practical Wireless

APRIL 1993 £1.75

THE UK'S BEST SELLING MAGAZINE FOR AMATEUR RADIO ENTHUSIASTS

Propagation Special

Meteor Scatter
Ian Poole G3YWX Looks At This Fascinating Mode

Feature
Spread Spectrum - Communications Of The Future?

Antenna Workshop
Build A Rotatable Mast

Valve & Vintage
For The Valved Equipment Enthusiast

Reviewed This Month

Yaesu's FT-530 Go Anywhere Hand-held Dual-Bander With The Smart Mic

Plus
QSOs In French
Packet Panorama
And Much More

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SMC

South Midlands Communications Ltd, S.M. House, School Close, Chandlers Ford Ind. Est., Eastleigh, Hants SO5 3BY

FT530
DUALBAND HANDHELD

- VHF/UHF Handheld
- Dual reception on same or different bands
- Rx Frequency coverage: 144-146, 430-440 MHz Expandable to 110-180, 300-500, 800-950 MHz
- AM Capability
- Built-in CTCSS & DTMF Encode/Decode
- Full Duplex Crossband operation
- Built in VOX for "Hands Free" operation
- Programmable clock with TIMER/ALARM functions
- Enhanced save function for extended NiCad life
- MH29A2B Speaker/Microphone c/w LCD frequency display and most used keypad function buttons.
- Supplied with FNB28 NiCad & charger.

TRY ONE TODAY –
WE KNOW YOU'LL LIKE IT !!!

SECONDHAND SELECTION

HF EQUIPMENT

FT102	HF transceiver	£425.00	AX
IC726	HF transceiver	£699.00	AX
IC735	HF transceiver	£750.00	AX
IC2KL	HF linear	£1099.00	AX
FT757GX	HF transceiver	3 from £595.00	AX/PX
FT901DE	HF transceiver	£439.00	AX
FT902DM	HF transceiver	£549.00	RX
FT980	HF transceiver	£895.00	CX
FTONE	HF transceiver	2 from £850.00	CX/RX
TS120S	HF transceiver	£299.00	AX
TS120S	HF transceiver + Ext VFO	£340.00	AX
TS140S	HF transceiver	£650.00	CX
TS450SAT	HF transceiver	£1099.00	AX
TS680S	HF + 6m	£799.00	AX
TS940S	HF transceiver	£1495.00	PX
FT101ZD	HF transceiver 2 from	£450.00	RX
FT102	HF transceiver 5 from	£495.00	RX
FT650	24/28/50MHz c/w PSU	£1295.00	RX
CORSAIR	HF transceiver	£725.00	RX
TS440S	HF transceiver	£750.00	RX
TS450SAT	HF transceiver	£1095.00	RX
TS530S	HF transceiver	£525.00	RX
TS930	HF transceiver	£895.00	RX
TS930S	HF transceiver	£895.00	RX
TS940S	HF transceiver	£1350.00	AX
FT101Z	HF transceiver	£449.00	PX
FT107M	HF transciever 12VD	£475.00	PX
FT980	HF transceiver 5 from	£895.00	PX
FTONE	HF transceiver	£895.00	PX
HL2K	HF linear	£1450.00	PX
HT120	20m transceiver	£289.00	PX
HT180	80m transceiver	£289.00	PX

VHF/UHF EQUIPMENT

ALR222	Transceiver	£160.00	AX
FT208R	Handheld	£130.00	AX
FT736R	Transceiver 2/70 + 6m	£1299.00	PX
FT736R	Transceiver + 6m	£1395.00	AX
IC2SRE	Transceiver handheld	£299.00	AX
IC2GE	Transceiver handheld	£169.00	AX
KT44	Handheld	£125.00	AX
TR9500	Transceiver	£325.00	AX
C5608D	Transceiver	£500.00	AX
FT290R	2m multimode	£310.00	LX
FT703R (3)	70cms handheld 2.5w	£135.00	LX
FT727	2/70 handheld	£260.00	RX
FT727	2/70 handheld	£276.00	CX
FT73R	70cms handheld	£175.00	AX
FT790R	70sms handheld	£269.00	AX
IC211E	2m Base station 10W	£349.00	AX
IC271E	2m Base station 25W	£395.00	CX
IC271H	2m Base station 100W	£650.00	AX
TH205E	2m handheld	£175.00	CX
TS790E	2/70 multimode	£1250.00	LX
TS811E	70cms Base station	£650.00	AX
FT690R2	6m multimode	£389.00	BX
C500	2m/70cm handheld	£150.00	RX
FT203R	2m handheld	£145.00	RX
IC25E	2m mobile	£155.00	RX
FT211RH	2m mobile	£299.00	PX
FT290R2	2m multimode	£239.00	PX
FT790R2	70cms multimode	£425.00	PX
FT811	70cms handheld	£239.00	PX
FT203R	2m handheld	£110.00	AX

RECEIVERS/SCANNERS

MX7000	Scanner	£149.00	AX
PRO2005	Scanner	£100.00	AX
PRO2006	Scanner	£299.00	AX
PRO37	Scanner	£115.00	AX
PRO80	Receiver/Scanner	£158.63	AX
R2000	Receiver	£369.00	AX
R532	Receiver	£125.00	AX
SW1E	Receiver	£115.00	AX
AR1500E	Scanner	£249.00	AX
AR2001	Scanner	£125.00	AX
200XLT	Scanner	£99.99	AX
AR2002	Scanner	£275.00	RX
ICR7100	Receiver + HF	£999.00	AX
FR101	Receiver Ham Band + 2m + 6m	£160.00	PX
FRG7700	HF Receiver	£299.00	AX
FRG8800	HF Receiver	£439.00	AX
HF225	HF Receiver	£279.00	BX
SRG8600SDX	HF Receiver	£325.00	AX
ICR100	Scanner	£380.00	LX
2C	Amateur Band Rx	£135.00	RX
D2999	Multiband Rx	£195.00	RX
AIR 7	HF + VHF RX	£140.00	RX
FRG7000	HF Receiver	£155.00	RX
ICF2001D	Receiver	£179.00	AX
ICF7600	Receiver	£119.00	AX
PRO80	Handheld Receiver	£220.00	RX
ICR1	Handheld Scanner	£255.00	RX
R2000	HF Rx + VHF Convertor	£475.00	RX
AIR7	Airband + B/cast RX	£169.00	PX
AR3000	Scanner	£599.00	RX
FRG9600	Scanner	£439.00	PX
HF225	Receiver	£389.00	PX
HX850E	Scanner	£99.95	PX
AR2001	Base Scanner	£175.00	RX

AX = ARE, LONDON BX = SMC, BIRMINGHAM CX = SMC, CHESTERFIELD LX = SMC, LEEDS PX = SMC, SOUTHAMPTON (HQ) RX = REG WARD, AXMINSTER

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NEXT ISSUE (MAY)
ON SALE APRIL 8

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Other Regular Features

Front Cover: Our thanks go to Mike Richards G4WNC, who took time off from writing 'Decode' in Short Wave Magazine to photograph the landscape in the Lake District.

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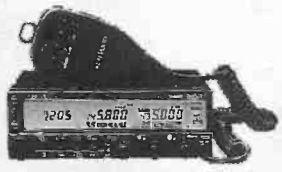


TM741E • TM732E • TM241E

TH78E • TH28E

YAESU

FT1000D • FT1000
FT990 • FT990DC • FT890AT
FT890 • FT747GX • FT736R

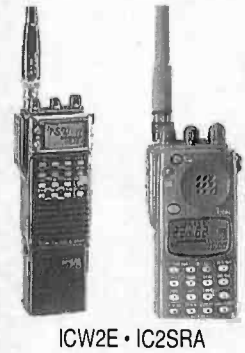
FT2400H • FT5100 • FT5200

FT411E • FT415
FT470 • FT530

ICOM

IC725 • IC735 • IC728

IC3230H • IC2410H • ICR7100
IC229H • IC228H • IC28H



ICW2E • IC2SRA
IC2SE • IC2GE
IC24E • IC2E

ALINCO

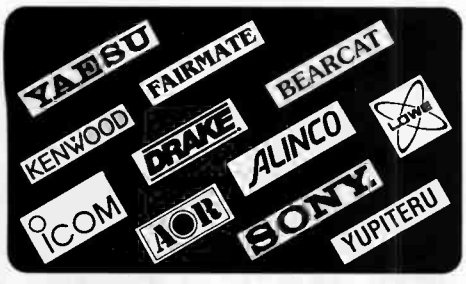
DR570T • DR599T

DR112T • DR119T • DR1200T

DJF1T • DJF1TH
DJ162T • DJ580T

PACKET

AEA PK232 • PK88 • AEA-FAX



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FREE WITH ANY NEW HAND-HELD/ SCANNERS

ALINCO ELECTRONICS

2m & 70cms Dual Bander DJ-580E

£409

inc VAT

The DJ-580E hand-held is the most advanced design ever offered to the radio amateur. Building on the winning formula of the DJ-560E, ALINCO have now reduced the size dramatically and introduced a combination of innovative features that will make your operating even more fun and certainly more versatile.

It goes without saying that ALINCO offer you all the standard features you expect from a hand-held including dual watch, dual controls, scanning, searching, priority, etc. Of course ALINCO's standard of engineering and reliability is now becoming the envy of its competitors. (They're also pretty envious of ALINCO's prices!) Naturally you get a full 12 month warranty including parts and labour. It's the extra features that really make this a winner.

For example you now have ALINCO's patented circuit that retains full operation with dry cells even when battery voltage falls by 50%. Great for emergency applications. You get a programmable auto power off feature, battery saver, digital telephone dialler and three output power levels. And we've only just started! Key in a special code on the keypad and your rig will turn into a fully operational automatic crossband repeater. Key in another code and you will open up the receiver for a.m. airband reception and frequency segments up to 995MHz! You can even use the DTMF feature to send and receive two digit code messages.

To learn more about the transceiver that has already taken the Japanese and American markets by storm, phone or write for a full colour brochure.

"The Most Comprehensive Specification Ever Offered!"

Available direct or from your local dealer

Auto repeater mode
AM Airband Reception
Expanded Receive to 995MHz

UK "Gold Seal" Warranty
Now with every unit
Look for the sign on the box!

Specification

Tx	144-146MHz 430-440MHz
Rx	AM 108-143MHz FM 130-174MHz FM 400-470MHz FM 810-995MHz
Steps	5, 10, 12.5, 20, 25kHz
Memories	42
Power Output	2.5/1.0/0.3 Watts 5 Watts with 12V DC
Scan	8 Modes
Tones	1750Hz plus DTMF Optional CTSS
Sensitivity	12dB SINAD -15dBu
Size	140x58x33mm
Weight	410g

Accessories Supplied
Ni-Cad pack, AC charger, belt clip, carry strap, dual band antenna.

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Kenwood HF

NEW! ***TS-50*** ***£Phone***

The amazing 100W mobile rig. No bigger than many 2m FM boxes it give you all hf bands. 1.8-30MHz plus 500kHz-30MHz receive! SSB/CW/FM/AM. Memories, Dual VFO, Scan, Noise Blanker etc.

TS-450S ~~***£1249***~~

1.8MHz-30MHz 100W transmit plus receive 500kHz-30MHz. Optional ATU, triple conversion, IF shift, notch filter, dual mode noise blanker, reverse CW, CW pitch control, 100 memories. Send for details.

TS-850S ~~***£1599***~~

The most popular 100W transceiver in 1992 SSB/CW/AM/FM super dynamic rx range. IF slope tuning, IF notch filter, tx monitor, true rf speech processor, full break-in CW, 100 memories and more!

MFJ 1278 Multi mode Data Controller

£299.95

The MFJ-1278 is the most comprehensive data controller ever offered by us. It has more modes than any other model and is now outselling all other competitive units. You get 9 modes: **Packet (including mail box) FAX, AMTOR, SSTV, RTTY, NAVTEX, ASCII, Electronic keyer, CW reader,** plus a feature packed specification. Now is the ideal time to try all these interesting modes from one single box. Watch the data and pictures come up on the screen; converse with fellow hams around the world and get the most out of your vhf or hf station. Amazing value, and even more amazing performance. We can also supply matching software package, software manual and cables for IBM 232 port at an inclusive price of £299.95.

Ten-Tec Omni-VI 160-10m 0-100W £2,495

The OMNI VI is different from any other hf transceiver you have used or ever seen. Craftsman built, it employs beautifully assembled circuit boards that are easily accessible should you ever need to service them. The factory actually encourage you to take the covers off and examine the craftmanship. No mass production here!

Receiver experts agree that good old crystal mixing can't be beaten and using this method the phase noise has essentially been eliminated. The OMNI-VI can receive signals on todays crowded bands that other popular models can't even hear. Great for contests and DXI A truly quiet receiver.

AZDEN

Direct Factory Prices!

£239.95! PCS-7000

- 2m FM 25 W
- AM Airband Rx
- FM 138-174MHz
- 20 Memories
- Auto Tone-burst
- Scanning
- Programme Shift
- Mic & Hardware

The AZDEN PCS-7000 is possibly the most underated rig available. It is simple to operate and can store tone-burst information in its memory. In order to promote it we are, for a limited period, offering you the chance to purchase at "factory prices." There's no catch; these are genuine current production models complete with all accessories plus our money back warranty if goods returned within ten days. How's that for an offer!

MFJ Products from Stock!

300W HF ATU

The MFJ-948 is a complete 300 Watt aerial matcher in one box. It will match coaxial, balanced feeder and single wires. A dual needle VSWR/Power meter makes adjustment simple and a 3 way aerial switch completes the package. Fantastic value! *£139.95*

Other MFJ Products:

MFJ-949D	ATU as above but with 300W dummy load
MFJ-901B	ATU less switch load and meter. Super!
MFJ-264	1.5kW dummy load. DC-650MHz
MFJ-260B	300W dummy load DC-160MHz
MFJ-816	HF 30/300 Watt power meter
MFJ-812B	144MHz 30/300 Watt power meter
MFJ-110	Fabulous world clock with map
MFJ-32	Packet radio handbook. Super guide!
MFJ-1286	Gray Line Graphics Programme for IBM
MFJ-1281	Easy DX logging programme
MFJ-1040	1.8-54MHz tx/rx preselector
MFJ-1020A	Indoor active antenna station. 0-30MHz
MFJ-1272B	TNC/Microphone interface
MFJ-722	Superb rx audio filter
MFJ-752C	Tuneable audio filter
MFJ-207	Antenna analyzer. Brilliant idea!
MFJ-557	Self contained CW practice key and oscillator
MFJ-407B	Electronic keyer. 8.5-WPM Self powered
MFJ-931	Artificial HF ground unit. Ideal for flats etc.
BY-1	Genuine Bencher Paddle. A precision product
MFJ-704	HF Low Pass Filter
MFJ-108B	Dual time deck top clock. LCD Display

PHONE FOR CATALOGUE

Delta-II HF 160-10m 100W £1,495

The Delta-II is ideal as fixed or mobile. Its rugged design and Ten-Tec label make it an obvious choice for those who demand quality and craftmanship. The receiver boasts a continuously variable IF filter with a range of 500-2500Hz. You'll also love the silent break-in operation, the notch filter, passband tuning and wideband receive. Send today for colour brochure.

DIAMOND

BASE STATION ANTENNAS

CP-5	10-15-20-40-80m vertical with radials	£229.95
CP-6	6-10-15-20-40-80m vertical with radials	£249.95
D-130N	Discone 25-1300 MHz. 50 FT cable	£94.95
CP-22E	2m 2 × 5/8 6.5dB gain omni directional	£49.95
D-707	Active rx. 1.5-1300 MHz 12V	£109.95

FIBREGLASS VERTICALS

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X-300	2m/70cms 6.5/9dB gain 3.1m long	£109.95
X-510	2m/70cms 8.3/11.7dB gain 5.2m long	£159.95
X-700	2m/70cms 9.3/13dB gain 7.2m long	£295.95
V-2000	6m/2m/70cms 2.15dBi/6.2dB/8.4dB 2.5m	£109.95
X-5000	2m/70cms/23cms 4.5/8.3/1.7dB 1.8m	£129.95

AMERITRON HF LINEARS

NEW

600 Watts

£799!

AL-811

This linear is incredible value. We have put it throuh its paces and it really stands abuse. 3 rugged 811A tubes provide up to 600 Watts output from 160-10m. A hunky mains transformer and full metering is included. Used by DX-peditions it has to be amazing value at **£799 inc VAT**

AL-80BX 1kW from 160-10m 3-500z tube. ***£1499.00.***

Other Ameritron linears are available. Send SAE today.

40/80m QRP Tx Kits

0.5 – 5 Watts CW
12V DC **£14.95**
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British Made QRP kits that will get you going on 80m or 40m QRP CW in an evening. Everything you need to build a working transmitter that will get you round the UK and Europe. You get top grade components, screen printed circuit board, heat sink, circuit diagram, full instructions and a great deal of pleasure! We worked all over Europe on 40m with a dipole. We can also supply matching VFO on request.

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NEW! **Highly Sensitive Frequency Counter**

Optronics "2300"

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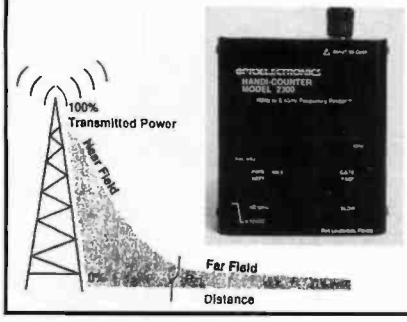

DISCOUNT PRICE!

ALINCO ELECTRONICS GmbH. **DJ-180E 2m Handheld**

£189.95 *Free Ni-Cads Free Charger Free Delivery*

- ★ LCD Display
- ★ 10 Memories
- ★ Repeater Shift
- ★ 2 Watts Output
- ★ Ni-Cad Pack
- ★ AC Charger
- ★ Auto Power Off
- ★ Battery Warning
- ★ 5kHz-25kHz steps
- ★ Superb Audio
- ★ Helical Aerial
- ★ 132 x 58 x 33mm

At this price the ALINCO DJ-180E represents your last chance to purchase a top brand name handheld at yesterday's prices. The DJ-180E offers more features per Pound than any other rig. Take advantage of this offer and pocket the difference. You'll get a superbly engineered radio with a quality name and our 12 month warranty. There are plenty of accessories to follow including a memory expansion module to give you 50 or 200 channels. Offer subject to current stocks only.

Flexi-Mast

- ★ *9m Long*
- ★ *Closes to 1.2m*
- ★ *Weighs just 2kgs*
- ★ *Self Locking*
- ★ *Very tough*

The famous flexi-mast is back. It's a telescopic fibre glass whip, 9 metres long. Tape a wire to it to make a cheap hf vertical. Wind a coil round it to make a loaded vertical. Use thin coax and make a coxial sleeved vertical for VHF. The ideas are endless. Its easily supported and we supply a bracket for this purpose.

£69.95 *Carr. £6.00*

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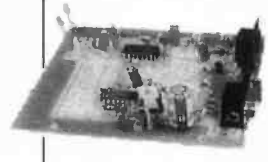

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Keylines

Last year, we introduced the *Practical Wireless* 'Elmer' award. The idea behind this new award, was to go some way towards recognising and paying tribute to the many unsung heros who help others to enjoy our hobby.

The first *Practical Wireless* 'Elmer' was Doctor Ken Smith G3JIX. Ken, who's based at the University of Kent, has spent many years helping young people into amateur radio and electronics in general.

The *PW* team were delighted when Ken arrived at the Leicester show, surrounded by his youngsters, for the presentation ceremony. The subsequent photograph in 'Newsdesk' (December 1992 *PW*), proved what a keen bunch they all are!

So, with the very first winner in mind, we start looking for nominations for the 1993 *Practical Wireless* Elmer. Don't forget, that your nominations don't have to be for a radio amateur. My own Elmer (for example) was a British Rail Electrician, who spent many years helping keen youngsters like myself into the hobby.

As last year, we want to make this award open to anyone who helps or has helped others. Don't forget also, that the nominated person does not have to be a *PW* reader either.

If you have anyone you'd like to nominate for the Elmer award, write in with a maximum of 100 words, explaining why you are nominating your candidate. It would also help if you could enclose a recent photograph of your candidate at the same time.

Alternatively, you can write to me at the new *PW* office, and I'll send you a photocopy of the January 1992 'Keylines' where I explained the new award fully. Once you've followed the instructions, we would be very pleased if nominations could be returned as soon as possible, especially if you live abroad.

I wish you all the best of luck. It's a pity we can't reward every Elmer, because there are thousands of them. So, get nominating, and the person that helped you into the hobby, could be the 1993 award winner.

Another job I have to do this time, is to remind you all that the *PW* 144MHz QRP Contest takes place in June. Following comments and interest from readers, this year, we're introducing a new category and special prize for listeners.

Doctor Neill Taylor G4HLX will be bringing you all the latest news, rules and details on prizes later on in the spring. But, in the meantime, if you're a listener and fancy having a go at this fun contest, drop me a line. I'd be interested to hear from you, as of course will Neill G4HLX.

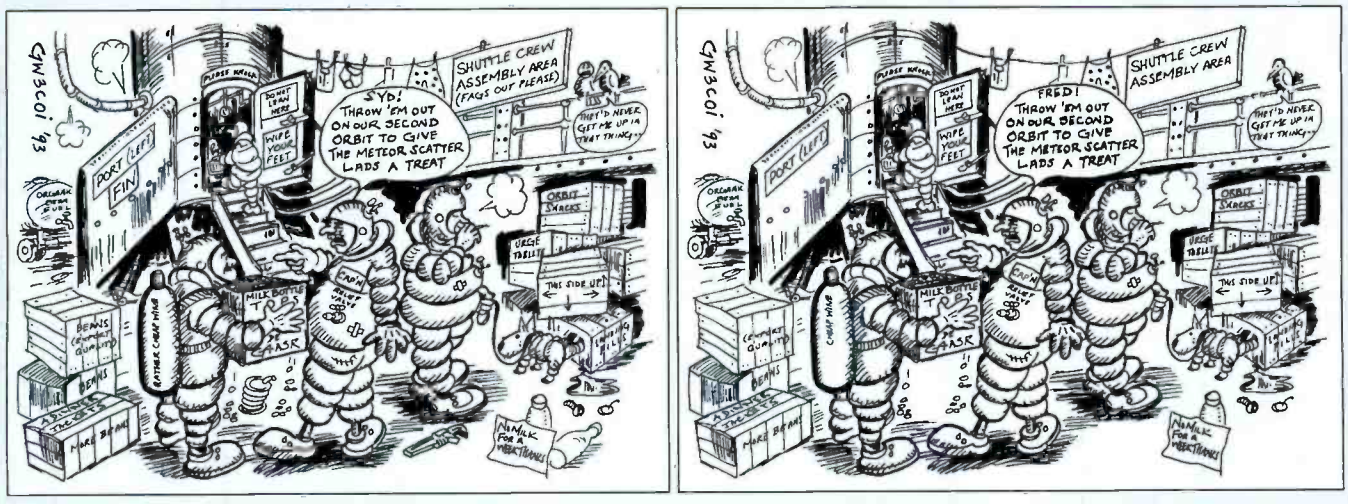
This year's contest is on the 11th. And apart from introducing the listener's new category, Neill and I have thought very hard about introducing an 'alternative energy' entrants category. Unfortunately, unless we have every competitor verified, we can't guarantee that G????/P is really solar-powered.

An alternative-energy category for contest entrants is a good idea, but how do we check that everyone is playing fair. Thinking about it, I suppose we could ask the s.w.l.s taking part, if stations near them disappear when the sun goes in, or wind drops. Hi!

As usual, I look forward to receiving your ideas and suggestions on how we could verify alternative energy category stations. I'd be delighted to publish the most practical, and the funniest suggestions from readers.

Rob Mannion G3XFD

COMPETITION CORNER Spot The Difference



Mark the 12 changes made to the right hand version of the cartoon. See opposite for details of entry to this months' Competition Corner.

First Prize

A year's subscription to *Practical Wireless* or a £20 book voucher.

Second Prize

Six month subscription or £10 book voucher

❑ Subscription ❑ Voucher

Name .....

Address .....

.....

.....

.....

Send your entry (photocopies acceptable with corner coupon) to: Competition Corner, Spot The Difference Competition, April '93, PW Publishing Ltd., Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. Editor's decision on the winner is final and no correspondence will be entered into. Entries to reach us by Friday 23 April 1993.

Competition Corner April '93

Receiving You

★★★★ Star Letter ★★★★

Dear Sir

I read of the conviction of two men in Cheshire in the 'Newsdesk '93' section of *PW* (February 1993). Would it be possible in future, if you have to report any more convictions, to mention the offence committed. This is not morbid curiosity on my part, but a desire to understand what the offence was, why it's an offence and not to make the same mistake myself.

Martin Pirrie
Radway
Warwickshire

Editor's comment: We're all anxious to stay within our licence conditions Martin, and we'll be pleased to help in any way we can. Recently, the Editor of *Short Wave Magazine* and I, took the decision to publish the names of persons convicted on matters connected with amateur radio. It seemed absolutely pointless to print only half the facts. The Radio Investigation Service fully support our initiative, and we will certainly publish full details of the offence in future court reports whenever possible.

Dear Sir

I would like to add a suggestion to George Dobb's article (January 1993, page 39). Stereo headphones may be used without modification if a stereo socket is fitted and the signal is fed to the tip and the ring (left and right) of the jack plug.

The body (common) must be isolated. Clearly a plastics bodied socket provides the easiest way of achieving the insulation.

This arrangement puts the two transducers in series - a dodge used in the days of high impedance 'phones to gain higher impedance. Equally, it makes the correct connections with a mono jack.

For some time I've also been meaning to congratulate you on continuing to use the zig-zag line symbol for a resistor, instead of the idiotic rectangular box. The former is a distinctive symbol which is instantly recognisable and cannot be mistaken for anything else. Thank you for resisting the change (pun intentional!)

Mike Glasson
Ilminster
Somerset

Editor's reply: It's my pun time now Mike - thanks for the tip! As regards your comment on the resistor zig-zag symbol, I totally agree. It was a decision taken before my time at *PW*, but I entirely agree with your sentiments and that of my predecessors!

Dear Sir

Just a line to say how good I thought the article 'Boxing it Up' was in *PW* for December 1992/January 1993. I would like to add a couple of comments of my own.

Screening: adhesive aluminium tape may be more convenient than double-sided sticky tape. Sellotape (among others) make it in different widths, and it can also be used for indoor v.h.f./u.h.f./TV antennas stuck on a convenient window.

Trimming aluminium and Perspex: a carpenter's plane gives a better finish than a file. I use a small block plane with a blade angle of 20°. Needless to say, the blade must be very sharp and set to a very fine cut.

Painting: Finnegan's Hammerite is not suitable for direct application onto aluminium, though one would probably get away with it on something to be used indoors and not subject to rough handling. In general with aluminium, a self-etch primer should be used for best adhesion.

I enjoy the magazine, especially articles on antennas and home-brewing test equipment. Wishing you success in 1993.

Willy Wilson GM3NUF
Kilmelford
Argyle

Editor's reply: Thanks for your comments Willy. Many readers reported that they enjoyed Steve Harding's article, and I hope your comments will prove as useful.

Dear Sir

I think the p.c.b. layout idea by Jack King G4EMC ('Receiving You' February 1993) is an extremely good idea. It's certainly the area that sometimes makes me hesitate before commencing a project.

I also read with interest the article by Roger Bennett G3SIH, in the same issue about his special general coverage receiver, as this is one of my pet dreams also. However, I remember back in my 'teen days when *Practical Wireless* (about 1975-76) had a mammoth project on just such a receiver. I believe the author was F.G. Rayer and the project ran over three or four issues plus add on's.

I faithfully bought *PW* every month, so that when richness happened I could construct this project. Alas, mothers not understanding the importance of such dreams deemed that such reading material was unsuitable for storing under the bed and threw them out!

The only item I ever managed to purchase was the 365pF triple gang air spaced capacitor for the princely sum of £1.50. Perhaps *PW* could update this project and re-publish it using home-made coils? As the Denco coils are certainly no more.

C. D. Barnard
Lee
London

Editor's reply: Thank you Mr Barnard. Roger Bennet's article invited a lot of comment, and a number of readers have suggested a similar project. If you're interested in an advanced receiver home-brew project in *PW*, please write and let me know.

Send your letters to the editorial offices in Broadstone. They must be original, and not duplicated in any other magazine. We reserve the right to edit or shorten any letter. The views expressed in letters are not necessarily those of *Practical Wireless*. The Star Letter will receive a voucher worth £10 to spend on items from our Book, PCB or other services offered by *Practical Wireless*. All other letters will receive a £5 voucher.

The following letters are in response to the invitation in 'Keylines' regarding a 'Code Free HF Licence. We hope to publish more next month. The topic has certainly aroused a lot of comment from PW readers!

Dear Sir

In response to your invitation for comments on the subject of a 'No Code HF Licence' I regret to have to say that I am absolutely scandalised that such an idea should ever have been conceived in the first place. Although I am only a s.w.l., I regard the sound of Morse as sheer music. It is indeed, the essential language for all who are engaged in communication by radio.

I myself first learnt the code at the beginning of the last war. Although I have now, as a 70-year old handicapped pensioner lost some of my speed, I still regard learning the Morse code as one of my better achievements.

The very idea of such an animal as a 'codeless' class A transmitting amateur simply doesn't bear thinking about. For as long as I can remember, I have looked upon the class A amateur as the 'Créme de la Créme' of the amateur fraternity. Because he/she has exercised the self discipline required to learn the Morse code, to have the ability to send and receive it at a specified speed in accordance with the requirements of the class A licence. Why then, should the class A licensee not be awarded privileges which are not generally available to other licensees?

There is however, another important factor in the use of the code as it enables operators to make QSOs with amateurs of other languages without the need to be a linguist. Further QSOs by code are invariably precise, informative, polite and devoid of much of the boring waffle one often hears on 3.5 and 7MHz in phone contacts.

However, if there really is a need for a no-code licence to be allowed access to the h.f. bands, then perhaps there might just, but only just, be a case for allowing access to small segments of the 3.5 and 7MHz bands only. I would support this, always provided that the Morse code remained a condition for holding a class A licence.

These are of course simply the views of one of the 'Old Brigade', but it is sad that the young no longer consider our values worthy of consideration. I am all for change when and where it is really necessary, but why change simply for the sake of it?

Leslie Biss
Knaresborough
North Yorks

Dear Sir

Accepting your invitation in February 'Keylines', I make a rare sortie into print to add my opinion to the 'No Code HF Licence' debate.

I have not heard any sustainable arguments why such a relaxation of the rules of our hobby should be made. It is immaterial whether certain ship's radio officers are relieved from being proficient at Morse or not. Our current need stems from the desire to gain and hold an A licence, in accordance with the current rules and thereby enjoy the wider aspects of our hobby.

There are many features in the current City & Guilds/RAE examinations that relate to knowledge that is not necessarily required to operate an amateur radio station. Particularly one equipped with today's black box transceivers and accessories. Is it to be suggested that the scope of these examinations is to be reduced too?

My views may be described as old fashioned, but I'm afraid that the cry for a No Code Licence is symptomatic of many of today's ills. Too many people want to play in the First Team without wanting to put in the work and training to justify their selection.

Many RAIBC members and others similarly at a disadvantage, have persevered and passed the Morse test to gain their A licence. I am sure they are justly proud, and if you decide to print this letter I would like any voucher to go to the RAIBC for their use.

Brian H. Gilbert G0BOO
Banham
Norfolk

Dear Sir

I do hope you can publish this letter to let others know what will happen if we get a c.w. free h.f. licence.

I passed the c.w. test in December 1992 after two months of learning total time about 70-80 hours. My wife is now learning as well with the help of something most people have in their homes - a computer (it taught me).

It seems to me and many other A class amateurs that the RSGB membership is dropping, so they need all they can to get the money coming back in. We all have to agree *PW* is better than *Radcom* or is it Radcon! Hi Hi. What does the RSGB offer the average amateur A or B class? Twelve issues of *Radcom* and a QSL bureau - they never seem to offer any help to s.w.l.s or the problems amateurs suffer.

They introduced the Novice licence and now a new (easier) c.w. test, so why drop the c.w.? For their pockets only!

In my mind 12 *PW*s = £21.00 and shared PO Box = £1.50 (If you get a few locals) Total = £about 23.00 (save £7.00). Maybe a new body instead of the RSGB would be better - any comments? How many of these people who want to drop c.w. for h.f. have actually tried to learn c.w.? I would think less than 80%. Just look at CB, is this the future of amateur radio? I hope not.

If they really must insist on a c.w. free licence, well what about these points:

1) Restrict e.r.p. to 30W and only on a few bands.

2) Licence fee of £100 per year!

Finally c.w. kits are cheaper and easier to make than s.s.b. How many newcomers can afford £700+ for h.f. sets? How many kit-makers will go under? Well if I can pass - so can anyone, after all what's 70-80 hours of anyone's time if they really want to work h.f.? If you want to drive you have to learn.

R. A. McKinnon
Barnstaple
Devon

Dear Sir

You asked in *PW* February 1993 for readers' opinions on a 'No Code HF Licence'.

Let us assume that it is necessary to put another barrier after RAE to v.h.f. operators wishing to use the h.f. bands. The Morse test has the advantage of having been that barrier for a considerable time, of being useful in encouraging a relevant skill and being straightforward to carry out.

Another barrier would be an examination similar to that of the RAE, but more advanced. This should not be difficult to devise within the community of radio amateurs and easy to set.

Amateurs having passed the RAE could be given the option of Morse or RAE II (A Level) as their barrier to the h.f. bands.

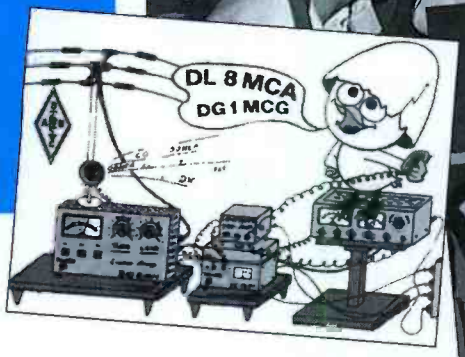
Gordon Lines G0ROH
Reigate
Surrey

Editor's comment: I have no doubt that the opinions and ideas expressed in the above letters will bring even more replies! If you wish to write, please make it short, as we want to get as many published as possible.

New address

***Practical Wireless* and *Short Wave Magazine* have moved to Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW.**
Full details on the contents page.

Newsdesk '93



QSL card from Detlef DL8MCA.

The young boy on mic is Chris Roberts with operator Melvyn G0KGU.

Grateful Thanks

The North Ferriby United Amateur Radio Society and the North Humberside Scouts, would like to send their grateful thanks to Detlef DL8MCA for a FB QSO, and for his speedy delivery of his very nice QSL cards. Five QSL cards from Detlef DL8MCA arrived on the Thursday following the JOTA event on Sunday 18 October, one for Melvyn G0KGU, the h.f. operator and two each for Daniel and Thomas, the two scouts who had the privilege of talking to him.

Top left: A Turkish Scout Jamboree Station in Antalya, Turkey.

Radio Software

Steve Hunt G3TXQ (not our Art Editor!) has a selection of amateur radio software available for the Archimedes. A Morse tutor, an antenna designer, frequency prediction and filter design programs are available on a compilation disk, priced £9.95 (inc. VAT and p&p). For further details, send an s.a.e. to Steve at **21 Green Street, Milton Malsor, Northampton NN7 3AT.**

Novice Instructors Required

Novice instructors are urgently required in the Lincolnshire area, no experience is necessary. Please contact **Alan Gibson, 1 Oakliegh Road, Grantham, Lincolnshire NG31 7NN. Tel: (0476) 66701.**

Norcall Communications Centre

January saw the official opening of Norcalls new retail showroom in central Northampton. Specialising in all forms of wireless communications systems, Norcall will be offering sales and service facilities for both CB, amateur and business users alike.

Part of Northampton Communications, and backed by their BS5750 accredited service centre, Norcall are able to offer low cost repair and diagnosis facilities, both in the shop and by mail order.

Both new and used transceivers, receivers and associated items are available for purchase.

The shop is open Monday to Saturday, 9am to 5.30pm, and can be found at **Victoria Chambers, 1 Victoria Road, Northampton. Tel: (0604) 26283, 24-hour answer phone.**

Trio-Kenwood Launches SG 5260

The SG 5260 from Trio-Kenwood is a programmable f.m./a.m. standard r.f. generator, providing a frequency range of 10kHz to 260MHz. It uses phase lock loop technology, which ensures a high precision stable signal is maintained.

Digital displays are provided from output level, frequency modulation and address location.

The SG5260 has a 99-step memory which can be pre-set for all parameters, making it ideal for repetitive applications (a remote controller is optional).

Frequency, output level and modulation can be entered or changed from the front panel keypad or rotary cursor. The SG 5260 is ideal in all r.f. applications, from tuner alignment to radio test. A GP1B option is available.

The SG 5260 is supplied complete with cables at a price of £3201.00.

Two other models in the range are available, the SG 5110 (10kHz-110MHz) at £1578.00 and the SG 5115 (as 5110, plus f.m. stereo) at £1326.00.

For further information, contact.:
Tony Starling, Trio-Kenwood UK Ltd., Kenwood House, Dwight Road, Watford WD1 8EB.

Amateur Radio Course

The Radio School 8-day (Wednesday to Wednesday) course of preparation for the RAE, is designed as a highly intensive 'crammer' for a small class of keen and dedicated adults, designed purely and simply to pass the exam.

Prospective students must make their own application for examination (there are only two exams held each year) at their local college at least two months prior to the exam date. The CGLI exam fee is about £34, but the college will make a small additional charge for use of the facilities.

Course dates April 28-May 5 and November 24-December 1. Exam dates May 10 and December 6. Course fee £500.

For more details, contact:
Radio School Limited, 33 Island Close, Hayling Island, Hants PO11 0NJ. Tel: (0705) 466450.

Young Amateur Of The Year Award

The Radiocommunications Agency, in conjuction with the Radio Society of Great Britain (RSGB), recently announced the Young Amateur of the Year Award for 1993.

The Award, which is for the most outstanding achievement by a young amateur radio enthusiast, is open to anyone under 18 who has an interest in radio.

They do not necessarity need to be a licence holder to apply. When applying, applicants may like to consider the following areas of activity:
i) DIY radio construction
ii) operation of radio
iii) community service (eg. helping in emergency communications or helping the disabled)
iv) encouraging others (eg. through the Novice licence scheme)
v) international communication
vi) school projects.
The idea behind the scheme is to generate interest in amateur radio and to encourage people to become involved themselves.

The prize, for the most outstanding achievement between 1 August 1992 and 31 July 1993, will be awarded by the Radiocommunications Agency and presented at the RSGB's HF Convention in September.

All entrants will receive a copy of the RSGB's amateur radio log book, while the winner will receive a £250 cash prize donated by the Agency.

Both winner and runner-up will also be invited to visit the Agency's Radio Monitoring Station at Baldock, Hertfordshire.

In the past, the radiocommunications industry has also been very supportive of the Award and has provided additional prizes for both the winner and runner-up.

Last year's winner, shown here, was 17-year old Martin Saunders from Broadstone, Dorset. Martin's main area of interest was in packet radio; having assembled his own equipment and obtained a Notice of Variation to his licence to operate a mailbox. He had also written several articles both on packet radio and on amateur radio in general.

He was Secretary of his local packet group and was serving on the forward planning committee of the Flight Refuelling Amateur Radio Society.

As well as £250 from the Agency, Martin received a certificate signed by Michael Heseltine, President of the Board of Trade. Runner-up was 16-year old Neil Mothew from Loughton, Essex. Neil's main interest was in home construction and he had also set up a radio club at his school.

The closing date for applications is 31 July 1993. The Award is open to any resident of the UK, the Channel Islands, or the Isle of Man, who has not reached his or her 18th birthday by the closing date.

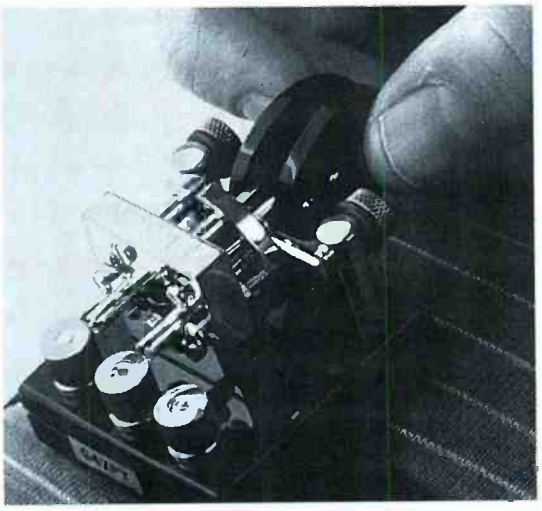
Entrants can enter themselves or be nominated by an adult sponsor. There is no requirement for entrants (or nominees) to hold an amateur radio licence.

Applications or nominations for the Award should be sent to:
Radio Society of Great Britain
Lambda House
Cranborne Road
Potters Bar
Herts EN6 3JE.
Tel: (0707) 659015.

G4ZPY Paddle Keys International

News from G4ZPY Paddle Keys International is that they have recently introduced the new 3-in-1 miniature Twin Paddle Key.

Designed for QRP, mobile and back-packing use, it is something a little different from the usual design of Morse key. It is light, weighing just 150g, robust and efficient.



Finished in highly polished brass, with tiny oval black paddles, your callsign can also be engraved on the top of the back plate, which is included in the price.

Introductory price offer is £65 plus p&p (UK £2, Europe £3, USA £4.50, Japan £6).

G4ZPY Paddle Keys International
41 Mill Dam Lane
Burscough
Ormskirk
Lancashire
L40 7TG.
Tel: (0704) 894299.

Worldwide Radio Communication Course 1993

The Worldwide Radio Communication Course will be held at Kilve Court Residential Centre, Kilve, Bridgwater, Somerset, between April 5-8th.

This course is a practical introduction to radio communication, which is suitable either as an introduction to amateur radio for a complete beginner of any age, or to anyone who may wish to have a refresher in basic radio theory, obtain practical advice, or just play radio for a week!

The special callsign GB2KRC will be active on all h.f. bands and 144MHz s.s.b. will be used extensively, but also used will be QRV on c.w., SSTV, RTTY and possibly Packet. Members of the course will construct a working amateur band receiver to take home, which is included in the cost of the course.

Fee for the course is £108.50. Further details from **Adrian Dening G4JBH on (0935) 74562 ext. 238.**

International Marconi Day 24 April 1993

Arrangements for the 1993 International Marconi Day are now well in hand. It is understood that 21 stations are taking part this year and the current list is shown below. To claim the Marconi Day Certificate, stations must work 12 of the stations. Any award application should be made through **PO Box 100, Truro, Cornwall TR1 1RX,** also acting as a clearing centre for QSL cards. The s.w.l. award is also available on the same basis; that is to hear and log 12 of the stations. The cost of the award this year is £3.50 UK, $8 US and 12 IRCs. For the s.w.l. section, the costs are £2.50 UK, $5 US and 8 IRCs.

Stations for International Marconi Day
GB4IMD - Truro, Cornwall
GB4MID - Poldhu Marconi site, Cornwall
GB0IMD - Isle Of Wight Marconi centre
GB2IMD - Rathlin Island Marconi site, Northern Ireland
GB2MDI - Marconi site on Salisbury Plain
GB0SFL - South Foreland lighthouse Marconi centre
CT1TGM - Tertulia Radioamadoristica Gugleimo Marconi, Coimbra
EI2IMD - Crookhaven, Eire, Marconi site
EI4IMD - Galway, Eire, Marconi site
DA0IMD - Borkum Island, Marconi site
IY0TCI - Civitavecchia
IY1TTM - Sestri Levante
IY4FGM - Villa Grifone, Pontecchio
IY0GA - Golfo Arancci, Sardinia
ZS6IMD - Johannesburg
VO1IMD - St Johns, Newfoundland
VE1IMD - Glace Bay, Nova Scotia
K1VV/IMD - Cape Cod, Mass., Marconi site
N2FCZ/IMD - Babylon, New York Marconi Memorial site
KK6H/IMD - Marshall, California Marconi park
GB2MID - Sandbanks, Poole, Marconi site

More details from **Mike G4WQL QTHR or PO Box 100, Truro, Cornwall TR1 1RX.**

Newsdesk '93

Still Alive And Pounding

It is not given to many to experience the dubious pleasure of reading their own obituary! The thought crossed my mind when, upon perusal of the recent correspondence in 'Receiving You' March 1993, about that archaic device called 'the Valve', I noticed a reference to "the all-time EF50 t.r.f. receiver, published in *Short Wave Magazine* August 1946 by the **late** Jack Hum G5UM".

Anybody today, still in possession of a G5-plus-two callsign, can reasonably be expected to be called "the late"; the callsign block is a dying race, as the *Callbook* clearly shows. There are not many of us left.

But premature clog-popping is not our only worry; many of us are greeted with incredulity on the air when we attempt a QSO. "I didn't catch the last letter" says the QSO partner. "There isn't one" reply us old-timers, who then proceed to launch into a dissertation on the structure of British amateur callsigns, not forgetting to add that the letter 'E' was not normally used - being the shortest *'dit' in* the Morse alphabet, it tended to get lost in the noise. No longer true today, of course; there are many E-licensees and fewer noise sources (or should be).

Finally then, a big thank you to all my chums out there, many known by sight, but very many more solely as QSO partners, who took the trouble to telephone me, or, somewhat disbelieving after seeing that phrase about "the late", to call me over the air. All may rest assured, that at this moment in time, as television interviewees tend to say, the cardiacs are still pounding, and so is the A1A mode at G5UM by no means - yet - a silent key!

Attribute that "the late" to a slip of a key, non-Morse G5UM.

Jack Hum G5UM

50th Anniversary. Jack Hum and wife Grace, at a dinner party held in 1977 to celebrate 50 years of licensed radio activity by G5UM. Ten years later another such event signalled the 60th anniversary. "Only four more until the 70th" says Jack.

Busy at the checkout. Jack Hum G5UM makes sure that all the log sheets are in order after a National Field Day contest in the mid-1950s.

SMC Break-In

The following is a list of items stolen from the SMC (South Midlands Communications) showroom on February 18:

1 x FT-530 s/n 2N060720
1 x FT-411 s/n 8N051492
1 x FT-415 s/n 1L061036
1 x FT-76 s/n 1E040177
1 x FT-26 s/n 0N010026
1 x MH29A2B remote speaker mic for FT-530
2 x thumb wheel 'air handies' (matt black cases)

All units were unboxed.

Any information on the above should go to **SMC at SM House, School Close, Chandlers Ford Industrial Estate, Eastleigh, Hampshire SO5 3BY. Tel: (0703) 255111.**

North Cheshire Radio Club

The North Cheshire Radio Club are operating a sponsored radio station in aid of the NSPCC (National Society For The Prevention Of Cruelty To Children) under the callsign GB0CAT, at their premises within the Morley Green Club, near Wilmslow. The station will be on air on all h.f., v.h.f. and u.h.f. bands, using f.m., s.s.b., packet and c.w., starting Friday midnight April 2, through to Sunday midnight April 4.

Visitors during this sponsored weekend will be most welcome, as will of course any donations. The last charity event in which the radio club was associated raised over £10 000. This was a joint effort between all sections of the Morley Green Club. Further information regarding this event can be obtained from the secretary, **Jill Gourley G0OZJ on 061-485 5036.**

Special Event Call GB0LCP

On March 24, special event station GB0LCP (Langrish County Primary) will be operating from the Langrish County Primary School, Ramsdean Road, Stroud, Petersfield, Hants, during school hours, 10.30am to 3pm.

The object of the station is to give live 'on air' experience to the children sending greetings messages to other amateur stations, and hopefully to other schools, this being part of a classroom communication project, where various forms of communication are studied. The children taking part will range between the ages of eight to 11 years.

Depending upon band conditions on the day, operation will be either near or on 3.570MHz or 7.060MHz.

Further details from: **Eric G0BUZ, 44 Parsonage Estate, Rogate, Petersfield, Hants GU31 5HJ.**

Royal Air Force 75th Anniversary

The Royal Air Force celebrates its 75th birthday on 1 April 1993!

The commemorate this momentous occasion a Royal Review will take place at Royal Air Force Marham on April 1 where the Queen and other members of the Royal Family will be shown the past, present and future of the Royal Air Force.

There will be 850 personnel on parade, including members of the Air Training Corps and the Royal Air Forces Association, and there will be a spectacular flypast involving 148 aircraft including a Red Arrows flypast with the aircraft vertically stacked in a '75' formation.

In addition, the Royal Air Force North Luffenham Amateur Radio Club (G6RAF, G3TCQ) will be on the air for 24 hours on April 1 from 0001 hours to 2359 hours using the Special Event callsign GB75RAF and appropriate QSL cards.

It is hoped that the station will participate in all RAFARS nets on the day, with as many other Royal Air force Amateur Radio Clubs as possible.

It is also hoped to work as many past and present members of the Royal Air Force as possible and to work all countries where the Royal Air Force has, or has had, bases. Frequencies used will be 1.984, 3.710, 3.790, 7.045, 14.290 and 21.290MHz s.s.b.; 1.830, 3.515, 7.015, 14.055 and 21.055MHz c.w., plus 144MHz s.s.b. and c.w.

Help will be needed on and around the day and it is intended to invite all serving amateurs to Royal Air Force North Luffenham to aid in operating and/or setting up the special event station. Visitors will, of course, be welcome on the day but, as space is fairly restricted in the club house, prior notice would be appreciated.

More details from **Rob Luckham on (0780) 720041 ext. 7283, or Mark Havard G6UYT ext. 7455. Alternatively, please send a packet to G6RAF @ GB7RUT.**

BBC Russian Service Winner Collects Prize - 28 Years Overdue

A Ukranian who won a two-week trip to Britain in a BBC World Service competition finally visited the country - after 28 years.

Alexei Antonovich Brazhnik, aged 61, from Svetlovodsk, in Ukraine, was refused permission to make the trip in 1965 by local communist party bosses. But three years ago, he was able to claim his prize when he contacted the BBC during its first-ever exhibition on the former Soviet Union.

The BBC ran the competition on its Russian Service, at a time in the 1960s, when East/West relations were relatively relaxed. Jamming of the BBC had temporarily ceased and only resumed when Soviet troops invaded Czechoslovakia in 1968. It stopped finally in 1987.

Competition entrants were asked to write a short essay about what they would like to do if they had a chance to visit Britain, together with questions on how they saw life here.

A trip around London's water system ranked high in the list of places to visit by Mr Brazhnik, who works as an electrician at a water works!

Itineraries for Mr Brazhnik were arranged with the assistance of the London Tourist Board, and British Airways, who were involved in the original competition, supplied the flight.

Got an exciting item of club news? Can't find that vital component? Don't worry, send your news and requests for 'Can You Help' to Sharon George at the Broadstone office.

Sony Broadcast Amateur Radio Training Group

The Sony Broadcast Amateur Radio Training Group was formed to help people become radio amateurs.

In January 1991, 18 people enrolled full of enthusiasm. Some, for various reasons, fell by the wayside, others because of home or work commitments, attended on an occasional basis, doing most of their study at a distance. One young man was unable to get to Basingstoke at all because he lived in Southampton, so he did a sort of correspondence course.

The aim was to set up a flexible form of training which could be used according to people's needs, and this has been one of its greatest successes. Its other great success, has the been the provision of a forum for radio amateurs in the area in the public lecture programme which is run by the Sony Broadcast Amateur Radio Club (although differently named, the two organisations are the same).

As a training group, some would say they ought to measure their success in terms of exam results. If that is so, they have done very well with some 22 new callsigns taking to the air as a result of their studies there over the last 18 months or so.

To mark the second anniversary of the acceptance of the Training Group as part of the Company's community programme, a photograph of as many members of the training group as could make it was taken in the entrance foyer at Sony's European HQ on August 24. The line-up is as follows:

Back row (standing) left to right Ian Clewley G7KAK, Robin Lince G7MWV, Chris Cory G3MEV (instructor), Albert Kleyn G0SIT, Mark Aylett, Wayne Davies, Chris Hurst G7MER, Gavin Walker G7LBK, Andrew Dressler G7MEP.

Front row (sitting) left to right Wendy Harding G7LJR with husband Andrew Harding G1JHM (instructor), Ken Barratt Chairman of Sony Broadcast and Communications, Stephen Harding G4JGS (founder of the group), Ken Aldus.

Where the group goes in the future is a big question mark. It exists to help people get into the hobby of amateur radio, and so long as there is a need, will respond as best it can. Even if they cannot help with training, anybody can take the exam in their registered centre, for which no charge is made other than the City & Guilds examination entry fees. People who would like to use the Training Group should write in, giving a daytime telephone number and a brief statement of their needs.

All lectures take place at the Sony Sports & Social Club in Priestley Road, Basingstoke starting at 7.30pm for 8pm. On March 22, they have a lecture on Digital Audio Recording - DAT, CB, Compact Cassette or Minidisk? Speaker Richard Schiller. Further details on **(0256) 483454 between 12.30 and 1.30pm or 5pm and 5.30pm.**

The 7th Annual 144MHz SSB National Contest Rules

The 7th Annual 144MHz SSB National Contest, run by the Derby & District Amateur Radio Society, will take place on Sunday 21 March 1993, starting 1300GMT and finishing at 1700GMT. The mode will be s.s.b. (J3E) and the bandplan must be observed. Fixed and portable entries are permitted. Contestants will exchange callsign, RS, incremental serial number starting at 001, and administrative county (Scottish contestants will send region). Metropolitan areas, eg. Greater London are still considered counties. Contact with G3ERD and G8DBY scores 10 points for each callsign. All other contacts score two points. The final score is the total number of contact points multiplied by the number of counties worked. Each country outside the UK is scored as a county.

Logs must show time in GMT, callsign of station worked, RS and serial number sent, RS and serial number received, county received.

RSGB log sheets are preferred, but any neat alternative is acceptable. Please head each sheet with the callsign of the entering station, the county in which the station was located and whether a single or multi-operator.

No logs are to be submitted on computer disks. Completed entries should be sent to the following address, to arrive by 30 April 1993:

Derby And District Amateur Radio Society
119 Green Lane
Derby DE1 1RZ.

Check lists of stations and counties worked would be appreciated.

There will be two sections for awards, each of two categories. Full legal power limit, single operator and multi-operator. Low power - 30W maximum output, single operator and multi-operator.

The winner and runner-up in each section and category will receive a certificate. For a set of results, please send a s.s.a.e. to the above address quoting the entering station callsign, and a set shall be sent direct.

Further details from **Dave G1VAB, c/o above address.**

Club News

Please send in all of your 'Club News' items to Sharon George at the new editorial offices in Broadstone.

Antrim

Carrickfergus AG. Tuesdays, 7pm. Downshire Community School, Downshire Road, Carrickfergus. April 6 - Computer Speech by GI4IRW. **Gavin on (0232) 835650.**

Avon

North Bristol ARC. Fridays, 7pm. Self Help Enterprise, 7 Braemar Crescent, Northville, Bristol. RAE & Morse tuition available for members. March 12 - Scanning Receivers by John G6BGY, 19th - Table Sale, 26th - Video - Silicon Glen G0RFB & G0MEM, April 2 - committee meeting. **Tony G4ROX on (0272) 513573.**

Bedfordshire

Shefford & DARS. Thursdays, 8pm. Church Hall, Ampthill Road, Shefford, Bedfordshire. March 11 - Recovery Of The Olympus Satellite, 25th - Junk Sale, April 8 - a talk by Nick G4TXG. **Paul G1GSN on (0462) 700618.**

Berkshire

Newbury & DARS. Wednesdays, 7.30pm. Bucklebury Memorial Hall. March 24 - Operating From Afar. **(0635) 46241.**

Reading & DARC. 2nd & 4th Thursdays, 8pm. The Woodley Pavilion, Woodford Park, Haddon Drive, Woodley, Reading. March 11 - Club Quiz vs Maidenhead Club, 20th - assist with 3 Towers hike, 25th - Spring Junk Sale, April 8 - WWII Radio Equipment (part 2) by Russel Rixon G8ORE. **Nick Challacombe G0LGG on (0734) 722489.**

Buckinghamshire

Aylesbury Vale RS. 1st & 3rd Wednesdays, 8pm. Village Hall at Hardwick. March 17 - AGM, April 7 - Cellular Telephones by R. Biltcliffe G2BSJ. **Martyn G4XZJ on (0296) 81097.**

Cheshire

Mid-Cheshire ARS. Cotebrook Village Hall, Cotebrook, nr. Northwich, Cheshire. March 24 - Presentation on Packet Radio & the Clive database by Colin Chadburn, 31st - talk by the International Short Wave League, April 7 - Theatre in POW Camp by Len Moss. **Mike Baguley G7LQD on (0606) 331210.**

Stockport RS. 2nd & 4th Wednesdays, 7.45pm. Room 14, Dialstone Centre, Lisburne Lane, Offerton, Stockport, Cheshire. March 24 - Surplus Equipment Sale. **Jim France G3KAF on 061-439 4952.**

Widnes & Runcorn ARC. March 16 - Surplus Equipment Sale, 30th - Map Reading. **Dave Wilson G70BW on (0270) 761608.**

Clwyd

Rhyl & DARC. 1st & 3rd Mondays, 8pm. WRVS Centre, 116 Vale Road, Rhyl. March 15 - Demo of Slow-Scan TV by GW0DSJ. **Ken Padley GW7IAR on (0745) 338276.**

Wrexham ARS. Maesgwyn Community Centre, Maesgwyn Road, Wrexham. March 16 - AGM, April 6 - Test Equipment talk. **Ian Wright GW1MVL on (0978) 845858.**

Cornwall

Cornish RAC. Village Hall, Perranwell Station, Perranwell, nr. Truro, 7.30pm. March 15 - computer section, April 1 - AGM, 6th - activities night. **Geoff Bate on (0209) 820836.**

Derbyshire

Buxton Radio Amateurs. Lee Wood Hotel, Buxton, 8pm. March 9 - Fox Hunts explained. **Derek Carson G4IHO on (0298) 25506.**

Derby & DARS. Wednesdays, 7.30pm. 119 Green Lane, Derby. March 24 - AGM. **Richard Buckby G3VGW on (0773) 852475.**

Devon

Appledore & DARC (Devon). 3rd Mondays, 7.30pm. Appledore Football Clubroom. March 15 - AGM followed by Video - Expedition to Herald Island, April 6 - Construction techniques class. **Reg Lyddon G4ETJ QTHR on (0237) 477301.**

Torbay ARS. Fridays, 7.30pm. ECC Social Club, Highweek, Newton Abbot. March 19 - Talk & film by the RNLI. **Andy Stafford G4VPM on (0803) 329055.**

Dorset

Dorset Police ARS. The Dorset Police ARS will now be holding regular monthly meetings, at force HQ on the first Thursday of every month, at 7.30pm. Membership is open to Police Officers, serving and retired, Civilian employees, Special Constables and their immediate family. Further info from **PC 915 Richard Newton at Ferndown Police Station on (0202) 229351.**

South Dorset RS. 1st Tuesdays, 7.30pm. Wessex Lounge of Weymouth Football Club. April 6 - AGM & presentation of trophies. **Mike Lenzi G7HNY on (0305) 773860.**

East Sussex

Hastings Electronics & RC. 3rd Wednesdays, 7.45pm. West Hill Community Centre, Croft Road, West Hill, Hastings. March 17 - AGM. **G3YYF on (0424) 830454.**

East Yorkshire

North Ferriby United ARS. Fridays, 8pm. North Ferriby Utd. FC Social Club, Church Road, North Ferriby, East Yorkshire. March 12 - Packet Update by Chris G6KIA, 19th - night on the air, 26th - Latest equipment by Peter, Rodmell Electronics, April 2 - night on the air. **Frank Lee G3YCC on (0482) 650410.**

Essex

Braintree & DARS. 1st & 3rd Mondays, 8pm. Community Centre, Victoria Street, Braintree. March 15 - Members Memories. **M. J. Andrews on (0376) 327431.**

Greater London

Acton, Brentford & Chiswick ARC. 3rd Tuesdays, 7.30pm. Chiswick Town Hall, Heathfield Terrace, London W4. March 16 - Low Power Field Day. **Colm Mulvany G0JRY on 081-749 9972.**

Clifton ARS. 'Earl of Derby' Public House, Dennetts Road, New Cross, London SE14. March 19 - Lecher Lines by G0PPO, 26th - Quiz evening, April 2 - Packet evening. **Keith Lewis on 081-859 7630.**

Edgware & DRS. Watling Community Centre, 145 Orange Hill Road, Burnt Oak, 8pm. March 11 - Bring & Show evening, 13th & 14th - Commonwealth Contest, 25th - Morse training evening. **Howard Drury G4HMD on (0923) 822776.**

Loughton & DARS. Room 12 of Loughton Hall, 7.45pm. March 19 - Direction Finding On 144MHz by Ray Pedley G0LWF, April 2 - AGM. **Ray Pedley G0LWF on 081-500 2811.**

Southgate ARC. Winchmore Hill Cricket Club Pavilion, Firs Lane, Winchmore Hill, London N21. March 11 - Rig Check evening by Donald G4DFB, 13th & 14th - London Amateur Radio & Computer Show, Picketts Lock, 25th - Visit to Kings College, London for lecture on Cartography, April 8th - Grand Surplus Equipment Sale. **Brian Shelton G0MEE on 081-360 2453.**

Greater Manchester

Rochdale & DARS. Mondays. T. S. *Frobisher,* Greenbank Road, Rochdale. March 22 - talk on Power Supplies by G4KLT. **Brian on 061-653 8316 or Dave (0706) 32502.**

Gwynedd

Dragon ARC. 1st & 3rd Mondays, 7.30pm. Four Crosses Hotel, Menai Bridge. March 15 - an evening of amateur radio videos, April 5 - Using Camcorder by Trefor GW0PZS & Dewi GW0ABL. **Tony Rees GW0FMQ on (0248) 600963.**

Hampshire

Basingstoke ARC. 1st Mondays, 7.30pm. Forest Ring Community Centre, Sycamore Way, Winklebury, Basingstoke. March 28 - 144MHz direction finding competition OS185 - Fox Dave G3ZOI. **(0256) 25517.**

Itchen Valley RC. 2nd & 4th Fridays, 7.30pm. Scout Hut, Brickfield Lane, Chandlers Ford. March 12 - AGM, 26th - Annual Surplus Equipment Sale. **Maurice Cheeseman G1IPQ on (0703) 736784.**

Winchester ARC. 3rd Fridays, 7.30pm. Red Cross Centre, Durngate House. **Peter Simpkins G3MCL on (0962) 865814.**

Hereford & Worcester

Bromsgrove ARS. 2nd & 4th Tuesdays, 8pm. Lickey End Social Club, Alcester Road, Burcot, Bromsgrove. March 23 - Noise Bridge (construction). **Mr D. Edwards G4ZWR on (0527) 546075.**

Bromsgrove & DARC. Fridays. Avoncroft Arts Centre, South Bromsgrove, Worcester. March 12 - AGM (at Art Centre). **Joe Poole G3MRC on (0562) 710010.**

Hertfordshire

Cheshunt & DARC. Wednesdays, 8pm. Church Room, Church Lane, Wormley, nr. Cheshunt, Herts. March 17 - natter night, 24th - Chairman's lecture, 31st - natter night. **Roger Frisby G4OAA on (0992) 464795.**

Dacorum AR & TS. 1st (informal) & 3rd (formal) Tuesdays, 8pm. The Heath Park, Cotterells, Hemel Hempstead. March 16 - Junk Sale & blue smoke evening. **Dennis Boast G1AKX on (0442) 259620.**

Hoddesdon RC. Alternate Thursdays, 8pm. Conservative Club, Rye Road, Hoddesdon, Herts. March 18 - Operating In Sri Lanka by Doug G0LUH, April 1 - Hints & Tips with Don G3JNJ. **Roy G4UNL on 081-804 5643.**

Humberside

Bridlington & DARS. Alternate Thursdays, 7.30pm. Combined Cadet Building at Bridlington Upper School, Bridlington. March 18 - The Bombing of Bridlington by Mr J. Langton, April 1 - Emergency Services by Mike Norrie. **Norman Bedford G4NJP on (0262) 673635.**

Kent

Bredhurst T&RS. Thursdays, 8.15pm. Parkwood Community Association, Parkwood Green, Rainham, Kent. **Martin Pearson G7JBO on (0634) 365980.**

Bromley & DARS. 3rd Tuesdays, 7.30pm. The Victory Social Club, Kechill Gardens, Hayes, Kent. March 16 - WAB Award Scheme. **Alan Messenger G7GBH on 081-777 0420**

Lancashire

Hesketh ARC. Every other Tuesday. Birkdale, Southport. March 16 - QRP on the air. **Bernie G7DEM on (0704) 63344.**

Leicestershire

Charnwood ARCC. 1st & 3rd Sundays. The Albion, Loughborough. March 21 - VHF Contest, 27th - HF Contest, 28th - HF Contest, April 4 - 80m QRP night on the air. **Phil on (0509) 232927.**

Lincolnshire

Grantham RC. 1st & 3rd Tuesdays, 8pm. Kontak Sports & Social Club, Barrowby Road, Grantham. April 6 - Visit to the County Emergency Centre, Lincoln.

John Kirton G8WWJ on (0476) 65743.

Spalding & DARS. Fridays, 8pm. The Riverside Centre, The Old Fire Station, Double Street, Spalding, Lincolnshire. March 12 - Hospital Radio G6ADG (provisional). **David Johnson on (0778) 425367 (6-7pm).**

Merseyside

Liverpool & DARS. Tuesdays, 8pm. Churchill Club, Church Road, Wavertree, Liverpool. March 2 - Quiz, 9th - Activity night, 10th - Norbreck Rally preparations, 23rd - home-brew test gear G4GEB, 30th - Surplus Sale, April 6 - contest preparation. **Ian Mant G4WWX on 051-722 1178.**

Middlesex

Echelford ARS. Community Hall, St. Martin's Court, Kinston Crescent, Ashford, Middlesex, 7.30pm. March 11 - Radio With Computers by P. Borrett G3XTC & J. Todd G4XLM, 25th - Transmitting Aerial Basics by Gerald Stancey G3MCK, April 8 - AGM. **P. Townshend G6PMT on (0344) 843472.**

Norfolk

Dereham ARC. 2nd Thursdays, 8pm. St. Johns Ambulance Hall, Yaxham Road, Dereham. March 11 - Strange Noise On HF Explained, April 8 - SWL by G4LPW. **Mark Taylor G0LGJ on (0362) 691099.**

Norfolk ARC. Wednesdays, 7.30pm. The Norfolk Dumpling, The Livestock Market, Harford, Norwich. March 14 - Club trip to London Amateur Radio Show, 17th - Weather Charts by Jim G3YLA, 24th - Practical Oscilloscope (part 2) RF by Mike G4EOL, 28th - Surplus Equipment Auctions/Bring & Buy, 31st - Informal & committee meeting, April 7 - AGM. **Jack Simpson G3NJQ on (0603) 747992.**

Northants

Kettering ARS. Tuesdays, 7.30pm. Electricity Sports & Social Club, Eksdale Street, Kettering. March 23 - Kettering In WWII by Mr A. Buksh, April 6 - Repeaters details to be finalised. **Len G0RDV (but QTHR as G7EHM) on (0536) 514544.**

Nottinghamshire

Mansfield ARS. Polish Catholic Club, off Windmill Lane, Woodhouse Road, Mansfield. April 1 - Junk Sale. **Mary G0NZA on (0623) 755288.**

Nottingham ARC. Thursdays, 7.30pm. Sherwood Community Centre, Mansfield Road, Nottingham. March 11 - Around The World In 43 Days by G4MHB, 18th - construction exhibition/competition, 25th - Top Band/MW propagation by Richard G3VGW, April 1 - Construction/activity/on the air, 8th - AGM. **Ian Miller G4JAE on (0602) 232604.**

South Notts ARC. Highbank Community Centre, Farnborough Road, Clifton Estate, Nottingham, or Fairham Community College, Farnborough Road, Clifton Estate. March 12 - construction (Fairham College), 19th - Talk-in (S22)/VHF Linear & PSU Design by Martin G6ABU, 26th - on air. **Ray G7ENK on (0602) 841940.**

Scotland

Aberdeen ARS. Fridays, 7.30pm. 35 Thistle Lane, Aberdeen. March 12 - PC Public Domain Software Giveaway by Graham GM8FFX, 19th - Concrete In Amateur Radio by Brendan GM0CQV, 26th - Bettle Drive & Family Evening, April 2 - Junk Sale. **John GM1TDU on (0224) 706619.**

Dundee ARC. Tuesdays, 7pm. College of Further Education, Graham Street, Dundee. March 16 - construction night, 23rd - Morse Testing Service by Wallace Shakleton GM0GNT. **George Millar GM4FSB, 30 Albert Crescent, Newport-on-Tay, Fife DD6 8DT.**

Stirling ARS. Thursdays, 7.30pm. Premises near Throsk, Stirling. March 25 - Electronics In Medicine by Hugh Martin GM4UYE. **Brian Mulleady GM0KWL on (0324) 36235.**

Wigtownshire ARC. Thursdays, RAE & Morse, chats, etc. Community Education Office, Stranraer Academy, 7.30pm to 10pm. **Ellis Gaston GM0HPK on (0776) 7215 evenings or (0294) 217979 day.**

Somerset

Yeovil ARC. Thursdays. Red Cross HQ, Grove Avenue, Yeovil, Somerset. March 11 - Talk by BBC engineer on Rampisham Transmitting Station, 18th - Club project any problems & future plans by G4GVM, 25th - constructors contest entry, April 1 - Quiz, 8th - Adjudication of constructors contest. **Cedric White G4JBL on (0258) 73845.**

South Glamorgan

Barry ARS. Alternate Thursdays. Old College Inn. **Ann MacKay GW0SQT, QTHR.**

South Yorkshire

Barnsley & DARC. Mondays. Radio club room & shack, at the rear of the Darton Hotel, Station Road, Darton, Barnsley. March 15 - Junk Sale, 22nd - AGM. **Ernie G4LUE on (0226) 716339.**

Devonshire Arms ARC. Mondays. Devonshire Arms Public House, Herries Road, Sheffield. **David G0JJR on (0742) 446282.**

Suffolk

Felixstowe & DARS. March 13 - Minibus visit to Picketts Lock Rally (8.30am) pickup at OPS, 29th - AGM. **Paul Whiting G4YQC on (0394) 273507.**

Sudbury & DARC. 1st Tuesdays, 8pm. Five Bells Inn, Great Cornard, Sudbury, Suffolk. March 13/14 - London ARC Show, April 6 - Mike Marsh G4GGC compares the date modes of Packet & Amtor.**Colin Muddimer G0PAO on (0787) 77004.**

Surrey

Surrey RCC. 'Terra Nova', The Waldrons, Waddon, Croyden, Surrey. March 15 - natter night, April 5 - AGM. **Berni G8TB on 081-660 7517.**

Sutton & Cheam RS. 3rd Thursdays, 7.30pm. Sutton United Football Club, The Borough Sports Ground, Gander Green Lane, Sutton, Surrey. Natter nights - 1st Thursdays. March 18 - Cable Television by Ralph McDermott of United Artists. **John Puttock G0BWV, 53 Alexandra Avenue, Sutton SM1 2PA.**

The Kingston & DARS. 3rd Wednesdays, 8pm. Alfriston, 3 Berrylands Road, Surrey KT5 8RB. March 17 - I followed Rommel by Joan Nichols. **Ray Fuller on 081-398 1128.**

Wimbledon & DARS. 2nd & last Fridays. St. Andrews Church Hall, Herbert Road, Wimbledon SW19. March 26 - Secret Listeners by Brian Cannon G8DIU. **Chris Frost G0KEB on 081-397 0427.**

Warwickshire

Stratford-Upon-Avon & DRS. 2nd & 4th Mondays, 7.30pm. Home Guard Club, Main Road, Tiddington, Stratford-Upon-Avon, Warwickshire. March 22 - Surplus Sale. **Alan Beasley G0CXJ on (0608) 82495.**

West Midlands

Barr Beacon RC. 1st Mondays & 3rd Wednesdays, 7.30pm. 112 Walsall Road, Aldridge, West Midlands. **C. J. Baker G0NOL on (0922) 36162.**

Solihull ARS. 3rd Thursdays. The Shirley Centre, 274 Stratford Road, Shirley, Solihull, West Midlands. March 18 - EMC & The Motor Vehicle by Ivor Mantell G4NRY. **Colin Taylor G3USA on 021-777 9965 evenings or (0827) 53344 daytime.**

West Yorkshire

Denby Dale & DARS. Pie Hall, Denby Dale, nr. Huddersfield, 8pm. March 17 - Wavemeters & GDOs by Gerald G3SDY, April 7 - Surplus Sale. **Ivan Lee, Clayton Lodge, Sunnyside, Edgerton, Huddersfield HD3 3AD.**

Halifax & DARS. 1st & 3rd Tuesdays, 7.30pm. March 16 - Pete Sheppard G4EJP - RSGB. **David Moss G0DLM on (0422) 202306.**

Keighley ARS. The Ingrow Cricket Club, Ingrow, Keighley, 8pm March 11 - The Sky, The Beauty & The Wonder by Mr Dougherty, 18th - natter night, 25th - Transatlantic on 144MHz by G3OTE, April 1 - natter night, 8th - Junk Sale. **Kathy Conlon G0RLO on (0274) 496222.**

Wakefield & DRS. Tuesdays, 8pm. First Floor Rooms, Ossett Community Centre, Prospect Road, Ossett. March 16 - QRP & Home-brew by Rev George Dobbs G3RJV, 23rd - construction evening, 30th - on the air night, April 6 - The G3TDZ Phasing Transceiver by John Hey G3TDZ. **Dave Ackrill G0DJA on (0924) 240577.**

Wiltshire

Trowbridge & DARC. 1st & 3rd Wednesdays, 8pm. Southwick Village Hall, 8pm. March 17 - natter night, April 7 - CW Operating Practice & Procedures by G3BPE. **Ian G0GRI on (0225) 864698.**

Radio Diary

* Practical Wireless & Short Wave Magazine in attendance.

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

***March 13/14:** The London Amateur Radio & Computer Show will be held at Picketts Lock Centre, Picketts Lock Lane, Edmonton, London N9. Large trade presence, free parking, lectures, disabled facilities, Bring & Buy, special interest group section. Talk-in on 144 & 430MHz. (0923) 678770.

March 13: Lagan Valley ARS will be holding their Annual Hamfest In the Nurse's Recreation Hall, Lagan Valley Hospital, Lisburn. Trade stalls, Bring & Buy, refreshments, QSL bureau, club stand. **GI0GDF, QTHR.**

March 21: Tiverton South West Radio Club Mid-Devon Rally will be held at the Pannier Market, Tiverton. Easy access, only minutes from junction 27 on the M5. Two halls of trade stands, free parking, Bring & Buy, snack bar. Club room bar open throughout day. Doors open 10am, talk-in S22. **G4TSW, PO Box 3, Tiverton, Devon.**

March 28: Bournemouth Radio Society's 6th Annual Sale will be held at Kinson Community Centre, Pelhams Park, Millhams Road, Kinson, Bournemouth. Doors open 11am to 5pm. Talk-in from G1BRS on 144MHz S22. Amateur radio & computer traders, clubs & specialised groups. Refreshments. Admission £1, including free raffle ticket. **Ian G2BDV on (0202) 886887.**

March 28: Pontefract & DARS will be holding their 13th Annual Components Fair & Springtime Rally at the Carleton Community Centre, Carleton, nr. Pontefract. Admission by prize programme, three prizes plus free prize draw for lady visitors. Traders, Bring & Buy, bookstall, licensed bar, hot & cold snacks. Free car parking. Talk-in S22. Car boot spaces will be available. **Colin Wilkinson G0NQE on (0977) 677006.**

April 18: Marske-by-the-Sea Radio Rally will be held in the Marske Leisure Centre, High Street, Marske-by-the-Sea, near Saltburn. Doors open 11am. Usual traders, Bring & Buy & refreshments. Talk-in S22. **Mic G7IDN on (0287) 610030.**

April 18: Cambridgeshire Repeater Group have their Amateur Radio Rally at Philips Telecom PMR - Catering Centre, St. Andrews Road, Chesterton, Cambridge. Trade stands, Bring & Buy, Auction, hot food & drinks. Doors open 10.30am. **Mike G6COQ on (0223) 358985 Ext. 3310.**

April 26: The Bury (Lancashire) RS will be holding another Hamfeast/Rally at the Leisure Centre, Bolton Street, Bury. **Laurence G4KLT on 061-762 9308.**

May 3: Dartmoor Radio Club Rally will be held at Yelverton War Memorial Village Hall, Meavy Lane, Yelverton, Devon. Doors open 10.30am. Talk-in S22. **Ron G7LLG on (0822) 852586.**

May 9: The 9th Yeovil QRP Convention will be held at the Preston Centre, Monks Dale, Yeovil, Somerset. Featuring lectures, displays of home-made QRP equipment & vintage radio, on-air QRP stations & trade stands. Refreshments, doors open 9am, admission £1.50, talk-in S22. This convention is not a rally, but a convention for amateurs not only to attend interesting lectures about the technology & practice of low power communication, but also to meet other QRPers. There will also be the usual friendly QRP Contest on 3.5 & 7MHz, during the evenings of the previous week. This event is known as the QRP 'Funrun'. **Peter Burridge G3CQR on (0935) 813054.**

May 16: The 2nd National Vintage Communications Fair will be held at the NEC, Birmingham. Doors open 10.30am to 5pm. Hundreds of items for sale, including vintage radios, telephones, gramophones, jukeboxes, radiograms, etc. Admission will be £3. **Jonathan Hill on (0398) 331532.**

May 16: The Parkanaur Rally will be held at the Silverwood Hotel, Lurgan, Co. Armagh. Doors open 12 noon. Admission £1. Plenty of parking. Usual traders. Refreshments available. Talk-in S22. All proceeds of this rally will go to the Stanley Eakins Memorial Fund, a very worthy charity. **W. A. Hutchman, 35 Carlingford Park, Newry, Co. Down, N. Ireland BT34 2NY.**

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Kenwood TS450/690S – Two superb H.F Transceivers capable of delivering the "punch" when necessary. 100W O/P, optional Auto A.T.U. plus general coverage receive...**TS450 – £1149 690S – £1399**

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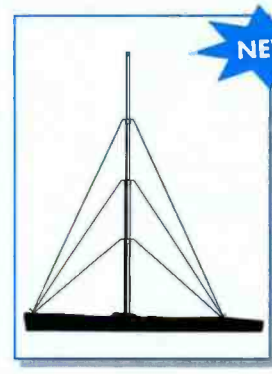

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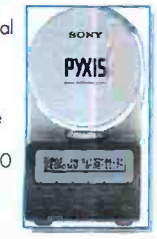

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KT-44 – 70 cms handheld. Thumb wheel frequency control. Full 10MHz! Ideal novice or repeater user. c/w NiCad, beltclip & charger **£159.00**

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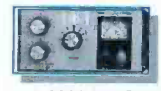

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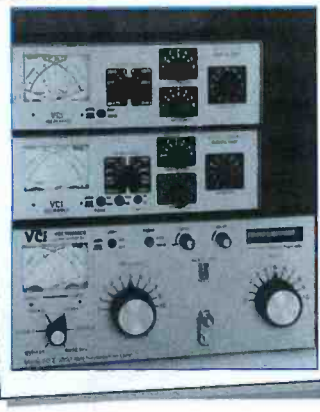
Call us now – even if we haven't listed your radio, for what we know to be unbeatable P/X deals.



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Propagation Logging
It's Easier Than You Think

Tony Hopwood has been running a propagation logging station for several years. Here he describes a very simple station which can be used to increase your knowledge of h.f. propagation.

Everyone knows that long range h.f. radio reception is influenced by daylight, the sunspot cycle and the time of year. My research to determine the relationship between the earth's electric field and solar emission using electrometers, published in *PW* November 1988, has shown that the ionosphere is a sensitive indicator of sunspot and solar flare emissions.

The question, still unanswered, was how sensitive are h.f. radio signals to ionospheric changes caused by the arrival of charged particles from an active sun? I needed some way of recording what was happening, and that meant a recorder of some sort.

Propagation Logger

I made a propagation logger to record short wave radio signal reception over long periods. This signal was correlated with those of other instruments designed to give an early warning of magnetic storms and possible aurora.

The specification was for a propagation logger to detect and record average broadcast signal levels between 15-85MHz. One solution was to automate receiver tuning and make it cycle between those limits. The signal spectrum was then integrated by recording each cycle on a chart recorder.

The more I considered this idea, the less I liked it! The main problem, is coverage and waveband switching.

A better alternative, seemed to be an broadband r.f. amplifier, fed from a broadband antenna. My final layout is shown in **Fig. 1**.

The first stage, using an SL560C i.c., is shown in **Fig. 2**. This stage amplifies the broadband r.f. signal.

The signal is then fed to a second double stage amplifier and detector. This stage is shown in **Fig. 3**.

Simple Plan

The approach I adopted turned out to be a very simple plan. The SL560C can be configured to give a fairly level response from 15 to over 200MHz. So I used this version as an untuned first stage, running off a 5V supply.

The first stage was fitted in a weather-proof box, mounted on the mast of a 'fishbone' antenna. The antenna was originally built for a solar radio telescope, and designed for use on 210MHz.

The output from the first stage 'pre-amplifier' is then fed to a second double SL560 stage. This is fitted with a 15pF variable capacitor across the input, to limit the effects of the Band II f.m. broadcast band. The amplified r.f. signal is then detected by a Schottky signal diode, to provide a d.c. level output.

Amplified Audio

The d.c. output level from the logger is amplified by a 741 amplifier. This provides a signal gain of 100 to give a respectable audio signal level.

I've used an elderly pen recorder as a recording medium. The system only uses one roll of paper and a 'fill' of ink a month, but a fairly high level of signal power is needed to drive the chart recorder.

Rather than use a power amplifier i.c. stage to drive the recorder, I use an old 'Hi-Fi' audio amplifier to do the job. One output of this amplifier is fed to a loudspeaker for monitoring purposes.

The other output is fed to a power bridge rectifier, and then to the recorder. The signal, at first quite lively, was smoothed with a 250 000µF capacitor.

Fishbone Antenna

The 'fishbone' antenna design was taken from *Radio Engineering*. As I've already mentioned, it was originally designed for use on 210MHz.

The fishbone has a very broad response, in fact so

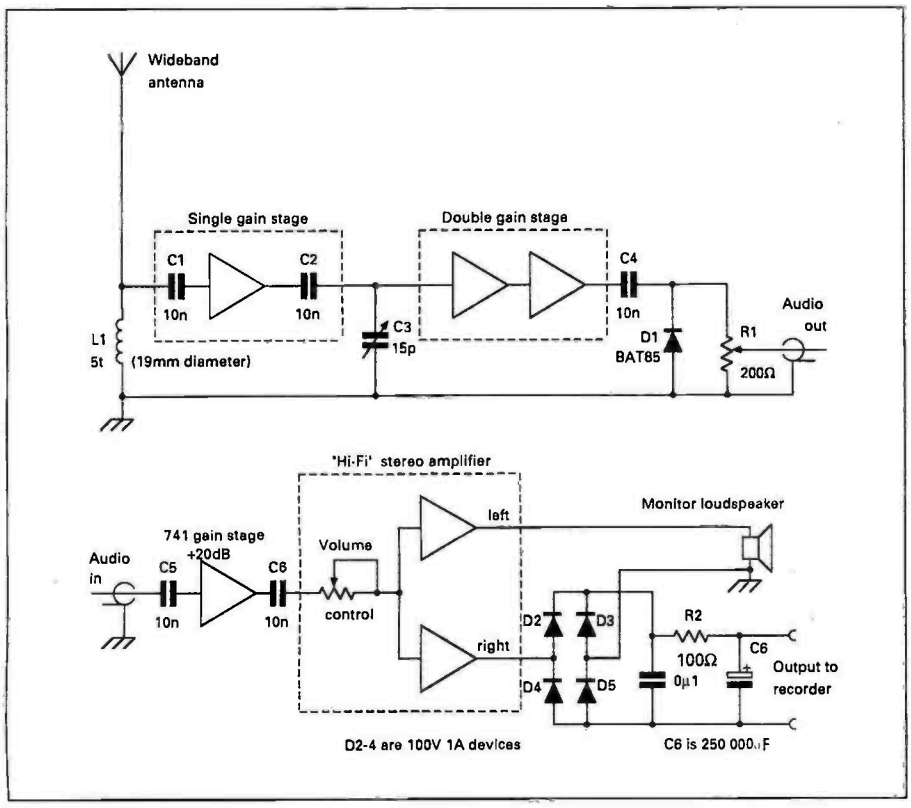

Fig. 1: The block diagram of the propagation logger. The gain stages are shown in Figs. 2 and 3.

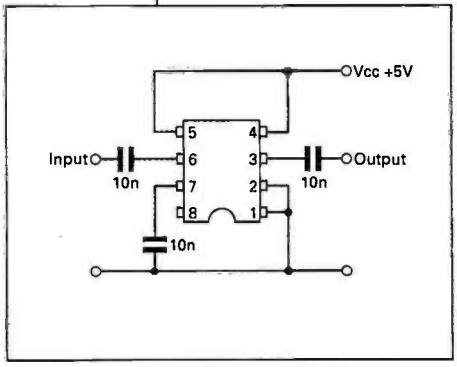

Fig. 2: The masthead pre-amplifier stage, which uses a single SL560C i.c.

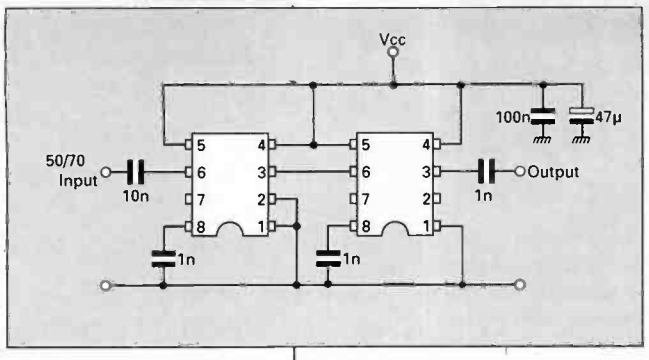

Fig. 3: Two coupled stages, as shown in the diagram, provide enough amplification before the detector stage.

broad that it responded to signals from 210MHz downwards. Many other antennas are featured in this book, which is written by F. E. Terman, with the maths involved reduced to a minimum.

Reception tests proved the fishbone antenna to be a good choice, although a wire antenna would work just as well.

I made the antenna and its tripod from two defunct aluminium garden clothes dryers from the local tip!

The drying cords used to pass through holes with *pvc* ferrules. The ferrules are on the right pitch, and they make excellent insulators for the tuned aluminium collector rods.

The rods are first cut to size. Then they are threaded with 2BA and screwed into place through the ferrules.

A carbon terminating resistor is fixed across the forward end, and 'potted' in epoxy resin to protect it from the weather. A high pass coil, L1 in **Fig. 1**, is then wired across the antenna end of the feed to the head amplifier. Coaxial cable is then used to connect to the masthead pre-amplifier.

System Response

When it was finished, I was able to tweak the system response so it covered the aircraft and 144MHz bands. But it was more by luck than design, that the system was insensitive to 85-110MHz!

The lower frequency limit of the system, seemed to be around 15MHz, which turned out to be a good compromise. A 210MHz fishbone antenna should have little response at this low frequency, so it's likely that the unbalanced feed I used, contributed to the additional h.f. pick up.

I wanted to make the most of the directional v.h.f. properties of the antenna and detect possible auroral 'lift'. So, to do this, I inclined the antenna to 45°, and pointed it to the NE to cut out local taxi p.m.r. services in Worcester and Malvern, not far from where I live.

Cacophony Instructive

When the system was on, monitoring the cacophony from the speaker also proved to be instructive! Individual stations came and went, with idents showing that the logger was picking up signals between 15MHz and the 144MHz band.

Occasionally, DX TV video field signals from the v.h.f. Band I could also be heard. At night, when the background falls to a low level, amateurs, CB operators and aircraft using Heathrow and Luton airports (about 160km away) can also be heard.

With the system up and running, it soon became clear that the logger was producing a daily propagation curve which clearly showed the changes familiar to DXers. Data from the magnetometer and earth current recorder already show if conditions are magnetically quiet.

So, my system really helps. Now it's easy to compare the propagation profile of a 'quiet' day with the effects of a magnetic storm.

Level Rises

On a 'quiet' winter day, the signal level rises from a low night-time level at sunrise, and peaks on a level 'plateau' around 1300hrs. This continues until sunset, when it falls back rapidly to the night-time low level.

My observations and comparisons with other magnetic storms have proved interesting. They've confirmed that an aurora above the visible horizon, is signalled by a signal lift to above daytime propagation levels. This is coincident with earth current transients, and magnetometer deviation.

The logger can show when conditions are favourable by indicating a signal level above the normal daytime peak. It will also provide an audio clue as the characteristic 'round the world echo' becomes audible on some stations.

On 'quiet' nights, after the h.f. signal background drops, v.h.f. signals reflected from meteor trails also show up. So, all things considered, the propagation logger is a valuable indicator of potential DX conditions, as well as providing a practical aurora and meteor scatter early warning system.

System Refinements

Since the original system was put into service in 1987, certain refinements have been added. The refinements include a mechanical integrator, which provides a propagation count on every 24 hours for record purposes.

Organisations like the British Astronomical Association and Ron Ham's 'Propagation' column in *Short Wave Magazine* receive these reports.

The recordings are now integrated with a continuous multi-channel logger. This shows earth currents, electric field, low energy particle count and solar ultraviolet.

A composite recording is shown in **Fig. 4**. Such recordings provide an unrivalled insight into the balancing act the ionosphere carries out daily, to give a long range h.f. mirror for radio signals.

The trace shown in **Fig. 4**, was made on Wednesday February 17. It shows, from top to bottom, the time, earth currents, particle count, propagation, electric field stress, sunlight and ultraviolet traces.

Dellinger Fade

Interestingly, there's an almost complete Dellinger fade at about 1040hrs shown on the trace. This propagation fade, was due to an X-ray flare, which is shown as a drop on the particle count at the same time.

Later that day on the chart, there is a large magnetic disturbance. This is at a maximum at about 1600hrs, before dropping away to more normal low level by late evening.

It's also very noticeable, that around 1700hrs, the propagation conditions change to evening conditions. The vast wall of h.f. noise disappears, and by 1930hrs it's almost immeasurable.

The sunlight trace on the chart is useful. It's used to check that the ultraviolet detector is recording uv and not just bright white light.

You don't need all these different traces. I think you'll find that the propagation logger itself is a very useful item to have. So, don't just sit there! Get building and catch the DX when it arrives, not when your friends tell you about it!

PW

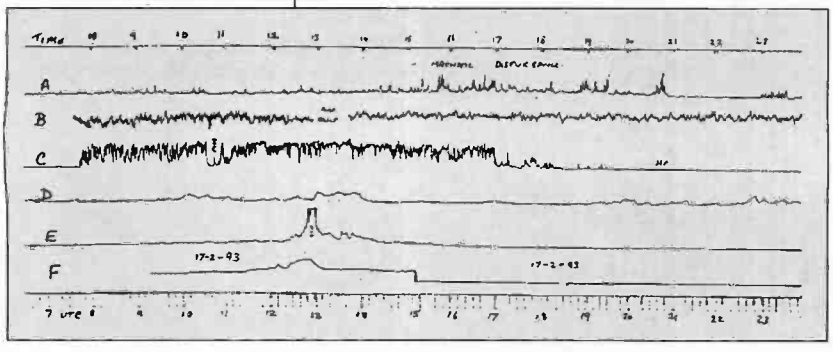

Fig. 4: The trace made on Wednesday February 17. Earth currents at A, particle count at B, propagation at C, the electric field (static) at D. Sunlight and ultraviolet are at E and F respectively.

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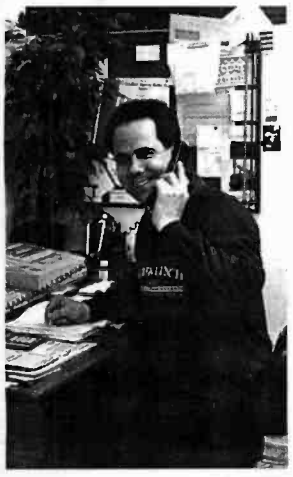

No prices this month, they're impossible to print for daily changes - get dialing or drop me a line, you'll get a pleasant surprise, may even get the chance of talking to the lovely **VALERIE G4WIS**, or even get lumbered with me or **CHRIS G1FMH** (YES, TRUCK KING CHRIS). Which ever way, you'll welcome the personal chat, no high pressure sales and as much free info as you want.

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My congratulations go out to two 'old timers', both called **'HARRY'**, one living in **BRISTOL**, the other near **READING**. Thanks chaps, for supporting me once again. Harry B. buying himself a Yaesu FT-890 and Harry C. going the whole hog and and forking out for a new KENWOOD TS-950SDX. I've dealt with you both for many years and it's always a pleasure to do business with the experienced operators amongst our great hobby. **Thank you.**

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TRADE-INS TAKEN SERIOUSLY

We asked Richard Newton G0RSN to try the Yaesu FT-530 dual-band hand-held transceiver, and as keen as ever, here's what he thinks!

Review

The Yaesu FT-530
Dual-Band Hand-Held

The Yaesu FT-530 is supplied with a dual-band helical antenna (which measures 100mm in length), a 7.2V 700m/Ah NiCad battery pack, a belt clip and battery charger. Circuit diagrams, instruction book and quick reference card are also included.

Pleasing Radio

The FT-530 is a pleasing radio to look at. The case is black in colour and is polycarbonate high impact plastics at the front and die cast alloy heat sink at the rear.

The top panel of the radio has a BNC antenna connection, 13.8V external power supply/charging socket and external speaker/microphone sockets. The top panel also supports a pair of two-in-one squelch/volume controls, one for v.h.f., the other for u.h.f., and a 20 detent rotary switch used to tune the v.f.o. and memories. This also has functions when setting up CTCSS and DTMF tones.

The antenna is situated directly behind the volume squelch control for v.h.f., thus inhibiting the use of those controls. A small point, but one which will be frustrating to a user. I feel that since the FT-530 is not one of the smaller hand-helds on the market at the moment, this design difficulty could have been avoided.

Side Panel

I'll move now on to the side panel. This is the home to the power switch, which is almost flush with the case and bright orange. This design is a godsend to a scatty operator like me, who, when in deep conversation with some long distance contact, invariably hits the off switch instead of the push-to-talk (p.t.t.) switch.

The tone burst, push-to-talk and lamp switches are grouped together under a rubber membrane, although together they cannot easily be mistaken. The lamp illuminates the display well and will stay on for five seconds.

If pushed after the function key, the light will stay on continuously. The tone burst will transmit a tone without the use of the p.t.t. button.

The usual squelch defeat or monitor facility is not present on the FT-530, a departure from tradition maybe, but personally I cannot remember ever using this facility.

Good Size

The front panel has the l.c.d. display. This is a good size and the important information is easy to see. However, if a lot of the functions are being used it does become cluttered. A block of l.c.d. squares, serve as signal strength meter on receive and r.f. power indicator on transmit.

Below the display are the function and numerical keys and dual colour, (red and green) l.e.d.s to indicate transmit and busy v.h.f. and u.h.f. I would have preferred to see these l.e.d. indicators on the top panel, however I accept that this is a personal preference.

The speaker and microphone are located behind a grill below the key pad. In addition to lighting the display, the lamp also illuminates some of the keys. This has obvious advantages.

I have however one criticism. The 'band', 'call subBand' and 'reverse' keys are not under-lit nor are the secondary functions of any keys. It's a shame that such a good idea was not fully exploited.

The Manual

The FT-530 is not a radio you can pick up, turn on, and use. In fairness, the manual itself tells you this.

I am not very technically minded, (anyone who knows me will now be nodding to themselves knowingly!) I am however, reasonably competent in the use of radio equipment and understanding the jargon and instructions found in user manuals.

The instruction book that came with the FT-530 changed all that! When I eventually got to grips with it, I found the information was there.

However I found that the book was set out in a most off-putting way. Text was bunched together, paragraphs were long, terms were confusing and diagrams were scarce.

I found the book difficult to digest and frustrating. Not wishing to be unfair, I sought some more opinion. I took the FT-530 and handbook to my radio club, where colleagues of all levels of experience had a go. The verdict was unanimous, it was, to say the least, hard-going.

It's a good job there's a quick reference guide supplied with the FT-530. This is a small aid-memoir, that can be carried in even the smallest shirt pocket. All the main functions of the set are laid out pictorially and as such are very easy to use, off-setting the main manual complications.

I hope this criticism will be seen as constructive. To this end, perhaps I could suggest in the main manual the inclusion of an A-Z index, an 'Easy Get On The Air' chapter, detailing the basics of v.f.o. and memory operation and more examples throughout.

Versatile Radio

The FT-530 is an advanced and versatile radio when you get to know it. I was pleased to see it came with DTMF and CTCSS.

How many times are we expected to spend vast amounts of money purchasing this board and that chip? Not so with the FT-530.

Useful Features

The functions of this radio are far too numerous to mention all of them, however I will mention some of the more useful features I feel the FT-530 has to offer. It has programmable frequency steps and variable repeater shift. The frequency steps can be programmed for 5, 10, 12.5, 15, 20, 25, or 50kHz. It is also possible to tune in 1MHz steps, which is very useful for 430MHz.

Dual VFO

Each band has a dual v.f.o., and this is an unusual feature for a hand-held that will prove to be a very useful asset. Particularly when trying to find a free channel when working simplex, and especially when operating mobile.

Memories

There are 41 memories on each band, 38 of these will store frequency, offsets, tones and other functions. Two are used to set the limits of v.f.o. programmed scan and one is a call frequency. The call frequency can be retrieved at the touch of a button.

Modes Of Scan

There are several modes of scan offered by the FT-530. Priority scan, where memory No. 1 is monitored every five seconds. Programmed v.f.o. scan, where you can set the upper and lower limits. Memory scan, any memory can be temporarily omitted.

A total v.f.o. scan can also be achieved. When scanning, the FT-530 can be programmed to either stop at a carrier and remain until it has gone, or to stop for five seconds and then continue.

Recent Innovation

A relatively recent innovation, has been the introduction of certain hand-helds being able to receive and transmit paging by use of DTMF tones. The FT-530 had this facility, so you can page friends on an individual or group basis or be paged yourself.

If you live near a group of licensed friends, this facility will doubtless give you hours of fun and you never know, it might even be useful! There is no need for others to have FT-530s to join in, but they do need a hand-held that can transmit DTMF tones including the star (*) symbol or have a page facility.

When working duplex with a speaker/mic attached, the received audio can be split between the internal and external speakers, thus preventing feed-back.

Variable Power Output

The FT-530 has a variable transmit power output. This differs with input voltage.

At approximately 7.2V in the power levels can be 0.5W, 1.5W or 2W. At approximately 12V the levels can be 0.5W, 1.5W, 3W or 5W. This is one of the many power saving features on the FT-530.

Others include automatic power off, automatic battery save and being able to disable the l.e.d.s and key bleeps. The parameters of these are all variable.

Repeater Shift Function

One feature I feel is useful, especially when mobile operating, is the automatic repeater shift function. As soon as you tune to a repeater frequency on v.h.f. the set automatically engages a -600kHz shift. No more fumbling round for the offset switch!

The FT-530 will only allow you to transmit on the main band, however the sub band can be set to receive a different frequency on the same band as the main band. Confused? So was I!

To explain, I could be transmitting on the v.h.f. band using 145.625MHz but set the u.h.f. side to monitor 145.500. This is a very useful feature and could be done for two u.h.f. frequencies just as easily.

The sub band can be left blank, to effect single band operation. It can display the built-in clock or display, in a numerical read-out, how much voltage is left in the battery. This feature impressed me greatly, it's a simple addition, but so very useful.

Great Effect

The clock too is used to great effect. The FT-530 boasts a timer-on and timer-off facility, along with an alarm.

How many readers remember the song 'Deck of Cards', where a soldier convinces his sergeant he is using a deck of cards as a prayer book, Bible and almanac when caught with them in church? Well, you can now tell your better half that your FT-530 is not being taken on holiday as a radio. It is a time piece, travel alarm and egg timer. I know, I was that radio amateur!

Accessed With Ease

I accessed the local repeaters with ease and found the receive sensitivity to be adequate. I received favourable reports on the transmitted audio.

I was disappointed with the quality of the audio on receive. Although acceptable, it was not up to the quality one would expect from a radio such as the FT-530. I feel most, if not all of the blame, must be laid on the very small speaker used. But there's no room for a bigger speaker in this rig.

Microphone Display

With the FT-530, I was given the MH29 speaker/microphone. This has its own l.c.d. display and lamp. The MH29 controls most of the main functions of the FT-530 by remote control. I found it to be a good companion to the FT-530 and extremely useful when mobile on my feet. The audio from this very smart unit is good, both on transmit and receive.

Battery Pack

The battery pack that comes with the FT-530 has a 2.5mm jack socket in the side. The jack input

There's an interesting option to go with the FT-530, in the shape of the MH29A2B microphone with l.c.d. frequency display.

I found the microphone display unit to be a good companion to the FT-530 and extremely useful when mobile on my feet. The audio from the very smart MH29 speaker/microphone is good both on transmit and receive.

Manufacturer's Specifications

General

Frequency range:	144-145.995MHz and 430-439.995MHz (can be extended)		
Channel steps:	5, 10, 12, 5, 15, 20, 25 & 50kHz		
Emission type:	F3 (f.m.)		
Supply voltage range:	5.5 to 16-V d.c.		
Power source:	7.2 or 12-V NiCad pack, or external d.c. power supply		
Current consumption:	190mA unsquelched, 150µA (auto power-off)		
	144MHz	**430MHz**	**Dual RX**
Squelched	60mA	50mA	95mA
Batt. Saver (1:43)	16mA	16mA	16.8mA
Transmit (13.8V, 5W)	1.5 A	1.6 A	——

VHF Section

Transmit (European)	144-146MHz (other frequencies may be programmed
Receive	130-174MHz
Repeater shift:	+/- 600kHz (default)

UHF Section

Transmit	430-440MHz
Receive	400-500MHz
Repeater Shift	1.6, 5 or 7.6 (default 1.6MHz)

Receiver

Circuit type:	Double-conversion superhet
IFs:	v.h.f. - 15.25MHz & 455kHz
	u.h.f. - 44.775MHz & 455kHz
Sensitivity:	v.h.f. < 0.158µV (12dB SINAD)
	u.h.f.< 0.18µV (12dB SINAD)
Selectivity (-6/:-60dB)	> 12 / < 30kHz
AF output :	0.3W (@ 13.8V, for 5% THD)

Transmitter

Power output (@ 13.8V):	approximately 5W (see below)
Modulation:	variable reactance F3
Maximum deviation:	+/- 5kHz
Spurious emissions:	> 60dB below carrier
Microphone type:	2kΩ condenser
Burst tone:	1750Hz (except vers. A)

Transmitter Power Selection

Display	7.2V Nominal		12V Nominal	
Shows	**Watts**	**mA**	**Watts**	**mA**
L1	0.5	600	0.5	600
L2	1.5	750	1.5	850
L3	2	750	3	1100
Hi	2	1000	5	1500

Operating Temp, Range:	-10°C - +60°C
Frequency stability:	+/- 5p.p.m.
Antenna (BNC):	50Ω (rubber-covered helical antenna suplied)
Case size:	55x134x33mm w/o battery or antenna
Weight (approx):	530g with FNB-27 & antenna

CTCSS Tone Frequencies (Hz)

67.0	94.8	131.8	186.8
69.3	97.4	136.5	192.8
71.9	100.0	141.3	203.5
74.4	103.5	146.2	210.7
77.0	107.2	151.4	218.1
79.7	110.9	156.7	225.7
82.5	114.8	162.2	233.6
85.4	118.8	167.9	241.0
88.5	123.0	173.8	250.3
91.5	127.3	179.9	——

Accessories & Options List

Rechargeable Ni-Cad Battery Packs		Charger
FNB-25	7.2V, 600mAh	NC-28C
FNB-26	7.2V, 1000mAh	NC-34C
FNB-27	12V, 600mAh	NC-18C
FNB-28	7.2V, 700mAh	NC-28C

Other Accessories

NC-42	1-hour Desktop Quick Charger for all above FNB packs
MH-29A2B	Remote Control Speaker/Mic
YH-2	VOX Headset
YHA-29	Rubber flexible antenna

is the charging socket for the supplied charger.

The socket is protected by a hard plastics plug, which is hinged and secured to the side of the battery pack. Unfortunately, this hinge was beginning to whiten along the crease after only two charges. I am of the opinion that it would not last long, and when it breaks it will cheapen the look of the radio considerably.

In Conclusion

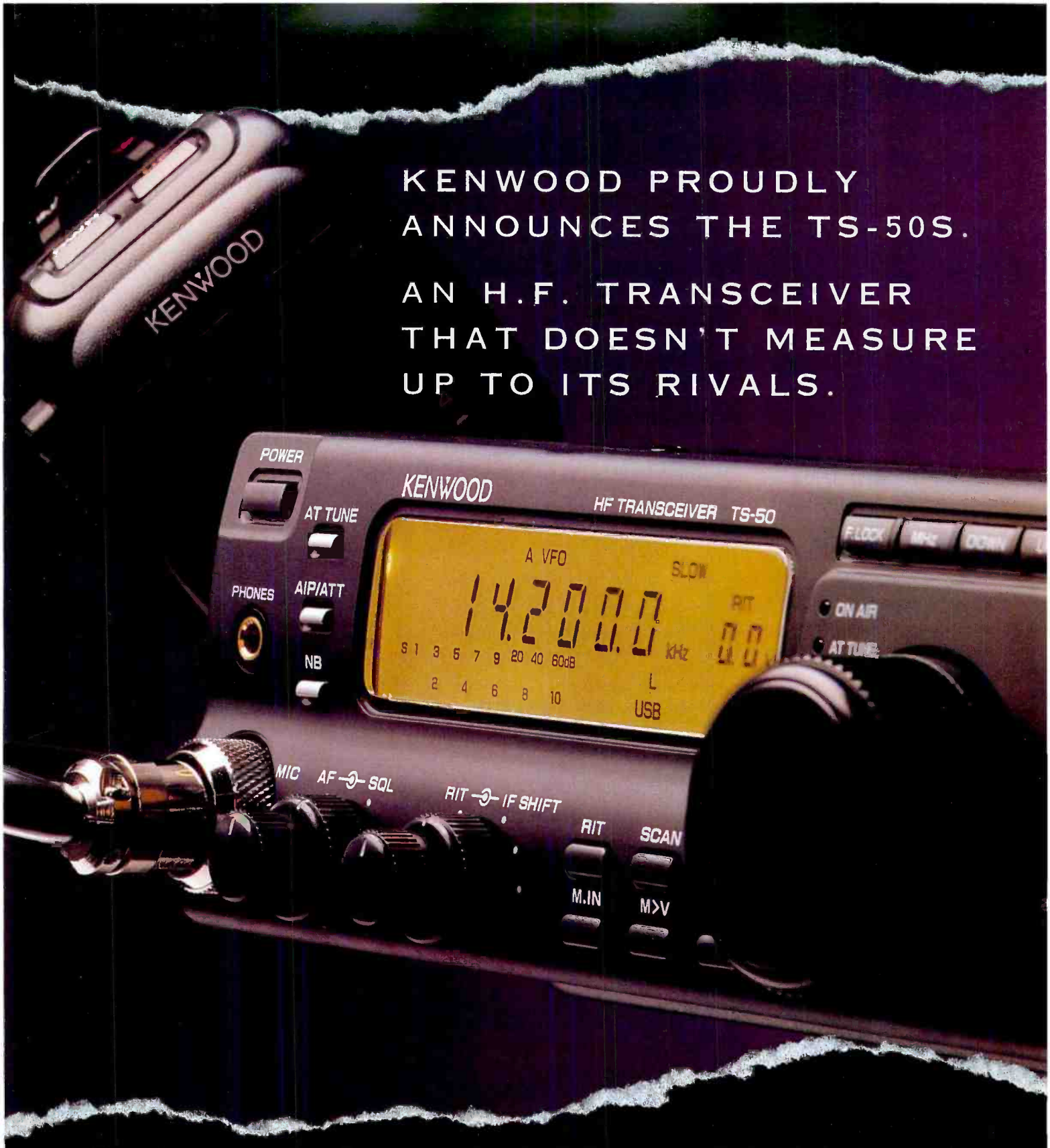
In conclusion, I think that the FT-530 is a complicated, but nevertheless reasonable little radio. If you are into gadgets and gismos then you will feel very much at home with the Yaesu FT-530.

Once I got over the initial hurdles, I found the FT-530 to be a solid little radio with some useful functions. It is a good all-round package, coming complete with facilities that are expensive add-ons for other similar radios on the market.

PW

My thanks go to South Midlands Communications (SMC) Ltd., of S. M. House, School Close, Chandlers Ford Industrial Estate, Eastleigh, Hampshire SO5 3BY, tel: (0703) 255111, for the loan of the review model.

The FT-530 is available in the price range £420 to £449, and the MH29A2B is available at around £69.



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Meteor Scatter - The Basics

Meteor scatter (m.s.) has been used by v.h.f. enthusiasts for many years. It requires some specialised operating procedures and relatively high powers to produce some very good results, enabling contacts to be made up to distances of about 2000km. It has its own methods and terminology. Ian Poole G3YWX explains what they mean, and how it all works.

Meteor scatter operation, is increasingly being used in professional circles. Here it provides a low cost and reliable form of communication over medium distances. It is used to obtain data from remote weather stations, or to send back information from oil rigs.

A number of the larger countries are begining to use meteor scatter as a general part of their data communications infra-structure. In fact it can be used for any application where data has to be transmitted over a medium distance.

Operation Simple

The basis of m.s. operation is quite simple. Every day, uncountable meteors collide with the earth, where they burn up in the atmosphere, leaving a trail of ionised gases behind them. Individual trails are quite small and don't last for long, but they're capable of reflecting radio signals as shown in **Fig. 1**.

To overcome this short trail life, amateurs use very high speed Morse and the messages are repeated many times. This should enable the receiving station to pick up the complete message.

Commercial users operate a system rather like packet radio. It starts when a request signal is sent out by the controlling station. When this request signal is picked up by the remote station via a meteor trail, an acknowledgement is sent. In turn this is received by the control station which initiates the transfer of data in packet form.

After each data packet, an acknowledgement request is sent to ensure that the data has been correctly received. This to-and-fro continues until the meteor trail disappears, breaking the link. When the link is broken, the request signal is sent out again, until the next meteor trail is found and the process is repeated.

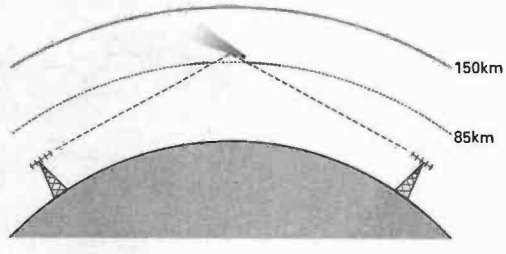

Fig. 1: The basic meteor scatter communications link.

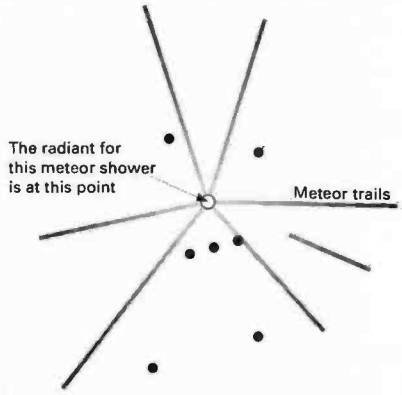

Fig. 2: The radiant of a meteor shower is where all the meteors seem to come from.

Intermittent Nature

By its very nature, m.s. operation lends itself to data communications. The intermittent nature of m.s. means, that communication cannot take place in real time.

Waiting for a suitable meteor trail introduces delays. For a commercial data system, this delay is typically in the region of 10-15 minutes and may have used many meteor trails. If large amounts of data have to be transferred, more meteor trails are needed and the delay will be longer.

Using m.s. provides a surprisingly cheap and reliable form of communication, despite the intermittent nature of the propagation. Computer technology is now very cheap and readily available, so meteor scatter is being used more and more for this type of data transmissions. One major reason for this change, is that m.s. is not subject to ionospheric variations, when magnetic storms can totally disrupt h.f. communications for long periods.

Meteor Showers

To radio amateurs, m.s. communications revolves around the various meteor showers that occur throughout the year. Although there are meteors every day, there are times when the number of meteors greatly increases.

Some showers can last as little as a few hours. But others, like the Perseids at the beginning of August, can be seen over a period of many days.

The major showers that occur are listed in **Table 1**. The larger showers can produce some quite spectacular displays when they occur during clear nights.

There are many smaller showers that appear throughout the year. However, they can be so difficult to spot as they leave only the smallest of visible trails.

During a shower you'll notice that the meteors all seem to come from one place in the sky, as shown in **Fig. 2**. This

Table 1: Major Meteor Showers

Shower	Begins	Maximum	Ends
Quadrantids	1 Jan.	3 Jan.	6 Jan.
Apr. Lyrids	19 Apr.	21 Apr.	24 Apr.
Eta Aquarids	1 May	4 May	7 May
Jun. Lyrids	10 Jun.	15 Jun.	21 Jun.
Ophiuchids	17 Jun.	20 Jun.	26 Jun.
Capricornids	10 Jul.	26 Jul.	15 Aug.
Delta Aquarids	15 Jul.	27 Jul.	15 Aug.
Pisces Australids	15 Jul.	30 Jul.	20 Aug.
Alpha Capricornids	15 Jul.	2 Aug.	25 Aug.
Iota Aquarids	15 Jul.	6 Aug.	25 Aug.
Perseids	25 Jul.	12 Aug.	18 Aug.
Orionids	16 Oct.	21 Oct.	26 Oct.
Taurids	20 Oct.	4 Nov.	25 Nov.
Cepheids	7 Nov.	9 Nov.	11 Nov.
Leonids	15 Nov.	17 Nov.	19 Nov.
Geminids	7 Dec.	14 Dec.	15 Dec.
Ursids	17 Dec.	22 Dec.	24 Dec.

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ICOM UK, Sea Street, Herne Bay. Tel: 0227 741741

Lowe Electronics, "The Corner House", Chatham Road, Sandling. Tel: 0622 692773

LONDON
A R E, 6 Royal Parade, Hanger Lane W5A. Tel: 081 997 4476

Radio Hamstore, 11 Watford Way NW4. Tel: 081 202 0073

Martin Lynch, 286 Northfield Avenue W5. Tel: 081 566 1120

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Lowe Electronics, 223 Field End Road, Eastcote. Tel: 081 429 3256

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Eastern Communications, Cavendish House, Happisburgh. Tel: 0692 650077

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Lowe Electronics, Newcastle Airport, Woolsington. Tel: 0661 860418

NORTHERN IRELAND
GM Electronics, 1 Evelyn Avenue, Belfast. Tel: 0232 671876

Tyrone Amateur Electronics, 44 High Street, Omagh, County Tyrone. Tel: 0662 242043

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R A S Nottingham, 3 Farndon Green, Wollaton Park. Tel: 0602 280267

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Lowe Electronics, Cumbernauld Airport, Cumbernauld, Strathclyde. Tel: 0236 721004

Jaycee Electronics, 20 Woodside Way, Glenrothes, Fife. Tel: 0592 756962

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is only a perspective effect, caused by the fact that all the particles enter the earth's atmosphere parallel to one another.

The area, where the meteors seem to appear from, is called the radiant. The shower name is also taken from the radiant name. For example, the Perseids shower has its radiant in the constellation of Perseus.

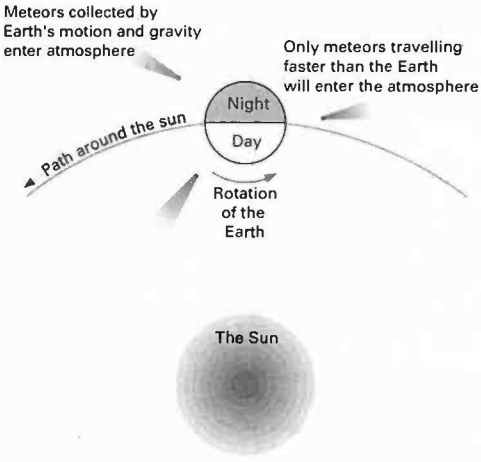


Fig. 3: The number of meteors entering the earth's atmosphere vary over the course of a day.

Random Meteors

Whilst meteor showers give the most spectacular displays, there are far more random meteors that enter the atmosphere at all times. Surprisingly, the rate at which these meteors enter the atmosphere is not constant, even when meteor showers are discounted.

The variation is caused by a number of factors. The first is that the particles that become meteors are not evenly distributed around the sun. The earth passes through one dense area between June and August, and that produces a much greater number of random meteors during these months.

The seasonal change of attitude of the earth to the sun also has an effect. To illustrate how this happens, imagine a car travelling along into a rainstorm. When running straight into the storm, far more rain hits the windscreen than any of the other windows. But if the storm sweeps across the path of the car, more rain will hit one of the side windows.

Seasons Change

As the seasons change, the attitude of the earth changes and different areas of the earth present a larger frontal area to the oncoming meteors. The result is, that the southern hemisphere receives more meteors in March and the northern hemisphere more in September.

A similar effect also occurs during the course of a day. That part of the earth rotating into the sunrise receives far more meteors than the part rotating into the sunset.

From **Fig. 3,** it can be seen that any meteors entering the earth's atmosphere at the end of the day have to be travelling faster than the earth. Meteors entering around sunrise are swept up by the earth's motion. The effect of this is very large, showing a difference of as much as 3:1.

A final variation in meteor numbers can be linked to the 11 year sunspot cycle. Evidence suggests that the number of sporadic meteors reaches a peak around the bottom of the cycle and the minimum is around the peak of the cycle. In this way meteor scatter propagation from random meteors is at its best when h.f. communications are in the dip of the sunspot cycle, and vice versa.

Staggering Number

A staggering number of meteors hit the earth's atmosphere, around a million million every day. Most of them are very small - about the size of a grain of sand. Even so, one of this size is quite large enough to produce a visible trail. A meteor about the size of a pebble would produce a very bright trail visible for a number of seconds.

Larger meteors also exist, and hit the atmosphere from time to time. Fortunately for us, very few of them make it through the atmosphere and there are fewer documented cases of people actually being hit by one!

Meteors come from a number of sources. The majority of the random ones are thought to have come from the sun.

Meteors which occur in showers are groups of meteors orbiting the sun in an elliptical orbit. Usually they are thought to be associated with comets that leave their debris behind them.

As yet not all meteor showers have been linked to particular comets. But it is thought that most, if not all showers come from this source.

When the particles are not evenly spread around the orbit as shown in **Fig. 4**, showers may vary in intensity from one year to the next. One of the most reliable and constant showers is the Perseids, but even this one shows some fairly large variations.

Meteor Trails

Meteor trails are formed by meteors of all sizes as they enter the atmosphere. They can enter at speeds of anywhere between 10 and 75km per second, and burn up at altitudes of between 80 and 120km high, leaving a visible trail.

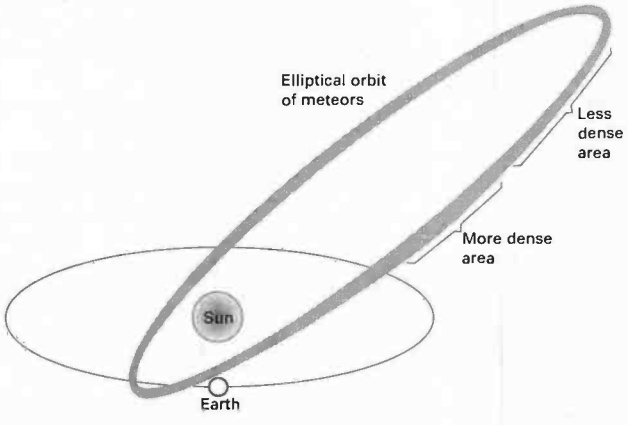
On a clear night it is possible to see quite a number of these trails, especially after midnight, when the number of meteors increases.

The friction, caused by passage through the air, is sufficient to vaporise the atoms on the surface of the meteor, leaving a trail of positively charged ions and free electrons behind.

This trail of particles is usually a long flat parabola with the meteor at its head, as shown in **Fig. 5.** The trail will vary in size, but as a rough estimate they can be up to 20km long and a few metres wide.

Ionisation in the trails is very dense. In fact, it's dense enough to reflect radio frequencies up to around 150MHz,

Fig. 4: Variations in the number of meteor in any shower, are caused by non-uniform densities of meteors in orbit.



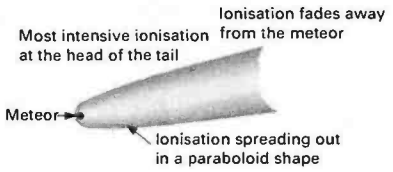


Fig. 5: The ionisation trail of a meteor is used as a reflector.

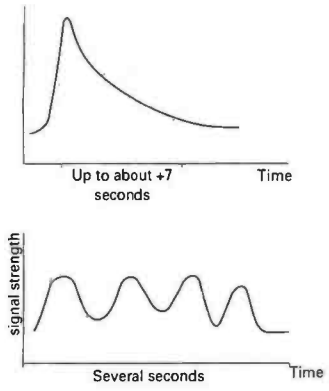


Fig. 6: Signals received from meteor trails.

or more, in some cases. Trails are split into two types - under-dense and over-dense.

Under Or Over

The term, under or over, refers to the density of electrons left in the trail by the meteor. The dividing line is normally taken to be above or below $1x10^{14}$ electrons per metre.

Over-dense trails can last for several seconds, making them very useful for amateur communications. They are however, not normally used for commercial meteor scatter systems. Though over-dense trails reflect radio signals for longer than under-dense trails, they are much less frequent, needing much bigger meteors to produce them.

Reflections produced from an over-dense trail, sometimes have very large variations in signal strength. The signals may have multi-path effects, making the signals difficult to copy. This effect is shown in **Fig. 6**.

Under-dense trails usually grow to a maximum in a few hundred microseconds, then gradually they fade away. They may only last a few tenths of a second, whilst others may last for a few seconds. Whatever the type, as the electrons spread out from the main trail, and the level of ionisation decreases, the trails fade.

Widely Used

For amateur m.s. communication, the 144MHz band is the most widely used. This band is fairly close to the limiting maximum frequency. Although some contacts can even be made using the 432MHz band. Commercial systems tend to use lower frequencies, generally in the 30 to 50MHz range.

The upper frequency limit of 50MHz, is chosen for two main reasons. Working above 50MHz could cause interference to other users. This is because a number of countries still use these low v.h.f. frequencies for television.

The main reason, is that the performance of the m.s. mode is falling off above 50MHz. Meteor trails, used for commercial systems, have lower levels of ionisation than those used by amateurs, making them unsuitable for use at the higher frequencies.

The lower limit of 30MHz has more to do with the h.f. band being below that point. In the h.f. band, more traditional ionospheric forms of propagation are used. In spite of this, meteor scatter can still be used to very good effect. It can even be used as a standby mode for when there are magnetic storms and normal ionospheric propagation is disrupted.

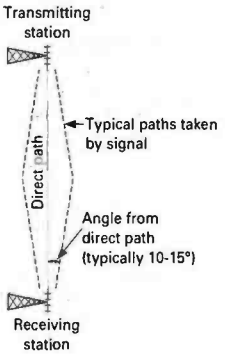


Fig. 7: The path taken by a meteor scatter signal may not be the direct path between both stations.

Maximum Distance

The maximum distance that can be achieved using meteor scatter is about 2000km. If further distances have to be covered, then a relay station has to be used.

Performance also falls off at shorter distances below about 400km. At these distances, very high antenna angles have to be used, limiting the effectiveness of the system. Generally, the optimum distance is around about 1000km or so.

When two stations are in communication, it is often found that the optimum beam heading is not the exact heading between the two stations. Instead, most of the usable reflections seem to occur slightly off to one side or the other. This angle may be as much as 10-15° away from the direct path as shown in **Fig. 7**.

High effective radiated powers (e.r.p.) are the norm in m.s. operation, so antenna gain is an important feature in any meteor scatter system. Obviously the main advantage is that signal strengths can be improved. This improvement can be of great importance for amateur systems where transmitter power is a limiting factor.

Increasing the antenna gain however, can also bring some disadvantages with it, as this reduces the beam width of the antenna. This in turn, reduces the amount of sky illuminated by the signal.

If a smaller amount of sky is illuminated, the number of meteor trails that can be used are also reduced. In fact, increasing the antenna gain can actually reduce the reliability of the whole system.

Commercial Developments

With meteor scatter increasingly being used in commercial systems, it is quite likely that some of these developments will spill over into amateur operations. This could possibly mean that packet radio links could be set up in the not too distant future. It could be another area where amateurs could become trail blazers and set the pace for commercial developments.

David Butler G4ASR and readers of 'VHF-Report ' enjoy m.s. already. So don't just sit there, get out and use meteor scatter - it's fascinating! **PW**

Antenna Workshop - A Rotatable Fold-Over Mast

This month, Peter Dodd G3LDO says that a good mast should be the first thing on the list to increase DX. So to back his ideas, Peter describes how you can improve your DX using a cheap rotatable mast.

We all accept that a good h.f. DX antenna should have a low angle of radiation, so that most of the energy is radiated at the horizon. The lower the angle of radiation, the less 'bending' is required for ionospheric propagation. A lower angle of radiation also gives a greater distance per hop.

There is an argument that a vertical antenna gives the lowest angle of radiation. This can often be true, but not in every case.

Using computer analysis [*1], the radiation of a ground mounted vertical antenna has been compared with a horizontal dipole, one wavelength above earth. It was surprising which one turned out to have the better DX antenna.

Suburban Environment

Considering the number of obstructions, such as wiring and plumbing, in the suburban environment, the situation for any antenna is not good. Increasing the antenna height is the surest method of improving low angle radiation.

Raising the antenna reduces interaction with the ground. At the same time the radiation clears obstacles.

But, and it's a big but, getting an h.f. antenna 10-20m up in the air, with access for adjustment and tuning, is a minor civil engineering project. So let's set about the job.

Mast Design

This article describes a mast design that can be raised or lowered quickly, without using a winch. This allows experimental antenna work to be done relatively easily. Moreover, it's cheap to construct. Have a look at the basic structure in **Fig. 1.**

As the mast is thin, it presents a small visual impact considering the height. Because of this low visual impact, it creates less annoyance for neighbours.

The mast can be free standing and guy ropes are not absolutely necessary. A rotator can also be attached at the bottom of the mast. This gives some freedom for designing a home-brewed rotator.

The mast can be quickly folded over if gale force winds are forecast, though the design is reasonably sound. It was up during the hurricane of October 1987 without any movement of the base.

I've built many variants of this mast from 10-20m tall. The basic design was originated by Alfred W. Hubbard K0OHM [*2]. It was an 18m tilt-over mast designed to support a 3-element tri-band beam and rotator.

The mast described in this article is a 12m tall version. You

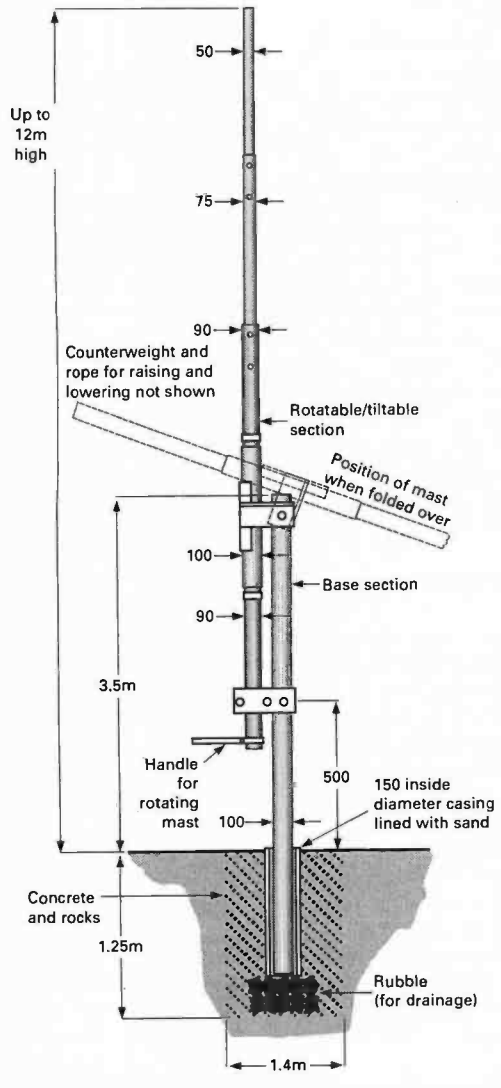
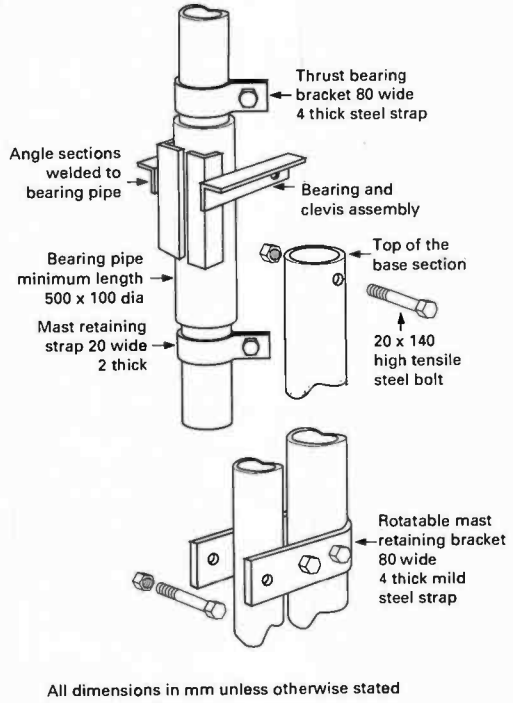


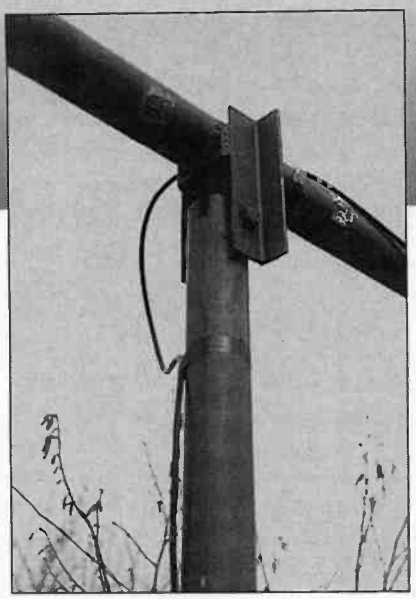
Fig. 1: The basic rotatable mast shown with the tilt-over bracket action.



All dimensions in mm unless otherwise stated

Fig. 2: The drawing of the tilt-over mechanism at the top of the base section in more detail. It is important that all welds are carried out to professional standards.

Sand should be packed into the space. It gives under strain, but holds the base section in place.



Looking up at the tilt-over joint. The bearing and clevis tube extends outside of the picture.

Hiding the base section behind a small shrub helps to disguise it.

could though, modify the size to suit your QTH.

Should you be tempted to do this, please bear in mind the lower sections of an 18m high self-supporting mast must be at least 140mm in diameter. The sections should also have a wall thickness of at least 4mm.

The lower section of a 12m high mast should be at least 100mm in diameter, and have walls at least 2.5mm thick. Costs can be reduced considerably if you buy the steel tubing from a scrap yard. All tubing to be used for a mast should be free from damage and corrosion.

Counter Balanced

This mast is counter-balanced, with approximately 15kg of extra weight on the bottom section. It takes only a few seconds to raise the antenna mast into the vertical position. The mast is relatively light weight, the top third of its length is 50mm diameter aluminium scaffolding pole.

The whole mast can be manually rotated by a handle fixed to the bottom of the assembley. The whole mast can be folded over, using a bearing pipe which is hinged on top of the base section.

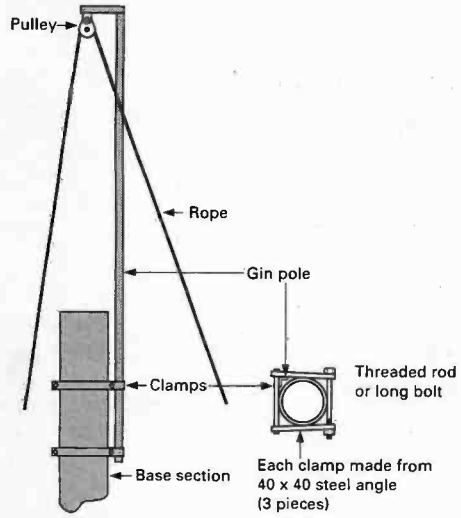


Fig. 3: When first raising the mast itself a gin pole can make things easier. An alternative position could be on the mast, rather than the top of the base section as shown here, but the idea remains the same.

Power Lines

Never erect an antenna or mast that can possibly come in contact with electric power lines. Steel mast sections can be very heavy. Ensure that adequate lifting tackle and a gin pole is available.

Always stop to consider the implications of the next move. This is particularly important when dealing with heavy unwieldy sections of metal.

If you use a ladder, it must be set at a safe angle and fixed in place as firmly as the situation will allow. A set of step-ladders should be used fully open, with all four feet in contact with the ground.

Base Section

The base comprises a section of ground socket casing 1.2m long and 150mm internal diameter, fixed in a concrete foundation in the ground. The internal diameter of the casing is not critical and should be around 20-40mm greater in diameter than the bottom section of the mast.

The gap between the mast and the casing is filled with sand. This acts as a buffer and allows the mast to move within the base during high winds. Packing the base with sand removes the high-stress point that normally exists if the mast is set directly into concrete.

Digging the hole for the base was the hardest part of the project. The concrete was a mixture of one part cement to four parts coarse sand. Use plenty of stones and clean rubble, and you should be able to manage with one bag of cement.

Before I put the rubble and concrete into the hole, I buried several very heavy copper wires into the side of the hole. The other ends of these wires are brought up through the concrete near the base of the mast. Connecting these wires to the mast provides a degree of lightning protection

A spirit level should be used to check that the ground socket casing tube is vertical before the concrete sets. Allow a minimum of two days for the concrete to set, before trying to mount the mast.

Critical Component

The most critical component is the pipe bearing and clevis assembly. This assembly takes much of the stress on the mast and must be welded. The drawing, **Fig. 2**, shows it in more detail.

The welding should be done

by a professional welder. I was quoted around £20-25, just to do the job, by a small workshop near me.

Arrange the various sections together on the ground before marking and drilling the holes for the bolts. Check that the bolts fit, and that the assembly moves freely when fixed to the base section. Mark the components with quick drying paint so that they can be stripped and reassembled correctly.

Tubing Overlap

The sections of tubing that make up the mast are each fitted into the section below with about 300mm overlap. They are then secured by two bolts.

I use 8-10mm high tensile steel bolts with locking nuts for joining the mast sections. Mark the orientation of the relative overlapping sections, as described above.

Screw Couplers

Steel tubing is available threaded for use with screw couplers. These couplers are great for the purpose they were designed for, and that is piping liquid or gas.

Do not be tempted to use these couplers to join sections together. They only have a short thread length, and little strength against flexing stress.

Mast Raised

Initially the mast is raised without the top sections. This reduces the overall weight and makes the mast easier to deal with.

Getting the base section into the ground socket is no easy task. Ask at least one, preferably two, other people to help.

Attach two medium ropes to the top end of the base section, by tying them to the holes drilled in the mast for the pivot bolt. Place the lower end of the fixed mast above the ground socket.

Raise the top end, where the ropes are attached, on a pair of step ladders. Your two helpers can then raise the mast by pulling on the ropes. This must be done so as to keep the mast under control.

The unusual counterweight was rescued from a scrap-metal yard.

At the same time, the lower end of the mast is guided into the ground casing with a section of angle iron. When the mast is within a few degrees of vertical, it will probably drop into the casing, so care must be taken at this point.

Check the orientation of the holes at the top of the base section so that the fold-over mast will raise and lower in the right direction. Making sure that you keep the mast base vertical, and central in the casing.

Pack the space between the casing and the mast with sand. Then pack and compress more sand around the base to make it as firm as possible.

Clamp Position

Fix the thrust bearing clamp to the mast in the correct position. Swing the pipe bearing and clevis assembly into the folded-over position.

Manoeuvre it into position so that the holes match up. Fit the hinge bolt. Swing the assembly from the vertical to the horizontal to ensure freedom of movement.

Raise the bottom end of the mast proper, and push it into the bearing and clevis assembly. Now push the mast through as far as is practicable and fit the top mast retaining straps to the mast.

Now fix the middle section of the mast to the lower section. Tie ropes to the upper and lower sections of the mast so that you have control raising and lowering it.

Using A Gin

Using a gin pole (with a rope retaining eye) fixed on the top of the base section can make things easier when lifting long heavy sections. The length of this gin pole is not critical, although the longer then better. It should be attached so as not to foul the pivot point

The gin pole is fixed to the mast using clamps made from pieces of steel angle and a long threaded bolt, see **Fig. 3**. Then run a length of rope through the eye before the gin pole is fitted.

Raise the mast to the vertical position so that the lower half of the mast fits into the mast retaining bracket. Move the bottom mast retaining strap up the mast so that it is nearly touching the bearing and clevis assembly. The retaining strap prevents the mast slipping out of the assembly when it is tilted over.

Fix a U bolt to the bottom of the mast, or drill a hole in the mast and fit a nut and bolt. This is to provide a point to fix a counterweight.

As you add more weight to the top in the form of antennas you will need heavier counterweights. I have added a solid section of 100mm steel bar to the bottom of my mast.

Tilt the mast over and fix the top aluminium section of the mast. By now it will be fairly top heavy and you will be glad of the counterweight.

In Use Six Years

This mast has been in use for the last six years and is a boon for experimenting and adjusting antennas. A further advantage of this design is that it can be moved relatively easily.

When I had to move the mast to a different part of the garden I dismantled it, and was faced with the problem of extracting the fixed mast section. This was done by removing the sand from the base casing with a modified vacuum cleaner. A bracket was fixed to the mast, which was then lifted out using a hydraulic jack.

All that now remains is to add the antennas to the top, and you're ready to get chasing that DX.

PW

References

***1** MN Antenna Computer Analysis program, based on MMININEC (Subject of an article in the May edition of PW)

***2** The Paul Buyan Whip, *QST March 1963*, Alfred W.Hubbard K0OHM.

This month Gareth Roberts GW4JXN, introduces us to basic QSOs in French, providing you with enough information to hold a simple conversation with French speaking amateurs.

Basic QSOs In French

The British apparently, or so it seems, almost pride themselves on a general lack of ability to speak foreign languages. We are very fortunate that English is one of the most widely used world languages.

Luckily for us, very many foreign amateurs have learnt enough English for at least a very simple QSO. Some, of course speak English very well. Most people, however, appreciate being able to speak their own language and a call in French to a French speaking station is more likely to be replied to.

The greatest advantage for radio amateurs is that the vast majority of contacts follow a very similar pattern and the matters discussed can be very closely predicted. Thus the following article is not meant to make you fluent in French, but to help you with a basic QSO.

Speaking To French Amateurs

The French in this article is for the use of foreigners speaking to French amateurs, rather than two French friends talking to each other. Because your contact cannot see you there's no need to be self-conscious

The relatively narrow band speech transmitted, although making comprehension more difficult, has the virtue of going a long way in eliminating a 'foreign' accent. Don't forget also, that a foreigner's mistakes are usually freely forgiven.

Two further factors can help the English speaking amateur. The seasoned listener will have noticed that some French amateurs do tend to use English technical words.

The use of English (often called 'Franglais') reflects the influence of English on contemporary French. Examples are 'le call' - callsign, 'le log' (no prizes for guessing this), 'le call-book'.

Very often, French amateurs sign by saying 'bye-bye' to each other. The other tradition is the influence of the Q-code, as for example le QTH (cu-tay-ash) or QRM (cu-er-em).

So, it's nice to know that you can probably get away with English technical word or a 'hamism' if you don't know the French word. Basically, however, the French are purists at heart and they appreciate 'good' French, especially from a foreigner.

Well Meaning People

As a language teacher, I know that well meaning people will always try to correct or improve the use of their language by foreigners. Unfortunately, this can have a disheartening effect on a learner.

Any correction offered by a French speaking person should, however, be seen for what it is - a sign of encouragement. So, I would appreciate any suggestions or additions to this series of articles.

The only other problem likely to be encountered by the person using this series, is that the French contact will think you have a greater knowledge of French than you have! They may suddenly forget that they're speaking to a foreigner, and start talking too quickly.

If this happens, then slow them down by saying 'parlez plus lentenment, s'il vous plait, n'oubliez pas que je suis etranger (speak more slowly, please, do not forget that I am a foreigner). Keep repeating this politely until the message goes home!

Strong Signal

It would be wrong to assume that a strong signal in French on say 14MHz, is coming from mainland France. I've heard heard a very strong Canadian station talking in French to France and Switzerland, and also European stations when in contact with many former colonies.

Don't forget that French is spoken widely as a second language in parts of Africa, Asia and Oceania, including some of the rarer islands and colonies. Some French, therefore, has a practical value in gaining new countries for you. See the *RSGB Operating Manual* for some possibilities.

It best to listen out first. Around 14.120MHz seems a favourite French-speaking working frequency, so you can practice listening.

The following is a list of useful sentences and phrases divided into sections with the English side by side with the French written form. As French spelling and pronunciation is as difficult as that of English, the third column contains an **approximate** phonetic pronunciation.

In part two there follows an appendix of useful tables. This includes the alphabet - used for spelling without using the phonetic alphabet and for giving the callsign quickly. Remember, you might not understand everything, but the important thing is to be able to follow the conversation. Bonne chance - good luck!

English	French	Pronunciation
Making A Call		
CQ France, Switzerland, Belgium, Canada or a French speaking country. This is (own callsign) calling CQ and standing by.	Appel general à la France, la Suisse, la Belgique, au Canada ou un autre pays francophone. Ici (own callsign) qui appelle CQ et qui reste à l'écoute.	Appell zheneral a la Frons, la Swiss, la Belzhik, oh Canada oo unotr pay francophone. Isi (own callsign) ki appell say kew ay key rest a laycoot.
Replying To A Call		
(Other callsign phonetically) this is the British/English/ Welsh/Scottish/Irish/ Australian/Canadian/New Zealand/ South African station (own callsign) calling you/returning your call. The French speaking station, this is ...	(Other callsign phonetically) Ici la station Britannique/ Anglaise/Galloise/Écossaise/Irlandaise/Australienne/ Américaine/Canadienne/Neozélandaise/Sud-Africaine (own callsign) qui vous appelle/qui répond a votre appel. La station francophone, ici ...	(Other callsign phonetically) Isi la stasion britanik/onglaze galwaz/aykosayse/irlondayze/awstralien/americayn/ canadiayn/nayozayolandayze/sudafrikayn (own callsign) ki vouz appell/ki raypon a votr appell. La stasion francophone, isi ...
After Someone has Replied to Your Call		

I heard more than one station replying. Go ahead (XYZ). Try again (XYZ) please wait. This is (own callsign). Good morning/ afternoon-evening old man. Thank you for returning my call. I think this is the first time we have worked each other I think we have worked before. The name is ... I'll spell it for you phonetically. I repeat.	J'ai entendu plus d'une station qui a répondu. Allez-y (XYZ) Une fois de plus (XYZ). Attendez s'il vous plaît. Ici (own) callsign). Bonjour - bonsoir mon vieux. Merci d'avoir répondu à mon appel. Je crois que c'est la première fois qu'on s'est contacté. Je crois qu'on s'est déjà contacté. Le prenom de l'opérateur, c'est. Je vous le donne phonétiquement. Je le répète.	Zhay ontondoo ploo doon stasion ki a raypondoo. Alez e (XYZ). Une fwa de ploo (XYZ) atonday sil voo play. Isi (own callsign). Bonzhore - bonswar mon vyeu mersi davwar reypondoo a mon appell. Zhe krwa ke say la premier fwa kon say kontaktay. Zhe krwa kon say dayzha kontaktay. Le praynom de loporateur, say ... Zhe voo le don phonetikemon. Zhe le raypet.
Location		
The Location is ... I'll spell it for you, in the county/state of ... in North/South/West/East England/Wales/ Scotland/Ireland/Canada/USA, etc. The location is in the centre of ... On the island of ... In the small/big town/city of ... In the village of ... In the seaside town of ... About ... kilometres from ... The longitude and the latitude is ... degrees-minutes North/South, degrees-minutes East West. The QTH locator is ...	La location est ... je vous le donne, dans le comté/l'état de ... au Nord/Sud/Ouest/Est de l'Angleterre/du Pays/de Galles/de l'Ecosse/l'Irlande/du Canada/des Etats Unis. La situation est au centre de ... Sur l'ile de ... Dans la petite/grande ville de ... Dans le village de ... Dans la station balnéaire de ... A peu pres à ... kilometres de ... La longitude et la latitude sont ... degrès ... minutes Nord/Sud, degrès ... minutes Est/Ouest. La location selon la carte de répérage, c'est ...	La lokasion ay ... zhe voo le don, don le komtay/ayta de ... oh Nor/Sood/West/Est de longleter/do pa/de gal/de laycos/de lirlon/doo Canada/dayz aytas uni. La sitooasion ay oh sontr de ... Sir lil de ... don la petit/grond vil de ... don le viladz de ... don la stasion bolnayr de ... au pu pray a ... kilometr de ... La longitood ay la latitood son ... degray-minutes Nor/Sood, degray-minutes Est/West. La lokasion selong la kart de raypayraj say ...
Signal Report		
You are five and nine in ... Your signal is variable/very weak/weak/strong/very strong/ excellent. There is no interference. There is a lot of local interference. Your signals are fading. Your modulation is good/bad. I can understand you very easily. I can understand you only with great difficulty.	Vous êtes cinq et neuf à ... Votre signal est variable/très faible/faible/fort/très fort/ excellent. Il n'y a pas d'interférence. Il y a beacoup d'interférence localé. Vos signaux s'affaiblissent. Votre modulation est bonne/mauvaise. Je vous comprends très facilement. Je ne vous comprends qu'avec beaucoup de difficulté.	Vooz ets sank ay nerf a ... Votr sinal ay variabl/tray faybl/faybl/four/tray four/ exselong. Il ni ah pa dantifayrons. Il e a bowcoo dantifayrons lokal. Vos sinaw safayblis. Votr modulasion ay bon/mawvayz. Zhe voo komprong tray fasilmong. Zhe ne voo komprongkavek bowcoo de difikultay.
Asking For Information And Commands		
Please state your name/your location/your callsign. What is your country? Please spell your name/location/callsign phonetically. Please can you give me a report? Please repeat. Please speak more slowly. Do you have a lot of interference? Are my signals fading?	Veuillez dire votre nom/votre location/votre indicatif. Quel est votre pays? Donnez-moi votre nom/location/indicatif phonétiquement. Pouvez-vous me faire un rapport? Répétez s'il vous plaît/veuillez répéter Parlez plus lentement s'il vous plaît Avez vous beaucoup d'interférence? Est-ce que mes signaux s'affaiblissent?	Vayay deer votr nom/votr lokasion/votr andikatif. Kel ay votr pay? Epelay votr nom/lokasion/andikatif phonayteakmong. Poovay voo me fair yng rapor? Raypaytay sil voo play/vayay raypaytay. Parlay ploo lontement sil voo play. Avay voo bowcoo dantiferons? Es se ku may sinow safaiblis?

Have we worked each other before - on this band/on 10, 15, 20, 40, 80, 160 metres?	Est-ce qu'on s'est déjà parlé sur cette bande/sur dix, quinze, vingt, quarante, quatre-vingt, cent-soixante mètres?	Es se kon say dayzha parlay sir set bond/sir di/kanz/van/karont/katrvan/son swasont metr.
I'm sorry I do not understand you.	Je regrette, je ne vous comprends pas.	Zhe regret zhe ne voo comprong pas.
I do not understand/speak French very well.	Je ne comprends pas parle pas très bien le francais.	Zhe ne comprong pa/parl pa tray biang le fronsay.
Please stand by.	Restez à l'écoute s'il vous plaît	Restay a laycoot sil voo play.
Please go again.	Essayez encore une fois?	Essayay onkor une fwa.
Do you copy?	Comment me copiez-vous?	Me copyay voo?
Is this frequency free/occupied?	Est-ce que cette fréquence est libre/occupée?	Es se ku set fraykons ay libr/okupay?
This frequency is in use old man, I'm sorry.	Cette fréquence est déjà occupée mon vieux, je regrette.	Set fraykons ay dayzha okupay mon vyeu, zhe regret.
I have a sked.	J'ai une sked.	Zhai un sked.
Can we change frequency? How about 10kHz up/down if the frequency is free?	Si on changeait de fréquence? Si on descendait/montait de dix kilohertz si la fréquence est libre?	Si on shonzhay fe fraykons? So on desonday/montay de di kiloherts si la fraykons ay libr?
How about S19?	Si on allait á la dix-neuf?	Si on allay a la dis nerf?
Can we go simplex?	Est-ce qu'on peut se contacter en direct?	Es ce kon pu se kontaktay en direct?
I shall see you on the ... repeater.	Je vous verrai sur le relais de ...	Zhe voos verray sir le relay de ...
Shall we try sideband?	Si on essayait la bande latérale?	Si on essayay la bond lateral?
How about Morse?	Si on essayait de se contacter en Morse?	Si on essayay de se kontaktay en Morse?
I'll give you a report on the next over.	Je vous ferai un rapport pendant votre prochain échange.	Zhe voo ferray un rapor pondon notr proshain exchonzhe.

Net Working

I think it is (XYZ's) turn.	Je crois que c'est à (XYZ) de parler.	Zhe krwa ke say a (XYZ) de parlay.
I've forgotten whose turn it is.	J'ai oublié à qui est le tour.	Zhai oobliay a ki ay le toor.
Over to ... with the group.	Micro à ...	A ... de parlay aveck ke group. Mee crow a
Break.	Break.	Break.
Over.	À vous le micro.	Meecrow a voo.

Rig And Antenna

The rig here is ...	L' équipment ici est un ...	Laykipemon isi ay un ...
I'm using a ... transceiver.	Je me sers d'un émetteur-récepteur ...	Zhe me ser d'un aymayteur-rayseptor ...
I have hear a ... receiver and ... transmitter with a transverter/ with a linear amplifier.	J'ai ici un récepteur ... et un émetteur ... avec transverteur/avec un amplificateur linéaire.	Zhay isi un rayseptor ... ay un aymayteur ... aveck transverter/avack un amplificateur linayair.
I am putting out 10, 20, 50, 100, 150 watts.	J' émets dix, vingt, cinquante, cent, cent cinquante watts.	Zhemey di, van, sankont, son, son sankont watt.
The rig is home brew with modifications.	L'équipment est de mon propre constuksion.	Laykipemon ay de mon propre construksion aveck day mofificasions.
My antenna is a dipole/is a trapped dipole/ a beam with three elements.	Mon antenne est une dipole/une dipole à trap/ un faisceau avec trois éléments.	Mon anten ay une daypol/une daypol a trap/un faskow aveck trwa elaymon.
A Yagi with 10 elements.	Un Yagi à dix éléments.	Un Yagi a di elaymon.
with horizontal/vertical/circular polarisation.	avec polarisation horizontale/verticale/circulaire.	aveck polarizasion orizontal/vertical/sirkulair.
with a gain of ...	avec un gain de ...	aveck un gan de ...
A quad/a long wire/an end fed Zeppelin.	Un quadrangulaire/un long fil/un Zepp alimenté au bout	Un kwadrangoolair/un long fil/ un Zep alimontay oh boo.
A centre fed Zeppelin.	Un Zepp alimenté au centre.	Un Zepelain alomontay oh sentr.
The antenna is about ... metres above ground level.	L' antenna est à peu près à ... mètres au dessus du niveau du sol.	Lanten ay a pu pray a ... metr oh dessay do nivoh do sol.
The QTH is ... metres above sea level/at sea level/below sea level.	Le QTH est à ... mètres au dessus du niveau de la mer/au niveau de la mer/au dessous du niveau de la mer.	Le coo tay ash ay ... metr oh dessey do nivoh de la mare/oh nivoh de la mare/oh desoo do nivoh de la mare.
The antenna has a rotator.	L'antenne a un rotateur.	Lanten a un rotateur.

I'll turn the antenna on you during the next over. I rotate the antenna by hand. The antenna is in the garden/attic/ on a ... metre high mast. I am testing the rig. I am glad of your report. I like my ... I want to change my ... How do you like your ...	Je tournerai l'antenne vers vous pendant notre prochain échange. Je tourne l'antenne à la main. L'antenne est au jardin/à la mansarde/sur un mât haut de ... mètres. Je suis en train de tester l'equipement. Je suis content de votre rapport. J'aime bien mon ... je veux changer mon ... Est-ce que votre ... vous plâit?	Zhe tourneray lanten ver voo pondon notr proshain ex-shonge. Zhe tourn lantern a la man. Lanten ay oh zhardan/a la monsard/sir un ma oh de ... metr. Zhe sweez on train de testay. Zhe swi conton de voptr rapor. Zhaim byan mon .. zhe voe shonzhe mon ... Es ce ke votr ... voo play?

Weather And Radio Conditions

Today the weather is fine/sunny/(very) cold/hot/misty/windy. It is raining. It is snowing. The snow is 300mm thick. The weather has been fine. Today/yesterday/during the weekend it has been raining. It has been snowing. Winter/spring/summer/autumn has come. The wind has been strong. There has been thunder and lightning. Working conditions are poor/bad/moderate/good/very good/excellent. All the bands are open. The 10, 15, 20, 40, 80 metre band is closed/open to North/Central/South America. Eastern/ Northern/Southern/Western Europe, Asia, Australasia, Africa, the Far East, Japan. I have just heard a ... I can hear but cannot work a ... There is an opening on 2 metres, 70cm. This lift is getting better/getting worse. Hope it lasts. Nice to speak to you under lift conditions. It is ... o'clock approx, local time/GMT. What time is it in ...	Aujourd'hui il fait beau/du soleil/(très) froid/chaud/du brouillard/du vent. Il pleut.Il neige est à trente centimetres d'épaisseur. Il a fait beau. Aujourd'hui/hier/pendent le weekend il a plu. Il a neigé. L'hiver/le printemps/l'été/l'automne est arrivé. Il a fait un orage. Il a fait du tonnerre et des éclairs. Les conditions de travail sont pauvres/mauvaises/ moderées/bonnes/très bonnes/excellentes. Tout les bandes sont ouvertes. La bande de dix, quinze, vingt, quarante, quatre vingt, cent soixante métres est fermée/overte sur L'Amérique du Nord/Central/du Sud. l'Europe de l'Est/du Nord/du Sud de l'Ouest, l'Asie, l'Australasie, l'Afrique, l'extrême Orient, le Japon. Je viens d'entendre un ... J'entends mais je ne peux pas contacter un ... Il y a une éclaircie sur deux métres, soixante-dix centi métres. Le temps se lève/à empiré. Espérons que cela va durer. Enchanté de pouvoir vous parler dans de si bons conditions. Il est à peu près ... heures, zulu/GMT. Quelle heure est-il à ...	Ohzhordwe il fay boh/do solay/(tray) frwa/sho/do brooiar/do von. Il plu. Le nezh eta tront sentimetr daypaysor. Il a fay boh. Ohzhordwe/ee-air/pondon le weekend il a plu. Il a nezhay. Leevair/le prontom/laytay/lohtum ay arrevay. Il a fay un orazhe. Il a fait du tonair ay daze ayclair. Lay condision de travai son povr/mohvase/ modayray/bon/tray bon/ecselongt. Toot la bond son oovairt. La bondde di, kanz, van, karont, katrvan, son swasont metr ay fairmay/oovairt sir lamayrik do nor/sentral/ du sud. Loorop de lest/do nord/do sud/de lwest/lasi/lawstralasi/Lafrik/lestrem oriong/le zhepong. Zhe vee-an dontondr un ... Zhonton may zhe nay pu pa contactay un ... Il e a une eklairsee sir du metr, swasont di sentimetr. Le temp se se laiv/a ompray. Ayspayron ke sela va diray. Onshantay de poovwar voo parlay donlay see boncondisions. Il ay a pu pray ... oers, zulu/Zhe m tay. Kel oer ayt il a ...

Arranging A Sked

May I speak to you again? Are you free tomorrow/this time next week/at ... hrs GMT? How about this frequency or alternatively ... Let's try the 10, 15, 20, 40, 80 metre band. No I'm sorry, I am not free at that time. I am usually on 20 metres at ... GMT on (days of the week) except ... I have to go to bed/work now.	Puis-je vous contacter de nouveau? Est-ce que vous serez libre demain/à cette heure la semaine prochaine/à ... heures GMT? Essayons cette fréquence ou bien ... Essayons la bande de dix, quinze, vingt etc., métres. Non, je regrette, je ne serai pas libre à cette heure. Je suis généralment sur vingt mètres à ... GMT (days of week) sauf le ... Je dois me coucher maintenant/je dois aller au travail.	Pwi zhe voo kontacttay de noovoh? Es se ke vooseray libr deman/a set oeur la semayn proshain/a ... oeur Zhay m tay? Esayon set frekons oo biang ... Esayon la bond de di, kanz, van, karont, etc metr. Non, zhe regret, zhe ne seray pa libr a set oeur. Zhe swi zhenynayralemon sir van metr a ... zhay m tay (days of the week) sof le ... Zhe dwa me koosahy mantenon/zhe dwa allay oh travai.

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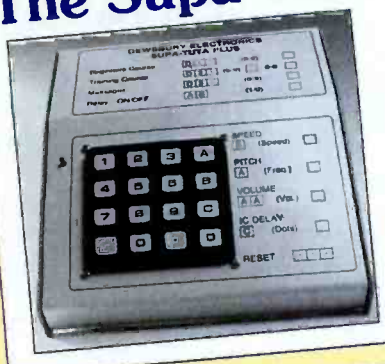

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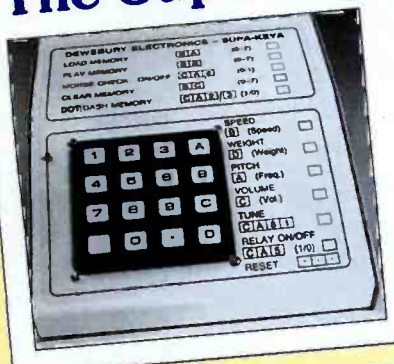

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Are You Keen On The Key - Or Would You Like To Be?

Or Are You One Of The Many Satisfied Kenwood Receiver Or Transceiver Owners? If So, Here's An Opportunity To Increase The Versatility Of Your Rig.

This Month *PW* has got some 'Supa' special offers for you, direct from the famous Dewsbury Electronics stables. They come in the shape of the Supa-Tuta Plus at £55 including p&p (normal price £75 plus p&p), the Supa-Keya at £75 including p&p (normal price £99 plus p&p), and the Supa-Tuna for £50 including p&p (normal price £67.50 plus p&p).

The Supa-Tuta Plus is a self-contained unit, ideal for everyone from absolute beginner to advanced student. The unit offers a 10-lesson introductory course, with full check listings in the comprehensive handbook. And when you're ready to go on the air, it's also a full-function electronic keyer!
The Supa-Tuta Plus is easy to use and everything is controlled from the front-mounted keypad. The unit has an external Morse key socket for sending practice, plus variable speed (two to 99 words per minute), variable sidetone via an internal speaker and headphone socket. There are also 90 different training sequences with answers for checking, plus 10 random sequences, and also 10 different messages of 500 characters with answers. You'll also find a library of random words and abbreviations - (no answers here!). The **Supa-Tuta Plus** has an 'echo' mode enabling the student to send Morse back to the unit for comparison, a Morse character check, and a Morse element check. After you've learned Morse with the **Supa-Tuta Plus,** you can use it as an electronic keyer, by connecting it to your transceiver. As an electronic keyer the **Supa-Tuta Plus** features: Relay switching, dot and dash memory, iambic paddle memory, single paddle operation, variable speed operation between two and 99 w.p.m. and variable weighting. It's also fully portable, measuring 130 x 145 x 40mm (sloping to 20mm), and operates from an external power supply of between 9-14V d.c.

The Supa-Keya uses microprocessor technology to provide: sidetone pitch between 500 and 1250Hz, sidetone volume control, speed between two and 400 w.p.m., single key speed trim, set weight control, single key weight trim, automatic insertion of serial number (four digits), automatic increment/decrement of serial numbers, eight stored messages (non-volatile), and you can edit/append or clear stored messages. **The Supa-Keya** accepts iambic paddle operation, has switchable dot and dash memories, employs a relay output for transceivers, has a Morse check and transmitter tune facility. An innovative design feature enables the keyer to check the accuracy of the input characters. If you send an incorrect character, the **Supa-Keya** will reject it and sound an error signal (switchable in normal use). And, to complete a very useful package, the **Supa-Keya** is also fully portable, measuring 130 x 145 x 40mm (sloping to 20mm), and is powered from an external 9-14V d.c. supply.

The Supa-Tuna has been been designed to make the use of the Kenwood range of receivers and transceivers even easier to use. **The Supa-Tuna** provides the following facilities: Rapid frequency selection, v.f.o. selection, frequency scanning up or down, memory channel (and bank where applicable), mode selection, and transmit/receive (where applicable). The Dewsbury **Supa-Tuna** is housed in an attractive metal case measuring 130 x 145 x 40mm (sloping to 20mm), and is powered by an external 9-14V d.c. supply.

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PW APRIL SUPA OFFER

Spreading The Spectrum

Amateur Radio Communications For The Future?

Phil Cadman G4JCP takes a look at spread spectrum techniques, and explains the techniques behind this apparently frequency extravagant system, which is coming into use in amateur service, particularly in the USA.

As pressure on the r.f. spectrum has increased over the years, the natural tendency has been to reduce the bandwidth of transmitted signals. This allows more stations to share a given r.f. allocation.

The (almost) total change-over from a.m. to s.s.b. on the amateur bands below 30MHz, resulted in many more stations being able to use the limited frequencies. In the professional sphere, there's also been a change from a.m. to s.s.b. on the h.f. bands.

Professional v.h.f. and u.h.f. equipment f.m. channel spacing has also been gradually reduced from 50kHz to 12.5kHz. Strangely, amateurs have, so far, resisted the widespread adoption of 12.5kHz channel spacing on the 70, 144 and 430MHz bands.

Running against the trend, some users consistently use r.f. bandwidths vastly in excess of what's required. The apparently greedy technique used is called spread spectrum or s.s. The technique was originally developed for high resolution radar and for military communications.

Spread Spectrum?

So, just what is spread spectrum? The answer, in general terms, is that a spread spectrum signal is one where the r.f. bandwidth used is substantially greater than the bandwidth of the modulating signal.

A useful comparison, is wide-band f.m (w.b.f.m.). As is well known, Band II f.m. broadcast transmissions occupy r.f. bandwidths in excess of 10 times the highest modulating frequency.

At the receiver, the excessive bandwidth is traded for a higher signal-to-noise ratio. Providing the r.f. signal at the input of the demodulator has an S/N ratio above a certain limiting value, then the signal at the output will have a higher S/N ratio than that of the signal at the input.

However, w.b.f.m. is **not generally regarded as spread spectrum** because only two signals, the carrier and the modulating signal, are involved. In what is universally regarded as 'true' spread spectrum, a third signal is introduced to deliberately 'spread' a narrow-band signal over a large r.f. bandwidth.

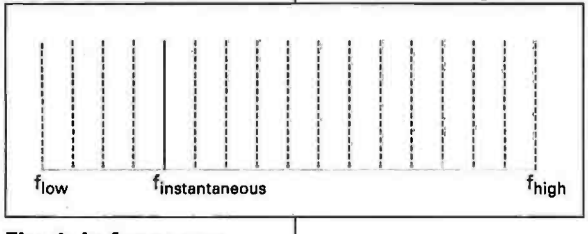


Fig. 1: In frequency hopped spread spectrum (f.h.s.s.), the transmitter's output at a particular instant, centres on one out of a number of possible frequencies between two limits.

Creating Spread Spectrum

Before going into how an s.s. signal is created, the question arises of why anyone wants to create one in the first place. In the case of radar, one reason is to increase accuracy. In the case of radio communication, two major reasons are summarised below.

1. An s.s. signal is difficult to jam and can be extremely difficult to intercept (eavesdrop), making the technique particularly attractive to the military. Indeed, most work on the communications potential of s.s. was done by defence related establishments.

2. The civilian use of s.s. centres on the ability of many s.s. signals to simultaneously share a common r.f. allocation both with each other and conventionally modulated r.f. transmissions.

Several Types

But, although there are several types of s.s., only two of the common forms will be discussed here. The first is called frequency hopped (or hopping) spread spectrum (f.h.s.s.), the second is called direct sequence spread spectrum (d.s.s.s.).

Frequency Hopped

Frequency hopped spread spectrum is easier to understand than d.s.s.s. This is because it uses (in a modified form) familiar radio techniques.

In f.h.s.s. the transmitter's output at a particular instant, centres on one out of a number of possible frequencies between two limits, **Fig. 1**. After a short time (usually much less than one second) the transmitter moves to a different frequency.

After a similar time has elapsed the transmitter moves yet again. This continues for as long as the transmitter remains on-air.

The frequency used at any instant is provided by a frequency synthesiser which is, in turn, controlled by a pseudo-random number generator (p.r.n.g.). The diagram, **Fig. 2**, shows a simplified block diagram of a basic f.h.s.s. transmitter.

Number Of Frequencies

The number of frequencies the synthesiser can provide, may range from a hundred or so to many thousands. Some systems manage more than one million.

The minimum spacing between adjacent frequencies is ultimately dictated by the bandwidth of the base-band signal and the modulation technique. In other words, the bandwidth of the signal at point 'A' in **Fig. 2**.

Some form of f.m. or phase modulation (p.m.) is usually employed, as both kinds of modulation provide a signal of constant amplitude which is easier to handle later on. However, in principle any modulation technique could be used.

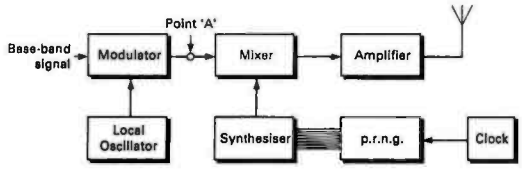


Fig. 2: A simplified block diagram of a basic f.h.s.s. transmitter.

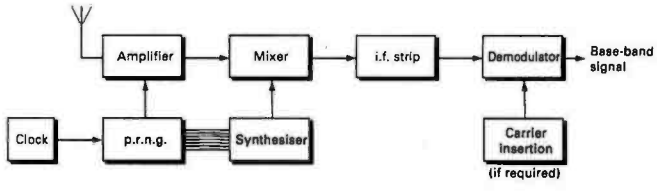


Fig. 3: Basic block diagram of a demodulation system for a f.h.s.s. signal (see text).

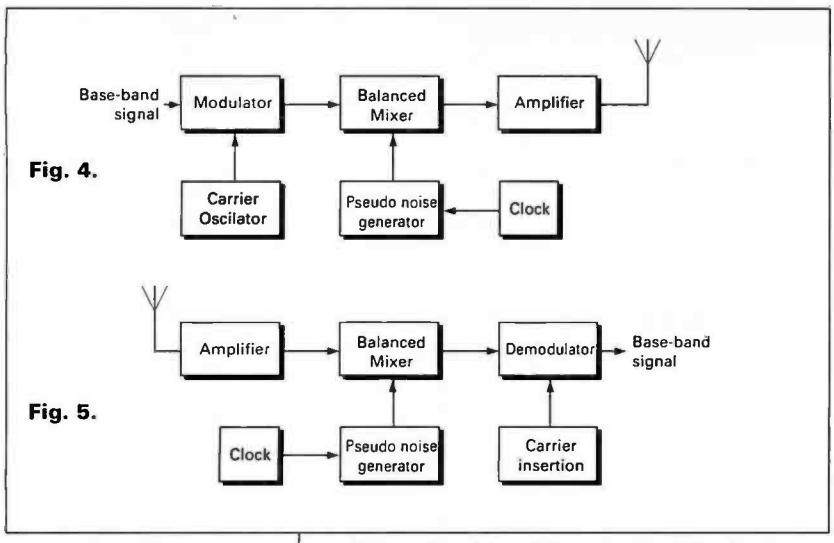


Fig. 4.

Fig. 5.

Fig. 4: Simplified block diagram of a direct sequence spread spectrum (d.s.s.s.) transmitter.

Fig. 5: Simplified block diagram of a simple d.s.s.s. receiver (see text).

The number of 'hops' the transmitter makes in one second is called the hopping rate. It can typically vary from as little as 10 per second to several thousand per second.

Demodulation of a f.h.s.s. signal is done by using another synthesiser at the receiver. This is driven by an identical p.r.n.g., and **Fig. 3** shows a simplified block diagram.

It should be understood that the two p.r.n.g.s and their associated clocks, have to be kept in close synchronism for the s.s. signal to be successfully de-spread. This is easier said than done, and synchronising the receiver to the transmitter is the main problem in s.s. system designs.

Notice the similarity between **Fig. 2** and **3** and a block diagram of a typical synthesised amateur transceiver when the p.r.n.g. is replaced by a tuning control.

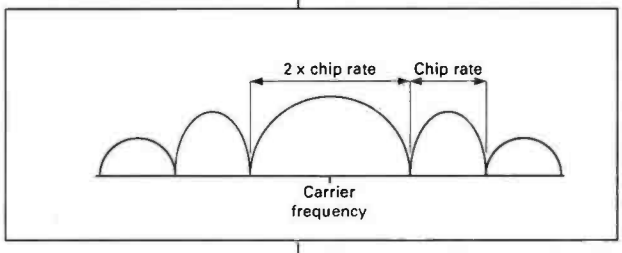


Fig. 6: A d.s.s.s. signal, when viewed on a spectrum analyser, looks like wideband noise, similar to this illustration. The characteristic shape is due to the spectrum of the spreading pseudo-noise signal.

Difficult To Visualise

Compared to f.h.s.s., it's more difficult to visualise what happens to a narrow-band signal when spread in a direct sequence s.s. transmitter. The diagram, **Fig. 4**, shows a simplified block diagram of a d.s.s.s. transmitter. The corresponding receiver form is shown in **Fig. 5**.

A d.s.s.s. signal, when viewed on a spectrum analyser, looks like wide-band noise, similar in appearance to that in **Fig. 6**. The characteristic shape is due to the spectrum of the spreading pseudo-noise (p.n.) signal.

The diagram, **Fig. 7**, shows what happens to a narrow-band signal, in this instance a pure carrier, when fed into a balanced mixer together with a p.n. signal. The carrier effectively disappears, and the output spectrum becomes a double-sideband version of the base-band spectrum of the p.n. signal, **shifted by an amount equal to the carrier frequency**.

Note that: If the carrier is replaced by a narrow-band modulated r.f. signal, the output spectrum is almost identical. Hence it's extremely difficult for any third party to gain any information about the narrow-band signal once it has been spread.

Masks The Spectrum

To all intents and purposes, the spreading signal effectively masks the spectrum. It also masks the information content, of the narrow-band signal by its own, noise-like spectrum. This is probably the main reason why spread spectrum is so attractive to the military.

The diagram, **Fig. 8**, shows how a carrier is affected by multiplication with the spreading signal. For simplicity, the transitions in the spreading signal have been chosen to occur at the zero crossing points of the carrier.

As the phase of the resulting signal changes so rapidly, narrow-band receiver has no time to respond. This happens because no sooner has the signal begun to build up oscillations in the tuned circuits of a receiver, they are opposed by the now reversed phase of the signal. The only noticeable effect would be an apparent increase in received noise.

At the s.s. receiver, the de-spreading signal switches the phase of the incoming s.s. signal so that the phase changes are removed. The now phase-continuous signal can be recovered with relative ease.

Number Generators

So far, the only unfamiliar items appearing in the block diagrams of s.s. transmitters and receivers, should be the pseudo-random number generator (p.r.n.g.) in the case of f.h.s.s., and the pseudo-noise generator (p.n.g.) in d.s.s.s.

Both generators are based on the same device, the pseudo-random binary sequence generator (p.r.b.s.). So, let's consider the requirements for a pseudo-random number generator first.

The number generator has to generate a sequence of numbers, usually binary, that are used to programme a synthesiser. The sequence must approach a statistically random sequence for optimum performance.

The operative word is 'approach', because the sequence must be reproducible. Don't forget the receiver must be able to generate the same sequence of numbers if it is to successfully de-spread the s.s. signal. Therefore, the sequence cannot be truly random, only 'pseudo-random'.

Let's move on now to the p.n.g. in the d.s.s.s. system. In practice this should produce a signal whose spectrum approaches that of noise, and yet must once again, be reproducible.

It is possible to generate a noise-like signal suitable for use in d.s.s.s. systems. This is done by low-pass filtering a binary sequence, such as one produced by a pseudo-random binary sequence (p.r.b.s.) generator. The p.r.b.s. generators are surprisingly easy to build.

The p.r.b.s. generators consist, in their simpler forms, of nothing more than a few d-type flip-flops and an exclusive-OR gate.

The diagram, **Fig. 9**, shows a 4-stage p.r.b.s. generator, when clocked it produces the sequence detailed below. Assume a starting point where all flip-flops are pre-set to the '1' state.

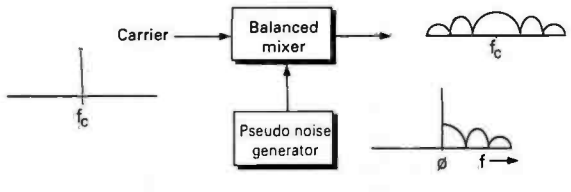


Fig. 7: Diagram showing what happens to a narrow-band signal, in this example a pure carrier, when it's fed into a balanced mixer together with a pseudo-noise (p.n.) signal (see text).

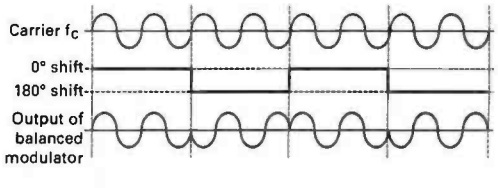


Fig. 8: Diagram showing how a carrier is affected by multiplication with the spreading signal. For simplicity, the transitions in the spreading signal have been chosen to occur at the zero crossing points of the carrier.

Clock pulse	D1	Q1/D2	Q2/D3	Q3/D4	D4/output
0	0	1	1	1	1 initial state
1	1	0	1	1	1
2	0	1	0	1	1
3	1	0	1	0	1
4	1	1	0	1	0
5	0	1	1	0	1
6	0	0	1	1	0
7	1	0	0	1	1
8	0	1	0	0	1
9	0	0	1	0	0
10	0	0	0	1	0
11	1	0	0	0	1
12	1	1	0	0	0
13	1	1	1	0	0
14	1	1	1	1	0
15	0	1	1	1	1 as beginning

Points To Note

The salient points to note are:

The starting condition of all '1's recurs after 15 clock pulses.

The output sequence is what is known as maximal, it is not formed from a simpler, repeating, sequence.

The output sequence can change only as fast as the clock rate and in places (such as the runs of '0's and '1's it changes much slower. In s.s. terminology the maximum rate at which the output of the generator can change, is termed the chip rate. And for these simple types of p.r.b.s. generators, it's numerically equal to the clock rate.

Maximal Generators

Maximal p.r.b.s. generators generate a sequence which does not repeat in less than (and in fact only repeats) every 2^{n-1} clock pulses.

Let's take a closer look. The term 'n' being the number of flip-flops between the output of the exclusive-OR gate, and its input which is 'furthest away' from its output. In the example shown n=4, so 2^{n-1} is 15.

We have seen the sequence does indeed repeat every 15 clock pulses. It's clear from just looking at the sequence in this example, it could hardly be taken as random, the sequence length is far too short.

However, by adding a few extra flip-flops, the sequence can be greatly extended. Remember the maximal sequence length is 2^{n-1} chips; the table below shows how the sequence length effectively doubles for every extra flip-flop added to the generator.

n	sequence length (2^{n-1})
3	7
4	15
5	31
6	63
7	127
8	255
16	65 535
24	16 777 215
32	4 294 967 296

Even with only 32 stages the sequence will be over 4 000 million chips long. To give some idea of what time intervals are associated with these sequences we can assume a realistic d.s.s.s. chip (clock) rate of 10MHz.

The 32-stage generator sequence would then repeat every 429 seconds; just over seven minutes. Doubling the number of stages to 64 would give a repetition time of no less than 58 000 years!

Before moving on, there's one final, but very important point about p.r.b.s. generators. The stage from which the feed-back is taken (to the exclusive-OR gate) has to be carefully chosen; not all tapping points give maximal length sequences.

In the example of **Fig. 9**, the feed-back is taken from the output of the first stage. It could have been taken from the third stage, where a different but still maximal sequence, would have been produced.

Had the second stage been used the sequence would not have been maximal. In other words, it would have repeated after less than 15 chips.

Longer p.r.b.s. generators can have many tapping points all giving different maximal length sequences. It is most important that the flip-flops forming the p.r.b.s. generator should never all be allowed to output the '0' state simultaneously.

A brief check with **Fig. 9** will reveal that such a state is permanent. The output of the generator will remain at '0' no matter how many times it's clocked.

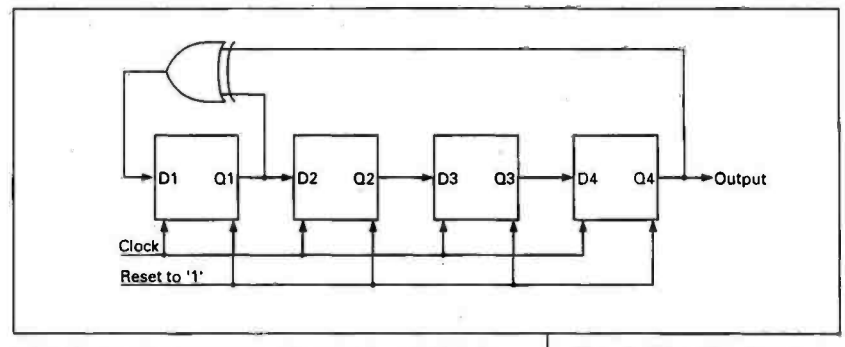


Fig. 9: The flip-flops forming the p.r.b.s. generator should never all be allowed to output the '0' state simultaneously. The diagram illustrates that such as situation is permanent, the output of the generator will remain at '0', no matter how many times it is clocked (see text).

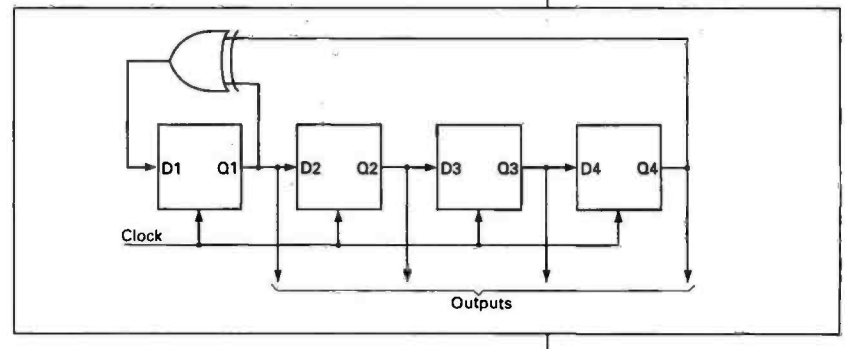


Fig. 10: A 4-stage p.r.b.s. generator, suitable for direct connection to a 4-bit synthesiser (see text).

Generators And Systems

Conceptually, the output of a p.r.b.s. generator can be fed into a balanced mixer together with a narrow-band signal to produce a d.s.s.s. signal. Actual d.s.s.s. systems filter the p.r.b.s. signal to tailor its spectrum before it's allowed to spread the narrow-band signal.

In the case of f.h.s.s., a parallel feed to the synthesiser is needed. This is obtained by taking the output of each flip-flop in the p.r.b.s. generator in parallel to the synthesiser, as in **Fig. 10**. The 4-stage p.r.b.s. generator, **Fig. 10,** could be fed directly to a 4-bit synthesiser giving the following sequence of numbers.

clock	4-bit number	decimal equivalent
0	1111	15
1	0111	7
2	1011	11
3	0101	5
4	1010	10
5	1101	13
6	0110	6
7	0011	3
8	1001	9
9	0100	4
10	0010	2
11	0001	1
12	1000	8
13	1100	12
14	1110	14
15	1111	15

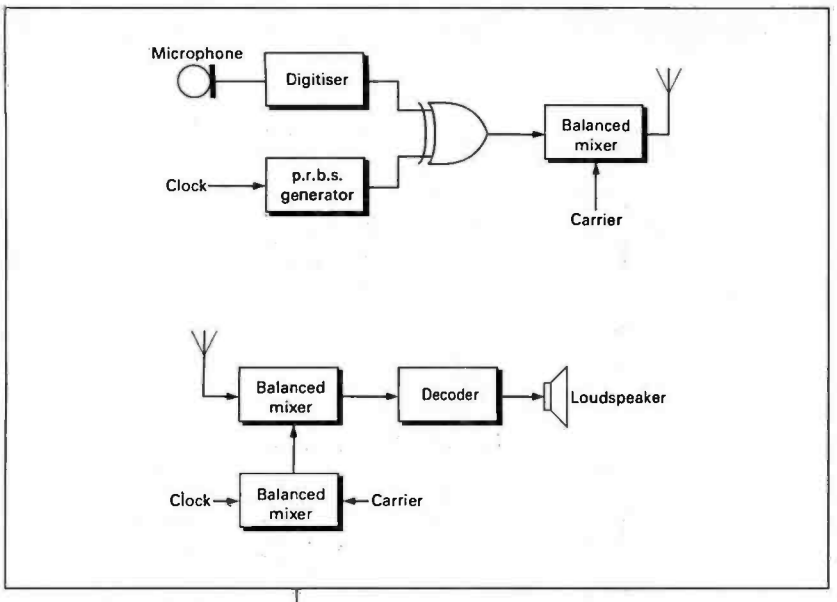


Fig. 11: The spreading sequence, and the digital information, together form a composite signal which then spreads an un-modulated carrier. The diagram shows how a voice signal could be transmitted and received by such a technique.

Notice that: during the 2^{n-1} chips of the maximal length sequence, every number between 1 and 15 occurs just once. However, it is possible to produce a different sequence of the same numbers, by simply swopping the wires around on their way from the p.r.b.s. generator to the synthesiser.

Limited And Slow

A rather limited and slow form of f.h.s.s. system could be achieved by two amateurs, if they both programmed two identical 144MHz transceivers with the same memory channels. Both radios would be set to scan the memories at the same time.

Providing the scanning did not stop for any reason, and the settling time of the radio's synthesisers was sufficiently short, the two amateurs could communicate quite happily. Without the operators really 'knowing' they were whizzing all over the band!

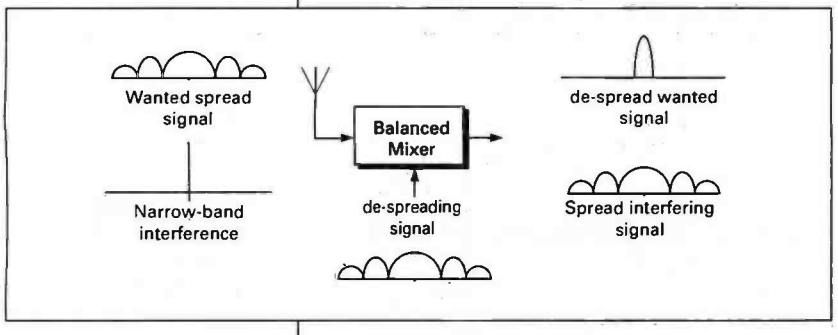


Fig. 12: Just as the narrow carrier is spread at the s.s. transmitter, any narrow-band interference will be spread at the receiver (see text).

Repeat Infrequently

Real sequences repeat very infrequently. A 32-stage p.r.b.s. generator clocked at, let's say, 10 000 hops per second, would take four days to repeat. The problem of synchronisation is the same, if not worse, than with d.s.s.s.

Now, the first problem is telling whether there is an s.s. signal present in the first place. As we have seen, in **Fig. 6**, the spectrum of a d.s.s.s. signal 'looks' like noise.

If the receiver is located a long way from the transmitter, the received signal will be below the local noise present at the receiver. This is another reason why the military love s.s. communications. The opposing forces may not even be able to detect an s.s. transmission, let alone de-spread it!

Synchronisation has to come from a separate signal in nearly all real s.s. systems. The synchronisation signal can take the form of a short-sequenced s.s. signal transmitted periodically, and be one which can be locked on to by simple methods.

The rough point in the main sequence can be estimated, providing the sequence and the time it was started is known, by reference to a third transmitter. This will be accurately controlled and receivable by all participants. This could be, for example, Droitwich on 198kHz and MSF on 60kHz. Maybe that's one reason why they are so accurate?

Easily Produced

With f.h.s.s., the narrow-band signal can easily be produced by any of the usual techniques, and similarly demodulated. In the case of d.s.s.s., digital modulation techniques are much preferred.

One reason for the digital preference, is the ease with which it is possible to digitally modulate the spreading sequence. This is easier than first modulating the carrier and then spreading the modulated signal.

The spreading sequence, and the digital information, together form a composite signal which then spreads an unmodulated carrier. The diagram, **Fig. 11**, shows how a voice signal could be transmitted and received by such a technique.

Note the simplicity of the digital modulation stage. The exclusive-OR gate acts as a digital 'mixer'.

Difficult To Recover

The problems of synchronisation have been mentioned several times. This is because an s.s. signal is so difficult to recover (even by the intended recipient) that third parties have tremendous difficulties in intercepting s.s. transmissions.

Rather than face such difficulties, a third party may instead elect to jam the transmission. Unfortunately, unless the jammer is very close to the intended receiver, (or can run quite staggering amounts of power) that too will fail.

Just as the narrow carrier is spread at the s.s. transmitter, any narrow-band interference will be spread at the receiver (by the de-spreading signal). This will take most of the energy in the interfering signal out of the demodulator's passband. This is shown in **Fig. 12**.

Amateur Spread Spectrum

As far as I'm aware, s.s. is not used by UK amateurs. Indeed, it is almost certainly not within the terms of the current UK amateur radio licence.

However, there's certainly amateur s.s. activity in other countries. These include the USA, where certain types of s.s. are permitted, providing the code generators adhere to an agreed specification. This is to allow official monitoring stations to de-spread the signals, as well as allowing other amateurs to 'listen-in'. **PW**

Further Reading

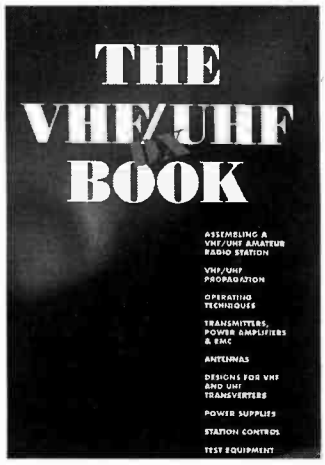
The ARRL Handbook **(available from the PW Book Service) contains some information on amateur s.s., especially as regards the situation in the USA. For an in-depth study of all types of s.s. the best book is: *Spread Spectrum Systems* (2nd edition) by Robert C. Dixon, published by John Wiley & Sons (Wiley-Interscience), New York, ISBN 0-471-88309-3.**

Another book which includes a large section on s.s. is *Modern Communications And Spread Spectrum* by George R. Cooper and Clare D. McGillem, published by McGraw-Hill (USA), ISBN 0-07-012951-7.

Late News: There's now an ARRL book devoted to amateur s.s. entitled *The ARRL Spread Spectrum Sourcebook*, edited by Andre Kesteloot N4ICK and Charles Hutchinson K8CH.

The VHF/UHF DX Book

Reviewed by John Fell G0API



If your communications interests lie within that part of the frequency spectrum known as v.h.f./u.h.f. i.e. 50 - 1000MHz or so, then *The VHF/UHF DX Book* will come as a welcome source of reference and inspiration for both the s.w.l. and radio amateur. Within its 450 pages you will find 12 chapters dealing comprehensively with virtually all relevant aspects of today's amateur band v.h.f./u.h.f. communications, written by well known radio amateurs who are well versed in their particular fields.

The specific object of this book is to promote your ability to work DX, making contacts at the limits of propagation and system performance. The ways and means of doing this effectively take a long time to master - reading this book will provide a means to speed up the process and if it leads to more activity, I am sure it will have fulfilled the authors' objectives.

Fundamental to all radio operations, the chapter on Propagation mechanisms is given a comprehensive review by Geoff Grayer G3NAQ. The style is such that the reader is introduced to the subject at atomic level and progresses through propagation mediums, to path losses and enhanced modes. All tropospheric and solar influenced modes are covered to a level consistent with current knowledge.

Operating techniques may appear at first glance to be a dry subject but under the guidance of David Butler G4ASR a solid basis to maximise your station's effectiveness is given. Topics covered include weak signal DX, listening to determine what is going on before you put your foot in and how to handle pile-ups. One of David's classic lecture comments comes up *viz* "a little c.w. can go a long way - a lot of c.w. can go even further".

Meteor scatter, e.m.e. (moonbounce) and how to increase the available intelligence flow are also well covered. Early April seems to be the only regular part of the annual cycle available to repair the antenna system, at least according to the DXer's Year Planner Chart.

Ian White G3SEK is the overall editor of this book as well as a regular and well-respected author on subjects from receiver design to microwave amplifiers, so who better to cover the subject of assembling your station. Ian explains how to determine the optimum requirements for all available modes and why, for instance, trading noise figures for dynamic range is worthwhile for terrestrial communications where ground noise rules. Station improvements and record keeping to constantly evaluate your performance are also regarded as imperative. Receivers and local oscillators are covered in depth with regard to overall system performance allowing evaluation of current 'black box' technology and providing you with the knowledge to specify your 'best case' system.

The theory given is put into practice by Sam Jewell G4DDK, Dave Powis G4HUP, Dave Robinson G4FRE and John Wickenson G4HGT to present designs for 'state of the art' transverters for 50, 70, 144 and 432MHz.

Driving from 28MHz using the best of todays h.f. rigs is still seen to be the most effective combination, certainly for strong signal handling capability such as contesting.

Power amplifiers and power supplies can take many forms, but if you want the best in terms of reliability, clean signals and raw power, John Nelson GW4FRX, has always been a firm advocate of tetrode valves, preferably those made by EIMAC. In the chapter covering transmitters, power amplifiers, and e.m.c. John gives full vent to his long-time love of r.f. power devices, quoting the good and bad points of most available methods of generating strong signals. Not surprisingly the valve approach comes out well ahead of all contenders for the station p.a. and detailed information is given on the design, construction and commissioning of amplifiers, including mods to tame most known amateur designs. No one could fail to acknowledge the comprehensive protection systems designed into GW4FRX power supplies - belts, braces, you name it, it's all in here and at the end of the day, as John says, nobody wants to stop working the DX to repair a duff p.a. - even in GW it can be quite rare. For the sake of local spectral purity it would have been nice to see details of a single valve amplifier of, say 150W, but I suppose this does represent less than ultimate station capability in John's eyes.

Antennas are covered by Gunter Hoch DL6WU from theory to practical realisation. After reading previous works by Gunter on double optimised long Yagis I can do little more than say that the material presented here is both comprehensive and invaluable if your intention is to build antenna systems capable of predictable and efficient performance. Specific long Yagi designs for all the v.h.f./u.h.f. bands covered are presented in table form together with stacking and matching techniques.

To round off the book Roger Blackwell G4PMK discusses the requirements for test equipment and station accessories to make measurements of r.f. power, voltage, frequency, etc. Practical details of impedance and v.s.w.r. measurement, receiving and transmitting, test gear and filter designs also feature.

Each chapter contains references in text which are given at the end and are for the most part available to the reader. Some may well present difficulties in obtaining but will be worth the effort.

As an all round source of reference and inspiration I thoroughly recommend adding *The VHF/UHF DX Book* to your armoury of DX chasing equipment - see you on the bands.

The VHF/UHF DX Book
DIR Publishing Ltd. ISBN 0 9520468 0 6.
Price £18.00 plus £1.00 p&p.
Available from PW Book Service, FREEPOST, Arrowsmith Court, Station Approach, Broadstone, Dorset BH18 8PW. Tel: (0202) 659930

Normally radio enthusiasts try to avoid 'feed-back', but Ron Ham is delighted at the reaction of readers to his new column.

Valve &

First of all, I must thank all of you who have written to me and for your kind remarks about 'Valve & Vintage'. It's good to know that such a column is being well received and that my work is helping so many people.

A long time ago a radio amateur said to me, "however humble or grand another man's shack may be, you can always learn something." How true, there is a wealth of radio know how and experience among our readers old and new, so let's use it through this magazine and help save a few more early sets for posterity.

Safety First

As always, safety must come first and **Bruce Adams** (Halesowen) warns of the risk of explosion when a set is first switched on after being out of service for a long time. On this subject Bruce, I have seen tubular capacitors blow themselves apart, the innards of an electrolytic smoothing capacitor littered around the inside of a cabinet and an electrolytic going off like a steaming kettle while an elderly set was on soak test.

On this theme, **Bob Morton** (Bolton) recently added a Bush DAC90 to his collection and wrote, "it sort of popped when I plugged it in and switched on!". He refers to my warning in the February column "Avoid the temptation to plug it in" and explains, "I got the set on the Friday and the *PW* on the Saturday."

However, the 'pop' and no doubt a nasty smell, was caused by a 0.1µF capacitor, across the mains input, blowing its end off. **DO NOT REPLACE THIS WITH A STANDARD** 0.1µF, because these capacitors were special and must have a high a.c. working voltage.

Now readers, had this fault been one or both of the smoothing capacitors, then the rectifier may have been wrecked at that time. There is a thin connecting link inside a half-wave rectifying valve between the cathode, where the d.c. comes out and the external pins.

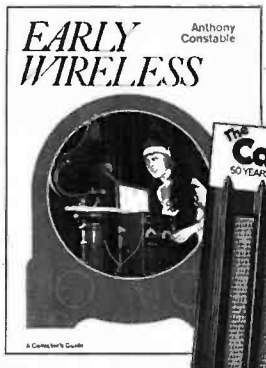


Fig. 1.

Fig. 2.

Fig. 4.

The link usually burns out like a fuse when a short in the high-tension supply occurs. You should be able to see this through the glass when the valve is removed. Do check that the h.t. line is clear of shorts before inserting a new and possibly expensive rectifier.

Live Chassis

Bruce Adams also warns about those chassis that remain 'live' when a set is switched off. On this point make sure that a double pole mains on/off switch is fitted and that the mains lead is not perished.

In many cases the lead enters via a hole in the rear of the chassis and makes its way to the on/off switch, attached to the volume or tone control, at the front of the set. Fit a good insulating grommet and cord-grip where the lead enters the chassis and keep the 'exposed' wires between the end of the cord and the switch contacts as short as possible. Although the latter are already insulated, slide an extra sleeve over these ends for added protection.

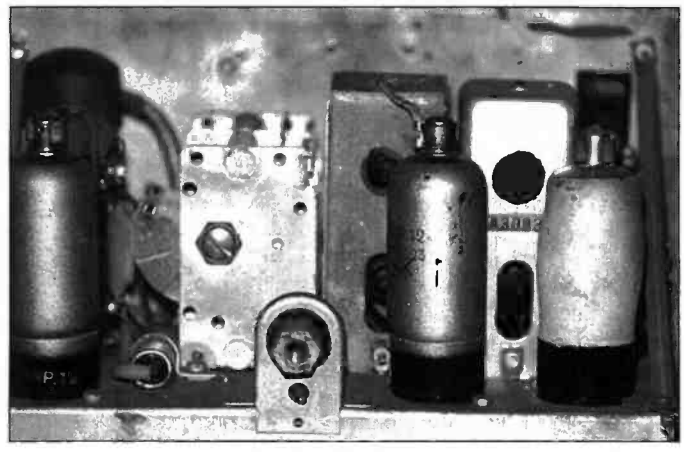


Fig. 3.

Museums And Books

Radio sets of the 1930s made by Bush, Ekco, HMV, Pye and Ultra are the fascination of **R. Matthews** (Wolverhampton) who, along with Bob Morton, wants to know more about museums, where vintage sets can be seen and reference books on the subject. There is a very good private wireless museum run by **Gerald Wells, 23 Rosendale Rd, West Dulwich, London SE21 8DS,** which can be seen by first phoning for an appointment on **081-670 3667.** Gerald is also the membership secretary of the **British Vintage Wireless Society**, an organisation which many of you may be pleased to join.

I had a word with **David Rudram** (Worthing), a BVWS member, about books on vintage radio and he suggested sending four first class stamps to **Chevet Books, 157 Dickson Rd, Blackpool FY1 2EU,** to get their catalogue. David is the Hon. Curator of the wireless exhibition at the **Amberley Chalk Pits Museum** and you can write to him for more information, c/o the museum, at **Houghton Bridge, Amberley, Arundel, West Sussex BN18 9LT**, enclosing an s.a.e.

Two books that I have, and would thoroughly recommend to serious collectors, are *Early Wireless*, **Fig. 1**, by Anthony Constable, (ISBN 0 85936 125 X) and *The Cat's Whisker*, **Fig. 2**, by Jonathan Hill (ISBN 0 905368 46 0 (cloth) or ISBN 0 905368 479 (paper-back).

Military Set

One of the happiest periods remembered by **Paul Fry** (Winchester) was Christmas 1964, when he received a complete working ex-military 'Wireless-Set No.18 (WS-18) as a gift. These back-pack combined receiver-transmitters were mainly built during WWII and, if you find one today, please keep in mind that it is about 50-years old and never intended to last this long.

However, this gives me the chance to show you a bit of detective work that is often needed with ex-wartime equipment. Briefly WS-18, is battery operated and has a 6-9MHz receiver, **Fig. 3**, in the top half of the case and a similar styled transmitter in the lower half.

The rear view of the receiver **(Fig. 3)** shows four valves, three of which are marked ARP12, which means Army Receiving Pentode No.12. Wartime valves were coded like this, for example, 'VR' is the RAF for 'valve receiving' and 'NR' for Navy Receiving.

In the late 1940s, when all that lovely surplus radio gear was about, the Radio Society Of Great Britain published a *Service Valve Equivalents* book, **Fig. 4**, which is a mine of information about military valves of that period. The ARP12 is listed among the Army valves on page 8, and gives a CV (civilian) equivalent number of CV1331, which equals a Mazda VP23.

The next step is to look at a good valve manual, to find out the working voltages and base connections of a VP23. Very often, valve information can tell you a lot about the set itself, especially if you haven't got an original service manual. For instance, the VP23 is a directly-heated valve requiring 2.0V at 0.05A to light its filament, 120V at 1.0mA on its anode and 60V at 0.35mA on its screen-grid. By the

Vintage

By Ron Ham

Abbreviations Table

A	ampere
ht	high tension
in	inch
mA	milliampere
MHz	megahertz
MΩ	mega ohm
V	volt
µF	microfarad

way, don't be caught out, the VP23's base is a Mazda octal, which slightly differs in size to the international octal.

Working Order

Forty years ago, **Peter Watkins** (Leicester) obtained a brand-new ex-WD AR88D communications receiver which, I am not surprised to learn, is still in working order. One reason is because it has been kept working and the original high quality components have remained dry. Peter reminds me of the sheer delight many of us had in the 1950s looking at all the state-of-the-art radio gear that was sold off by the various government departments.

The rear cover of the RSGB book in **Fig. 4** has an advert for ex-RAF T1154 transmitters and R1155 receivers at £10.10s and £12.12s respectively. Former air crew wireless operator, **G. D. Hall** (Cambridge) tells me that his squadron were still using this combination of r.t. equipment when they were disbanded in 1966.

May I add G. D., that a good 10-years later, when I was a radio instructor, some ATC squadrons were still using them! This all proves readers, just how good the original design was, but more about these sets in the future.

Crystal Sets

"My first wireless reception was by a British-Thompson-Houston (BTH) crystal set in a quite magnificent mahogany case. At boarding school, the aerial was the bed springs, while the earth was a water-pipe," wrote **Dr. W. G. Taylor** (Scarborough) and continued, "Reception was good as I well remember. Cost, 5/-. Later I swapped it for a penknife." While W. G. was laid up during the mid-1960s, his bedside companion was an Eddystone 840C communications receiver, which remained there throughout his convalescence.

Peter Jones (Fownhope, Hereford) built his first crystal-set at the age of six, using a crystal obtained from his grandfather and his father's old RN issue earphones. Peter has one of the famous 'SHORT-WAVE SET MKIII' crystal-sets, **Fig. 5**, in his collection. These were used during WWI by soldiers in the trenches to receive signals, about enemy artillery positions, from a Marconi spark-transmitter installed in an aircraft.

A close look just above the middle of **Fig. 5** will show a 'Perikon detector' in the centre and a 'carborundum detector' to its right. The incoming signal (terminal top right) from the long-wire antenna, was peaked up by a stud-switch with 19 taps, in conjunction with the 'Aerial Condenser' on the lower right.

The Intermittent Fault

One of the many pains suffered by radio service engineers is the intermittent fault. OK, some like the badly soldered joint, the loose nut and bolt holding a solder tag to the chassis, etc., are fairly easy to find. But, what about the beast of a set that ran perfectly well for about an hour and then stopped working. After being off for ten minutes it re-started and worked happily for a further hour when it died again. That is when such a set takes up residence on the 'soak' test bench until the fault is cleared.

Many years ago, I had an elderly Philips with an intermittent fault, and I finally tracked the trouble to an unusual failure in the wiring to the volume control. Although it is a simple circuit, as my sketch in **Fig. 8** shows, it is an area of circuitry worth looking at in more detail.

Imagine that the rear cover of the potentiometer, in **Fig. 6**, has been removed and you are looking at the wiper, 'C', which is moved up and back on the carbon track by a centre shaft. Depending on the circuit design, the resistance of the track ranges between 0.5 and 2MΩ.

The black area at the top is the insulated terminal block. In most cases, the two outers connect to each end of the track, while the centre contact, 'D' goes to the wiper. The metal frame-work of the 'pot' is secured to the chassis by a centre nut and thread around the drive shaft, which, when tightened (and don't forget the locking washer), electrically bonds the control to the chassis. Despite this, it's a good practice to solder a jumper wire 'B' between the 'earthy' end of the track, the case of the 'pot' and the chassis.

In order to reduce 'hum' in the audio frequency circuits, the manufacturers use some form of metal covering. This is 'A' and 'E' in the diagram, to screen the audio signal wiring in and out of the volume control (now more often called the a.f. gain).

Now, back to my intermittent fault. You will see that the outer casing of cables 'A' and 'E', **Fig. 6**, are earthed to the chassis. Only the minimum amount of the insulated inner wire, dotted within 'A' and 'E', is left exposed at the connection points.

After decades of use, the rubber insulation inside the screening had gone 'spongy', although the exposed bits looked okay. However, when the set got really hot, the perished rubber 'bubbled' up and allowed the inner conductor, about 0.25in inside 'A' from 'D', to touch the outer and short-circuit the audio signal to earth. Of course when it cooled, the rubber congealed and, for a while, re-insulated the wire and removed the short.

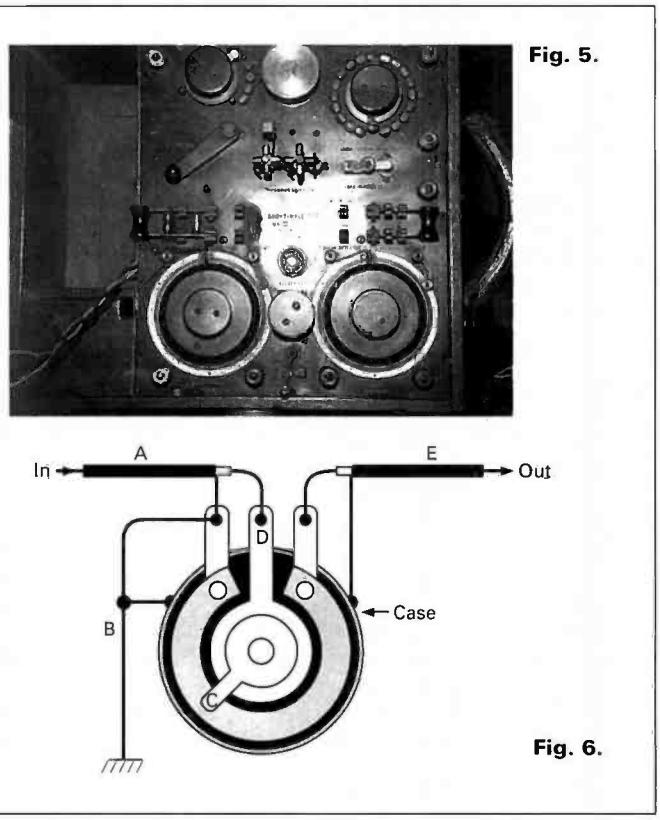


Fig. 5.

Fig. 6.

Pride And Joy

The pride and joy of **Baden Gooch** (Ely) is his pre-war 'Ovaltinies' Philips, while his current project is a mid-fifties radiogram. Unfortunately, the stylus tip from the Perpetuum pick-up cartridge is missing and evidently no longer available. You asked me about clubs for "people who like old wireless sets," Baden, well, here is one good reason for joining the BVWS where you can see adverts in their journal and discuss such problems with like-minded people who can very often come up with an answer.

Some time ago, **Norman Parr** (Hinkley) acquired a seven valve radio, including rectifier and magic eye, with four wavebands, plus f.m. and a rotatable ferrite rod antenna. "There is no manufacturer's name only the name 'Orion' and I suppose it must have been made when f.m. first came into vogue," said Norman.

I can think of several high-class table sets of the late 1950s era that fit your description and were made both in the UK and in France and Germany. 'Orion' may be a makers model logo. You may get a clue as to the date and the country of origin by taking a detailed look at the valves and components, inside the cabinet, back-cover and loudspeaker and underneath the cabinet. If you want a service manual, don't forget to try one of the firms whose advertisements appear in *PW* and our sister journal *Short Wave Magazine*.

Cheerio for now and keep writing to me on your 'Valve & Vintage' memories. My address is **'Faraday', Greyfriars, Storrington, West Sussex RH20 4HE.**

See you next month.

Packet Panorama

This month, Roger Cooke G3LDI gives us some good news about h.f. forwarding to and from the USA. He then gives us some basic user information, before requesting some information back from you.

In the November '92 issue of *PW*, I reported the ARRL's proposed curtailment of automatic h.f. packet operation, which many of you must have read, with dismay. But I'm pleased to say that there were a large number of protests to the proposals. Subsequently, at a meeting held in September, the ARRL's decision has been reversed.

I also received a letter from Mr Barker G3WAL, accusing me of being "intemperate in my comments". He suggested that running my packet radio BBS, was akin to playing with a toy. He also said, that packet radio users have no right to amateur radio bands, except those our government (?) are kind enough to give us!

Real Users!

I can only say, I hope you feel that way when the government decide to take more slices of our bands and give them away to 'real' users.

If everybody had this sort of attitude, we could end up using semaphore again. We **need** people to make intemperate remarks. We **need** people to get off their backsides and shout, in order to at least keep what we have of the amateur bands.

However, back to the original story. The ARRL have now decided that enough amateurs want the forwarding privileges afforded them by a special temporary authorisation (STA). Once again, the proposal is, that automatic operation can take place within sub-band segments, but semi-automatic (with operator present) can take place in any part of the band.

No packet-only segment was proposed, so the digital modes are still all mixed together. This should ensure that unattended automatic operations does not affect other mode users, as they should be aware of the segments involved.

All unattended stations must be equipped with a 'time-out' function, to ensure that the transmitter is not kept keyed-up in the event of problems. I don't know of a TNC that doesn't have this facility, so our "toys" shouldn't be a nuisance in the event of a problem occurring!

The band segments allocated for h.f. forwarding (this applies to the USA only) are as follows:

1.810 - 1.820MHz
3.620 - 3.635MHz
7.100 - 7.110MHz
10.140 - 10.150MHz
14.095 - 14.099.5MHz
14.100.5 - 14.112MHz
18.105 - 18.110MHz
21.090 - 21.125MHz
24.925 - 24.930MHz
28.120 - 28.189MHz

We can exchange mail again as usual, with the USA, when propagation is in our favour.

Compressed In Size

All mail to my h.f. gateway is usually passed to WA3TAI. If this hasn't happened within a day, it's then compressed in size, and sent automatically to GB7LAN, the satellite gateway in Lancaster. We have to thank Andrew G8TZJ, the sysop at GB7LAN, who has written a server program for the FBB software to allow us to do this.

So there should be little delay in Stateside mail, whichever route it takes! Of course, there should be even less delay when I receive written permission for my satellite gateway, nudge nudge!

Surviving The BBS!

Looking at some of my BBS user statistics, it's apparent that quite a number aren't completing their user details when first logging onto the BBS. It's in your own interest to complete these details, if only from the point of view of **not** receiving the same request each time you connect to your BBS.

The details aren't for some big-brother like purpose, but your correct details can make things easier when using some of the server facilities. Even something basic, such as your name, can be made to look better when using the correct mix of upper and lower case, e.g. Roger, not roger, or rOgER, etc.

Basic Information

Here is just a little basic information that can help the BBS and sysop.

NZ - When entering your postcode, **do not** put a space in, enter it like this: NR148LQ.

NH - Please enter just one call for your 'HomeBBS, which is where you wish your mail to be sent on to.

NQ - Please enter your full Grid Locator, e.g. JO02ON. This will be essential when I, or your sysop, begin using the satellite server.

There is the ability to add other information into the database held on the BBS. If you don't mind the information being held by the BBS, you could enter your full user details. If anybody then wanted your address or telephone number it could be available.

To put these details into the BBS, enter the server mode by typing 'F', then enter the user-data mode by typing 'N'. At this point, using the '?' command, will give you a list of what details you can enter. You can enter your callsign, 'HomeBBS', full name, full postal address, QTH locator, home and work telephone numbers.

Some people may object to entering this information, but it can be quite useful. There is no space for "particulars withheld", etc., so if you don't like it, you don't have to put it in.

As you become more confident at using the BBS, you can change your 'expertise' level by using the 'X'. This means that you will just receive the minimal prompt, instead of the long line of command letters. You can also toggle back and forth with 'X', so it's not permanent.

That's it, space has escaped me once more. If you have any news, comments, etc., please let me have them. I'm particularly interested in receiving more details about user groups.

See you next month.

73 DE G3LDI @ GB7LDI, QTHR, tel: (0508) 70278

E N D

A pair from PacComm. The TNC-320 packet controller, sits on top of the PacTOR

Satellite Scene

This month, Pat Gowen G3IOR describes the French ARSENE amateur radio satellite, planned for launch on April 20 this year.

From Bernard Pidout F6BVP and Jean Gruau F8ZS, President of Radio Amateur Club de Espace 'RACE', the organisation of radio amateurs first founded in 1980, comes news of the French ARSENE amateur radio satellite.

The term ARSENE is an acronym for 'Ariane Radio amateur Satellite pour l'ENseignement de l'Espace'. Michel Danvel F8YY of the CNES French Space Agency and Jean-Pierre Redon F8IC CNES Engineer head the project, whilst F6FAO, F6ABJ F8FV and F6GXY all contributed to the end-product.

The satellite has been designed, built and tested by over 300 student engineers in 30 schools and the communications system completed by radio-amateurs of ATEPRA, the 'Association Technique pour l'Experimentation du Packet Radio Amateur'. Now ARSENE is planned for launch with ASTRA-1-C from the ARIANE-V-58 rocket from the ESA Kourou French Guiana site on the 20 April 1993. The craft's lifetime expectancy is three to five years.

The ARSENE's final orbit will be equatorial, i.e. at 0° inclination. It will have a perigee close to 20 000km and an apogee of 36 000km. This will give an orbital period of 17 hours 30 minutes and will result in a slow drift from west to east.

The high orbit will provide a mean access time of nearly 12 hours daily for stations up 40° latitude. There are corresponding reductions in access times at higher latitudes.

Packet Transponders

The ARSENE craft will carry three packet radio transponders, all using standard AX25 f.s.k. at 1200 bauds. They will operate as a digipeater in real-time only, ie. there will be no mailbox memory for message storage and retrieval.

The three uplink frequencies will be in the 435MHz band and the single downlink frequency in the 145MHz band. A mode 'S' linear transponder will also be available.

The packet mode will support experimental s.s.b. and c.w. working. The 18W of output power from the satellite will provide a comfortable link budget allowing connections through the packet transponder of ARSENE between stations without any additional or specialised equipment.

High Efficiency Panels

The latest high efficiency GaAs solar panels from Italy will provide 60W of available d.c. power. The ARSENE communications payload uses B mode (435MHz for the uplink and 145MHz for the downlink) or S mode (435MHz uplink with 2445MHz for the downlink).

The B and S modes will not operate simultaneously. Mode B has it's three combined uplinks at 435.050, 435.100 and 435.150MHz. The single downlink is at 145.975MHz, and can be output power switched to give either 15W (42dBm) or 2W (33dBm).

Due to the slow motion in respect of the user, the maximum Doppler shift at 145MHz is expected to be no more than 3Hz per minute. The S mode has a 16kHz bandwidth linear transponder, uplink 435.100MHz and downlink 2446.540MHz with 0.8W of output power (29dBm). The Doppler shift at this downlink will be only 14Hz maximum per minute.

The Three Differences

Joe Kasser W3/G3ZCZ points out that there are only three differences between ARSENE's digipeater and any conventional terrestrial digipeater, these being:

1. The device is cross band. You must uplink to it on 435MHz and receive it on 144MHz.

2. The device is moving, and will only be available for predictable but specific times of the day.

3. The link control parameters in your station TNC will need to be adjusted. This is so it will cope with the time delay involved in the round trip from the ground to the spacecraft and back again from the satellite to you.

Working through ARSENE will be similar to working through AMSAT-OSCAR-10 or 13 with minimal Doppler. But, due to the distance from and to the satellite, there will be some time delay on the signal.

Received signal strengths are expected to be much stronger than those of OSCAR-10 or 13, and hopefully without spin-modulation. Users will need only 10W to a 10dB gain (10-element Yagi) at 435MHz and a receiver of 4dB NF to assure contact.

The main problem may be ARSENE's very high popularity due to it's ease of access. Conventional packet stations equipped for 435 and 145MHz operation will be able to use it with their existing TNC, e.g. without any additional modems or special equipment.

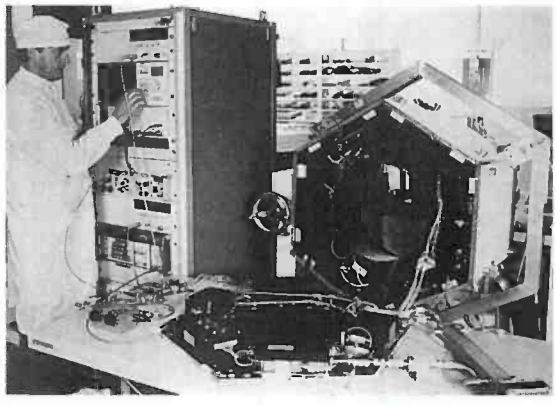
Furthermore, it will be at one point in the sky for long periods of time, so negating the necessity to calculate and constantly change the antenna heading and elevation. You merely point at it, peak it, and go ahead!

Sharing The Satellite

Individual users, Packet Clusters and PBBS will all be sharing the satellite at the same time. To even up the odds of getting packets through, Joe suggests that we allocate one uplink channel to each class of user. This approach ensures that competition for the transponder in each class of user is limited to the particular use.

He recommends that Packet Clusters use 435.050MHz, individual users employ 435.100MHz, and that PBBS forwarding uses 435.150MHz.

He writes: "ARSENE will provide an interesting addition to packet radio and world wide communications if we don't choke it at birth. Those among you who have tried to use the 1200 bauds AX.25 digipeater on orbiting MIR will know only too well the problems of popular multi-station overload, and MIR's footprint is far less than that of ARSENE's. For this reason we must think about it, and plan for its optimum use"



The French ARSENE satellite under test.

E N D

The World of ATV

FOCAL POINT

This time around, Andy Emmerson G8PTH starts his bi-monthly look at some fascinating news of a very active ATV network.

Here's some fascinating news of a very active ATV network which sort of parallels the Manchester Ship Canal.

Courtesy of Brian G3SMU, I hear the system starts with G3UVR in Heswall and is sent on 10GHz to G3SMU halfway up Winter Hill (Bolton). Signals are re-transmitted on 10GHz and combined with other 10GHz signals from G6ZBV (also Bolton) at the QTH of G4CBW in Newcastle-Under-Lyne.

From here, they are radiated on 1.2GHz to all comers (or receivers). G4CBW has a fancy video-effects generator and apparently manages to show incoming signals as well as his own, all in the same picture - it sounds magic! In fact the whole system is working so well, they are thinking of establishing a repeater at Brian's place, the precise mix of 1.2GHz and/or 10GHz inputs and outputs to be determined.

It's great to hear of keen activity and enthusiasm like this, that's what will keep ATV bubbling. I look forward to hearing more about this enterprising project.

East Yorks Repeater

"Don't call it Humberside any more," says Clive Reynolds G8EQZ, who with Andy Goy G4HJD and Richard Guttridge G4YTV are celebrating the arrival of a licence for the amateur television repeater they have built. The new callsign is GB3EY and by the time you read these words it should be operating in the 1.2GHz band on channel RT3 (1248MHz in, 1308MHz out). The slightly odd choice of frequencies was more or less forced on them by a radar station in the coverage area.

The new repeater is located at Aldbrough, offering a good service area to the east of the Yorkshire Wolds and the south bank of the Humber to the east of the Lincolnshire Wolds. It runs 25W e.r.p. from an Alford Slot antenna, which should provide a good TV repeater service from Bridlington in the north, to Cleethorpes in the south, and Hull to the west. The site owner is Tony Leake G0NAA, who has a farm on the cliff-top.

The use of the site and the 23m lighting tower will be shared with Tony's antennas and those of GB3HA , when it moves down the coast from Hornsea. The group plan to interlink GB3EY with GB3ET on Emley Moor, also to add touch-tone controlled user facilities, so it sounds as if things are bubbling there.

If you would like to join in the fun, why not contact Clive G8EQZ on (0482) 563691 or Richard G4YTV on (0964) 562948?

"Our licence application must have been the fastest ever granted," continues Clive. "From start to finish, the whole process took just four months, with no come-back on any points. Fortunately there were no objections, but we weren't expecting any from the amateur community because we put a lot of effort into educating the local users of the airwaves. We visited every club in the coverage area and gave talks and demonstrations of ATV, told them how TV repeaters worked and generally made it all sound interesting and useful. As a result, we got everybody on our side and things have worked out very well."

This public relations aspect is crucial, I think. I hear of some repeater groups (but they are really more like one or two man bands) who do nothing to get locals interested. They build the box, put it on the air and that's it. And when nobody shows much interest, they claim the amateur fraternity is not supporting them. I'm not naming names but if the cap fits, well... isn't it time to do something?

As hams, we complain how the public tend to react with total indifference to amateur radio and television, but at least the public have the excuse that they don't understand about widgets and haven't had it all explained to them. It ought to be easier to get the amateur radio community interested in ATV, but how can they be, if they haven't been told what's going on? Some repeater groups can't even be bothered to tell fellow ATVers what's going on!

I have never had a letter from the groups allegedly at work in Bath, Hastings or even Northampton. The last letters from Scotland, Stoke and Nottingham, were about eight years ago. Come along guys, why not drop me a line and tell the rest of the ATV world what you are up to? Do you even exist any more?!? Do you care? Does the rest of the BATC care? Frankly, I'm coming to think I don't care, but I still think it's a shame, so deep down in my heart I suppose I do care. OK, end of sermon, back to the story.

News From Poland

Now some news from Poland. Yes, it's a bit late, but... Stanislaw Pazur writes: "On May 16 and 17 last, the eighth congress of members and sympathisers of the Polish ATV club, RVG, took place in Kalisz. The discussion focussed on creating a system of packet radio. A transmission of ATV from the car was presented and they also showed interesting constructions of FAX and SSTV modems for Amiga and PC computers. The management of the club was chosen. The president is Wojciech Cwojdzinski SP2JPG, the vice-president Bartosz Pastusiak SP3CAI and the secretary Kaziermierz Slomski SP2ERD. The club bulletin will not be issued any more and the current news will be published in amateurs' magazines."

DX From Dartford

Dave Clarke G7KAD (Dartford, Kent) has been enjoying operation lately. "Just to let you know there was another good lift on Monday December 28 last year. At about 2130 I saw GB3UD (P5, 248km), GB3NV (P4, 194km), G0NAA beacon (now, there's a thing!) and worked through GB3TN. However, I saw all these on my Severnside aerial (with home-made extension) which is on fixed alignment towards GB3TN; I had to make do with this because my G3JVL loop Yagi had become very deaf due to a severe build-up of ice on it!

"Has anybody else had this problem and not realised it? The symptoms were increased domestic TV breakthrough and my pre-amp kept taking off," he writes.

If you can help Dave drop me a line in ATV, **c/o the *Practical Wireless* Editorial Office in Broadstone, Poole.**

END

D A V I D B U T L E R G 4 A S R

This month David brings news of excellent propagation, increased Novice Licence allocations on 430MHz and the final table scores for 1992.

VHF Report

During January I received many reports of excellent F2 propagation to Australia on the 50MHz band. There were also tremendous Sporadic-E openings on the 144MHz band and record-breaking tropo contacts on the 430MHz band.

On the other hand, this is the April issue! The reality was of course that the UK was battered with gale force winds and heavy rain, the sun spot count reached an all-time low and many antenna systems did the same!

However I do have good news of increased v.h.f. allocations for Novice operators, reports of 50MHz Sp-E openings, unusual DX on the 70MHz band, details of free r.f. design and antenna design software, some new features on the DX Clusters and the usual solar data and contest calendar.

Novice Licence

A Gazette notice was published in February which varied the existing conditions of the Novice licence. In particular, the schedule was altered to allow novices access to the frequency range 50-52MHz and 432-440MHz. Before this announcement came into force, the existing allocations were 50.620-50.760MHz, 51.250-51.750MHz and 433.00-435.00MHz. It's a very welcome move which I'm sure you'll all agree with.

Tropo

Conditions via the tropo mode were very poor during January, with nothing being reported in the way of DX on any of the v.h.f./u.h.f. bands. But at least reports are still trickling in about the good tropo that occurred over the Christmas period.

Propagation was very good on December 27 to Scotland, according to **Ralph Sachs G2CZS** (JO01) who reported working GM3JFG (IO77), GM3POI (IO88), GM4AFF (IO87) and GM4YXI (IO87) on the 144MHz band.

It was also good in other directions, and during the evening of the 27th **Neil Underwood G4LDR** (IO91), operating from his new QTH near Salisbury, worked a number of stations in southern France on the 430MHz band. On December 28 he found EA1TA (JN53) on the 144MHz band, but didn't hear anything from him after moving to the 430MHz band. However, he did manage to work OZ9IT (JO46) on that band at 2005UTC on January 2.

Gordon Emmerson G8PNN (IO95) concentrated on even higher frequencies. He worked DL5KVA (JO64) and OZ7IS (JO65) on December 28 for new squares on the 1296MHz band and G6PHJ and G8ZQB (both in IO92) on the 1296MHz and 2320MHz bands.

Conditions were still good the next day and more contacts were made on the 2320MHz band with G6PHJ, G8ZQB and G4LRT, all signals being S9+. A number of contacts on the 1296MHz band were made during the evening of the 29th including G4KGC and G8DKK, but despite getting 599 signals from the GB3DUN, GB3IOW, GB3MHL and GB3MLE beacons, nothing else was heard.

Aurora!

Very little in the way of auroral activity was detected during January. But those of you that have studied the calendar shown in the February issue of *PW* will have noticed that aurora can occur at any time of the year, but it tends to peak around the equinoxes September/October and February/March. It may even be happening at this very moment!

Chris Tran GM3WOJ (IO77) has sent me an interesting analysis of 719 different stations worked via aurora on the 50MHz band in a 10-year period between February 1983 to February 1993. The actual number of auroral openings during this period in which Chris made c.w. or s.s.b. QSOs was 129, and a total of 20 DXCC countries were worked, including the unusual multi-propagation mode contacts with CX8BE and ZS6AXT, which I reported in 1992.

Moonbounce

Time to look at moonbounce now. In the latest issue of the *VHF-UHF DXer* (available from **Dave Hardy G8ROU**) comes details of a new 144MHz e.m.e. antenna system at the QTH of K5GW. The array consists of 48 x 10-element Yagis in an area 23m wide by 16m high, and contains 175m of 7/8in Heliax and 200m of RG213 coaxial cable.

The Yagis were designed using the K4VX Yagimax 3.0 antenna modelling software and special attention was used with the stacking software to produce an array with very low sidelobes. Antenna range measurements of a single 10-element Yagi and sidelobe checks of the completed array verified the accuracy of Yagimax 3.0.

Following the demise of his e.m.e. array in 1992, **Dan Gautschi HB9CRQ** has built a new 144MHz system, only this time it's even bigger. The reasoning behind this is based on the old remark "if your antennas didn't blow down then they weren't big enough". However the e.m.e. fraternity have an even better saying which is "if they did blow down then put up something even bigger!" The array at HB9CRQ now consists of 8 x 19-element M2 Yagis (they're in excess of 10m long) and it certainly seems to be working well.

Richard Gardner G4WKN using a single 16-element F9FT Yagi and 300W worked him on January 9 with Dan peaking 529. During this period G4WKN also worked IK3MAC (8-Yagis) and heard SM2CKR (also 8-Yagis) and GM4YXI (4 x 9-element OZ5HF Yagis). Another station using 4 x 9-element Yagis is **John Hoban G0EVT**, although in his case they are the F9FT design. He has now worked 19 separate stations in nine countries, DL, HB9, I, LA, OE, PA, SM, W and VE, most of the c.w. contacts being unscheduled.

The 50MHz Band

If you thought that propagation on the 50MHz band during December was bad, well I can reliably inform you that January was even worse! It can be summed up in one sentence, the Quadrantids meteor shower on January 3, a sighting of the GB3LER beacon via aurora on January 11, a days worth of Sp-E on January 16 and a brief opening to Poland via Sp-E on January 17. **And that was it!**

The Sp-E opening on January 16 was particularly good, with an event starting early in the morning around 0700UTC lasting until 1200UTC, and another one from around 1500UTC continuing through to 2000UTC. Stations in central England reported working DX in Croatia (9A), Slovenia (S5), Czech Republic (OK), Slovakia (OM), Poland, Austria, Germany, France, Spain, Balearic Islands (EA6), Italy, Sardinia and Sweden.

Silvio Rua IW1AZJ reports that at 1800UTC following the Sp-E opening he made c.w. contacts with EA4LY (IN80) and IC8FAX (JN70) via field-aligned irregularity (f.a.i.), the signals being weak and displaying the characteristic frequency spread associated with this propagation mode.

I've received a very interesting report from **Richard Lamont G4DYA**. Richard noticed that his packet radio t.n.c. had received data at 0734UTC on January 16 from a station signing 4N7WW on

70.4875MHz.

As the signal did not possess a subsidiary station identification (s.s.i.d.), for example 4N7WW-15, it is assumed that it was received direct and not via a linking node. If this was the case and the callsign was genuine then it indicates that the Republic of Bosnia-Hercegovina has granted an amateur allocation in the 70MHz band. Richard wonders if anyone else has noticed DX callsigns appearing in their 'MHeard' list on 70MHz.

Brilliant Book!

In last month's column I made a very brief reference to the (absolutely brilliant!) *VHF/UHF DX Handbook.** Some of the subjects contained in the book (ISBN 0-9520468-0-6) include receiver front-end optimisation and DL6WU long-Yagi design, both of which utilise specific software which can be obtained from myself.

Additionally, I also distribute the US/UK RF library of BASIC programs. These programs cover r.f. design, antenna design, propagation and other areas. Programs on the US/UK library disk include design of microstrip circuitry, gamma match design, an upgraded MINIMUF program, path loss calculators, WA1JXN's multi-function moon tracker, G3SEK's e.m.e. program, W9IP's famous meteor scatter program, satellite trackers and much, much more. A total of 33 excellent programs are crammed into one 360k disk.

Two other program disks are also available, the first one is VK3UM's do-anything e.m.e. program - a real masterpiece. Facilities include tracking the moon, sun, stellar radio sources and quiet sky.

The program will calculate mutual moon windows and spatial polarisation offsets for any two locations, and has a signal/noise calculator and a 2.5 minute sequence timer for good measure. The program is written in Turbo Pascal and is distributed as a compiled, ready-to-run .EXE file with full instructions.

The other disk is MACE, an l.f. to v.h.f. circuit program, written by Roger Blackwell G4PMK. Specify the values of components and how they are to be interconnected, and MACE will predict the frequency and phase response of your circuit. The disk is distributed as a compiled and ready-to-run .EXE file, with documentation and sample circuit and device data files.

To obtain any of these three disks, sent me sufficient 360k formatted 5.25in disks, plus return postage and packing. As you are getting this material free of charge, it would be appreciated if you could include some details for this column, even a photograph if you have one!

A new version of meteor scatter software has been released to enable proper m.s. scheduling to take place. It can be obtained by sending four IRCs, an s.a.e. and 3.5in disk to **Ilkka Yrjola OH5IY**, Jukolant.16, SF-45740 Kuusankoski, Finland.

Annual v.h.f./u.h.f. table

January to December 1992

50MHz Station Countries	70MHz Counties	144MHz Countries	430MHz Counties	1296MHz Countries	Counties Total points					
G4FCD	40	27	—	—	86	23	54	21	38	13	302
G6HKM	63	64	—	—	68	23	33	17	21	9	298
G8ESB	10	11	32	6	83	18	36	10	21	5	232
G1SWH	15	29	51	7	67	12	33	10	3	1	226
G4ASR	10	62	44	8	62	37	—	—	—	—	223
G0NFH	19	29	28	4	60	15	32	13	7	5	212
G4LDR	15	20	28	5	58	20	41	15	—	—	202
G0EVT	8	38	21	4	35	31	2	5	2	1	147
G6MXL	1	17	9	1	38	19	26	11	9	7	138
G1SWH	8	20	18	5	37	10	21	9	2	1	131
G1THG	33	28	—	—	51	12	—	—	—	—	124
G7CLY	18	28	—	—	55	12	2	1	—	—	116

VHF Meetings

Time to look in the diary now, for further v.h.f. meetings. Don't forget that the Martlesham Radio Society are holding a v.h.f. round-table at the BT Research Laboratories Martlesham Heath Suffolk on Sunday March 28.

Full details were given in last month's column, but it is important to remember that you will only get in if you have applied in advance for a ticket from **Malcolm Bell G4CXT.**

Solar Data

Now, it's solar information update time! During the first week of January the more active side of the sun was in view, and although there was an increase in magnetic activity, very little solar flare activity was observed. The passage of coronal holes on January 11 caused the geomagnetic field to become very unsettled, and as a consequence, an aurora was detected in central England, but it was a very small event and only reached the 50MHz band.

The quieter side of the sun rotated into view from January 18 and there was a large decline in sun spot levels and similarly in solar flux levels. On January 24 the sun spot numbers measured only 33, the lowest level since June 1992.

Contests

I have news of some contests coming up in the next few weeks and the first is the 70MHz cumulative event being held on Sunday March 14 between 1000-1200UTC. This is the last one in the series but don't worry if you missed it, as another 70MHz contest is being held on Sunday March 28. This one runs from 0900-1500UTC and is intended for fixed stations, with single or multi-operator sections. The contest exchange consists of callsigns, report, serial number, locator and QTH.

If you like c.w. then why not try entering the German AGCW-DL 430MHz c.w. contest, being held on Saturday March 20 between 1900-2300UTC. I gave full details in the March issue of *PW.*

Two separate RSGB contests, one on the 1296MHz band and the other on the 2320MHz band, are being held on Sunday April 11 between 1600-2200UTC.

The Nordic activity contests will be held between 1800-2200UTC on the following Tuesday's; March 16 (Microwaves), March 23 (50MHz), April 6 (144MHz) and April 13 (430MHz).

Via Packet Radio

Whilst on the subject of contests, it is worth knowing that there is an on-line contest information system running on the packet cluster network. Details of annual contest dates can be obtained by connecting into a DX Cluster and sending the command TYPE/CONTESTS FIXTURE.VHF and this will provide you with a list of yearly events.

If you want further information, you send the command SH/VHFTEST MAR to give you details of v.h.f. contests during March. (Note that the month must be given in a 3-character format, e.g. Apr, Jul, etc.) The information provided may say something like "see also 70MHZCUM.RUL file in CONTESTS area" and by sending the command TYPE/CONTESTS 70MHZCUM.RUL very detailed rules for that specific contest are obtained.

Just in case the h.f. fraternity feel left out, there are similar facilities available, you only have to substitute h.f. in place of the v.h.f. command.

If any of these commands do not work then it simply means that your local cluster is not running the specific software, so contact your local cluster sysop, make a generous donation and ask nicely!

Final Table Scores For 1992

Congratulations to **Richard Girling G4FCD** who managed to squeeze ahead of **Ela Martyr G6HKM** by the narrowest of margins, as can be seen by the final 1992 v.h.f./u.h.f. table of results.

Interestingly, neither station has equipment for the 70MHz band but were streaks ahead of the rest of the field.

Leader in the c.w. ladder was yours truly, most of my contacts being 10-second auroral wonders unlike those of **Ian Cornes G4OUT** in second place, who made real QSOs with a conversation inbetween the callsigns!

Deadlines

As usual, please send your letters to reach me by the end of the month at the very latest, as I normally write up the column around this time. Don't forget that I can also receive messages via packet radio at my mailbox GB7TCM or at my DX cluster GB7DXC.

Photographs of your shack, antennas or any v.h.f. activity are especially welcome. Other pictorial items such as QSL cards, awards, certificates, etc., are also required. They will all be returned to you. **David Butler G4ASR, Yew Tree Cottage, Lower Maescoed, Herefordshire HR2 0HP**

*** Reviewed in this issue on page 47. Editor**

Annual c.w. ladder

Band (MHz) Station	50	70	144	Points
G4ASR	90	38	376	504
G4OUT	—	43	169	212
G0DJA	—	—	67	67

Number of different c.w. stations worked since January 1 1992

E N D

BROADCAST Report

This month, Paul Essery GW3KFE gives some advice on maps and beam headings.

If you have in your mind's eye a vision of the UK-based Great Circle Map, you have most of the starting information you need for beam aiming. After all, if you use your brains, you are going to wag the beam back and forth to find out the heading on which your man 'peaks'. And it quite often won't be the heading 'in the book'.

The surroundings distort the theoretical pattern. Example: with a beam, for VK you will find the early openings are long-path, the later short path. Theory says respectively 250 and 70° true; practice says it might be well away from that!

The QRP Scene

Now we'll look at the QRP scene. Novice **John Hemming 2E0ACN** in Northfield has an end-fed wire, around 15m high and 36m long, which he feeds, presumably via some sort of a.t.u. to either home-brew 'Sudden' or 'Oxo' rigs, or to an FR100b-FL200b set-up.

It didn't take John long to latch on to the value of c.w. for operation at his power level (he can't go QRO - the crystal mic distorts above 4W p.e.p.!) The result so far is that John had, at the time he wrote, some 46 countries worked and many of those confirmed.

The only thing John wants for a WAC was South America. Changing to a simple dipole indoors - also home-brew - resulted in piles of Yanks. John has even used his Novice power to put a signal into pile-ups with success.

Ted G2HKU (Sheppey) mentions his IC721S - like the IC725 but QRP - it netted him a QSO with Dave Sumner K1ZZ, publisher of *QST* and Executive Vice President of ARRL, who is a member of the G-QRP Club. No mention of antennas, frequencies or time, but there's always next time!

History

Recently there was P5RS7 active (Yes, that's right!) from N. Korea, which was a group led by 3W3RR. We understand the logs have arrived with the JA Manager, but the documentation hasn't, at the time of writing, turned up at the ARRL. Another of the good 'uns was the Howland AH1A offering, although not many have reported working this one.

Ghana And Islands

The PA3AWW group hope to activate Ghana in late March for three weeks, covering 3.5-28MHz. Earlier in March, we hear of a projected Chatham Is, ZL7 operation. In the Seychelles, S79MD is there for two years. Sao Tome and Principe will be represented by S92SS and his XYL S92YL.

It may be only a rumour, but the whisper goes out of a project to activate Andaman and Nicobar Is in March or April. Keep listening out!

Operators

Time to hear from the operators now. **Don G3NOF** in Yeovil has a TET 3-element tribander for 14/21/28MHz at 17m. He also has an A3WS for 18/24MHz at 18m and Butternut HF2V ground-mounted vertical for 3.5MHz, not to mention an trap inverted-vee at 11m and a trapped sloper of 17m.

Generally the Butternut wins, although the sloper has the edge in its preferred direction. The trap dipole of course is favourite for Europe and inter-G. Indoors, he has a Trio TS950SDX driving his old Drake L4B linear to 24dBW output. On 3.5MHz this made it to VO1FG, on 14MHz to AH1A (Howland Is), on 18MHz a QSO with P29DX (who was G8FEO and then G4JVG), this one was long-path.

The 21MHz preference for Don was Miss Liu Meizi BZ4RBD, a doctor at the local hospital in Nanjing - again long path. A good one on 24MHz was NOTG/KP5 for Desecheo - short path, 1650Z, 24.940MHz.

Now to Ted G2HKU, who uses an Omni-V as the main rig, plus an IC721S for QRP, with an HF6 (with the bits to make it an HF9!) outside; Ted also has a G5RV. At 1900, 5B4AEV was worked with the HF6; at 2300 HP1AC was best on the G5RV; the HF6 was just too noisy. On 10MHz at 1500Z, K6DC, all but inaudible on the G5RV, so worked on the HF6. The time was a bit odd too. At 2045, OD5/SP7LSE was good on the HF6. On 14MHz, OM3KFO was a new one. 1600, G5RV. On 21MHz, XE2MX and YN/SM0OIG in Managua both on the HF6. On 28MHz, HK3RQ and PZ1DY both on the HF6.

Up in the far North, **GM3POI** in Deerness, Orkney, raised FG5BG and 9M2AX on 1.8MHz c.w. For the rest it was all 7MHz c.w. with maybe JT1BR at 1043Z as the pick of the crop. No details of the rig/antennas - Clive was probably too busy keeping the antennas in one piece through the Orkney gales!

The report from **Vince 9H1IP** (Malta) on 24MHz shows WA4DAN/KP5, J28BG, C9RTC, while on 18MHz the prize was AH1A with OM3TZW for another 'new one.' Again, no details on rig or antennas.

Listeners

Time to hear from the all-important listeners now! **Stuart Crow** comes from Portsmouth, but is at Birks Hall, Exeter, during term-time, where the antenna is around 10m of wire strung from the ceiling. However, the noise level is lower at Exeter, and he is screened from Europe by a handy hill. On 1.8MHz, UK stations, on 3.5MHz VO1MZ and CQ9FF; on 7MHz (favourite band) all continents, on 14MHz mostly VKs, 18MHz VK/ZL/JA and FK8CP. On 24MHz, K1ZFA, 28MHz zilch.

Nigel Dunhill in Leeds, listens on a Sony IC2001D with the AN-1 active antenna from the same company. Favourite band is 3.5MHz, where KW2P/KP5, Desecheo was maybe best of the bunch. CE8ABF was best on 7MHz, but there wasn't much on 14MHz, only 7X2WKE and 9H4M.

Luciano Marcquardt is in Hereford. He prefers his DX302 and Datong AD270 active antenna, but also has the FRG7700/FRT7700 as reserves. On 14MHz, VO1NP and VKs, on 21MHz, West Coast Ws - DX in anyones language - with East Coast Ws on 28MHz. On 3.5MHz, a little bit of midnight-oil burning produced a couple of TI4s, and a brace of Ws.

Finally, **Geoff Crowley**, a New Zealander based in Hafnarfjordur, Iceland. Again, a Datong AD370, but Geoff has added to his station computer programs for FAX, RTTY and AMTOR, but not yet for SSTV. Geoff has managed to decode a couple of AMTOR signals, but is struggling a bit to master the new tricks. But on 14MHz, one can imagine how pleased Geoff was to hear his home-land in the shape of ZL4DD.

That's the lot for this time. Don't forget that details of your rig, antenna, frequencies, times and power, are important. Other operators can try for themselves then! Deadline is mid-month to me at the following address: **287 Heol-y-Coleg, Vaynor, Newtown, Powys SY16 1RA.**

I'm particularly pleased that even more listeners are joining in and sending their logs. Keep it up, the more the merrier.

73 DE Paul.

E N D

HF BANDS Round-up

This month, Peter looks at antennas, and simple rules for success.

Throughout the world, engineers at short wave radio stations practise the 'black art' of antenna design and construction. This is in order to send signals bouncing off the ionosphere to radio sets hundreds or thousands, and even tens of thousands of miles away from the transmitter site. Yet many listeners expect reception to be as good as a local medium wave signal, relying simply on the telescopic whip antenna on a small short wave radio set.

Many people, of course, do not have access to complicated receiving antenna. But despite this, it is possible to help those weak short wave signals make their way to a receiver.

At the tender age of 12 or 13, I started to build simple long-wire antennas running from my bedroom window over the quiet road outside my home, to some trees opposite. Luckily I lived on a cul-de-sac and therefore there was not too much traffic, particularly high-sided lorries! The antenna consisted of thin gauge plastic coated copper wire, running from the window-sill over to the trees, but secured by fishing line with a weight (generally a brick) on the end, to provide tension. It often proved a bit of a struggle to get the antenna successfully suspended, but when the thing was up - and stayed up - I felt particularly happy!

I felt even happier when I connected the end of the antenna to my receiver, for the difference it made was quite dramatic. Weaker signals were stronger, and strong signals were almost over-powering. But it proved to me the need for an external antenna for short wave listening. As a result, I have used one ever since!

Mind you, there are some simple rules to be followed when considering putting up an outside antenna. Safety is the most important thing to think about.

Make sure that the antenna wire cannot come in to contact with any power cables. Not just in calm weather, but in windy conditions when the antenna wire may be blown about, and make sure that you disconnect it from your radio set during thunder-storms.

If lightning strikes the antenna, the radios which have suffered this fate, tend not to work again.

Different Types

There are many different types of antennas which can be constructed, and plenty of reference books (some available through the *PW* Book Service) which describe the particular characteristics. You could also connect an antenna tuner between your receiver and the antenna. But really, it is experimentation that is the name of the game.

Now, if you feel inspired to go and build an antenna of some sort or other, you'll want something to listen to, so here are some bits and pieces of broadcast news.

The split of Czechoslovakia into two separate republics at the beginning of the year means that now there is an external radio service from both Slovakia and the Czech Republic. But it's the Czechs who have kept hold of the foreign language services, with English transmissions at 0700-0730 on 11.99, 9.505, 7.345 and 6.055MHz; at 1130-1157 on 15.355, 11.99, 9.505, 7.345 and 6.055MHz; at 1800-1827 on 9.605, 7.345, 6.055 and 5.96MHz; at 1930-1957 on 7.345 and 6.055MHz; and 2100-2127 and 2200-2230 on 9.605, 7.345, 6.055 and 5.96MHz.

The Slovak international service is limited to just the Slovak language at present. Transmissions are heard in Europe at 1400 for an hour on 9.505, 7.345 and 6.055MHz and at 1900 to 19390 on 9.58 and 9.505MHz. Judging by the frequency usage, transmitters are shared between the Prague and Bratislava broadcasters.

Radio Vilnius, the external service of the Baltic republic of Lithuania, dropped some of its frequencies shortly after I wrote my column last month. The European service at 2230 is now heard on just 9.71MHz on short wave, together with 666 and 1512kHz medium wave, and the American service at 0000 is now down to a single frequency of 7.15MHz.

Last month I gave you some details of Radio Sweden's revised schedule following a cut-back in the English service. Here now is the fuller picture: there is a 30-minute transmission at 1830, a new time, on 1.179, 6.065, 9.655 and, to the Middle East and Africa, 15.27MHz. The 2130 transmission has moved to 2200, on 1.179, 6.065 and 9.655MHz. Both transmissions are carried on Astra.

Asia And Pacific

Radio Japan's General Service has English transmissions of an hour in length, alternating with Japanese. European broadcasts, from facilities in England and Gabon, as well as Japan, are heard at 0700 on 21.64, 21.61, 21.575, 17.86, 17.81, 17.765, 11.875, 9.675MHz; at 2100 on 17.89, 17.81, 15.43, 15.28, 15.195, 11.925, 11.84 and 11.815MHz; at 2300 on 17.81, 15.43, 15.195, 11.815, 6.125 and 6.05MHz.

Two months ago, I mentioned the logging of St Helena by **Asantha R. Cooray** in Sri Lanka. From closer to home in Witney, Oxfordshire, a letter came winging to the *PW* Office from **Harold Buggins**, a DXer since 1938.

Harold says that Radio St Helena is not broadcasting daily on short wave, but did a "one-off" transmission on October 23 last year. The station used the facilities of Cable and Wireless on the island. Harold sent a report and received a QSL and newsletter with lots of information.

Harold has also logged Radio Inconfidencia, Belo Horizonte in Brazil on 6.01MHz at around 0700 until fade-out, with English announcements every 30 minutes or so, asking for reception reports (CP 1027, 30130 Belo Horizonte, Brazil). Other Brazilians noted in Witney include Radio Guarajui on 5.80MHz, Radio Guaiba on 6.0MHz and Radio Clube Paranaense on 6.04MHz, all noted around 0700GMT.

Michael Beesley in Romsey, Hampshire, has heard Radio Azerbaijan, which I mentioned in the February edition, was about to start transmissions. Michael confirms the frequency of 6.175MHz, with strong co-channel interference from RFI in Paris.

And lastly for this month, an interesting letter from **Des Walsh** in Carrigaline, Co Cork. Using a Sangean ATS803A receiver, Des has heard a weak religious broadcaster on 13.75MHz under Kol Israel. The programmes are mostly in English, but identification has proved impossible so far. Any offers?

Des notes Radio Australia on out-of-band 5.885MHz in the evening, particularly as darkness sets in.

Radio Moscow has been noted in English on a total of 38 frequencies at 0845 (the list is too long to print here!) and although some are undoubtedly from Asian transmitters, Des wonders whether they really need to use all those channels. No wonder, Des goes on, so many countries have taken to using out-of-band frequencies. As a comparison, checking the February edition of *BBC Worldwide* magazine, BBC World Service in English uses 21 frequencies which, if audience research claims are to be believed, serve 10 times as many listeners...

Do drop me a line if you have any news to pass on, queries needing an answer, or comments to make. Until next month, good listening!

Reports to Peter Shore via the *PW* Editorial Office.

END

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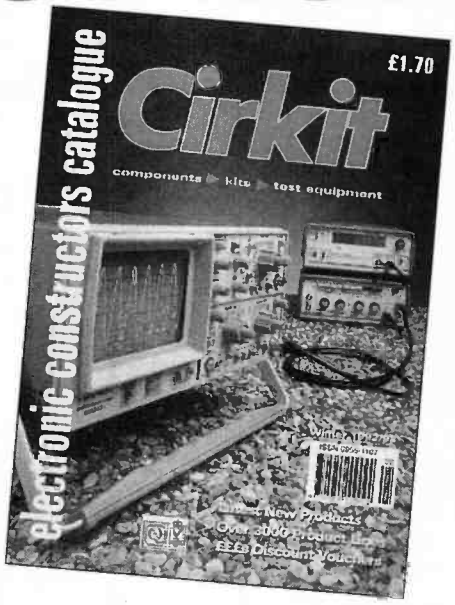

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RADIO

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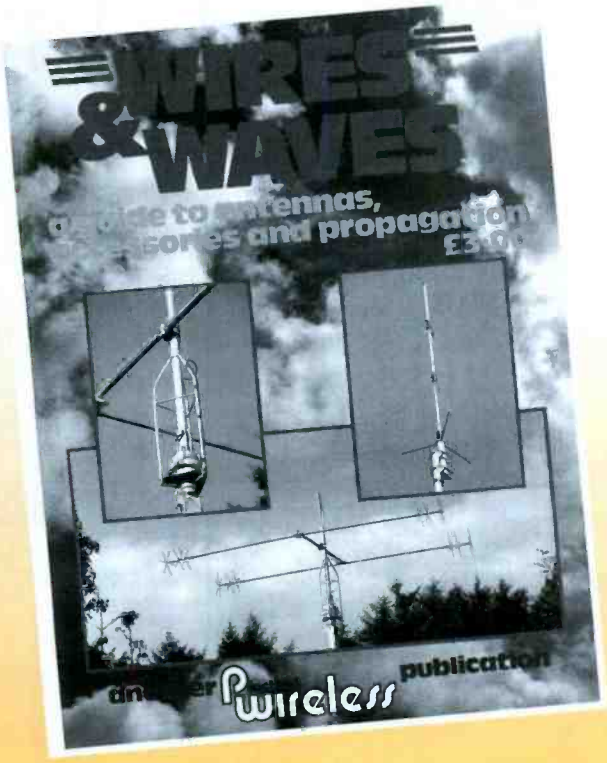

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Magazines for sale: *RSGB Bulletin 1946-1977* and index unbound but in 29 folders, £60. *Short Wave Magazine 1947-1974* and index unbound but 26 folders, £60. George. Tel: 081-686 6989.

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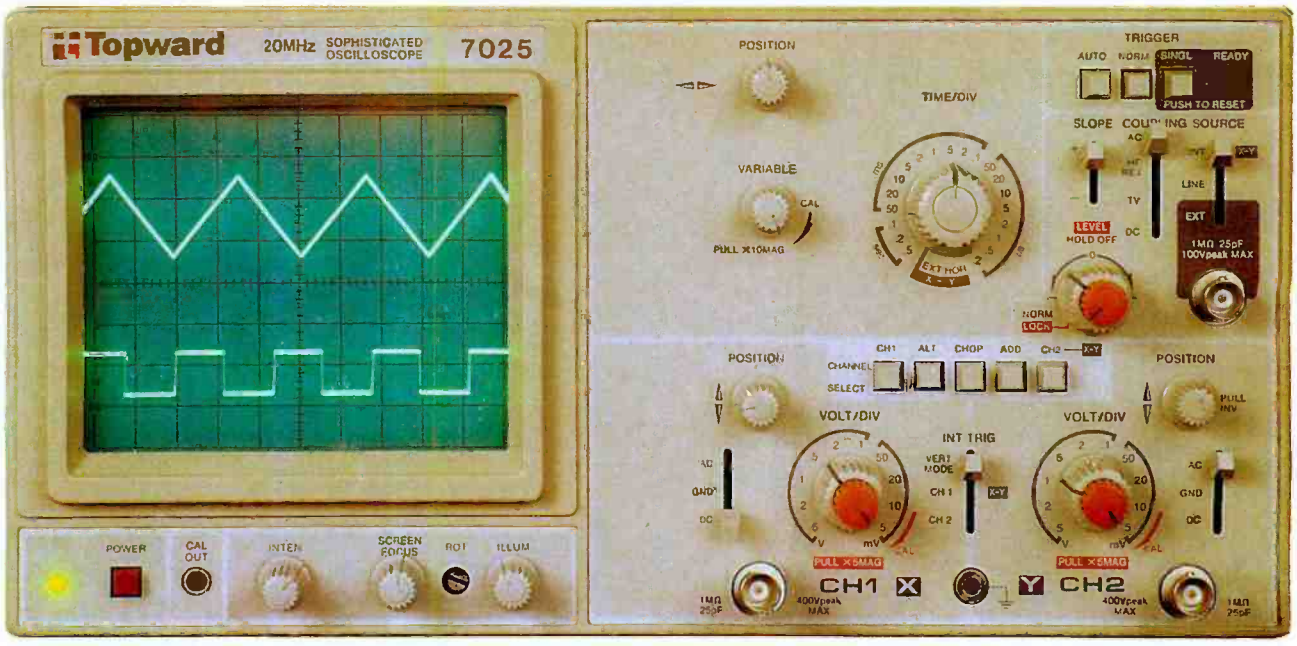

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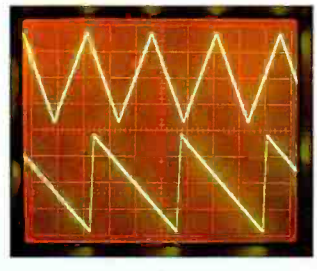

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