip and try changing your antenna if you cannot hear the DX.

In an interesting report from Cardiff, **Alan Jarvis** says



Pennant from Radio Beijing.

"Although I stayed up only until 0115 I have never before heard US stations coming in so well. In many cases local and European stations only a few kHz away were completely blotted out!" His list includes Canadian CBNA in St Anthony NF, 600; CHYQ in Musgravetown NF, 670; CJYQ 930; CFBC in St John NB, 930; CFRB 1010 & CHUM 1050 in Toronto. From the USA were WINS 1010 & WHN 1050 in NY; WBAL in Baltimore, 1090; WWWE in Cleveland 1100, OH; WCAU in Philadelphia 1210 and WMRE in Boston 1510.

Apparently my tip of using "exalted carrier" reception with an s.s.b. receiver last month has enabled **Mark Hillier** to log his first transatlantic station in Didcot just before midnight – WINS. Writing from Bristol, **Len Eastman** says he has also been using exalted carrier reception with his FRG-7000 receiver plus "Sooper Loop" antenna (PW July '86) and has been hearing WINS and CFRB on 1010 every night for two weeks – he has also been hearing WINS in the morning until 0755! **Phil Townsend** says he has been listening out for WINS in London before 2230 but strong interference from Hilversum 1 on 1008 has so far made things

SEEN & HEARD

Freq kHz	Station	ILR or BBC	DXer
603	Invicta Sound	I	A,D*,E,H,M,O
630	R. Cornwall	B	D,E
630	R. Bedfordshire	B	A,B,D,E,F,G,H, J,M,O
657	R. Clwyd	B	B,C,D,E*,M
657	R. Cornwall	B	D,E
666	DevonAir R.	I	D,E,M
666	R. York	B	B,C,D,H,J
729	BBC Essex	B	B,D,E,H,M,O
756	R. Cumbria	B	C,D*
756	R. Shropshire	B	B,D,E,H,J,M
765	BBC Essex	B	B,D,F,H,M,O
774	R. Kent	B	E,H,O
774	R. Leeds	B	B,D,J,M
774	Severn Sound	I	D,E
792	Chiltern R.	I	B,D,E,H,M,O
801	R. Devon	B	A,D,E,H,M
828	2CR	I	A,D,E
828	R. WM	B	D,F,M
828	R. Aire	I	B,D
828	Chiltern R.	I	D*,E,H,O
837	R. Leicester	B	A,B,D,E,H,M,O
855	R. Devon	B	D,E,M
855	R. Norfolk	B	B,D,H,O
855	R. Lancashire	B	B,C,D,M
873	R. Norfolk	B	B,D,H,M,O
936	GWR	I	A,D,E,H,M
945	R. Trent	I	D,F,H,P
954	DevonAir R.	I	A,D,E,H,K*,M
954	R. Wyvern	I	D,E
990	R. Devon	B	D,E
990	Beacon R.	I	D,F,H,I,M
990	Hallam R.	I	B
999	R. Solent	B	A,D,E,H
999	Red Rose R.	I	C,D,K*,L*,M
999	R. Trent	I	B,D,M
1026	Downtown R.	I	C,D*
1026	R. Jersey	B	A,D,E,H
1026	R. Cambridgeshire	B	B,D,E*,H,M,O
1035	R. Sheffield	B	B,D,M
1035	R. Kent	B	A,D,E*,H,O
1035	NorthSound R.	I	D*,K
1035	West Sound	I	D*,E,N
1107	Moray Firth R.	I	C,D*,L,N
1107	R. Northampton	B	B,D,E,F,H,M
1116	R. Derby	B	B,C,D,E*,M
1116	R. Guernsey	B	A,D,E,H
1152	LBC	I	A,D,H,O
1152	R. Clyde	I	D*,K,L*
1152	Metro R.	I	D*
1152	BRMB	I	D,E,I,M
1152	Plymouth Sound	I	D*
1152	Piccadilly R.	I	B,D
1152	R. Broadland	I	D*,E,L*,M
1161	R. Sussex	B	A,D,E,H
1161	R. Tay	I	D*,K,L
1161	Viking R.	I	B,C,D*,K,M
1161	GWR	I	D,E
1161	R. Bedfordshire	B	M
1170	Swansea Sound	I	D
1170	R. Tees	I	D*
1170	R. Orwell	I	D*
1170	Ocean Sound	I	A,D*
1170	Signal R.	I	D,M
1242	Invicta Sound	I	A*,D,H,O
1251	Saxon R.	I	C*,D,H,M,O
1260	GWR	I	A,D,H
1260	Marcher Sound	I	D,M
1260	Leicester Sound	I	D,H
1260	R. York	B	D*
1278	Pennine R.	I	B,C,H
1305	Red Dragon R.	I	A,C*,D,E
1305	R. Hallam	I	B,D
1323	R. Bristol	B	C,D,E,M
1323	Southern Sound	I	A,C,D*,H,M
1332	Hereward R.	I	B,D,E,L*,M,N
1359	Essex R.	I	D*,H,O
1359	R. Solent	B	A,D*
1359	Red Dragon R.	I	C*,D,E
1359	Mercia Sound	I	D,G*,M
1368	R. Lincolnshire	B	D,M
1368	R. Sussex	B	D*,H
1431	Essex R.	I	D,E,H,O
1431	Radio 210	I	A,D,E,M
1449	R. Cambridgeshire	B	A*,B,H,M
1458	R. London	B	A,C,D,K,L*,N,O
1458	R. WM	B	D,E,F,M
1458	R. Manchester	B	B,C,D,M
1458	R. Newcastle	B	C,D*,K
1458	R. Devon	B	A,E*
1476	County Sound	I	C*,D,E,H,M
1485	R. Merseyside	B	C,D,L*,M
1485	R. Humberside	B	B,D*
1485	R. Sussex	B	A,D*,H
1485	R. Oxford	B	D,M
1503	R. Stoke-on-Trent	B	B,D,H,M
1521	R. Mercury	I	D,E,H,L*,M
1521	R. Nottingham	B	B,D,M
1530	Pennine R.	I	B,C,D,J,L*
1530	BBC Essex	B	D*,H
1530	R. Wyvern	I	C,D,E,L*,M
1548	Capital R.	I	A,C,D,H,K*,L*,O
1548	R. Brlstol	B	A,D,E
1548	R. Forth	I	D*,K,L
1548	R. City	I	D,M
1548	R. Cleveland	B	D*
1548	R. Hallam	I	B,M
1557	Hereward R.	I	B,D,E,F,G*,K,L*,M
1557	R. Lancashire	B	C,D
1557	Ocean Sound	I	A,C*,D,E
1584	R. Nottingham	B	B,C,D,G,H,M
1584	R. Shropshire	B	D
1584	R. Tay	I	D*,L,N*
1602	R. Kent	B	B,D,E,G,H,M

impossible despite trying four receivers. Although a good loop antenna can be used to "null out" unwanted signals the use of an s.s.b. receiver would also help in such situations — by selecting u.s.b. most of the interference would be rejected.

Up in Glasgow, **Alexander Little** has been using his new Sony 7600D receiver to listen to some of the interesting broadcasts from stations in Canada and the USA — SINPO ratings in brackets. They included pop music from CJYQ 930 at 2230 (32333); the news via WINS 1010 at 2300 (33323); a weather report from CHER in Sydney, NS 950 at 2310 (33333); sports news via WMRE 1510 at 2317 (34333); pop music from CJCH in Halifax, NS 920 at 0015 (43333); a talk broadcast by WCAU by WCAU 1210 at 0026 (23322); pop music and competitions from VOCM 590 at 0035 (33333); country & western music via WHN 1050 at 0250 (22322).

While tuning around the band at 0030 in Redhill, **George Morley** picked up the Atlantic Beacon 1570 on Turks & Caicos Islands with a warning of heavy rain storms in the area — this was followed by a Religious programme. He also added three stations to his growing list of DX, namely CKCV Quebec 1280; CFGM Richmond Hill, on 1320 and WTOP in Washington, DC 1500. Writing from Mapperley, **John Sheridan** says he found conditions excellent during the early hours of one morning and heard 17 stations between 0006 & 0545 — he used a Yaesu FRG-7700 receiver plus FRT-7700 a.t.u. with a "Sooper Loop" antenna to log VOCM 590; CKYQ 610; CHYQ 670; CIYQ Grand Falls, NF 680; WABC NY 770; CJYQ 930; CBM Montreal 940; WINS 1010; CFRB 1010; WBZ Boston, MA 1030; WHN 1050; WWWE 1100; WCAU 1210; CKCW Moncton NB 1220; Radio Globo in Rio, Brazil 1220; WTOP 1500; CKLM Montreal 1570 and the Caribbean Beacon 1610.

In New Radnor, **Simon Hamer** added 5 new stations to his growing list of DX — CBT 540; ZDK Antigua 1100; CFGO 1200 and KGA Spokane, WA 1510. Among the many other stations logged by Simon were CFCB Corner Brook, NF 570; CKBW Bridgewater, NS 1000; CHTN Charlottetown, PEI 1190; CIGO Pt. Hawkesbury, NS 1410; WERE Cleveland, OH 1300 and XEBBC 1470 Tijuana, Mexico. A QSL has been received by **Derek Taylor** of Preston for his reception of KING

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

DXers:
A: Geoff Blakey, Gosport.
B: John Donkersley, Sheffield.
C: Rab Freeman, Port Glasgow.
D: Simon Hamer, New Radnor.
E: Alan Jarvis, Cardiff.
F: Graham Johnson, Nuneaton.
G: Bill Kelly, Belfast.
H: George Morley, Redhill.
I: Paul O'Connor, Birmingham.
J: John Parry, Northwich.
K: Alastair Ross, Findochty.
L: Stewart Russell, Forfar.
M: Martin Scholes, Telford.
N: Robert Taylor, Edinburgh.
O: Philip Townsend, London.
P: Jim Willett, Grimsby.

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Frequency range of the AR2002 is from 25 to 550 and from 800 to 1300 MHz. Modes of operation are wide band FM, narrow band FM and AM. The receiver has 20 memories, memory scan and a search mode which checks frequencies between user designated limits.

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A front panel knob allows the listener to quickly step up or down in either 5, 12.5 or 25 kHz steps from the frequency initially chosen.

The AR2002 has a front panel LED bar "S" meter.

There is a front panel 3.5mm jack socket for headphone use.

A socket for the optional RS232 interface (RC PACK) is provided on the rear panel. The RC PACK consists of an 8 bit CPU with its own ROM and RAM and with your own computer acting as a dumb terminal many additional operating facilities become available. Of course, if you want to write you own programs using the RC PACK as an interface then "the sky's the limit".

THE R532 AIRCRAFT BAND RECEIVER £224

Specification. Frequency range: 110 to 136MHz, i.e. all NAV/COM channels. Number of channels: 1040 (25KHz steps). Sensitivity: Better than 0.75 microvolts 10dB/SN. Memory channels: 100 (10 banks of 10) Memories can be scanned automatically or selected manually. Power required: 12V dc negative earth 300 mA typical. (Display can be switched off to reduce consumption when operating portable). Size: 160x 45x 130mm. Weight: approx. 1Kg. (Including memory backup batteries).

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Advanced microprocessor technology controls various features, including dual digital VFOs, 100 memory channels, memory scroll, memory and programmable band scan, superb interference reduction and other features for ease of operation to enhance the excitement of listening to stations around the world.

FEATURES

Covers 100 kHz to 30 MHz in 30 bands. Optional 108 to 174 MHz Coverage (VC-20).

The R-5000 covers 100kHz to 30 MHz in 30 bands. An innovative digital PLL synthesiser system provides outstanding frequency stability and accuracy.

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The **PA-3** will not only improve the performance of wideband scanning and monitor receivers, it can also be used to improve the sensitivity of RF instrumentation such as spectrum analysers, etc.

The **PA-3** is mains powered for economy and there is no need to run a power cable to the unit at the masthead as the co-axial cable is used to carry the supply voltage.

REVCO PA-3 PRE-AMPLIFIER (with p.s.u.) **£49.95**
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in Seattle, Washington 1090. Others confirmed are CJCA Edmonton AB 930; CKXL Calgary, AB 1140 and CFUN Vancouver, BC 1410. Derek uses a Sony ICF 2001D receiver with either a 1.5m Cardioid loop or a 2m fixed loop when DXing and may have scored two more firsts by receiving KURM in Rogers, AR 790 at 2310 and KPNW in Eugene, OR 1120 at 0309.

Other MW DX

Two stations in the Canary Islands were mentioned by DXers this time — RNE1 in Tenerife on 621, logged by **Nigel Final** in London at 2245 and Radio Las Palmas on 1008, logged by Ian Smith at 0101. Between 2045 & 2134 Ian logged Ouagadougou, Burkina Faso 747; Qurayyat, Saudi Arabia 900; QBS Qatar 954; IRIB Iran 1080 & 1278; LJB Libya 1125. An Amstrad 6011 portable receiver was used by Jim Willet from 2359 to log Sidi Bennour, Morocco 540; Qurayyat, Saudi Arabia 549; Riyadh, Saudi Arabia 585; Pico do Ariero, Maderia 603; Sebaa-Aioun, Morocco 612; Tunis-Djedeida, Tunisia 630; Umraniye, Turkey 702; BBC Zakaki, Cyprus 720; Ajlun, Jordan 801; BBC Zyyi, Cyprus 1323 and Vatican, Rome 1611. Using a Vega 206 portable in Gosport, **Geoff Blakey** picked up Antalya, Turkey 891 at 2321 and Kaliningrad, USSR 1143 at 0031.

Some of the official stations in S. Ireland logged by DXers include Radio Na Gaeltachta 540, noted by **Robert Taylor** in Edinburgh as SIO 444 at 1340; RTE-1 Tullamore 567 was received in Nuneaton by **Graham Johnson** at 1305 and RTE-2 Athlone 612 noted by Paul O'Connor at 1818 was SINPO 44444. Rab Freeman compared the ground wave signals from two of the BBC Radio Ulster transmitters in N. Ireland at 1430, logging Eniskillen 873 (1kW) as SIO 243 and Lisnagarvey 1341 (100kW) as SIO 454. Alastair Ross has been hearing Manx Radio, IOM 1368 which reaches some areas of Scotland during daylight.

Using an RCA AR77 receiver in Grimsby, **Jim Willett** was one of several listeners who were lucky enough to log a few new stations along with those more frequently reported — WGTO Cypress Gardens, FL 540; CFNB Fredericton, NB 550; CHCM Marystown, NF 560; VOCM 590; CHYQ 670; CKAC Montreal, 730; WJR Detroit, Mi 760; WZAM Norfolk, VA 1110; CIHI Fredericton, NB 1260; AND CHAM 1280 Hamilton, ON — all were noted between 0020 & 0215 and some of them are subject to confirmation by QSL.

Several new stations were also noted in the extensive log from **Ian Smith** of Paisley. Between 0030 & 0230 he logged CBT Grand Falls, NF 540; CJFX Antigonish, NS 580; VOCM 590; CBNA 600; CHNC New Carlisle, PQ 610; CKYQ 610; CFCL Timmins, ON 620; CBN St. Johns, NF 640; Greenlands Radio, Godhayn, Greenland 650; WNBC NY 660; CHYQ 670; CIYQ 680; CBF Montreal PQ 690; WABC 770; CJVA Caraquet, NB 810; WHAS Louisville, KY 840; WHDH Boston, MA 850; WWL New Orleans, LA 870; CFBC 930; CJYQ 930; CBM 940; CBZ Fredericton, NB 970; WYNZ Portland, ME 970; CFRB 1010; WINS 1010; WBZ 1030; WHN 1050; CJRP Quebec 1060; WBAL 1090; KMOX St Louis, MO 1120; WNEW NY 1130; WHAM Rochester, NY 1180; CFGO Ottawa, ON 1200; WCAU 1210; CKCW 1220; CFDA Victoriaville, PQ 1380; WTOP 1500; WMRE 1510; WQXR 1560 New York. Some new stations were logged between 0730 & 0815 too — WSM Nashville, TN 650; WLW Cincinatti, OH 700; WJR 760; WBBM Chicago, IL 780 and WLAM Lewiston, ME 1470.

Writing from Sheffield, **John Donkersley** says that he finds reception is much improved when the sensitivity switch of his Sony ICF 7600D receiver is set to "low" while using it with an indoor 10m wire antenna. During the period 1000-1200 he logged six stations in W. Germany — Frankfurt 594; Bremen 936; AFN Stuttgart 1143; VOA Munchen-Ismaning 1197; Mainflingen 1539 and Langenburg 1593 and four in France — Rennes 711; Paris 864; Lille 1071 and Nice 1557. Two Scandinavian broadcasters were received by Phil Townsend during daylight — Radio Sweden via Solvesborg 1179 and Radio Norway via Kvitsoy 1314.

Stewart Russell of Forfar and **Wyn Mainwaring** of Cowes IOW have been monitoring BRT Brussels on 1512 at 1830. Wyn heard their DXers programme state that they do not increase their transmitter power at sunset due to cost, so the increase in signal strength noted by **John Greenwood** in Evesham is still unexplained. John has now built automatic recording equipment and is running it for 40 days from 1830-1900 — I hope to publish his results soon.

MW Local Radio DX

This aspect of our hobby is very popular — see chart! if you hear any stations don't forget to write and tell me.

Short Wave DX

Although occasional openings to distant places may occur on the **25MHz (11m) band**, due to the present minimum period of the 11-year solar sunspot cycle it is unused by broadcasters. It is unlikely that they will include 11m in their operational schedules until a worthwhile service can be established.

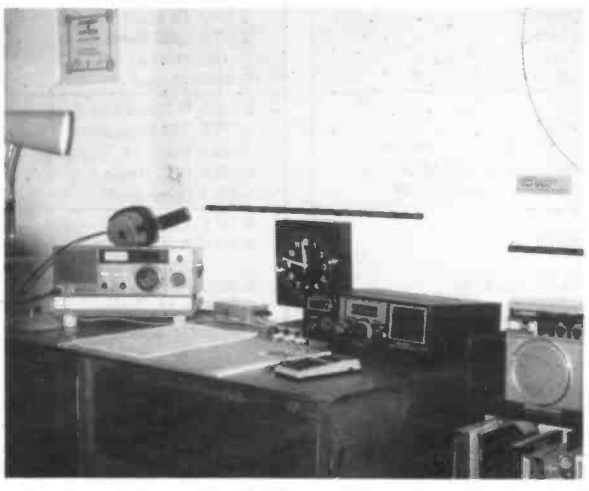
The conditions on the **21MHz (13m) band** tend to be generally unreliable although there have been a number of days when reception has been better than in recent months. Some of the broadcasts on this band during the day are directed to areas other than Europe but can often be received here. Several broadcasts to Asia were logged by Rab Freeman — Riyadh, Saudi Arabia 21.495 with the Holy Koran in Arabic at 0810; RBI Berlin 21.540 with programmes in English and German at 0845; Radio Cairo, Egypt 21.465 broadcasting in Arabic at 1419; Radio DW Cologne via their Cyclops, Malta relay on 21.650 broadcasting in Indonesian at 1417.

Rab also noted four stations beaming to Africa — RDP Portugal 21.700 in Portuguese at 1024; BBC Rampisham, UK 21.640 with programmes in Hausa at 1405; RFI via Allouis, France 21.620 in French at 1421; WYFR via Okeechobee, Florida USA on 21.525 at 1605. The broadcasts intended for the Middle East included the BBC World Service on 21.710 from Daventry, UK at 1208 and REE via Noblejas, Spain 21.575 in Spanish at 1443.

David Edwardson has also been listening to some of the broadcasts to other areas — Radio Nederlands Madagascar relay beaming to Asia on 21.485 at 0816; the BBC Misarah Island relay 21.470 with the World Service for Africa at 0900; Radio Pakistan, Islamabad 21.475 with programmes in Tamil for Asia at 0900 and Radio DW Cologne beaming to Australia via their Kigali, Rwanda relay 21.560 at 0900. The Radio Nederlands Madagascar relay moves onto 21.480 at 1130 and beams to the Middle East — Ian Baxter noted their signal as SINPO 23333 in Blackburn.

Listening in Macclesfield, **Philip Rambaut** has been hearing the broadcast in Spanish to S. America from Vatican Radio in Rome on 21.725 at 1300. Philip has also been hearing the broadcasts to S. America from VOA via Greenville, USA with programmes in Spanish on 21.580 & 21.610 from 1100 until 1400. VOA beam to Africa via a relay on Monrovia, Liberia on 21.485 from 1630 until 2300 and Philip logged them at 1710.

The broadcasts from Radio RSA in Johannesburg to Europe are usually well received on 21.590 from 1000 and were mentioned in many of the logs. **Gerry Lovell** has been hearing them at 1115 in



The listening post of Leslie Biss

SEEN & HEARD

Freq MHz	Station	Country	UTC	DXer
2.485	VL8K Katherine	Australia	1940	G
3.205	AIR Lucknow	India	0035	S
3.222	R.Dif.TV Togolaise	Togo	0630	G
3.250	SABC R.Orion	S.Africa	0400	G
3.255	ELBC Monrovia	Liberia	2244	J
3.270	SWABC 1, Windhoek	S.W. Africa	1825	D,R
3.320	SABC R.Suid Afrika	S.Africa	2220	D
3.325	R.Liberal, Belém	Brazil	0440	E
3.325	R.Maya de Barillas	Guatemala	0037	G
3.355	AIR Kurseong	India	1613	J,S
3.366	GBC 2	Ghana	2130	D,E,J,M,R
3.370	R.Tezulutlán	Guatemala	0115	E
3.375	AIR Gauhati	India	2229	K
3.380	R.Cumbre, Tazna	Bolivia	0330	S
3.380	R. Malawi	Malawi	1800	S,W
3.396	ZBC, Gweru	Zimbabwe	2330	W
3.905	AIR Delhi	India	1530	I,J,R,W
3.915	BBC, Kranji	Singapore	2200	D,E,R,W
3.931	R.Nac.de Cabo Verde	Cape Verde	2205	D
3.940	CBS Hubei 1, Wuhan	China	0100	W
3.955	BBC Daventry	England	2000	A,C,M
3.955	SABC R.Orion	S.Africa	2340	F
4.000	Bafoussam	Cameroon	0350	W
4.040	Yerevan	USSR	0532	G
4.045	R.Moscow	USSR	1745	R
4.060	Kharkov	USSR	1745	D,R
4.458	R.Capt.V.Ustariz	Bolivia	0100	S
4.500	CPBS Xinjiang, Urumqi	China	0107	E,I,J,W
4.719	RRI Ujung Pandang	Indonesia	1600	J,W
4.725	BBS, Rangoon	Burma	0145	W
4.735	CPBS Xinjiang, Urumqi	China	2341	A,R
4.735	R. Mozambique Maputo	Mozambique	2200	W
4.740	R.Afghanistan	via USSR	1900	O
4.750	R.Bertoua	Cameroon	1900	O,W
4.755	R.Dif.do Maranhao	Brazil	0215	W
4.760	ELWA, Monrovia	Liberia	1900	D,E,O,W
4.764	RRI Medan	Indonesia	0310	W
4.765	R.Moscow (Habana)	USSR	0400	J
4.770	R.Nigeria, Kaduna	Nigeria	1900	A,B,D,F,I,J,L,M,O,U,V,W
4.774	RRI Jakarta	Indonesia	1600	J
4.780	Djibouti R.	Djibouti	2210	W
4.780	La Voz de Carabobo	Venezuela	0052	T
4.785	Baku	USSR	0219	G
4.783	Bamako R.Dif.TV Malienne	Mali	2215	D
4.785	R.Tanzania	Tanzania	2240	K,W
4.790	R.Atlántida, Iquitos	Peru	0338	D,J,T
4.790	Azad Kashmir R.	Pakistan	1600	D,N,R
4.795	R.Douala	Cameroon	1950	D,O,W
4.795	Ulan Ude	USSR	2155	M
4.800	AIR Hyderabad	India	0045	E,T
4.800	LNBS, Maseru	Lesotho	2008	A,D,F,W
4.804	Voice of Kenya	Kenya	2330	W
4.805	R.Dif.do Amazonas	Brazil	0118	T,W
4.806	R.Nacional	Sao Tome	0120	W
4.810	R.San.Martin, Tarapoto	Peru	0445	G
4.810	Yerevan	USSR	2145	D
4.815	R.Burkina	Burkina Faso	2100	D,F,I,M,O,W
4.820	R.Botswana	Botswana	1930	A,B,D,J,O,W
4.820	La Voz Evangélica	Honduras	0001	T
4.825	Ashkhabad	USSR	1850	D
4.830	Africa No. 1	Gabon	1900	A,D,F,I,L,M,O,V,W
4.832	R.Reloj, Irazú	Costa Rica	0409	E,J,M,N,S,T,W
4.830	R.Táchira, San Cristóbal	Venezuela	0039	D,F,G,T
4.835	R.Dif.TV Malienne Bamako	Mali	2216	I,L,M,O
4.840	AIR Bombay	India	0135	G
4.839	Bukavu La Voix du Zaire	Zaire	2350	W
4.845	R.Bucaramanga	Columbia	0145	W
4.845	R.Nacional, Maraus	Brazil	2230	D,E,F,J,S,T
4.845	Nouakchott ORTM	Mauritania	2020	D,I,O,W
4.850	R.Columbia, Puntarenas	Costa Rica	2255	K
4.850	Tashkent	USSR	1745	R
4.850	Yaoundé	Cameroon	2100	D,I,T,W
4.850	R.Capital, Caracus	Venezuela	0811	E,F,J
4.853	R.San'A	Yemen	0130	W
4.860	AIR Delhi	India	0129	T
4.860	Kalinin	USSR	1825	D
4.865	CPBS Gans, Lanzhou	China	2220	E,K,L,W
4.865	R.Mozambique	Mozambique	2245	W
4.865	R.Verdes Florestas	Brazil	0100	S
4.870	Cotonou La V.de la Revolution	Benin	2140	D,F,I,M,O,T,W
4.875	R.Nacional Boa Vista	Brazil	0300	S,W
4.880	R.Difusora Acreana	Brazil	0241	S
4.880	SABC Radio 5	S.Africa	2000	A,B,D,I,L,M,O,Q,S,U,V,W
4.885	R.Clube do Pará	Brazil	0040	G,I,T
4.885	Voice of Kenya	Kenya	2012	L,O,W
4.885	ER do Zaire	Angola	2340	W
4.890	ORTS Dakar	Senegal	2210	W
4.895	Ashkhabad	USSR	2330	B,D,T
4.900	La V.de la Révolution	Guinea	2240	K
4.902	Ekala	Sri Lanka	0145	W
4.905	CPBS 1	China	2020	L,O
4.905	N'djamena	Chad	1900	O,W
4.905	R.Relógio Federal, Rio	Brazil	2305	D
4.910	R.Zambia, Lusaka	Zambia	2315	W
4.915	GBC-1	Ghana	2000	D,F,M,O,W
4.920	R.Afghanistan	via USSR	1900	A,H,J,L,P,V
4.920	VLM 4 Brisbane	Australia	0815	E
4.920	R.Quito	Ecuador	0413	J,T,W
4.925	R.Nacional, Bata	Eq.Guinea	2300	W
4.930	R.4VEH	Haiti	0025	K
4.935	SWABC Windhoek	S.W.Africa	2140	W
4.940	Kiev	USSR	2235	D,T
4.945	Caracol Neiva	Colombia	0530	E,G
4.945	R.Nacional Porto Velho	Brazil	0100	H,I
4.945	R.RSA	S.Africa	1800	O,S
4.960	AIR Ranchi	India	0435	I
4.970	R.Rumbos, Villa de Cura	Venezuela	0200	W
4.975	R.Timbira, São Luis	Brazil	2205	D
4.976	R.Uganda, Kampala	Uganda	1827	A,M
4.980	Ecos del Torbes, San Cristóbal	Venezuela	2235	D,J,K,L,T
4.985	R.Brasil Central	Brazil	0132	T
4.990	R.Nigeria, Lagos	Nigeria	1818	F,T,V,W
4.990	Yerevan	USSR	2230	D
4.995	Ulan Bator R., Choibalsan	Mongolia	2100	G,W
5.004	R.Nacioal, Bata	Eq.Guinea	1845	A,M,O
5.005	R.Nepal, Khumaltar	Nepal	1600	L,S
5.010	R.Eco, Iquitos	Peru	0245	S
5.010	Garoua	Cameroon	2020	K,O
5.010	SBC Radio 1	Singapore	1602	L
5.020	Niamey ORTN	Niger	2315	W
5.034	Bangui	C.Africa Rep.	2200	F,K
5.045	R.Cultura do Pará	Brazil	0149	T
5.046	RRI Yogyakarta	Indonesia	1600	J
5.047	R.Dif.TV Togolaise	Togo	2135	A,D,K
5.052	SBC Radio 1	Singapore	1555	L
5.057	Gjirokastër	Albania	1620	A,M
5.075	CPBS 2	China	2108	L
5.095	R.Sutatenza, Bogatá	Colombia	2215	D,F,I,J,K,L,W
5.260	Alma Ata	USSR	1529	J
5.288	R.Moundou	Chad	0530	F

DXers

A: Ian Baxter, Blackburn.
B: Alan Curry, Stockton-on-Tees
C: Colin Diffell, Corsham.
D: Neil Dove, Lockerbie.
E: David Edwardson, Wallsend.
F: Nigel Final, London.
G: Davy Hossack, Winchburgh.
H: David Jones, Liverpool.
I: Bill Kelly, Belfast.
J: Alexander Little, Glasgow.
K: Gerry Lovell, Weston-Super-Mare.
L: George Morley, Redhill.
M: John Nash, Brighton.
N: Michael Osborn, Chelmsford.
O: Fred Pallant, Storrington.
P: John Parry, Northwich.
Q: Ron Pearce, Bungay.
R: Philip Rambaut, Macclesfield.
S: Tim Shirley, Bristol.
T: John Sheridan, Mapperley.
U: Leighton Smart, Trelewis.
V: Darren Taplin, Tunbridge Wells.
W: Jim Willett, Grimsby.

SEEN & HEARD

Western-Super-Mare at SINPO 45444 without extending the whip antenna on his Sony ICF 2001D! **Leslie Lyon** also uses a small portable receiver with whip antenna to listen to their programmes in Scarborough — he mentioned that their 13m transmission now ends at 1500 and listeners are then asked to re-tune to 15.185. Nigel Final has been listening to UAE Radio Dubai 21.605 from 1000 — their programmes in Arabic and English are also well received during weekdays in the UK. Alexander Little logged Radio Free Europe via their Playa de Pals relay in Spain on 21.530 at 1437 — they beam programmes in Czech to C. Europe from 0830 until 1600.

Using a Grundig Satellit 600 receiver plus Dressler 30 antenna in Winchburgh, **Davy Hossack** has been hearing the RSI 100kW s.s.b. transmitter in Varberg, Sweden on 21.555 at 1300 with SIO 232. Their transmission is beamed towards Africa from 1200 and **Simon Illingworth** confirms that their signal is good in Johannesburg. Simon reports improved reception there as they enter their autumn period — the BBC Misirah Island World Service relay on 21.470 at 1030 and Radio Norway on 21.700 at 1200 are now both good signals.

The reception conditions on the **17MHz (16m) band** have also been unstable, however some of the rather better periods have enabled DXers to hear some interesting stations from several continents during daylight.

When conditions permit, Radio Australia's broadcast to Asia on 17.715 via their Carnarvon transmitter in Western Australia can be heard in the UK around dawn. Their broadcast from 0100 until 0910 is not intended for the UK and their signal is often weak or non-existent here. **George Hewlett** officially monitors their signals on all bands in Torquay and says that 16m reception has been possible around 0700, but it has been very variable. George Morley also logged their signals occasionally during the month, noting S10 222 at 0850 — he also received FEBA, Seychelles at SIO 243 on 17.875 at 1114 broadcasting in Arabic to the Middle East.

Alan Curry has been listening to one of the broadcasters who beam their programmes towards Europe in the morning, namely Radio Pakistan, Islamabad. Alan logged their 17.660 signal as SINPO 54434 in Stockton-on-Tees at 0925 — if you are a cricket fan, then try listening to their commentaries when there is a test match in progress! UAE Radio Dubai beam their broadcast to Europe on 17.775 from 1000 until 1500 — Robert Taylor enjoyed their DX programme at 1345 and noted SIO 444 in his log.

Using a Uniden CR 2021 receiver in Norton, **Edward Broadsmith** has been listening to All India Radio on 17.885 at 1000 — they beam to Australia at that time, but can often be heard well in the UK too. Later, Edward has been listening to the broadcasts in English from Radio Surinam via an RNB transmitter in Brazil on 17.755 — they are beamed towards Europe five days a week from 1700 until 1745. Writing from Hitchin, **Mike Kitchener** says has been checking the signals from Radio RSA in Johannesburg on the 13, 16 & 19m bands and finds reception very good on 17.780 between 1430 and 1530 — much better in fact than the transmission which they recommend on 5.185.

Four directional indoor antennas are used in conjunction with a Realistic DX400 receiver by Roy Spencer when DXing. He has been listening to *Hello from Tokyo* broadcast from Radio Japan via their relay in Moyabi, Gabon on 17.785 at 1515 — their transmission in English and Japanese is beamed to Europe from 1500 until 1700. In Trelewis, **Leighton Smart** has been listening to some of the very popular programmes from Radio HCJB located high in the Andies Mountains at Quito in Ecuador — they beam to Europe on 17.790 from 1900 until 2000.

The reception conditions on the **15MHz (19m) band** are generally more stable than the higher frequencies and some of the broadcasters use this band to "back-up" their transmissions on the higher frequencies, leaving to the listener the choice of the best band to use.

Some of the more distant broadcasters to be heard using this band in the morning include KTWR on Guam in the Pacific, beaming programmes to Australia on 15.115 — noted by **Sheila Hughes** as SINPO 32232 in Morden at 0830; KYOI in Siapan, N. Mariana Islands 15.190 broadcasting to Asia from 0800 — noted as SINPO 44433 by **Darren Taplin** in Tunbridge Wells at 0830 and Radio Australia on 15.415 beaming their programmes to Asia between 0900 and 1100 — **Bill Reid** found reception good in Finchampstead around 1030.

Tim Shirley has also been checking this band in the early morning and picked up the Voice of Nigeria 15.120 at 0500. Africa No. 1, Gabon on 15.200 at 0900; Radio Finland on 15.400 at 1300 and RNB Brasilia, Brazil 15.265 beaming to Europe at 1800 were all noted by Darren Taplin. He also heard RCI Montreal, Canada beaming towards Africa on 15.260 at 1800 — their broadcasts in French on 15.315 at 1530 have been attracting the attention of **Bill Stewart**, in Lossiemouth. **John Parry** of Northwich has been listening to their broadcast on 15.325 in English at 2120.

Writing from Chelmsford, **Michael Osborn** says that adding a Yaesu a.t.u. ahead of his FRG-8800 receiver has improved reception dramatically. He been hearing the Taipei, Taiwan relay of WYFR in Oakland, California on 15.055 at 1306 and later picked up WINB in Red Lion, USA on 15.185 broadcasting to N. Africa at 2159.

Up in Lockerbie, **Neil Dove** has been listening to two stations in S. America, namely RAE Argentina 15.375 at 2035 and Radio HCJB in Quito, Ecuador 15.270 at 2130 — his log mentions their *DX Party Line* programme which is very popular with DXers around the World. Tim Shirley has been doing some late night DXing and logged FEBC in Manila, Philippines on 15.445 at 2300.

Radio Moscow continues to dominate the **13MHz (21m) band** — John Parry logged their transmission to N. America on 13.790 at 0815 and also noted them on 13.765 at 1200. Philip Rambaut picked up their transmission in Chinese to Asia on 13.625 at 1009. Philip also logged the Voice of Israel, Jerusalem on 13.750 at 1346. Radio Korea, Seoul, S. Korea was logged by Roy Spencer on 13.670 at 0810 and Neil Dove heard Radio Bangladesh, Dhaka on 13.615 at 1405.

Listening in Brighton, **John Nash** heard Radio Baghdad on 13.650 broadcasting in Arabic with a station ident at 1429 and also listened to the news in English beamed to Asia by Radio Nederlands on 13.770 at 1430.

These bands are full of signals from all continents. Two of the interesting signals heard on the **11MHz (25m) band** by Sheila Hughes were TWR on Guam 11.715 at 0830 and RNB Brasilia, Brazil 11.745 at 0230. During the afternoon **Colin Diffell** of Corsham heard the Voice of Greece, Athens 11.654 at 1540; Radio Moscow (World Service) 11.670 at 1600; Radio Prague, Czechoslovakia 11.690 at 1620 and VOA via Greenville, USA 11.760 at 1700. During the evening, **Julian Wood** of Buckie logged Radio Kuwait 11.675 at 1925; Radio Damascus, Syria 12.085 at 2000 and the BBC World Service via Ascension Island 11.820 at 2000. Using a Philips D-2999 receiver with whip antenna in Wednesfield, **Stuart Frost** has been listening to WHRI in South Bend, USA on 11.705 at 2000. In Macclesfield, Phil Englehard has been receiving strong signals from Radio Japan via their Gabon relay on 11.800 at 2300.

Radio Australia can also be heard on the **9MHz (31m)** band — Phil picked up their 9.760 transmission to the Pacific area at 0800. Their broadcasts to Europe on 9.655 are usually well received in the UK — **John Berridge** often listens to them in Cardiff from 0700 and **Ron Pearce** was delighted to hear them on his 1 valve set in Bungay! George Morley noted their transmission to SE Asia on 9.770 at 1016 and heard ABC Brisbane on 9.660 at 1206 and ABC Perth on 9.610 at 1221. He also picked up Radio New Zealand on 9.600 at 0900 at SIO 233. In Stoke-on-Trent, **Daniel Masterson** logged SRI Berne, Switzerland on 9.885 at 1530; Radio Budapest, Hungary 9.835 at 1700; Radio Nederlands via their Madagascar relay 9.715 at 2055 and WYFR 9.510 at 2105. **David Jones** added a new one to his growing DX list in Liverpool — Radio Nacional Paraquay on 9.735 at 0154.

During the afternoon Radio Australia may be heard on the **7MHz (41m) band** — **Stewart Russell** of Forfar has found reception good on 7.205 from 1530. Using a Philips D-2225 portable with whip antenna in Thessalouiki, Greece **George Efstratiades** has been listening to All India Radio, New Delhi on 7.410 at 2215 and to the Voice of Free China via their US based relay in Okeechobee, Florida on 7.355 at 2245.

Reception conditions have also been good on the **6MHz (49m) band**. Using an RCA AR88D receiver in Marksbury, **Adrian Bryant** listens to Radio HCJB in Quito, Ecuador on 6.205 from 0700. Jim Willett has been hearing SLBC Columbo, Sri Lanka on 6.130 just before 1100.

There is plenty to interest the dedicated listener on the 5,4,**3** and **2MHz** bands — see chart! If you listen round on these bands write and tell me.

BBC Radio Devon, St. David's Hill, Exeter, EX4 4DB.

LBC, P.O. Box 261, Communications House, Gough Square, London, EC4P 4PH.

Radio Lesotho, National Broadcasting Service, P.O. Box 552, Maseru, Lesotho.

Far Eastern Broadcasting Association, Box 234, Mahe, Seychelles.

Ghana Broadcasting Corp., Broadcasting House P.O. Box 1633, Accra, Ghana.

Your deadlines for the next three issues are May 21, June 20 and July 23.

GUIDE TO FACSIMILE STATIONS

7th edition — May 1987

252 pages. ISBN 3-924509-67-0

£13.00 or DM 35.00

Reliable and easy-to-use FAX equipment is now available for less than £300. It prints weather charts, press photos, satellite pictures, etc., with excellent resolution via a standard Epson-compatible dot matrix printer on ordinary paper. The interest of mariners, yachtsmen, pilots, radio amateurs, monitors and meteorologists around the world in the reception of FAX transmissions has subsequently exploded during the past few months. Apart from the hardware mentioned, the potential user needs detailed and actual schedules of those FAX stations. That vital information is published since the early seventies in our international reference books like the FAX Guide.

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- Detailed explanation of the technique used for the transmission of FAX pictures.
- Regulations on technical characteristics of FAX equipment, including all CCITT and WMO standard test charts.
- Comprehensive list of both geostationary and polar-orbiting meteorological satellites, with full technical data. Detailed explanation of APT PREDICT and FANAS polar-orbiting satellite position data codes.
- Radio amateur FAX activities.
- 223 abbreviations.
- 60 station addresses in 37 countries.
- 167 sample charts and their interpretation.

References:

Dr. Ing. Gian Claudio Renzo Gallesi I2JJA, FAA Commercial Pilot 2260108, Italy — 20 November 1986.
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Graeme Ireland, Australia — 19 November 1986.
"The Melbourne Weather Bureau showed me your latest publication of weather fax transmissions throughout the world. It is my intention to leave Australia early in the new year and travel around the world in my yacht. Certainly your publication would be most useful."

Derek A. Bemister G3OBX, United Kingdom — 6 November 1986.
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STARTING OUT

Brian Oddy G3FEX

The nature of radio waves, the fundamental terms of wavelength and frequency and the electro-magnetic spectrum as a whole were discussed last month. By International agreement, small parts or bands of the overall radio frequency spectrum are allocated to broadcasting, however these do not include the v.l.f. region or frequencies above the u.h.f. region.

The Long Wave Band

The lowest frequencies used for broadcasting form part of the l.f. region and the segment involved is usually referred to as the **long wave (l.w.)** band, which extends from a nominal 2000 to 1053m or 150 to 285kHz.

The broadcasters using this band try to ensure that most of the radiated energy from their transmitting antenna travels along the earth's surface via direct or **ground wave** paths to reach their listeners. As the signals follow the contours of the ground they lose energy or become attenuated due to the resistivity of the surface. The nature of the land affects the resistivity. Flat pastoral country or marshy and loamy areas have a much lower resistivity than those containing rocks. Hills and mountains tend to absorb energy and sea paths introduce much lower losses than those over land. As the frequency of transmission is raised the losses in the earth's surface increase, causing the ground wave range of a station to become less and less – see Fig. 1.

Because the ground wave signals from a l.w. station can travel considerable distances, a single high power l.w. transmitting installation may well cover the whole of the country concerned. An example is BBC Droitwich on 200kHz. In order to ensure that maximum ground wave coverage is obtained, antenna characteristics dictate that a vertical antenna be employed at the transmitting station – in view of the wavelength a very high antenna is required.

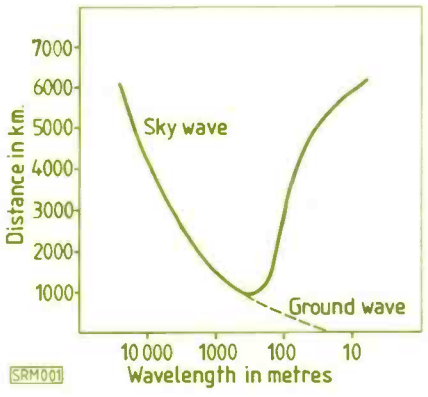


Fig. 1

The broadcasters using the l.w. band are located in Europe, N. Africa and the Soviet Union and they operate in accordance with a band plan. I discussed the band plan in Long, Medium and Short last month.

The Medium Wave Band

The segment of the m.f. region which is allocated to broadcasters throughout the world is usually referred to as the **medium wave (m.w.)** band, which extends from a nominal 571 to 187m or 525 to 1605kHz.

Due to the considerably increased attentuation of ground wave signals at m.f., several suitably placed m.w. transmitters would be needed to achieve the coverage obtained by a single l.w. transmitter. In practice the transmitters used vary from high power installations which are designed to cover as much territory as possible, to very low power ones, which cover a small area close to the transmitter location. As in the case of l.w. installations, a vertical antenna (often a mast radiator) is used to provide an adequate signal-to-noise ratio (40dB) in a given **service area.** The noise may be from both man-made and natural electrical sources and is present everywhere – more so in cities and towns than in rural areas.

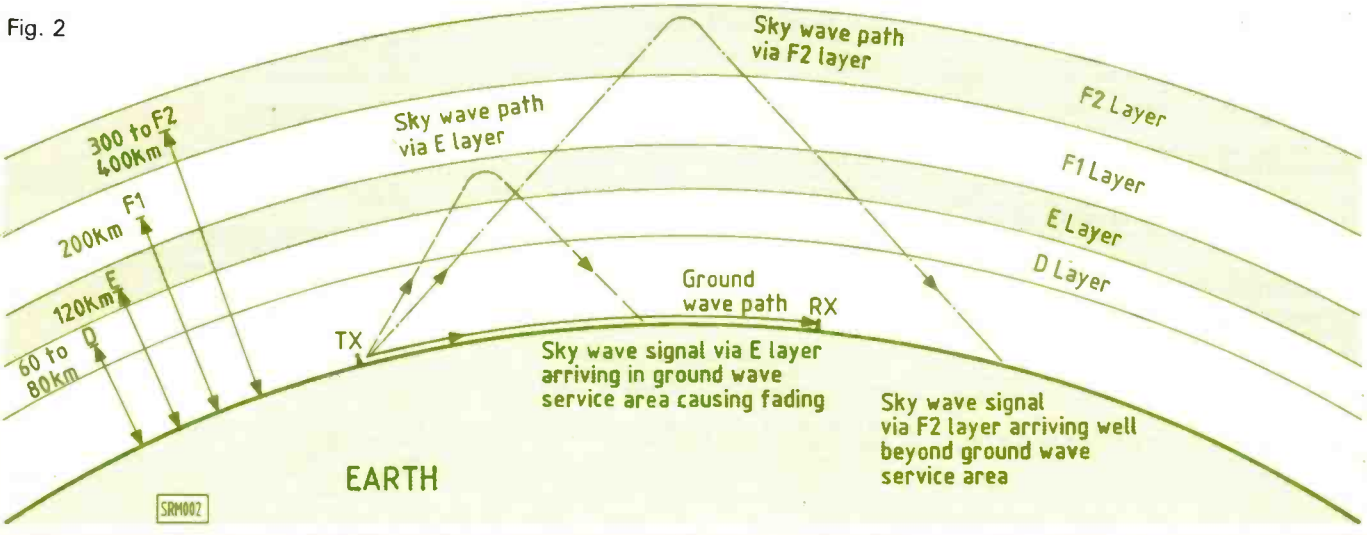
On this side of the Atlantic the stations are spaced apart at 9kHz intervals between 531 and 1602kHz, but in Canada, N. and S. America and some other areas they are spaced at 10kHz intervals starting at 530kHz.

The Ionosphere

So far only the waves which travel along the surface of the ground to reach the listener have been considered, but what happens to the waves which leave the transmitting antenna at an angle to the earth's surface? They travel upwards through our atmosphere and the stratosphere to reach a region of rarefied gases which surround the earth called the **ionosphere.** The ultra violet and X-ray radiations from the sun ionise the oxygen, nitrogen and nitric acid present there to form ionised layers. Since the radiation and position of the sun are constantly changing it follows that the state of the ionosphere is also changing by day, night and seasonally. The layers which form the ionosphere exist at different heights above the earth and to distinguish them they are termed the D, E, F1 and F2 layers – see Fig. 2.

During the hours of daylight the D layer absorbs most of the waves reaching it, so ground wave signals predominate. At sunset the ionisation of the layers starts to decrease and the D layer quickly disappears to expose the E layer. For some time after sunset the ionised E layer acts like a giant mirror in the sky and reflects the waves which reach it back towards earth. Such reception at night is said to be via the **sky wave** path and it is via this mode that reception of m.w. signals from countries which cannot be heard during the daylight hours becomes possible. After sunset the E layer gradually de-ionises to reach a steady night-time lower level of ionisation and the m.w. signals can then pass through it to reach the F2 layer. The F2 layer then reflects the signals back to earth, but since the signals have passed twice through the lower layers they are, to some extent, attenuated.

Fig. 2



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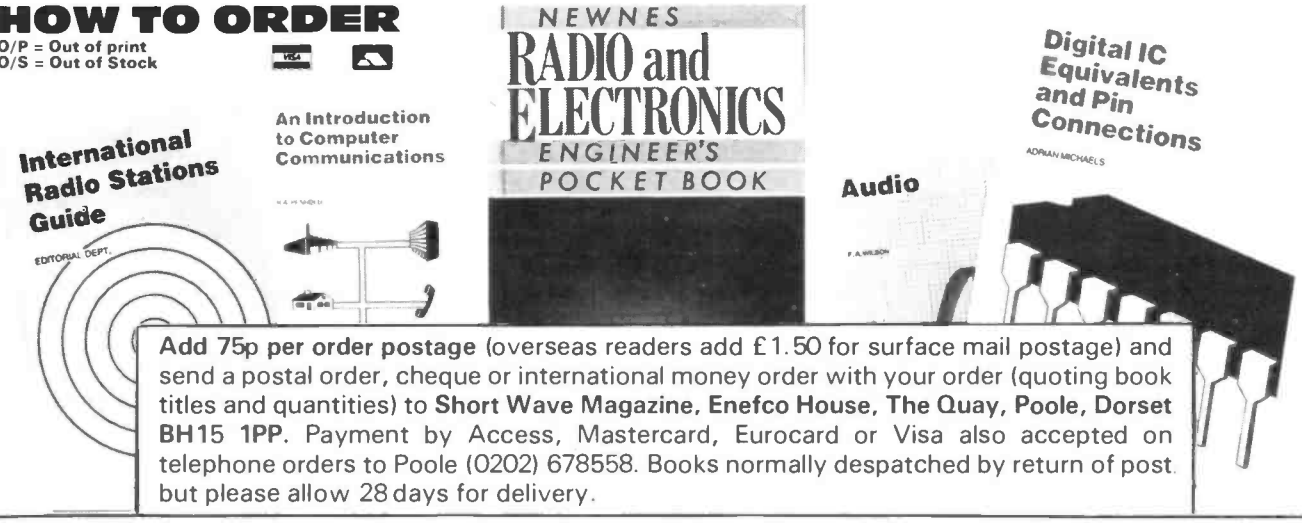

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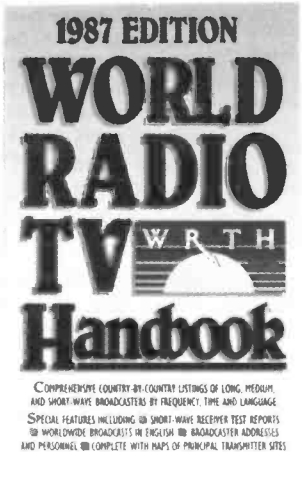

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STARTING OUT

After Dark

During darkness the sky wave signals can arrive in many distant areas and some broadcasters take advantage of this fact to provide a service beyond their normal ground wave range. For example there is Radio Luxembourg on 1440kHz. However the sky wave signal from a particular transmitter can also arrive within its own service area and when this happens in the outer limits or fringe areas considerable fading and distortion can arise.

The fading is caused by the combination of the ground and sky wave signals and is due to the fact that the strength and phase of the sky wave signal is not constant but continually varying – it may add to or subtract from the ground wave signal at any given instant and so produce fluctuations or fading. Provided all parts (carrier and sidebands) of the sky wave signal arrive together there will be no distortion present when the signal fades. However, if all parts of the sky wave signal are not reflected equally then severe distortion of the resultant signal will exist during fades – this is called **selective fading** and is very objectionable! The overall effect of the combination of ground and sky wave signals is to reduce the normal service area.

The maximum practical distance that can be covered by a single reflection via the E layer at night is about 2000km. However if darkness is present throughout a very long path and reflection is via the F2 layer, considerable distances can be covered – m.w. transatlantic reception becomes possible. At sunrise the sky wave signals rapidly fade out as the D layer re-forms and once again the ground wave signals predominate.

Many listeners enjoy tuning across these bands at night for new stations and in view of the large number present a receiver with a built-in directional antenna can help in separating the stations. A guide book detailing the frequencies used by broadcasters can help in identification – see Appendix. Next month some of the segments of the radio spectrum (or bands) allocated to broadcasters in the h.f. region will be examined. □

Appendix

Radio Stations in the UK. 6th Edition. £1.00. Available from BDXC-UK, 54 Birkhall Road, Catford, London SE6 1TE.

Dial Search. 4th Edition. £3.00 (plus 30p P&P). Available from George Wilcox, 9 Thurrock Close, Eastbourne, East Sussex BN20 9NF.

Guide to Broadcasting Stations. 19th Edition. £6.95.

International Radio Stations Guide. £2.95.

World Radio & TV Handbook. 1987. £17.95. All these three books are available from PW Publishing Ltd, Enefco House, Poole, Dorset BH15 1PP. Don't forget to add 75p P&P per order regardless of how many books.

RALLIES

June 7: The Spalding & District Amateur Radio Society are holding their rally at Springfields Gardens, Spalding. Gates open at 10am.

Dennis G4OO
0775 86382

July 12: The Worcester and District ARC are holding their Droitwich Rally at the High School, Droitwich. Entry to the rally is free, as is the parking. All the usual trade stands will be there, as well as entertainment for the rest of the family. They have even laid on free transport to the local strawberry fields.

Steve Colledge G0AOC
6 Tweed Close
Worcester WR5 1SH

August 2: The Rolls Royce Amateur Radio Club are holding their rally at the Rolls Royce Sports and Social Club, Barnoldswick. Doors open at 11am and talk-in will be available as well as trade stands, refreshments and other attractions.

L. Logan G4ILG
19 Fenton Avenue
Barnoldswick

August 15: The Wight Wireless Rally will be held at the Wireless Museum, Arreton Manor near Newport. The rally opens at 11am and closes at 5pm, with talk-in on S22 and GB3IW. All the usual trade stands will be there and they hope to run some demonstrations on the day too.

Douglas Byrne G3KPO
Tel: 0983 67665

September 6: The South Bristol ARC are holding their rally at Hareclive Youth and Hartcliffe Community Centres, Hareclive Road, Hartcliffe, Bristol. Doors are open between 10am and 5pm. There will be the usual bring and buy and general traders in the Community Centre and radio dealers in the Youth Centre. Admission is 50p.

Len Baker G4RZY
Tel: 0272 834282

September 6: The West Kent Amateur Radio Rally is being held in the Angel Centre, Tonbridge, Kent. Doors open between 10.30 and 4pm. There will be talk-in on S22, SU8 and 29.5MHz f.m. using the callsign GB0WKS. The rally has free parking, a bring and buy, club stands, many trade stands and a stamp fair.

Nigel Peacock G4KIU
Tel: 0892 515678

November 15: The Bridgend and District Radio Club are holding their rally at the Bridgend Recreation Centre, Angle Street, Bridgend. Doors open at 11am (10.30am for the disabled). There will be free parking, a bring and buy, Morse tests (pre-booked with RSGB), bar facilities and talk-in on S22.

Dave George GW1OUP
Tel: 0656 723508

June 7: The Southend and District Radio Society have their rally at the Rocheway Centre, Rochford, Essex. Doors open at 10.30am and there will be talk-in on S22.

Ron G6SOH
QTHR

June 14: The Royal Naval Amateur Radio Society are holding their famous rally at HMS Mercury, East Meon, Petersfield, Hants. Gates open from 10am to 5pm. Admission is £1 for adults and 50p for children. There will be the usual talk-in on 144 and 430MHz, all the traders are undercover in case it's wet. As regular visitors will know there is always plenty for the rest of the family; model boats, engine rides, arena displays, etc.

Cliff Harper G4UJR
Tel: 0703 557469

June 21: The Denby Dale Radio Rally starts at 11am at Shelley High School, which is on the B6116 near Skelmanthorpe. Talk-in will be on S22, SU22 as well as 28MHz f.m.

Gerald Edinburgh
Tel: Huddersfield 602905

May 24: The Plymouth ARC are holding their mobile rally at Plymstock School, Plymouth. Doors open at 10am. The usual trade stands and bring and buy will be there, and there will be refreshments and ample free parking. Talk in on S22.

Mervyn G0BNT
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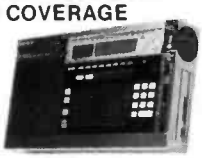

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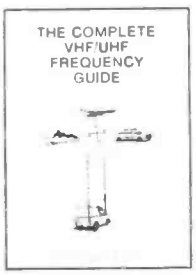

This guide has sold over 4,000 copies since its publication last August and is still selling well. Mainly because it is recognised as being of tremendous value and unique in radio literature. If you are one of the many who are curious to know who transmits where, in the wide VHF/UHF spectrum, then this is a guide that you should not be without. This book gives comprehensive details of all the main users of this part of the radio spectrum. The frequency range is subdivided into sections under appropriate headings for the type of services using the particular sub-divisions. All kinds of service are covered including land, sea, air and space. Full details are included of duplex splits for bases and mobiles plus some useful editorial. If you are at all interested in this part of the radio spectrum, you will find this a most valuable and absorbing book.

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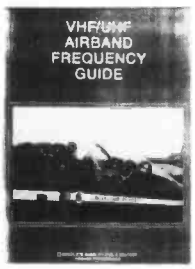

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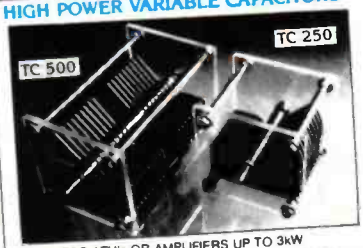

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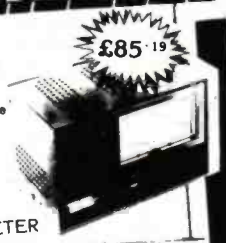
TEST EQUIPMENT

ZETAGI DL150 RF DUMMY LOAD AND POWER METER



£85.19

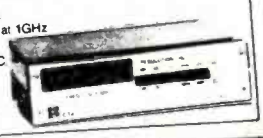
A very accurate unit for the service dept. or discerning enthusiast.
FREQ:- 0.5MHz-500MHz
POWER:- 150 Watt Max in 3 ranges 0-3, 0-15, 0-150W.

ZETAGI 500 SWR AND POWER METER

For the enthusiast who wants the very best. A twin meter unit with push button control for either 75 OHM or 50 OHM cable.
FREQ:- 3-200MHz
POWER:- Up to 2kW

£41.46

FD 1350 1.3GHz FREQUENCY COUNTER



FREQ:- 10Hz-1.35GHz
SENSITIVITY:- 43mV at 1GHz
DISPLAY:- 8 Digit
SUPPLY:- 9-12 Volt DC

£139.53

R.F. AMPLIFIERS

All amplifiers except broadband (2-30 MHz) models are tuned for 29.6 MHz centre freq. Should you require a lower freq. ie. 28.5 MHz please state when ordering. Export models available for 26-30 MHz.

C.T.E. MOD 767

£49.90

76 Watts FM (150W P.E.P.)
INPUT:- 05-10 Watts
SWITCHABLE:- Class AB, Class C
SUPPLY:- 13.8 Volt
REMOTE CONTROL FACILITY

MOBILE AMPLIFIERS

C.T.E MOD. 737 50W FM (80W P.E.P.)	£44.76
C.T.E. MOD. 767 80W FM (150W P.E.P.)	£49.90
C.T.E. MOD. 757 150W FM (300W P.E.P.) (3-30MHz	£116.87

ABOVE MODELS HAVE REMOTE CONTROL FACILITY
PLUS CLASS AB & CLASS C SWITCHING. (NOT MOD. 737).

ZETAGI B35 25W FM (26-30MHz)	£23.72
ZETAGI B150 70W FM (160W P.E.P.)	£49.96
ZETAGI B300 200W FM (400W P.E.P.) 2-30 Mhz	£136
NEVADA TC35 DX 25W FM (W/LOW PASS FILTER)	£23.99

MAINS AMPLIFIER

ZETAGI B132 SOLID STATE (240W P.E.P.) 2-30 MHz.... £119

NEW LOW PRICE 2 MTR HAND HELD CT1600

Through bulk buying we can now offer this superbly sensitive handheld at an all time low price. Unit covers 2 Mtr Ham Band Plus 142-149 Mhz (For Export)

£169

- Repeater Shift
- Hi/Low power ½ - 1½ Watts
- Thumbwheel Freq. Selector.

Each set supplied C/W re-chargeable battery pack and free mains charger unit.

VHF MOBILE AMPLIFIERS

MOD. B110
144 MHz 110 Watt FM Plus Low Noise Pre-amplifier Switcheable £169

MOD. B42
144 MHz 40 Watt FM Mobile AMP £84.66

SEE OUR HAM CATALOGUE FOR FULL RANGE

NEVADA

HIGH QUALITY BRITISH MADE 29MHz FM PRODUCTS

NEVADA TC35 DX

£23.99

R.F. POWER AMP. WITH HARMONIC FILTER
INPUT:- 1-4 Watts
OUTPUT:- 25-30 Watts
SUPPLY:- 13.8V DC
FREQ:- 26-30 MHz

Can be centred on 29.6 MHz or 28.5 MHz (state which). A new top quality amp. which now features harmonic filter to reduce harmonic O/P.

NEVADA TC27 RX

RECEIVER PRE-AMP FOR 26-30MHz

A superior low noise pre-amplifier for 29MHz FM operation. Variable gain -6dB's to +18dB's suitable for use with transceivers up to 25 Watts output.

£23.99

TELECOMMS

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TELEX 869107 TELCOM G

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