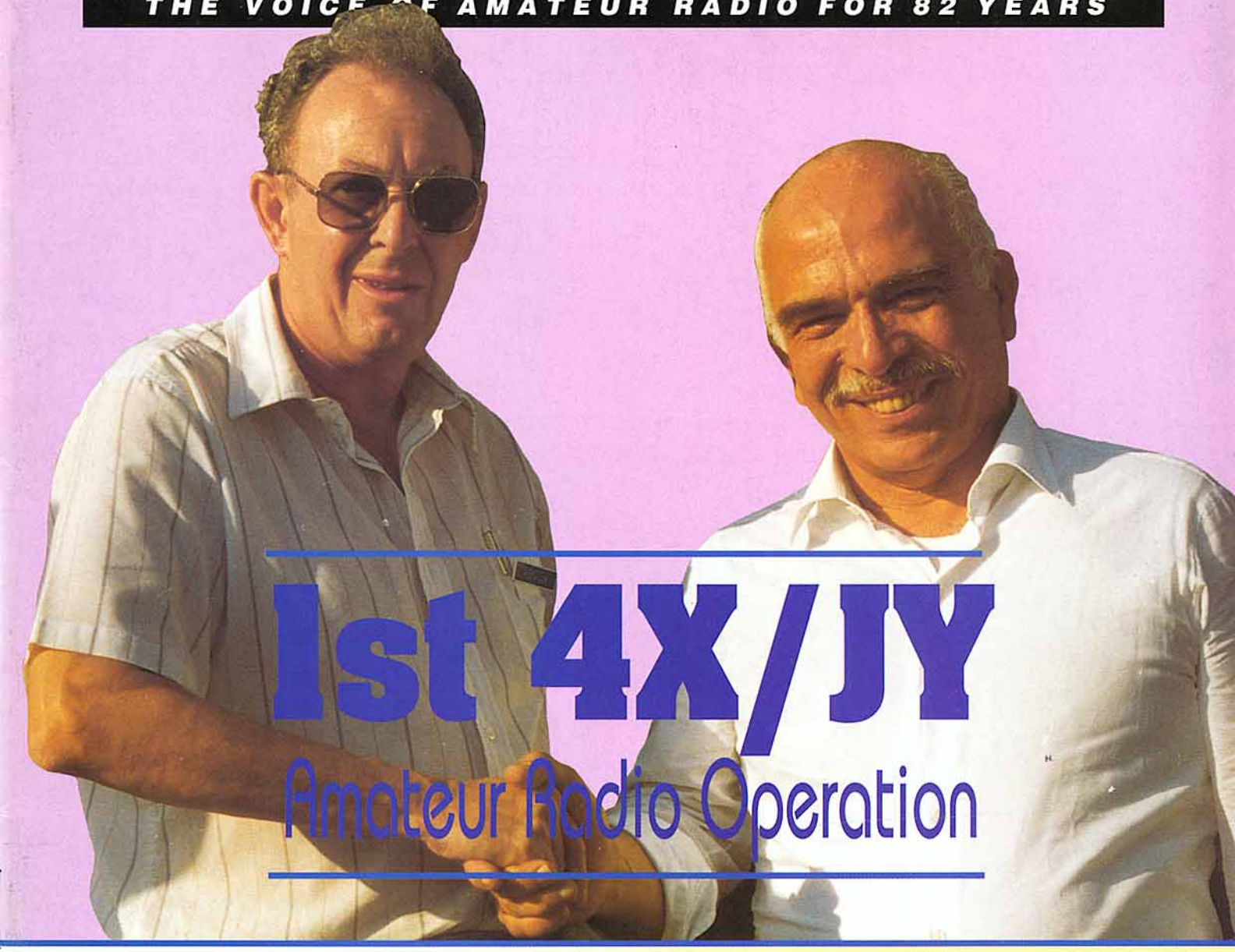
Volume 71 No 11 November 1995

RadCom

Radio Communication

The Journal of the Radio Society of Great Britain

THE VOICE OF AMATEUR RADIO FOR 82 YEARS



1st 4X/JY

Amateur Radio Operation

100 YEARS OF RADIO 1995

ICOM IC-706 REVIEWED

For all its class-leading features, there's something missing.

Interference.

Kenwood's TS-870S gives you something called an Intelligent Digital Enhanced Communications System.

Or to put it another way, you can talk to someone halfway round the world and it'll feel like they're in the room with you.

If you've never tried a digital HF transceiver before, you won't believe just how well the TS-870S can find a signal that's almost buried in noise. And because it's made by Kenwood, reliability can be taken for granted, too.

Features? High frequency DSP for post-IF signal processing, high-speed PC control, automatic antenna tuner, a built-in K1 LogiKey for a full range of CW operations features, 100 memory channels...and that's just a taste. Your nearest dealer has the full specification.

Best of all, the TS-870S gives you all this at a price that's amazing value. So you can talk to the world without getting any interference. Even from your bank manager.

KENWOOD

For more information on the TS-870S phone 01923 212044.

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RadCom

COVER PICTURE:
HM King Hussein, JY1, shaking hands with Joseph Obstfeld, 4X6KJ, who writes about the historic joint Jordanian-Israeli operation on page 10.

NEWS AND REPORTS

TECHNICAL FEATURES

REGULARS

PRODUCTS

More Bargains in our other double page advert!

NEVADA

Icom IC-706

New and unique all-mode mobile transceiver with ultra wide band receiver plus 2m and 6m all mode! 100 watts on HF + 6m and 10W on 2m £1195

Alinco DX-70

For those of you who feel they don't need 2m in their HF rig this is the ideal choice. We've tried it here in the showrooms and its good! ..... £1095...£995

Yaesu FT1000 MP

The very latest HF radio from Yaesu. Nevada can offer the very best deals and after sales service, call Paul or Lloyd now for further information.

Kenwood TS870

As Kenwood main dealers we can offer the very best deal on this new radio. Why not Part X your old set. . . and pay the balance by 3 post dated cheques. . .interest free!

We offer excellent part exchange deals and our Post-Dated Cheque Scheme!

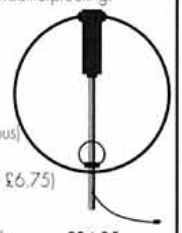
Call us for honest advice on these new radios - we will be pleased to help!

Magnetic Loop Antennas

DRAE

Our Drae magnetic loops use high quality semi rigid 13mm Japanese Ultra Low Loss cable for the radiating element, making loft mounting & portable operation possible. Packs easily away into the car boot. Fibreglass construction ensures full weatherproofing.

- (3 - 30) MHz Coverage
- Remotely Tuned
- 200W PEP Power
- Flexible for Loft Mounting & Portable Operation
- Low Visual Profile



Model ML80
Freq: 7 - 30 MHz (continuous)
Diameter: 80cms
Price: ..... £169.95 (P&P 5 £5.75)

Model ML170
Freq: 3 - 10.3 MHz (continuous)
Diameter: 1.7 mtrs
Price: ..... £189.95 (P&P £6.75)

ML1 Control Unit - Not Supplied
Optional 2 way control unit allows remote tuning & switches between 2 loops £24.95

High Power ATU Components

DRAE

Variable capacitors

TC 250 250pf @ 7.8 KV
Price £24.95

TC 500
250 + 250pf @ 7.8 KV £34.95

TC 26 Roller Coaster

Silver plated wire
1 - 30µH @ 500 Watt
Price £39.95

Control Knob
A professional graduated control knob. 6 cm outer diameter with 6mm shaft. £3.57

TC48 Turns Counter
Dial indicates 1 unit for 1rev of counter. 48 turns maximum. 1/4" drive shaft £19.95

Baluns - For outdoor antenna use

MSB 200 200W 1:1	£23.95
MSB 200 200W 6:1 (for windoms)	£23.95
MSB 2K 2 KW 1:1	£34.95
MSB 5K 5 KW 4:1	£39.95

Antenna Switches

Two Way

CX201 PL (0 - 1 GHz) 2.5KW	£18.50
CX201 N (0 - 1 GHz) 2.5KW	£19.95

Four Way

CX401 PL (0 - 1 GHz) 2.5KW	£37.50
CX401 N (0 - 1 GHz) 2.5 KW	£39.95
V4 PL (0 - 50 MHz) 500 Watts	£11.95

Remote Masthead Switch

CAS-A2 - Only 0.19dB insertion loss @ 1 GHz this switch requires 12V DC and handles 300 Watts £49.95

Wire Antennas

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Drae wire antennas use the very best quality components and "Flex Weave" wire with 168 strands of 36 gauge solid copper woven to give high strength and flexibility. This wire won't kink, unfold or rust. Drae antennas are guaranteed to give years of outstanding performance.

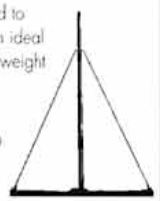
G5RV	Full size (80 - 10 mtrs)	£45.00
G5RV	Half size (40 - 10 mtrs)	£35.00
GW40	Windom (40 - 10 mtrs)	£55.00
GW80	Windom (80 - 10 mtrs)	£65.00
EFW	End Fed Wire..(s/waves)	£59.95
DLB	Long Wire Balun	£39.95
Flex Weave Wire		60p per metre

G5RV Plus Antennas
For the perfectionist a G5RV that uses 450 ohm ladderline/balun for coax feed.

G5RV Plus Full size (80 - 10 mtrs)	£75
G5RV Plus Half size (40 - 10 mtrs)	£65

New Military Style 35ft Telescopic Masts

DRAE



MSM 35 - Manufactured to military specifications an ideal support for wire & lightweight VHF beams.

- Seven sections
  65mm bottom section
  20mm top section
- Base plate
- 1 set guys/ground stays
- Spring loaded locking pins
- Weight 9.9kg

Price ..... £169.95 + p&p £10

As a Yaesu Master Dealer we stock . . .

Yaesu Rigs

FT736R	RRP £1999	£Call
FT790RII	RRP £749	£Call
FT990	RRP £2399	£Call
FT2500	RRP £399	£Call
FT5100	RRP £679	£Call

Yaesu Mics

MD100A8X	FT1000 Desk mic	£110
MH29A2B	Remote control spkr/mic	£84
MH18A2B	Mini spkr/mic	£27
MH19A2B	Ear/Tie clip mic	£22
MF1A3B	Boom mic (uses SB10)	£34

Yaesu Filters

XF110CN	250 Hz CW	£95
XF455K	250 Hz CW (455 IF)	£106
XF110C	500 Hz CW	£95
XF110S	2.6 kHz SSB	£95
YF112A	6kHz AM (2nd IF)	£63

Yaesu Accessories

DVS2	Digital voice storage	£199
FP800	20A Power supply/spkr	£339
MMB20	M.Bracket 840,90,757	£33
SP8	Deluxe filter speaker	£139
ADMS1	FT51 software	£39

Yaesu Rotators

G-250	light - medium use	£129
G-450XL	Medium duty	£269
G-600RC	Medium - heavy duty	£339
G-800SDX	Heavy duty with presets	£419
G-1000SDX	H/Duty ver. of G-800 series	£479
G-2700SDX	Premium/Commercial series	£899
G-500A	Basic elevation rotator	£279
G-5400	AZi/ELE rotator light duty	£519
G-5600	M/Duty AZi/ELE rotator	£599

Microwave Modules

Well known for their reliability and rugged design these amplifiers are back!

144-30LS	2m,30W + P/Amp	£99.95
144-100LS	2m,100W + P/Amp	£199.95
144-100S	2m,100W + P/Amp	£179.95
432-30LS	70cm,25/30W+P/Amp	£169.95
432-50S	70cm,50W + P/Amp	£169.95
70-100S	4m,100 W + P/Amp	£179.95
50-100LS	6m,100 W + P/Amp	£199.95
50-100S	6m,100 W + P/Amp	£179.95

Transverters

MMT50-28	£199.95
MMT144-28	£199.95
MMT432-28	£199.95

Yaesu Chargers

NC37	1hour desk charger	£102
NC50	Intelligent charger	£91
NC55C	Std wall charger	£20
PA10A	Mobile power/charger	£48
PA6	Mobile adaptor/charger	£19

Yaesu NiCads

FNB31	4.8v/600mA	£44
FNB38	9.6v/600mA	£66
FNB14	7.2v/1000mA	£64
FNB10	7.2v/600mA	£44
FBA	Battery case 6xAA	£15

Yaesu Cases

CSC61	Std for FT51	£15
CSC61	Std for FT11, 41	£15
CSC56	Std for FT530	£15
CSC35	Std for FT411,811,911	£15

Full range avail. for various Nicad sizes, call

Yaesu Add ons

FM100	FM board FRG100	£33
YS60	SWR/Pwr 1.6 - 60MHz	£134
FTS17A	CTCSS unit	£38
FIF232C	Cat interface	£77
FL2025	25w amp FT290R(2)	£159

AKD

A range of British made low cost transceivers - that offer outstanding value for money. At these prices we just can't keep up with the demand!

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AKD 4001	4mtr 25/5W FM	£193
AKD 6001	6mtr 25/5W FM	£193
AKD 7003	70cm 3W FM	£193
AKD WA2	VHF Wavemeter	£32.95
AKD WA3	HF Wavemeter	£32.95
AKD Rings	F/Rings (pair)	£3.50
AKD BB1	Braid Breaker Filter	£8.50

Alinco

DR130E 2m mobile

- 50 Watts
- CTCSS fitted
- 20 memories
- Extended RX

Special "one off" price £299

DJ-G5	New Model	£479
DX70	New HF + 6	£995
DRM06	6M Mobile	£299
DJ480E	70cm H/Held	£239
DJ180E	2M H/Held	£199

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Icom 707

If you are new to HF this is the radio for you. Transmits on all ham bands plus general coverage receive. 32 memories, pre-amp, attenuator and RIT ..... £829.. £690

Yaesu FT 840

Compact 100W HF transceiver with general coverage receiver. 100 memory channels, twin VFO's and 10 mtr FM repeater shift. Few only at ..... £959.. £699

Yaesu FT 8500

The very latest "smart controlled" twin band mobile. Full front panel control via handset. Spectra scope display with 112 memories
Price **£699**

Yaesu FT 900AT

Save £478 from now until the end of the year! Free SSB & CW filters and Free UK next day delivery. Order yours before stocks run out ..... £1777.. **£1299**

Hurry - We have only a few radios at these crazy prices!

As a Kenwood Main Dealer we stock . . .

Kenwood Rigs

TH79	RRP £479	£Call
TS50S	RRP £1059	£Call
TS450SAT	RRP £1649	£Call
TM733E	RRP £729	£Call
TS790E	RRP£1959	£Call

Kenwood Mics

MC85	Comp/Preamp desks mic	£139
MC90	For DSP Trans	£187
MC60A	Dual Input desk mic	£117
MC55	Mobile Goose mic	£71
SMC33	Multi func spkr/mic	£37

Kenwood Filters

YK88SN-1	1.8 kHz SSB	£61.95
YK88CN-1	270 Hz CW	£61.95
YK88A-1	6 kHz AM	£61.95
YG455CN-1	270 Hz CW (455 IF)	£159.95
YG455C-1	500 Hz CW (455 IF)	£138.95

Kenwood Accessories

AT300	Ext. auto ATU	£449
LF30A	HF low pass filter (1kw)	£45.95
SP31	Station speaker	£82.95
PS52	Station mains PSU	£309
SW2100	Inline pwr/SWR meter	£139

Kenwood Chargers

KSC14	Dual rapid/trickle	£105
KSC8	Drop in charger	£21.36
BC17	Wall charger	£16.95
BC15A	Rapid charger	£94.95
DC4	12v cigar/lighter chgr	£15.95

Kenwood NiCads

KNB7	12v/600mA (was PB8)	£48.95
PB34	9.6v/600mA (TH79 type)	£48.95
PB30	4.8v/600mA (TH22,42,79)	£31.95
PB17	12v/600mA (TH28,48,78)	£71.95

Full Kenwood range stocked call for details

Kenwood Cases

SC43	TH79 + PB33/34	£15.95
SC35	TH78 + PB13	£16.95
SC34	TH28/48 + PB17,18	£17.95
SC40	Soft case + strap	£15.95
WR2	H/held W/proof bags	£13.95

Kenwood Add ons

VS1 & 2	Voice board	£45.95
TSU7 & 8	CTCSS units	£35.95
IF232C	RS232 interface	£88.95
MJ88	8 pin - telephone adpt	£22.95
HS6	Small headphones	£35.95

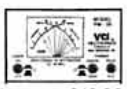
Vectronics

A range of high quality accessories imported by us direct from the USA.

HFT1500 - A 3K Watt (PEP) ATU, with all the extras. 4 way ant.switching, roller-inductor, SWR/PWR meter, Balun for open wire feeders and Peak reading digital meter.
Price £349

VC300DLP - Our most popular ATU. 300W (PEP), Dummy load, VSWR meter, 3 way ant. switch & Balun for open wire feeders £129.95

PM30 - Displays Peak or Average forward power, reflected power & SWR simultaneously. 1.8 - 60 MHz Pwr 3Kw (in 2ranges) £69.95



VC300M -New mobile ATU covers all bands. Dual meter reads Power and SWR simultaneously. Can be used at home or in the car £89.95

AEA Data Products

PK-12

1200 bps VHF, Packet TNC unit. Features include GPS Firmware, 18K Mailbox Standard (32K RAM) expandable, Forward & Reverse forward messages, Special easy command set for beginners, Gateway Firmway £119.00

PK-232MBX

Multi mode Data Controller. Modes inc:- Packet, AMTOR/SITOR, Morse Code, Baudot, & ASCii, RTTY, WEFAX, NAVTEX, PACTOR & TDM reception. Now supports gateway facilities with both ports handling HF & VHF £299.00

PK-900

Top of the range commercial grade multi mode dual port controller £439.95

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Skyview Fax	H.F.RTTY,FEC,CW + Fax	£139
Skyview Synop	WMO RTTY	£149.95
Sky Call	Windows Based Call Book	£19.95
IC-RX	Computer cont. Icom TX/RX's	£44.95

Quality Used Equipment

All Safety Tested & Guaranteed For 3 Months

Amateur

Alinco DJ160	2m handie	£125
Alinco DJ580	Twinband	£299
Alinco DR112	2m mobile	£225
FDK Multi 700EX	2m FM Handie	£175
Icom 720A	HF Trans. PSU	£695
Icom IC2E	2m Handie	£100
Icom IC4E	70cm Handie	£115
Icom IC4iE	70cm mini handie	£219
Icom IC240	Basic 2m mobile	£145
Icom IC730	Mobile HF	£375
Icom IC736	HF + 6m	£1595
Icom IC1200	23cm mobile	£345
Kenpro KT-22	2m thumb-wheeler	£125
Kenpro KT 22	2m Handie	£95
Kenpro KT44	70cm handie	£95
Kenwood TM451E	70cm ex-demo	£375
Kenwood TS120S		£395
Kenwood TS140S	Gen Cov HF	£695
Kenwood TS530SP	HF Base	£595
Kenwood TS680S	HF + 6m	£795
Kenwood TS830S	Classic HF	£595
Kenwood TS130V	HF	£395
Rexon RL102	2m H/Held	£165
Standard C500	Choice of 2	£225
Standard C528	Twinband	£325
Swan 100 MX	H.F Mobile	£345
Tentec Corsair II	V.G condition	£799
Tono TT40	70cm TX	£199
Trio TS180S	HFTransceiver	£475
Trio TS700	2m m/m base	£425
Trio TS830/S	Average cond	£575
Yaesu FC700	ATU boxed	£115
Yaesu FP800	PSU as new!	£250
Yaesu FT101ZD	Choice of 2	£495
Yaesu FT102	Base HF	£595
Yaesu FT707	HF Tx/Rx	£475
Yaesu FT727R	D/band handie	£295
Yaesu FT790R mk1	70cms portable	£345
Yaesu FT900 HF	Only 6wks old	£1095
Yaesu FT901 DM	Line up	£629
Yaesu FTV901R	With Fitted 2m	£175

Scanning Receivers

AOR AR1500	with SSB boxed	£245
AOR AR2002	Base Model	£199
AOR AR3000	Super W/Band	£695
Bearcat 580XLT	Mobile/base	£120
Bearcat 142 XLT	Basic model	£99
Nevada MS1000	Scanner	£210
Yupiteru MVT3100	Scanner	£195

Shortwave Receivers

Grundig YB400	Portable RX	£95
Kenwood R1000	Digital S/wave	£325
Kenwood R2000	Gen.Cov	£375
Roberts R818	Receiver	£140
Sangean ATS 803	Portable RX	£95
Sony 7600	Portable RX	£135
Sony Air 8	Receiver	£135
Sony SW1	Receiver + kit	£130
Steepletone MBR7		£45
Yaesu FRA7700	Active antenna	£45
Yaesu FRG7	+ Digital Display	£225
Yaesu FRG7000	Digital S/W Rx	£265
Yaesu FRG7700	Gen Cov+VHF	£450
Yaesu FRG8800	+ VHF	£475

Accessories

Adonis AM508	Base mic	£65
Datong FL2	Audio filter	£45
Datong FL3	Audio filter + notch	£65
ERA RS 232	Large opt display	£150
Icom PS15	20A PSU	£99
Global	2 way ant switch	£10
Kenwood AT230	ATU	£175
Kenwood MC50	Base Mic	£45
MM 70cm	Transvertor	£145
MM144/40	2m 40W amp	£70
SSC RTTY/CW	Decode software	£25
SEM	Transmatch	£75
SEM	Mulitfilter	£35
Spectrum Comms.	6m Amp	£49
Vectronics VC300DLP	ATU	£99
Vibroplex	D/luxe bug key	£65
Yaesu 2m 50W	Amplifier	£99
Yaesu FF501	L/pass filter	£20
Yaesu FP 757 HD	PSU	£225
Yaesu FL-6020	6M Amp	£85
Yaesu FT101ZD	AM Board	£10
Yaesu FT901	Band scope board	£45
Yaesu G-400	rotator used once	£159
Yaesu YM34	Base mic	£45
Zetagi HP105	Bench PSU with meters	£95

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THE BANDIT

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The JPS ANC4 is one of the most impressive products that we have sold for a long time. It connects between your transceiver and the antenna and nulls out all local noise including computer and TV timebase hash. You have to hear it to believe it!

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only **£189**

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Cushcraft Verticals
Hygain Beams
Hygain Verticals
Butternut Verticals
Hygain rotators
Emoto rotators
Yaesu rotators

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VHF SWR METER

125-525MHz. 5/20/200W

£69.95

Average and PEP reading

NEW! Hygain DX77

Advanced Vertical Windom.
10-40m including WARC.
NO RADIALS. 29 feet high.

only **£275**

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is now in stock

- Fully DSP at IF stage
- Built in RS232 control
- Auto ATU as standard
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- Successor to the famous TS850

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and we will send you full details of the top quality v.h.f. antennas from Vargarda of Sweden.

ADI 2m and 70cm hand-helds
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Latest GPS2000 personal navigator from Magellan.

- Smaller than a 2m handheld
- Tracks up to 12 satellites
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- 17 hour battery life

You'll be lost without it!

only **£199**

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- Enhanced DSP
- Collins filters
- Auto seeking notch filter
- Built-in Auto ATU

Phone for best price

NEW

2M linear amp bargain

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- 80W out
- GaS fet pre amp
- SSB or FM

only **£139**

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TRIED & TESTED

The WEP300 is a really well styled clip-on earphone that goes round your ear - not in it!

ONLY £9.95.

Call us for a leaflet.

Lowe Electronics are sole UK distributor for Kantronics, the world leaders in packet equipment. See the Kantronics range on demo at your nearest Lowe shop.

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The RadCom Leader

Use Your Vote

ROBERT MAYNARD HUTCHINS once said that the death of a democracy is not likely to be an assassination by ambush. It will be a slow extinction from apathy, indifference and undernourishment.

This observation is most apposite to the forthcoming Council elections which, if past experience is anything to go by, will be totally ignored by the vast majority of the Society's membership.

This is all the more disappointing when one considers that a large number of dedicated volunteers, together with the Headquarters staff, go to enormous lengths to see that the candidates for election to the governing body are presented to the electorate in a fair and balanced manner. Ballot papers, the format of which has been approved by the Electoral Reform Society, are supplied together with pre-paid envelopes for their return. All a member has to do is make his or her choice of candidate and return the completed paper. Notwithstanding the simplicity of the voting process, some candidates are elected to office with a total vote that does not reach three figures.

For a national society with 30,000 members it is incredible that less than 5% bother to exercise their franchise. It is also bad for democracy.

This year's election has a plethora of candidates who have put themselves forward in the hope that, if elected, they will exercise some influence over the conduct of the Society and the progress of amateur radio. They submit themselves in the knowledge that election will involve a great deal of their time and energy being devoted to ensuring that the amateur service is protected and advanced.

They deserve better treatment than candidates have previously received. Please take the time and trouble to read their election statements, which are circulated with this issue of *RadCom*, and vote for the candidates that most appropriately express your own view of how amateur radio and the Society should be administered.

John Hall OBE, G3KVA
Company Secretary

RadCom NEWS

- STOLEN from the shack of G7PPU in Birmingham: Yaesu FT-747 S/N 9G200206 and FT-290R1 S/N 3F281088, and Icom IC-W2IA dual-band S/N 01282 and IC-2IE S/N 10453001060. All models are marked for ultra-violet light. Any information to Stechford police station in Birmingham.

- MARTLESHAM RADIO Society is holding a Microwave Round Table at the BT Laboratories, near Ipswich in Suffolk, on Sunday 12 November. For BT Labs' security reasons, all access is by ticket only, so if you would like to attend please send an SASE to Roy Smith, G0RRC, QTHR *as soon as possible*, listing the names of all persons wishing to attend.

- CITY AND GUILDS has issued a report on the September 1995 Novice Radio Amateurs' Examination. Anyone wishing to obtain a copy should send an SASE to the Amateur Radio Department at RSGB HQ.

- A 15-WEEK RAE course will be starting in January at the Lee Valley Leisure Centre in Edmonton, London N9. Please contact the instructor, Steve White, G3ZVW, on 0181 882 5125 for more details.

- THE 1995 BRITISH Amateur Radio Teledata Group AGM takes place on 11 November at the Strathmore Hotel in Luton. Further details may be obtained from Peter Adams, G6LZB, QTHR, tel: 01923 220774.

Annual Report

THIS MONTH'S *Radio Communication* includes the *RSGB Annual Report and Accounts* for the year ending 30 June 1995. It contains details of what the Society has done for its members over the last year, the audited accounts for 1994 / 95, the agenda of the annual meeting, information on candidates standing for election to Council, a Council election voting form and a proxy vote form. Also enclosed is an envelope for the return of your Council vote.

If you have not received your *Annual Report*, please call HQ on 01707 659015 and ask for one to be sent to you.

Guglielmo Marconi's daughter and grandson attend prestigious London conference

'100 Years of Radio' at the IEE

LOUD AND clear, the sound of beautifully-sent Morse code filled the auditorium. It concluded with the message that "the equipment is in perfect working condition". The live transmission from Grimeton, near Gothenburg, by station SAQ came as a complete surprise to the conference that had been watching a video on that very station. SAQ is the oldest longwave CW station in the world [see *RadCom News*, September 1995, page 16 - *Ed*]. This only remaining Alexanderson Alternator 200W transmitter is now in a museum and was fired up by the manager especially for the occasion. The 17.2kHz signal was relayed by BBC Monitoring over a land line to the IEE's headquarters at Savoy Hill, itself the site of the early days of the British Broadcasting Company.

Princess Elettra Marconi and her son Mr Guglielmo Giovanelli Marconi.

Organised by the IEE in order to mark the centenary of Marconi's first transmissions, the opening day of this three-day event was graced by the presence of Princess Elettra Marconi and her son Mr Guglielmo Giovanelli Marconi.

From all over the world, several hundred leading personalities from the electronics field and academia, many of whom hold amateur licences, gathered for this unique conference which also included a series of 30 outstanding papers on the present state of the art and a glimpse of its future, including three papers relating to amateur radio and presented under the chairmanship of popular *RadCom* columnist Pat Hawker, G3VA.

Pat Hawker, G3VA, chairs the amateur radio session.

To the delight of the Marconi family and the audience, the Senator Marconi himself entered the auditorium and proceeded to confide in his listeners some of the more intimate aspects of his early work and family life, drawing heavily on his original photographs from the Marconi archives. In a dramatic presentation the Senator, played by Ralph Barrett, succeeded in sending by spark a wireless telegraphy signal clear across the auditorium without the benefit of wired circuit.

A substantial exhibition of historic radio equipment attracted everyone's attention during the breaks for refreshment. It included important items loaned by the Science Museum, leading collectors and the BBC. Actual instruments from the early pioneers were on display. The original Karlsruhe University Hertz manuscript and sketch were there for all to see. So, too, was a cabinet displaying the Marconi Magnetic Detector, beneath a mint R1155 receiver.

The conference closed with an appeal by the Chairman of the Organising Committee, Prof R W Burns. He emphasised the importance of ensuring that the younger generation of electronics practioneers understood the lessons that are provided by history, particularly in a field where scientific development was so rapid. To all those involved in the world of electronics, it was strongly recommended that today's records and artefacts be carefully preserved for tomorrow and that plans should be made to hold regular such 'historic' conferences in the years ahead.

IMPORTANT LICENSING NEWS PAGE 15

RADCOM NEWS FEATURE

JY74X / Z - the Joint JY/4X4 Operation

by Joseph Obstfeld, 4X6KJ* / JY8KJ

AT THE END of July, an extraordinary DXpedition took place. Celebrating the first anniversary of the Washington Declaration which officially brought peace between the two countries, Israeli and Jordanian amateurs co-operated in a joint operation for the first time. The two stations' callsigns, JY74X and JY74Z, symbolised the co-operation and new-found peace between the two nations. The story which follows is written by Joseph Obstfeld, 4X6KJ, President of the Israel Amateur Radio Club, and we thank him for permission to use the story which originally appeared in *HaGal International*. We join Joseph and the Israeli amateurs as they set off from Tel Aviv . . .

AT PRECISELY 7.00am on Monday 24 July the rented minivan set its wheels in motion, passing through the heavy early morning Tel Aviv traffic and continuing on to Jericho in the Jordan Valley. The van was loaded to the brim with equipment for the mission as well as operators Ami, 4X4DK; Amir, 4X6TT; Moni, 4X6ZK; Dov, 4Z4DX; Eyal, 4X6RE; and me. All of us were fascinated with the speed and efficiency of the preliminary arrangements for this DXpedition. During the two-hour trip to the border, the team was discussing in anticipation what might be awaiting us.

At the Allenby bridge, the Jordan-Israel border crossing, everyone involved did his utmost to make our passage as fast and easy as possible. No wonder - the border officials had received advance notice of our programme and the intended operation by none other than the Royal Court in Amman, as we later found out. It was the first time ever that Israeli radio amateurs would be crossing the border to operate with Jordanian amateurs in their country.

Within 30 minutes of our arrival at the border, the gate was opened and our minivan was allowed to bring our equipment to the other side. It was quickly transferred to one of the Jordanian vehicles which was waiting for us. After greeting Mohammed, JY4MB, who came specially to welcome us, and our escort, we made our way in a convoy of Royal Palace cars to Amman, the capital of the Hashemite Kingdom of Jordan.

On the Air from JY

WITHIN AN HOUR of our arrival at the clubhouse of the Royal Jordanian Amateur Radio Society, the first station, JY74X, was on the air. We were joined by our Jordanian friends and as the day progressed more transceivers were pressed into service on different bands and modes.

Three members of the group went with an escort to Mount Nebo, about 60km south-west of Amman, to start setting up stations so that on Tuesday 25 July operation of JY74Z could begin from this site. It was especially important to get on the air on this date as the whole mission was dedicated to 'The First Anniversary of the Washington Declaration' which took place at the White House. One year after signing the Principles of Peace between Jordan and Israel, radio amateurs of both countries got together to put this DXpedition on the air and handle the pile-ups.

Early in the morning of 25 July the entire team assembled in the hotel lobby and a royal car and escort took us to Mount Nebo, about 800m above sea level and an hour's drive from Amman.

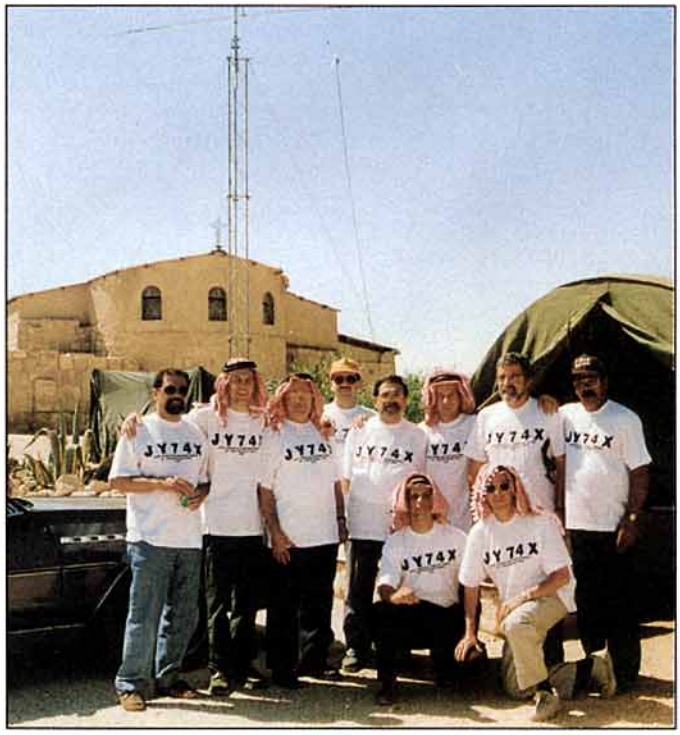
JY74Z from Mt Nebo

AS SOON AS we arrived we began operating. One by one the transmitters were fired up on the air on SSB and CW. We changed operators frequently, because of the terrible 40° C heat in the tents. The pile-ups were ear-shattering!

After supper, provided by the Mariott Hotel Catering Service and brought up to the mountain site, the team split into two groups. One stayed overnight on Mount Nebo, in what seemed to be the freezing cold: temperatures in the desert change dramatically between day and night. The other group went down to the city, to operate as JY74X from the clubhouse in Amman.

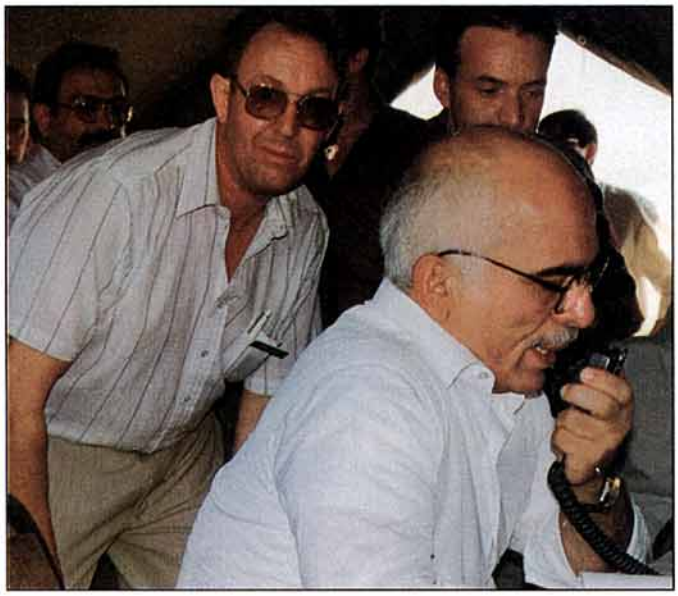
The next day, the programme was the same, but the heat even worse. The highlight of the day was the appearance of none other than His Majesty King Hussein, JY1, on the air on both HF and VHF. The excitement and enthusiasm increased as every member of the team present had a chance to have a QSO with His Majesty from his QTH in Amman. Afterwards the pile-ups doubled, the frenzy on HF went out of control and His Majesty decided to close down and maybe appear later to try again.

Later that day, around 5.00pm, we were honoured as His Majesty arrived in person at the Mount Nebo site. After introductions, he went on the air, "This is JY74Z, JY1 at the microphone". A few QSOs were made, but it was almost impossible to pick out a callsign through the roar of the

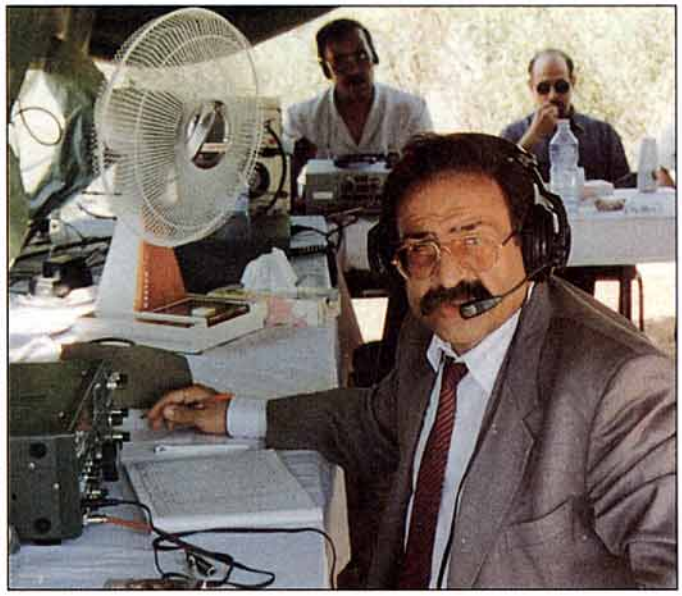


The Jordanian and Israeli operators in front of the main tent housing the JY74Z station. In the background, the Franciscan Monastery on Mt Nebo.

*c/o Israel Amateur Radio Club, P O Box 17600, Tel Aviv 61176, Israel.



His Majesty King Hussein, JY1, operating JY74Z on Mt Nebo. Immediately behind King Hussein is the author, Joseph Obstfeld, 4X6KJ.



The Secretary of the Royal Jordanian Amateur Radio Society, Mohammed, JY4MB, at the controls of JY74Z on Mt Nebo.

pile-up. The words used most during that half hour or so, were "stand by, stand by". Amateurs around the globe did not listen, each one thinking that he will make it through. Only those that have been on the other end of the pile-up know that the colossal noise at such moments causes 'the big switch' to be pulled. His Majesty put down the microphone and signed the log. For a few lucky ones this will be the most unforgettable and special QSO ever.

Thursday 28 July was supposed to be the final day. During the morning hours our driver took us on a sightseeing tour of the city, after which we returned to 'The Mountain' to continue with the pile-ups. As the day progressed it became clear to us that it could not be the final day of operation, as on Friday the Jordanian part of the border is closed and on Saturday the Israeli side is shut down.

At various times during the day His Majesty JY1 came on to the HF frequency and the frenzy on the bands continued. During the night it was the same. As word spread that there would be a special QSL card for this occasion, the amateur radio world tried to work the two stations on every band and mode possible.

Festivities

DURING THE MORNING of Friday 28 July we were summoned to the residence of His Highness Raad Bin Zeid, JY2RZ, the Chairman of the Royal Jordanian Amateur Radio Society, to officially and personally receive our Jordanian operating licences. Afterwards we went back on the air and it was decided that His Highness JY2RZ would go on frequency to take some calls. We went back to the Mountain enthusiastically and tried to control the pile-ups, as the two most-wanted Jordanian callsigns came on the air simultaneously. The few very lucky ones that made the contact must still have adrenaline running through their veins!

At sunset, we took time out for a most elaborate barbecue, prepared for us by the Mariott Catering Service, with an unforgettable view as background. From Mount Nebo one can see over the Jordan Valley with the Dead Sea on one side and Jericho and the River Jordan on the other. As the sun set, the colours of the landscape below and on the horizon were exquisite. Later that evening, the pile-ups reverted to the normal state that we had become used to during the previous days and nights.

On Saturday 29 July, which was really the last day of this very special operation, we decided that the stations would be dismantled and antennas taken down in the afternoon. The multitude of equipment that we brought had to be packed up and made ready for the return trip. At about midday the frenzy peaked once again, as His Majesty JY1 came on the band again, this time from his Palace at the southern city of Aqaba. Unfortunately, HF propagation was very bad, and very few had the chance of making a contact. We left Mount Nebo, had one more look at the unbelievable view of the surrounding landscape and went downhill with all the equipment that over the past days had accumulated at the site.

We made more than 15,000 QSOs on all bands except 160 meters. We gave our QSL information repeatedly, but here it is again: all QSLs go to JY6ZZ, either direct or via the bureau.

We were invited to a festive dinner His Highness Raad Bin Zeid, JY2RZ, Chairman of RJARS. At his residence we met up with our fellow Jordanian amateurs who had been with us on the operation and discussed the pile-ups, the activity of the past days and plans for the future. We were taken completely by surprise, when His Majesty King Hussein, JY1, arrived and joined us for the evening dinner. Many anecdotes were told and pictures taken. For us six Israeli hams, it was the climax of an incredibly successful and special DXpedition. We hope that we will have many more opportunities to work together with our fellow hams from JY-land.

Packing Up

ON SUNDAY 30 July we packed the equipment, cleaned up the mess, gathered and signed the logbooks, and everything was ready for the return trip. Shaking hands and saying goodbye was certainly not easy after such a week. Within a few hours we were back in the bustling Tel Aviv traffic, back to reality, everything looking like a dream, a dream that had come true.

Allow me to say a word of thanks to Amir, 4X6TT, who coordinated the whole event, and to the wonderful team of Israeli operators for making this such a memorable week. Special thanks to the JY operators, friends, partners in the task of controlling the pile-ups. It was great being together with them for this momentous and historical performance.

Extraordinary thanks to Mohammed, JY4MB, Secretary of RJARS, who orchestrated, guided, and supported the whole operation, from the beginning until the end, for his endurance in staying with us the whole time. Extraordinary thanks to Ibrahim, JY5IM, for the endless technical support, for keeping the towers and antennas up and the amplifiers running. Exceptional thanks to Ali Shoukri, JY3AK, of the Royal Palace for the logistics and support. And last but certainly not least, there are no words of thanks to describe the appreciation and gratitude of all of us to His Majesty, King Hussein of Jordan, JY1, for all he did for us. Without his personal involvement and assistance this event could not have come to pass.

Salaam - Shalom, Joseph Obstfeld, 4X6KJ / JY8KJ. ♦

His Highness Raad Bin Zeid, JY2RZ, Chairman of the Royal Jordanian Amateur Radio Society being presented with a clock by Amir, 4X6TT. It bears the inscription 'JY74X Commemorating the first anniversary of the Washington Declaration. Joint operation Jordanian - Israeli amateur radio operators, July 25, 1995'.

AT LAST . . . A 9600 PACKET COMPATIBLE TRANSCEIVER AT AN AFFORDABLE PRICE! . . .

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THINKING ABOUT STARTING UP IN PACKET BUT DON'T KNOW WHERE TO BEGIN? . . .

Yes, it can be a nightmare knowing where to begin. Which TNC? What software? How do I make the cables? What on earth are all those weird buzzwords? Well, at the risk of putting a few folks off this exciting and often rewarding aspect of the hobby more often than not digital radio isn't always a "buy a box, plug it in and that's that" scenario, at times it can be REALLY frustrating when starting out and especially if computers are not your strong point. We at Siskin have "held" thousands of hands over the past 10 years (ask around, you'll soon get the drift) and we're pleased to say that many of those who bought products from us in those early days are running Mailboxes, Packets nodes and DX Clusters. The really really great part about all this is that most of Siskin's business comes from personal recommendation which in turn allows us to apply the majority of our resources in customer support rather than having to rely too much on heavy advertising.

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ACCELERATING ELECTRONS

For many years textbooks of Physics have said that creating radio waves is simple. All you have to do is accelerate electrons: Ref: Feynman Lectures on Physics II 18.4. Unfortunately in a single conductor this is difficult to do. The free electrons at the centre of a conductor can only be accelerated from the ends by steeply changing potentials, and they progress along by means of disturbances moving with the velocity of light; electromagnetic waves. In other words radio waves must exist in order to create radio waves! If the wire is lambda/2 (and therefore resonant) it is possible to build up swings which (eventually) accelerate the free electrons to create radio waves. With short single wires it is hopeless. But we have invented the technique to do it in lengths as short as lambda/20, or non-resonant loops as small as lambda/200 in diameter. Have a look at one of our latest "CURRENTS on WIRES" forms of CROSSED FIELD ANTENNA, and you will agree that we have cracked the problem.
EMDR 1A is £189 EMDR 2 A is £199. They go over the house tiles or in the loft.
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FOOTNOTE: European Patent has been granted (with 17 Claims allowed) on our original "VOLTS on PLATES" form of Crossed Field Antenna. Get your company to write for licence terms; many countries available but hurry as time to claim is limited. "Radio Antennas" is number 0398927.
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Council Brief

NOTES OF A meeting held on 8 September 1995.

Administrative Matters.

The Founders' Trophy was awarded to Mr J Hall, G3KVA.

Council approved the attendance of the President and the IARU Committee Chairman at the forthcoming VERON celebrations.

All Committee Chairmen and Honorary Officers of the Society were confirmed in their appointments subject to the following changes: C Thomas, G3PSM, to take over as HF Committee Chairman with immediate effect; I D Suart, GM4AUP, would become Chairman of MLC with effect from 1 January 96; P W Kirby, G0TWW, to become Chairman of a new Publications Board created by the amalgamation of the Publications Advisory Board and the Publications Management Board; TAPAC would remain in being under the present Chairman. The HF Manager appointment would be delayed while the new Chairman and his Committee examined the post and made an appropriate recommendation.

The recommendation from the Presidential Advisory Group on Society representation to the City & Guilds Advisory Group was approved. The members would be I D Suart, GM4AUP; P D Sheppard, G4EJP; D Whalley, G4EIX; and J Bazley, G3HCT.

In view of the comments received about the recent change in policy regarding the awarding of trophies, this would be referred back for further discussion with Committee Chairmen.

I D Suart, GM4AUP, reported that no nominations had been received for any of the Scottish trophies. This was most disappointing.

Amateur Radio Matters

The recent letter received from RA, regarding their support for the New Zealand Administration's proposal that the compulsory Morse test requirement for HF licensing be removed, was discussed. The RA stance on this was unacceptable to the Society, and a letter drafted by LAC giving a robust response was approved, to be sent to RA above the signature of the President. J Bazley, G3HCT; J N Gannaway, G3YGF; I J Kyle, GI8AYZ; and the General Manager would make arrangements for all amateur licensees to be informed about this exchange of correspondence.

Financial Matters

The Honorary Treasurer reported that the final draft of the Annual Accounts, in a more contemporary format which more appropriately complied with Companies Acts requirements, would be circulated in the near future. Subject to any amendments they could then be formally approved. However, a revaluation of the Headquarters premises carried out recently indicated that they were currently valued at £275,000, a much lower value than that recorded by a similar exercise in 1992. Although a small operating surplus in line with that expected would be achieved, the lower valuation would mean the Society would record a loss for the year. After some discussion, Council resolved to take a conservative view of the current valuation in the knowledge that property values might not yet have bottomed out. While appreciating the effect that this would have on the balance sheet, it was decided to place the Headquarters building on the books at a value of £250,000 in order to provide a cushion against any further reductions that might be revealed in any future revaluation.

Government Minister on the Air

PRESIDENT OF THE Board of Trade, the Right Honourable Ian Lang, MP, recently opened the Greenock District Scout's new hut in Inverkip. To celebrate the event, the Inverclyde Amateur Radio Group operated special event station GB0GDS, and Mr Lang spent some time at the station talking to the operators, including some of the Scouts who had recently passed the Novice exam.

Mr Lang went on the air on 80m to exchange a greetings message with the Glasgow Scouts District Commissioner, who was at West of Scotland Radio Society's special event station at the Glasgow Scout Camp.

PHOTO: GREENOCK TELEGRAPH

Eddie Watt, GM0IOY, supervises Mr Lang as he sends a greetings message from GB0GDS on 80m. Looking on are Scouts Robert Lynch, 2M1EJI, and Martin McLintock, 2M1EJH.

Official RSGB Visit to Japan

IN JULY, RSGB Past President Peter Chadwick, G3RZP, visited Tokyo on business. After consultation with 1995 President, Clive Trotman, GW4YKL, Peter made a formal visit on behalf of the RSGB to the headquarters of the Japanese Amateur Radio League (JARL). Amongst areas of mutual interest that were discussed was the very slow progress on reciprocal licensing: apparently, matters are progressing within Japanese government circles. Peter was able to tour the satellite control station, the club station and the museum before a dinner with the President and the General Manager of JARL and the Secretary of IARU Region 3.

PHOTOGRAPH: JARL

Peter Chadwick, G3RZP, and JARL General Manager Masasoshi Ebisawa, JA1DM, in the JAS-1b and JAS-2 satellite control room.

WRC-95 Conference

The ITU is staging the World Radiocommunication Conference 1995 (WRC-95) in Geneva from 23 October to 17 November. Industry and government delegates from over 180 countries will be attending the conference, the aim of which is to reach agreement on some far-reaching changes to the Radio Regulations.

As is now well known, the UK's Radiocommunications Agency (RA) has indicated that it will be voting in favour of New Zealand's proposal to delete ITU Radio Regulation 2735 if the issue is debated at WRC-95 (see letter from the RA's Roger Louth on page 15).

We hope to bring you news of any vote in the next issue of *RadCom*.

HQ Open Saturday 18 Nov

RSGB Headquarters is open on 18 November from 10.00am to 4.00pm. The bookshop, museum, library and GB3RS shack will be available to visitors. RSGB Morse code tests are available on demand between 11.00am and 12.30pm; please bring two passport-size photographs with you.

● APOLOGIES for printing the wrong phone number for SSL on page 8 of the October *RadCom*. The correct number is 0117 9258333.

RAEN Now a Charity

The Radio Amateurs' Emergency Network is now a national registered charity (number 1047725) with the expressed object: "To protect human life and property by assisting the work of the police, the ambulance services, the British Red Cross, St John Ambulance, and any other organisation involved in rescue services."

For further details of the work of the RAEN, please contact the Director of Publicity, David Hicks, G6IFA, QTHR, or tel: 01244 336639.

MORE RADCOM NEWS ON PAGE 95

Important Licensing News

Changes to Radio Regulations - an Update

FOLLOWING THE correspondence enclosed in last month's *RadCom* a meeting was held with the RA at the end of September where the subject of consultation on such major issues was debated. Subsequent to that meeting the following letter was received:

4th October 1995

Dear Sir

THE MORSE REQUIREMENT

As you will be aware, the President of the Radio Society of Great Britain (RSGB) wrote to the Agency in August expressing concern about the UK's proposed stance to support the proposal to delete Radio Regulation 2735. That letter and my subsequent reply were circulated with last month's RadCom *promoting a flood of correspondence and telephone calls. I would like to take this opportunity to put the issue into context.*

Background

There has long been debate on whether there should be two separate licence classes and whether the Morse test should be the means of differentiation. We asked the amateur community in 1992 to submit their views on code-free licensing both to various publications, including RadCom, and to the Agency direct. The general result was that class A's were in favour of retaining the requirement, while class B's wished to see the test dropped. The main reason given by respondents for retaining the test was to maintain the high standards of operation on HF. Class A's felt that they have struggled to obtain their position and that opening up the bands to Class B's would be a retrograde step. The arguments given for abolishing the test were that Morse was no longer widely used and that modern technology had removed the need for a knowledge of Morse. Many Class B's felt that the Morse test is a real barrier to the development of amateur radio.

The Current Position

It is the role of the Agency to manage the radio spectrum on behalf of all users. The RSGB have stated that the HF bands are already overcrowded and that opening the bands up to all licence holders would result in them being unusable. If this is the case, and it is necessary to restrict access, the Agency needs to consider whether the Morse test is the appropriate means of doing this. A possible alternative option put forward by respondents to our survey was a further technical examination, perhaps one that related specifically to the use of HF. A further possibility is, in line with the Government's policy of deregulation, to abolish the distinction between A and B licences altogether.

By its very nature, radio is international and the UK will need to keep a close eye on events within Europe and worldwide. We already have a number of reciprocal agreements with other countries and participate in CEPT Recommendation T/R 61-01. We fully support these initiatives and would want to allow UK amateurs to continue to take part. Again, one option we could consider is an optional Morse test for those who want to travel abroad and operate.

The World Radio Conference (WRC) 1995

This issue has arisen because a proposal for the deletion of Radio Regulation 2735 may be discussed at the forthcoming WRC. There is a view that this regulation is outdated and therefore should be deleted. CEPT administrators have briefly discussed this topic but have been unable to reach an agreed view. While we are still considering our own national position, we see merit in the argument that the Morse test should cease to be an international obligation. Removing it would allow administrators a degree of flexibility and, should we decide to remove the Morse test in the future, would simplify procedures. It is still unclear as to whether this issue will come up for debate at the WRC.

The Future

Whatever happens at WRC, it is clear that the issue of the future of the Morse test needs to be firmly resolved. There is still much to be considered and we would propose to pursue this issue with the RSGB as the national representative body for radio amateurs. I have personally received a number of letters following publication of my letter and while some have expressed concern about the proposal to drop the Morse test, others have fully supported its abolition. Whilst I cannot give a definitive statement now of where we go from here, I can give an assurance that we will continue to act in the best interests of the whole of the amateur radio community.

I have copied this letter to the Editors of ShortWave Magazine, Ham Radio Today *and* Practical Wireless.

Yours faithfully

(signed)Roger Louth

Director - Mobile Services

Ian Suart, GM4AUP, Chairman Licensing Advisory Committee comments:

While the issue in question appears to be the Morse requirement, this involves far more than just the overcrowding matter referred to - our main concern is that such proposed changes to the Radio Regulations should not be made without consultation and agreement with IARU.

The discussions on this major issue are continuing, and will be reported in due course.

Developments on DSI and 10GHz

DSI

AT A MEETING on 28 September, the RA outlined the recently-finalised UK position on DSI. We are pleased to be able to report that they have taken on board the major concerns expressed by the RSGB, and in particular, they are not supporting the proposed changes at 430 - 440MHz, which was by far the greatest concern for UK amateurs. We would like to thank them for listening to our views.

In more detail:

a) The UK does not support raising the status of 50 - 52MHz, as this would create difficulties in administering the sharing arrangements.

b) The UK does support the proposal for amateur propagation beacons around 40.68MHz.

c) The UK currently has a secondary allocation over the range 70.0 - 70.5MHz, which will remain. The UK therefore fully supports the recommendation for an amateur allocation in the range quoted.

d) The UK supports the recommendation to leave unaltered the Amateur allocation at 144 - 146MHz.

e) The UK does not support the proposed changes to the 430 - 440MHz band. Amateurs have objected to the proposed reduction of the band, and the Primary User would have difficulties with co-ordinating the sharing. (We should note that, as Secondary Users, our sharing arrangements with the Primary User work very well; we would like to thank them for their co-operation.)

f) The amateur allocation at 919.5 - 920MHz cannot be accepted because that band is still in use by Cellular Radio (ETACS).

g) The other proposals, regarding the inclusion of 50MHz in T/R 61-01 and authorisation to listen to beacons in bands that are not available to amateurs in that country for transmission, are acceptable to the UK.

From a UK point of view, the existing UK facilities should be retained, and a few minor improvements made. From a European viewpoint, it is supporting spread of allocations for the 50 and 70MHz bands. On balance, this is a net improvement for the Amateur Service, although it is disappointing that some allocations could not be expanded nearer to their sizes in Region 2. We are also pursuing an extension of the 28MHz band and other HF allocations outside of the DSI process.

This is good news initially, however, there are several stages to the DSI process. RSGB has also input its views directly to the ERO. The ERO will be considering the views of UK and all the other CEPT countries' administrations, together with any direct imput, over the next few months and will make an initial report in March 1996, and a final report in 1997, so the situation will be evolving over the next year or so.

10GHz

SEVERAL MONTHS AGO, we reported the possibility of losing 10,150 - 10,300MHz to Wireless Local Loop services. The Government has now decided that this allocation will go ahead, although it may be a year or so before the actual loss takes place. It looks like this will be a permanent loss, as we will not be able to share with the new user. Discussions about the impact this, and other constraints, will have on our activities in the remainder of the band are continuing.

Finally, we would like to thank those who have responded and expressed their views on these important issues.

THIS MONTH'S LEADING FEATURE

RSGB International HF Convention

8 - 10 September 1995

THE INTERNATIONAL HF convention, once again staged at the Beaumont Conference Centre at Old Windsor in Berkshire, is arguably the RSGB's most prestigious event of the year. Many overseas visitors attend (a complete list is given in **Table 1**) and it is a great opportunity for all HF operators to meet the face behind the voice.

Indeed, despite the excellent presentations, many attend primarily for the social side of the event. The proceedings started on the Friday evening with a welcoming reception buffet for the overseas guests. The bar at the conference centre was packed until late into the night on both nights, as DXers swapped stories of the ones that got away.

There was also the chance to compare the latest offerings from the 'big three' manufacturers: Martin Lynch, G4HKS, of the Amateur Radio Exchange Centre, one of the major sponsors of the Convention, provided a display of the latest FT-1000MP, Icom IC-775DSP and Kenwood TS-870S transceivers, among others. Barry Cooper, G4RKO, of Yaesu (UK), another major sponsor, was also on hand to provide detailed information on his equipment.

Lecture Programme

FOR MOST OF those attending the highlight of the weekend was the series of top-quality presentations by some of the world's top HF operators and DXers. This year, the RSGB was privileged to have Chuck Hutchinson, K8CH, ARRL's Membership Services Manager attending. In many ways, Chuck *is* Mr DX: it is his department which administers the DXCC program, and he is himself at number 1 position on the DXCC Honor Roll. Chuck gave two enlightening presentations on the DXCC program as well as a slide-show tour of ARRL headquarters in Newington, CT. All cards for DXCC awards must be checked, and normally QSLs must be sent to ARRL headquarters. However, Chuck was able to check the cards personally at the Convention, and many DXers took advantage of this facility, the first time it had been available in the UK. In fact, on both the Saturday and Sunday Chuck had to be literally dragged away from DXers waiting to have their cards checked in order to give his talk! In all, Chuck, with help from Jim Kellaway, G3RTE, checked 86 DXCC applications or endorsements, comprising a little under 9000 QSL cards, considerably more than expected. This DXCC QSL card checking facility was so popular that it will be repeated in the future.

Above: Chuck Hutchinson, K8CH, with just a few of the 86 DXCC applications /endorsements checked during the Convention. Below: Mats Persson SM7PKK, looks like he is enjoying his visit to the HF convention.

Mats Persson, SM7PKK, although still only in his mid-20s, is already a veteran of many Pacific DXpeditions. He made a welcome return visit to the Convention to give a packed audience a graphic description of this year's 3D2CT / 3D2CU Conway Reef DXpedition. Conway Reef is sufficiently remote from other Fijian islands to count as a separate DXCC entity. Mats gave a hair-raising account of dinghies overturning in the surf, depositing operators and equipment alike in the sea. Nevertheless, all operators eventually landed safely and conducted a successful DXpedition, although some equipment was lost.

DX Dinner

ON THE SATURDAY evening, around 155 people sat down to the 'DX Dinner'. In his opening speech, RSGB President Clive Trotman, GW4YKL, warmly welcomed Chuck Hutchinson, K8CH, from the ARRL, and thanked the main sponsors for making the Convention possible.

The President pointed out that HF activity is but one of some 30 different aspects of amateur radio. HF operators cannot afford to be complacent because it is the UHF and Microwave bands which are under threat at present. The DX Cluster nodes also use those bands and who knows, maybe there will be a future 'DSI3' which will target the HF spectrum? The President said that in the USA, the ARRL is planning to negotiate with the FCC for additional HF spectrum, but that any success they may have would not necessarily benefit us in Europe. Addressing the many overseas guests as well as British amateurs, he stressed that both in order to fight against the loss of spectrum, and to fight for new spectrum space, it was essential to have strong national societies, no matter in which country you lived.

Barry Cooper, G4RKO, of Yaesu (UK) also made a short speech in which he said that "Yaesu (UK) considers the support of the HF and DX market to be very important, and therefore it is very keen to continue supporting both the HF Convention and the RSGB IOTA Programme." This naturally drew a large round of applause from all those present!

During the dinner, which was very ably MCd by Bob Whelan, G3PJT, a number of spot prizes were awarded and 'the flag competition' took place. Each table had two national flags and teams were invited to identify the country, give the radio prefix, and name the capital city and currency used there. This proved to be a great ice breaker in which the many non-radio guests could also contribute.

5Z4GB, 9J2BO, AA5NK, AA6MC, AP2JZB, DJ8NK, DK2OC, DL3OJ, EI5DI, HB9DX, HB9KT, HB9MX, HB9RG, JA1FNO, JA1LZR, JA3AER, JA3BUQ, K6ZH, K8CH, K9JCR, LA4BN, N6KIM, NN2C, NZ1W, OZ4ZT, OZ7SM, PA3EMN, S92SS, S92YL, SM5API, SM7PKK, SM0HNV, UT8LL, VK9NS, VS6CT, W6OSP, W8PR, WA2UDT, ZS1FJ.

Table 1: Callsigns of overseas visitors attending the International HF Convention.

One of the 100ft towers used by the demonstration contest station, in front of the Beaumont Conference Centre.

Ladies' Programme

THE INTERNATIONAL HF Convention is attended by many who have travelled a considerable distance and who stay overnight at the Beaumont Conference Centre, often with their partners, who, it must be admitted, do not always share their spouses' fascination with radio. The organising committee therefore provided a 'ladies' programme' which consisted of a Saturday morning shopping spree in Windsor, and in the afternoon a sightseeing trip with a professional tour guide. On the Sunday, a visit to Hampton Court was organised.

Contest Station

THE CONVENTION weekend coincided with the SSB leg of the Worked All Europe DX Contest and GB5HQ was on the air, not only participating in the contest, but also providing a demonstration of how to run a top-class modern multi-operator contest station. SMC loaned a Yaesu FT-1000 transceiver and 100ft mobile Versatower, which supported a Cushcraft 40-2CD two-element 40m beam loaned by Martin Atherton, G3ZAY. Linear Amp UK provided one of their Explorer HF amplifiers, Yaesu (UK) provided a second FT-1000 and the Verulam Amateur Radio Club provided a second 100ft mobile Versatower and TH6DXX triband beam. Logging took place on a pair of networked PCs running the latest version of *CT*.

One thing proved by GB5HQ, however, was that no matter how good the equipment, or how high the towers, it is impossible to influence propagation! Conditions were abysmal throughout the whole weekend, and GB5HQ only made 862 contacts for a score of about half a million points, considerably less than might have been expected. Nevertheless, the lengthy quiet periods allowed the operators more time to explain what was going on to interested onlookers. Thanks go to Dave Lawley, G4BUO, and the RSGB HF Contests Committee for organising the contest station. While the station was on the air, Chris Burbanks, G3SJJ, the Chairman of HFCC, gave a lecture on HF contesting, with the emphasis on how newcomers can enjoy themselves and at the same time make a decent score.

Sunday Programme

ONCE AGAIN THE lecture rooms were packed to overflowing on the Sunday. Indeed, for most of the lectures it was standing room only and anyone arriving late for some of the talks found that it was impossible to open the door of the lecture room more than a few inches due to the crowd within. The biggest difficulty was deciding which of the three simultaneous lecture streams to attend: it was impossible to attend all the presentations, but a complete list of the subjects covered is given in **Table 2**.

It was a pleasure to welcome famous DXer Jim Smith, VK9NS, from Norfolk Island, to the Convention. Jim has been influential in encouraging the establishment of the Amateur Radio Service in Bhutan [see *Return to Bhutan, Radio Communication*, September 1995 - *Ed*] and as a result has researched the history of all amateur radio operations in that country over the past 40 years. This provided the basis of one of two talks Jim gave to the Convention. Never one to miss a DXing opportunity, Jim stopped off in the Andaman Islands while travelling from the Pacific to the Convention, and operated briefly from the station of 'Mani', VU2JPS.

Presentations

THE HF CONVENTION is also the place where the RSGB's HF trophies are presented each year, and where the prestigious Young Amateur of the Year presentation takes place.

RSGB President Clive Trotman, GW4YKL, assisted by Trophies Manager David Simmonds, G3JKB, and HFCC Chairman Chris Burbanks, G3SJJ, made the presentations of the trophies to the individuals and groups who had won RSGB HF contests during the course of the year.

Amateur Radio on the Internet	Mike Richards, G4WNC
Computers in the Shack	Don Field, G3XTT
The Conway Reef DXpedition	Mats Persson, SM7PKK
ARRL HQ and the DXCC Program	Chuck Hutchinson, K8CH
Islands on the Air Programme Report	Roger Balister, G3KMA
Activating Islands - the DOs and DON'Ts	Don Beattie, G3OZF, and Jim Smith, VK9NS
HF Data Modes	Mike Kerry, G4BMK
Contesting in the Caribbean	Bill Hudzik, WA2UDT
Low Band Antennas My Way	Ron Stone, GW3YDX
Sunspots and Propagation	Martin Atherton, G3ZAY
Islands on the Air - the Fastest-Growing Award Programme	Neville Cheadle, G3NUG
Bhutan - 40 Years of Amateur Radio	Jim Smith, VK9NS
Kermadec Islands 1995	Barry Fletcher, G4MFW/ZS1FJ
HF Contesting	Chris Burbanks, G3SJJ
Topband Antennas for Mere Mortals	Neil Smith, G4DBN
Cluster Forum	John Clayton, G4PDQ
Equipment Reviews	Chris Lorek, G4HCL
Novice Forum	John Case, GW4HWR
CW Techniques	Mike Matthews, G3JFF and Mick Puttick, G3LIK

Table 2: List of presentations at the International HF Convention.

In addition to the contest trophies, the G5RP Trophy is awarded to the amateur who, in the opinion of the HF Committee and the Committee of the Vale of the White Horse Amateur Radio Society, has made the most progress in the field of HF DX during the year. This year it was won by Peter Leetham, G4YVV. In the last year Peter has increased his CW DXCC score from 121 to 231 countries, his SSB score from 189 to 221, and his IOTA score from 220 to 323. Much of his DX work has been on the WARC bands, after he modified his home-made quad antenna to cover those bands.

In the afternoon, the 1995 Young Amateur of the Year presentations were made. Winner Leroy Kirby, GW0ULC, and runner-up Charles Banner, G7UBA/2E1CHY, received their prizes from Roger Louth, Director of Mobile Services at the Radiocommunications Agency; RSGB President Clive Trotman, GW4YKL, and the other sponsors.

Raffle Prizes

IN ADDITION TO being one of the major sponsors of the Convention, Yaesu (UK) generously provided the star prize in the raffle, an FT-900 transceiver. As usual, the raffle proved to be extremely popular, so much so that this year the raffle tickets were completely sold out well before the draw took place. Clive Trotman, GW4YKL, officiated and the star prize winning ticket was drawn first and pinned up on the board to provide an exciting climax to the weekend's events. The second prize - a Kenwood TH-42E handheld transceiver, kindly donated by Trio-Kenwood (UK) - was won by Geoff Brown, GJ4ICD, and the third prize, a valuable Icom discount voucher, was won by Roger Brown, G3LQP.

Numerous other prizes were drawn and thanks go to Badger Boards; the QRP Component Company; Number One Systems Ltd; Siskin Electronics Ltd; Kenwood (UK); Strumech Versatower Ltd; Paul O'Kane, EI5DI; Alan Jubb, G3PMR; Fred Handscombe, G4BWP; H Leeming, G3LLL; Novell Netware and Venus Electronics for so generously providing prizes for the raffle.

Finally, the star prize winning ticket was revealed: it belonged to Neville Cheadle, G3NUG, who was amazed to win the FT-900. Coincidentally, he had only recently returned from a trip to Malaysia during which he activated a couple of IOTA islands - using a borrowed FT-900 which Yaesu (UK) had donated to the IOTA programme in 1994! ♦

Neville Cheadle, G3NUG (right), upon hearing that he has just won the raffle star prize, a Yaesu FT-900 transceiver. It was presented to him by Barry Cooper, G4RKO, of Yaesu (UK).

JOHN ALLAWAY, G3FKM
10 Knightlow Road, Birmingham
B17 8QB

THIS YEAR'S HF convention was fortunate enough to have ARRL Membership Services Manager Chuck Hutchinson, K8CH, in attendance. He gave two very interesting talks about ARRL HQ and the DXCC programme. He also made many people happy by dealing with their applications for DXCC (in fact he checked 86 DXCC applications and endorsements involving the checking of nearly 6,000 QSLs) - this was particularly popular because there was no need to mail precious QSL cards to the US.

If anyone has a photograph (or better still - *photographs*!) suitable for use in this column I would much appreciate receiving it/them. Colour pictures are preferable and I will make every effort to return them.

John Kelly, GM3TCW, is receiving QSLs from people who contacted '5R8MI' on 17 August. He says that he is neither QSL manager for '5R8MI' nor any other station!

EXPEDITIONS

STEVEN MUSTER, G4UOL, will be making his eighth pilgrimage to the **Isle of Man** from 2000 on 17 November until 1 December. He will be at Chergy Dhoo, near Peel. GD4UOL activity will be entirely CW and 11kHz up from lower band edges and near 10.102 and 18.070MHz. Skeds can be arranged in advance by telephoning Steven on 01702 334014.

As he did last year, he is hoping to operate from the club station of the Isle of Man Radio Society, GT3FLH, for one day - probably on 1 December.

The *CQ* WW DX Contest will take place during the visit and Steven said that 1.8MHz was like 14MHz between 0100 and 0600 last year.

DX NEWS

THE ARRL DX Desk announced on 15 August that the number of unprocessed applications at the end of July was 182 (19,187 QSLs). They had received 327 applications (31,779 QSLs) for endorsements and new awards during the month and applications being sent out at the end of the month had been received less than a week earlier.

John Layton, G4AAL, telephoned to say that he had operated from **Afghanistan** in June from three different locations which did not include Kabul. He travels for OXFAM in UN planes and was in **Southern Sudan** as G4AAL/ST0 on 24/25 August. He was due to go to either **Uganda** or **Mozambique** and he has a TS50 and a keyer with him. G4KLF is going to be in the **Sultanate of Oman** for two years as A45ZN.

He will also operate from the ROARS HQ station A47RS. He will be using CW, SSB, RTTY, AmTOR, and packet.

Kenn Everard, G0NKZ, will be at Patriot Hills (**Antarctica**) (80.20 South, 90.00 West) from early October until the end of January 1996. He will be listening for amateurs between 7.80 and 7.90MHz and between 14.150 and 14.200MHz. The callsign was not known at time of writing but he will have daylight 24 hours daily so might be active at any time subject only to the weather conditions. QSL to G0SZO via the RSGB bureau or to PO Box 599, Worthing, Sussex.

Ron Hill, G3SGQ, will be in **South Africa** from 5 December until 28 February next year. He will appear as ZS6/G3SGQ mainly using CW on RNARS frequencies. *QTC* (the newsletter of the Radio Society of Kenya) gives the excellent news that Kenyan amateurs have been able to use the 24.890 - 24.990MHz since 17 June. According to *DXPRESS*, documentation for the recent 5A1A has been received by the DXCC desk. There are three local operators now; Ali, Usaama, and Mufi. The same news source says that TT8NU, in **Tchad**, is active again mostly on CW on 10, 14, and 18MHz.

The expected appearance by JF1MG as 5R8EU from **Madagascar** has been postponed until October or November. Mark - 9X/ON4WW - was scheduled to return to **Rwanda** in September and to remain there until the end of 1995. He has CW, SSB, RTTY, and satellite on request but *no* 50MHz permission.

FR/F5PXQ will be on the air from **Reunion Is** between 18 and 25 October and again between 31 October and 15 November. He will use the bands from 14 to 28MHz.

It is rumoured that F5SZK and F5IJT may be on the air from **Crozet Is** from next month until February 1997 as FT5WF and FT5WG. F5SFD will be in **Djibouti** as J28PP for about two years.

Tony, G0REP, advises that he will be on the air from the island of Efate in **Vanuatu** from 27 October until 20 November using the callsign YJ0ARE. He will be limited to 100W output but he hopes to be on all bands including 1.8MHz. He will make special efforts to work into Europe and most operation will be on 14MHz near 14.260MHz whenever possible. G6DPU and G7UMM have recently acquired the calls ZL2MRH and ZL2VWJ and have moved to **Western Samoa** where they expect to stay for 18 months. Their callsigns are 5W1MH and 5W1NJS and they hope to be on all bands.

According to *RSGB DX News Sheet*, AL7EL will be on the air from **Wake Is** in late October as KH9/AL7EL.

The *RSGB DX News Sheet* reports that EP2FM - who is the President of the Anjomane Radioamateurie of Iran - has said that, after 14 years off the air, there are some indications that there might be some operation by Iranians again. He needs help to promote the idea within the country. A group of French amateurs including F6BFH, F5LGQ, F6AOI, F6AUS, and F9IE will be in **West Malaysia** between 1 and 20 November.

From **Cambodia** XU1FL is said to work after schedules which take place on 14.319MHz between 1430 and 1500 between the Universities of Sassari and Phnom Penh.

Thomas, A71AN/DL9FCQ, will be on the air from **Qatar** from 29 December until 14 January. He will be on all bands (mostly CW) from 3.5 to 28MHz. The latest news on **Vietnam** from the *RSGB DX News Sheet* is that Rolf, SM5MX, has returned to Hanoi and will be on the air again from XV7SW. There is another Swede on the air with the callsign XV7TH. DF5GF is in Ho Chi Minh City and operates as 3W6GM - but he is only allowed to use 14.016 and 14.295MHz and had no key at the time of writing.

4X7JY and 4Z7JY will be on the air from Ein Evrona at the end of October. This will be a continuation of the JY47X joint Israel/Jordan operation which took place from Mt Nebo in July. FB1LYE

QTH CORNER

A45ZN	T Selmes, c/o ROARS, PO Box 981, Muscat, Sultanate of Oman.
A71AN	T Backert, PO Box 1139, D-63590 Hasselroth, Germany.
SP0TPAX	via SP2FAP or to "QTC", PO Box 18, 82-312 Elblag 13, Poland.
TY8G	LA8G, c/o Morten Antonsen, PO Box 5626, Moellenberg, N-7027 Trondheim, Norway.
XR0Y	and XR0Z via WA3HUP, 2485 Lewisberry Rd, York Haven, PA 17370, USA.
YJ0ARE	A Blackburn, Otterburn, 2 Blackthorn Rd, Stratford-upon-Avon, Warwickshire, CV37 6TD.
ZW8DX	via PS8DX, PO Box 096, Teresina/PI, 64001-970, Brazil.
3W5FM	Nataly Stchelokov, UA0FFM/3, PO Box 66, Vladimir 6000, Russia.
5W1MH	5W1NJS c/o Meredith & Associates, PO Box 1084, Apia, W Samoa.
9N1/G3SXW	(or 9N1SXW) G3SXW, 7 Field Close, Chessington, Surrey, KT9 2QD.
9Q5MRC	G3MRC, 18 Grosvenor Avenue, Kidderminster, Worcs DY101SS.

(ex-J28CW) will be on **Kerguelen Is** for a year as FT5XL. He will be on all bands CW/SSB/RTTY and also on RS-12.

K9GS, ND9O, N9AU, and W9OP will be on **St Pierre & Miquelon** from 25 to 31 October. They will use their own callsigns preceded by FP/. During the *CQ* WW SSB Contest they will operate as TO5M.

Outside the contest they will concentrate on CW and the lower frequency bands.

NX4N, N4WW, K0LUZ, KY4Q, KF4WW, AB4OM, and KB4QKP will be visiting the **Turks & Caicos Is** from 23 to 30 October. In the contest they will be VP5WW but at other times VP5/own callsigns. N6KT will be in **Galapagos Is** as HC8A from 6 to 30 October.

Some Swedish stations will be on the air using the special SI (0 - 7) GM callsigns until 30 November. These will be commemorating the discovery of radio by Marconi and also the 70th Anniversary of SSA. OS4CLM will be on the air from 27 October until 5 November (during Canadian Week which commemorates the liberation of Knokke by Canadian troops in 1944). A multi-coloured award is available to those who make contact. The award costs US$5.00 or 10 IRCs from PO Box 110, B-8300 Knokke, Belgium, and the proceeds go to a welfare fund.

LA4CJA and LA3EX will be on **Jan Mayen Is** until April next year. They will be JX4CJA and JX3EX respectively and will be active on all bands 3.5 to 28MHz (including WARC).

SP0TPAX

THIS SPECIAL STATION will be on the air between 1 and 15 December. It will be put on the air to mark the 70th anniversary of the first amateur radio contact in Poland. This was between Tadeusz Heftman, TPAX, and a Dutch amateur - Ten Kate, N-OPM. SP0TPAX will be on all HF bands on CW, SSB, and RTTY and this is a joint venture between the publication *QTC* and the Polish national society PZK. The organisers promise to QSL all contacts.

BAND REPORTS

Thanks to G2HKU, G3GVV, GJ4GG, G4OBK, and the UK DX Packet Cluster via G4PDQ. Loggings were made between mid-August and mid-September and callsigns listed in italics were of stations using CW:

1.8MHz
0100 *A45ZZ, J28JJ, PY2DP, TF3DX.*
0400 *CX4SS, K1ZM, XR0Y, ZS6WT.*
2000 *5A1A, 9M8FC.*

3.5MHz
0600 EA9TQ, V44KAQ, *V5/ZS6YG*, XR0Y, ZL1BOQ.
1900 TA2BK, VK4STP, VK9NS.
2100 A71DX, D2/YO2YX, D3T, *EK8A*, JA5AUC, *S92SS*, VK3DZM, *ZS2LL*, 3V8BB, *9M2AK*, 9Q2L.
2200 DU9RG, *VK6HD, YB2 DK, 9X/ON4WW*, 9V1XQ.

7MHz
0000 ZS6B, *XR0Y, V31ML, VK8F, XQ1LS, 9Q2L.*
0500 *N7DD, TI5NW, ZL2CD.*
0600 *FK8HG, KC4AAA, TI9CF, XR0Y*, YS4/TI5NW, ZLs.
0700 DF5JT/HK0, KL7Y, PJ2MI.
1800 VK4MZ, *YI9CW, 9N1SXW.*
2000 *BV7FF*, HL9DC, *JD1AMA*, JH5FXP, *ST2AA.*

14MHz
0700 *FO5JR, JT1KAA*, KH3AF, KH6FKG, *WL7VO, ZK1PN, 3D2PN*, 5W1MH.
0900 AH8A, *FR5HG/T*, JT1FAS, S92YL, *V73C.*
1300 BA4AC, BV5GU, HS0/G4UAV, KH0CG, 3V8BB, 4J0FR, 9M2/G3NUG.
1500 AP2JZB, BV4BN, HS0/G3NOM, V85BG, XR0Y, XT2CH, 3B8GF, 4S7EA.
1700 S21YE, SU1AY, VS6AX, 5A1A, 7P8CI, 9M8PR, 9U/EA1FH.
1900 ET3MW, TR8IG,VP8CRY, VR2KF, XR0Z, ZD7DP, 9N1SXW.
2100 A61AN, *FG5ED*, HH2LQ, PT7BSH/PY0F, TU2JL, *XE3ARV.*

CONTESTS

UKRAINIAN DX CONTEST

1200 4 November - 1200 5 November

CW and SSB on 3.5, 7, 14, 21, and 28MHz. Single-operator single and multi-band, single-operator all-bands QRP (10W output), multi-operator single and multi-transmitter, and listener sections. Exchange RS/T and serial number (from 001). Ukrainian stations will send two letters indicating their region. QSOs with own country count one point, with own continent two points, with others three and with Ukraine 10 points. Multipliers are the sum of DXCC and WAE countries and Ukrainian regions per band. Send logs to: Ukrainian Contest Club HQ, PO Box 4850, Zaporozhye 330118, Ukraine, postmarked no later than 30 days after the contest. I can provide photocopies of the rules (SASE please).

OK/OM DX CONTEST

1200 11 November - 1200 12 November

CW, SSB, and Mixed categories. 1.8 to 28MHz (no WARC bands). Single operator CW, SSB, and Mixed classes. Multi-operator mixed, QRP, and listener categories. Contact OK, OL and OM stations. Exchange RS(T) plus serial number - each QSO counts one point.

Multipliers are OK/OL/OM counties on each band and mode. Mail logs before 15th December to: Karel Karmasin, OK2FD, Gen.Svodobody 636, 674 01 Trebic, Czech Republic. I can supply photocopies of the rules (SASE please).

HOMEBREW AND OLDTIME PARTY

1300 - 1700 19 November

1300 - 1500 = 7.010-7.040MHz and 1500 - 1700 = 3.510-3.560MHz. Single operator CW using less than 100W. All equipment must be homemade or older than 25 years. Class A: TX and RX homebrew or older than 25 Years, Class B: TX *or* RX ditto, and C: QRP TX not more than 10W/5W in/out and either homemade or older than 25 years.

A working A or C = three points, B working A or C = two points, and B working B counts one point. Exchange consists of RST, serial number and category. Post logs to Dr Hartmut Weber, DJ7ST, Schlesierweg 13, D-38228 Salzgitter, Germany, before 15 December. Copies of rules available.

IARU REGION 1 160M CONTEST

1400 18 November - 0800 19 November

(The rules of this contest have been modified to incorporate some ideas sent in by former participants. The contest starts 2h earlier in an attempt to include a possible opening to the east and the multipliers are no longer ITU Zones but DXCC/WAE countries). CW only. 1.810 - 1.950MHz. Single operator (14h maximum operation with breaks at least 1h long and marked in the log), multi-operator single transmitter and listener classes. Exchange RST and district code (in the case of the UK = county). One point for each QSO. Multipliers are one for each new 'district code'. Logs should be A4 size and those with more than 100 need to send A 'dupe sheet'. Logs on disk are welcome if in K1EA or ASCII format. Send logs to: IARU Reg 1

Contest, OEVSV, Theresiengasse 11, A-1180 Wien, Austria. I have copies of the rules.

In the **1995 Helvetia Contest** **G4IQM** scored 41,553 points (M), G0GVA 19,152 (M), G5LP 12,285 (M), G3RSD 9,720 (C), and G3KKQ 9,108 (C).

AWARDS

CULTURAL CITY OF EUROPE 1995 AWARD

This is being issued by the Reseau Luxembourgeois des Amateurs d'Ondes Courtes (RL) - a founding member of the IARU - to celebrate the fact that Luxembourg has been chosen as cultural city of Europe during 1995. It is issued to licensed amateurs and listeners who have heard or contacted Luxembourg stations in the calendar year 1995. Stations need 95 points - each QSO with Luxembourg counts 10 points for Europeans and 20 for others. Each QSO with a club station (LX95VEC, LX0RL, and LX0ITU) counts 15 and 30 points respectively. Each station can only be counted *once per band*. Send a certified list of contacts plus 12 IRCs, LUF 300, US $10.00, or 15 DM to: Reseau Luxembourg des Amatuers d'Ondes Courtes, Award Manager LX1TI, PO Box 1352, L-1013 Luxembourg. Please apply before 31 December 1996 and enclose a self-adhesive label showing your address.

MERCURY AWARD

Issued by RNARS for contacting or hearing members on or after 1 October 1960. One point per member station per band, two points for RNARS special stations, and double points for stations worked/heard above 30MHz.

Three classes: Class 1 - 20 points (basic minimum for UK stations); Class 2 - 10 points (basic minimum for European stations), and Class 3 - five points (only available outside Europe).

WORLD WIDE AWARD

For contacting/hearing members of the RNARS in 10 DXCC countries and two continents since 1 October 1960. Stickers are available for 25, 50, 75, and 100 countries and 3, 4, 5, and 6 continents - these cost an SASE or IRC plus SAE.

For either award send full log data signed by two other licensed amateurs plus £1.00 for UK applicants or £1.50, US$3.00, or six IRCs by others. The new RNARS Awards Manager is Glynn Burhouse, G4MVA, The Cedars, Foulbridge Lane, Snainton, Scarborough, North Yorks YO13 9AY. He took over on 7 August from Don, G3HZL, who carried out the task in exemplary fashion for more than 30 years.

1995 WARC BANDS TABLE

	10MHz	18MHz	24MHz	Total
G4YVV	78	117	72	267 (CW)
G3ING	77	84	34	195
G0DEZ	83	62	38	183
GJ4GG	48	60	29	137
G4OBK	29	52	27	108
G4CMZ	21	18	29	68
G0SKW	33	26	7	66
G4FVK	16	35	10	61

28MHZ COUNTRIES TABLE

G0AEV	123
G4OBK	111
G0DNV	90
G0MCT	55
G0DEZ	50
G0NQC	41
GJ4GG	36
G3XBM	32
G3ING	30
G2FQR	21
GM4CHX	20

PROPAGATION

I FOUND A paragraph in a recent *Long Island DX Bulletin* to be very interesting. It went as follows: "Sunspots Cycle 23 begins! On August 12, scientists at Caltech's Big Bear Solar Observatory noted Sunspot Region 7899, the first sunspot of Cycle 23. Region 7899 is located 18° south of the Sun's equator, and has the opposite polarity to Cycle 22 sunspots. This high latitude and reverse polarity are strong indicators that it is the first sunspot of the next solar cycle.

"This does *not* mean that we have reached the bottom of the 11-year sunspot cycle; only that Cycle 23 is starting early (less than nine years after the last sunspot minimum). Look for solar activity to remain very low for at least another year. However, the early start to Cycle 23 suggests the next solar activity peak will be earlier than previously expected, perhaps as early as 1998. Look for increasing solar activity in late 1996."

THANK YOU

TO EVERYONE who supplied input for the column, and once again special thanks to the following for news items extracted: the *RSGB DX News Sheet* (G4BUE), *DXPRESS* (PA0FQA), the *Lynx DX Bulletin* (EA2KL), and the *Long Island DX Bulletin* (VP2ML). Everything for the **January** issue should reach me no later than **16 November.** ♦

VHF/UHF NEWS

NORMAN FITCH, G3FPK
40 Eskdale Gardens, Purley, Surrey CR8 1EZ

SPORADIC-E propagation on 50MHz tailed off from mid-August. The long spell of above-average tropospheric conditions ended when low pressure Atlantic weather systems replaced the highs which had dominated the British Isles until early September.

TROPHIES

ONE OF THE VHF Committee's tasks is to recommend to Council to whom to award three Society trophies. At the meeting on 9 September we decided to seek members' suggestions for suitable nominees. The first of these items is the Harold Rose Trophy for an 'Outstanding contribution to 50MHz'. This could be for research, an article or publication, DX operation, etc.

The next is the Louis Varney Cup for 'Advances in space communication'. In recent years this cup has been awarded to members of the amateur satellite fraternity although space communication also embraces EME or moonbounce, a mode which is enjoying steady growth.

The last is the 1962 VHF Committee Cup for 'Best home-constructed equipment', but here we face a problem. This award was created back in the days when most VHF and UHF equipment was home designed and built with enthusiasts bringing their entries along to the VHF Convention to be judged. In this 'black box era' few seemed to build anything apart from simple test aids. Consequently, the VHFC now awards this cup for 'The best VHF/UHF technical article in *RadCom*'.

We would appreciate your nominations, by mid-November, for possible recipients of these three awards. Please send them to chairman, John Morris, GM4ANB, who is QTHR. His packet address is GM4ANB@GB7SAN.#77.GBR.EU and the Internet E-mail route is john@kirsta.demon.co.uk. We will be making our decisions at the next meeting of the VHF Committee.

BAND PLANS

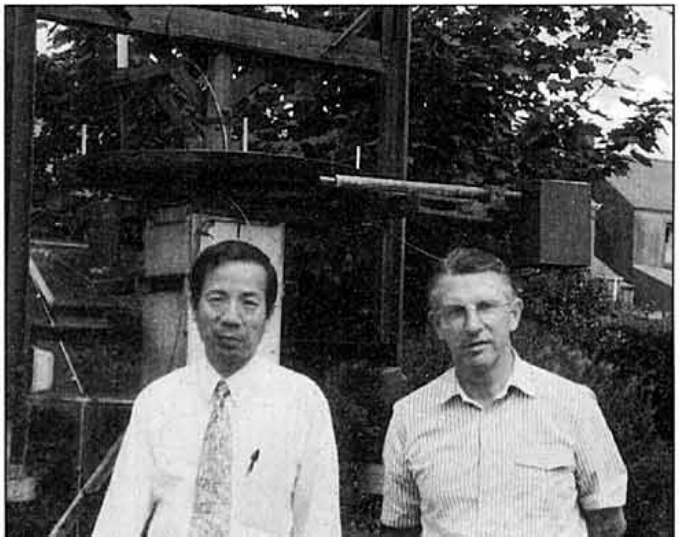
AMONG THE MANY items considered during the IARU Region 1 meeting of the VHF/UHF/Microwave Committee in Vienna last February was FM channel spacing in the 145-146MHz section of the 2m band.

Most member societies supported the eventual adoption of 12.5kHz with the notable exception of the German national society (DARC) which presented a long paper supporting its proposal for a 20kHz spacing.

The RSGB supports the adoption of 12.5kHz spacing in the long term. The VHF Committee has discussed the possible timescale for its implementation and the RSGB will be tabling a paper on this important subject at the next IARU Region 1 Conference scheduled for Tel Aviv in the 30 September to 5 October 1996 period. A phased plan over a long period is envisaged to give ample time for Region 1 societies to persuade their members to adopt the change. At present, opinion ranges from "let's change to 12.5kHz right away" to "there's no need to change at all. Keep things as they are".

Another band plan topics discussed during the 9 September

Stuart Jones, GW3XYW, was visited recently by keen EME operator Takao Sugimonto, JH3EAO. In the background is Stuart's EME dish which he uses for 70, 23 and 13cm.



VHFC meeting was the UK usage of the 432.150 - 432.500MHz part of 70cm which is designated as SSB and CW only. Keen microwave operator John Tye, G4BYV (NOR), suggests that one reason for the lack of activity on the UHF and microwave bands is that the original calling frequencies of 432.200 and 1,296.200 MHz are now designated as "centres of activity". This has led to their becoming "natter frequencies" causing difficulties for those wanting to arrange schedules on the microwaves.

This change to "centres of activity" was an IARU decision made some years ago. One UK solution would be an informal agreement for operators to QSY from 432.200MHz once they have made contact. Another would be to include a specific microwave calling frequency in the 70cm band plan if there is a genuine demand. Your comments on these ideas would be welcome.

VHF CONVENTION

THE VHF Committee would like to include a display of photographs on its stand at the 1996 VHF Convention, to be held at Sandown Park Racecourse on 18 February. Anything relevant to VHF/UHF activity will be considered, such as pictures of complete stations, antennas, items of home-built equipment, DXpeditions, etc. I will be preparing this collage and already have a few photographs. Please send your prints to me with a few explanatory notes as soon as possible.

PUBLICATIONS

ISSUE 3/1995 of *Dubus Magazine* includes an article on large-gate power GaAs-FET preamps by Kent Britain, WA5VJB. In the last six years these designs, based on the MGF 1801 and similar devices, have consistently given noise figures in the range 0.1 to 0.25dB for the 50, 144 and 222MHz versions, but are not suitable for the 432MHz band. There is extensive cover of the June Es events on 144MHz with maps, plus coverage of all the other modes.

Roger Blackwell, G4PMK, is the UK agent for *Dubus Magazine* but is no longer QTHR (address as in current *RSGB Call Book*). His new QRA is: 5 Tollgate Road, Culham, Abingdon, Oxon OX14 4NL but mail will be redirected from the old address until the end of the year. *Technik IV*, the new collection of technical articles from *Dubus* (1992-1994), runs to 388 pages in A5 paperback format and can be ordered through Roger for £15.00. *Technik III* costs £14.00 which is also the cost of the 1995 subscription to *Dubus Magazine*.

Derek Thom, G3NKS (GLR), has published the 4th edition of *Four Metres News* which comprises 12 A4 pages. He is in the fortunate position of having a surplus of copy but is always seeking news and information from 4m enthusiasts. This is a well-balanced, highly readable and excellently produced publication. For subscription details contact G3NKS (QTHR) or telephone him on 01242 241099 between 0900 and 2100 local time. His packet route is G3NKS@GB7GLO.

The Summer '95 edition of *FM News*, the publication of the Central Scotland FM Group, is a very neat A5 production complete with a comprehensive index and a list of all the committee members and what they do. The membership list occupies four pages and ends with the note: "Printed 437 of the 611 records." There are update reports on the several repeaters operated by the CSFMG, technical items and features. The editor is Dennis Cram, GM3NIG, and the group's secretary is Alasdair Fraser, GM3AXX; both are QTHR.

REPEATER NEWS

THE DUNDEE UHF voice repeater GB3DD on channel RB10 became operational from its new site on 12 August. It is shown on the map in the 1995 *RSGB Call Book* but not listed on page 110, so I cannot acknowledge the keeper.

Another re-sited repeater is the 23cm GB3SE, on channel RM3 which serves the Stoke-on-Trent area. It resumed operation on 27 August. When not relaying, the carrier remains on with identification every 35s. Reception reports should go to Geoff Booth, G8DZJ, who is QTHR.

BEACON NOTES

STEFAN HECK, LA0BY, sent news of three Arctic VHF beacons which operate continuously. JW7SIX (JQ88AD) in Svalbard is on 50.047MHz and runs 10W to a 4-ele Yagi beaming at 170°. LA7SIX is on 50.051MHz and runs 30W to a 4-ele Yagi and LA7VHF is on 144.982MHz with 65W to a 10-ele Yagi. Both are located at JP99LO and beam at 190°. All three are keyed in A1A mode and transmit dots between identification to save power. Reception reports and comments should be sent to LA0BY at Floyvegen 25, N-9020 Tromsdalen, Norway. His E-mail address is stefan@eiscat.no.

Ted Collins, G4UPS (DVN), reports that Francis Shepard, W7HAH (DN28NB), now has a beacon on 50.0622MHz running 25W to a halo antenna. It sends its call/locator followed by a series of dashes in a continuous cycle. In Yugoslavia, the 4N1SIX beacon on 50.0472MHz has been repaired after storm damage. It was reinstated but somebody forgot to switch it on!

METEOR SCATTER

PERSEIDS FEEDBACK

Alastair McBeath, vice-president of the International Meteor Organization, reports that the visual peak of the Perseids shower was around 1600-1700UTC on 12 August with a Zenithal Hourly Rate (ZHR) similar to the 1994 value. The Solar Longitude (LS) was 139.59° compared to 139.58° last year. Observers in the Crimea reported outbursts around 1950-2020UTC on 12 - 13 August, confirmed by others in Finland and Japan.

By contrast, the radio observations at 87MHz by OH5IY show the peak to have occurred around 0300 - 0400UTC on the 13th, some 11 hours later. Very high radio reflections were recorded around 0100UTC on the 14th but this was in part due to an aurora.

FIREBALLS

Alastair mentioned a "massive fragmenting fireball which ended over Sunderland (TWR) on 28 July around 2250UTC". The estimated magnitude was -20 (the Moon is -14 and the Sun -27) so no wonder the sky lit up like daylight. Sonic bangs rattled windows and set off car alarms. There were reports of another bright fireball over southern England about the same time, but on a totally different track. So, did anyone notice enhanced VHF signals, particularly MS-type with Doppler shift, at this time?

ANNUAL VHF/UHF TABLE JANUARY TO DECEMBER 1995

	50MHz		70MHz		144MHz		430MHz		1.3GHz		Total
Callsign	Cty	Ctr	Cty	Ctr	Cty	Ctr	Cty	Ctr	Cty	Ctr	Points
G6HKM	49	59	-	-	68	29	38	14	15	10	282
G1SWH	21	32	30	5	76	21	47	9	23	5	269
G3FIJ	21	28	26	5	60	15	31	9	12	2	209
G0FIG	-	-	-	-	67	36	40	12	14	5	174
G1HWY	-	-	-	-	59	27	41	14	19	6	166
G4VPM	-	-	-	-	75	20	28	10	20	5	158
GW6VZW	78	63	-	-	-	-	-	-	-	-	141
G1AWF	5	7	-	-	64	27	18	5	-	-	126
G8ESB	-	-	5	2	57	10	22	4	17	3	120
G0HIK	5	24	-	-	37	18	22	5	-	-	111
G8XTJ	12	27	-	-	55	15	-	-	-	-	109
G0UPU	7	4	27	3	35	6	12	1	4	1	100
GW0PZT	-	-	-	-	56	27	-	-	-	-	83
G3NKS	-	-	53	6	14	3	1	2	-	-	79
G0EHV	-	-	15	3	38	13	5	4	-	-	78
G1UGH	2	16	-	-	35	16	-	-	-	-	69
G4OUT	-	-	23	3	34	7	-	-	-	-	67
G7CLY	9	12	-	-	20	13	-	-	-	-	54
G0HDZ	1	10	-	-	28	6	-	-	-	-	45
GM6OFO	-	-	-	-	30	11	2	1	-	-	44
G3FPK	-	-	-	-	36	4	-	-	-	-	40
GW7EVG	-	-	-	-	33	6	-	-	-	-	39
2E1AIU	3	28	-	-	-	-	4	3	-	-	38
G4OBK	2	8	-	-	1	1	-	-	-	-	12

British counties are those listed on page 79 in the January 1995 RadCom; 77 in all. Up to three different stations allowed in each of the 12 GM regions. Do not include EI counties. Countries are the current DXCC ones plus IT9. Deadline for the January issue is 16 November.

NOVEMBER SHOWERS

The Taurids S (Southern) stream is a rather 'flat' night-time one lasting several weeks. The peak is likely to be on 3 November at LS 220.7° Best UTC times are: NE/SW 2000 - 0130, E/W 2130 - 0330; NW/SE 0000 - 0530; N/S 1900 - 2300 and 0200 - 0600. The radiant is below a mid-UK horizon 0800 - 1730.

The Leonids shower is one to watch as the ZHR is expected to reach storm levels in the 1998 - 2000 period. According to the OH5IY program this year's predicted peak is around 1340 +/-3 hours on 18 November. Last year it was around 0800. Optimum times are: NE/SW 0130 - 0700 and around 1100; E/W 0400 - 0900; NW/SE 0600 - 1200 and around 0200; N/S 0300 - 0500 and 0800 - 1300. The radiant is below the horizon 1430 - 2230.

MOONBOUNCE

THE SECOND LEG of the ARRL International EME Competition takes place over the 4/5 November weekend. Unfortunately, this coincides with major CW contests on 2m giving an overlap of about 13 hours. London moonrise on the 3rd is 1500 setting at 0330 on the 4th, followed by Saturday moonrise at 1525.

Sunday moonset is 0435, rising again at 1555, all times UTC. The 144MHz sky temperature varies from 277 to 342°K and the signal degradation from -0.91 to -1.33dB over the contest period.

The Toronto VHF Society's VE3ONT operation from Algonquin Park (FN05XW) is on at the time of editing - see page 24 in the September *RadCom* for their schedule. Operation from Morocco is also expected - see the October *VHF/UHF News* Moonbounce section.

Stuart Jones, GW3XYW (IO71), operated on 23cm in August. On the 19th he completed with KB2AH, AA6WI and W2UHI on CW with up to 559 reports. Next day he had a 15min SSB chat with KB2AH (56, 54). CW completions were with EA6/DF5JJ, DF9QX, ZS6AXT, DJ9YW, IK3COJ, AA6WI, W7GBI and SM3AKW. On 22 July he had a visit from Takao Sugimoto, JH3EAO, a very active EME operator from the Kobe area, who edits an EME magazine in Japan.

50MHZ

ROGER BETTS, G0TRB (SFD), finds it increasingly difficult to compete for the DX with the stations running 400W and large antennas. Trying to work counties for RSGB awards is also frustrating since nobody bothers to call when the band appears dead. When it does come to life, it is 'No UK, outside only'.

John Hill, G0WEH (HPH), completed seven random MS QSOs on SSB during the Perseids in the morning of 13 August, best DX being HB0/HB9QQ (JN47). He worked into SP5, 6 and 8, OE6 and YU1 on the morning of the 22nd. In the evening of the 29th he contacted YU1, IK0, EH4 and 7 and EH9IB (IM85).

Phil Catterall, G4OBK (YSN), bought an IC-736 and caught some Es on 18 and 22 August, best DX being ES2RJ/8 (KO28), ES2RW (KO29) and OH9NDD (KP26). G4UPS made Es QSOs on 18 August with OK2, EH7, EH9, ES and SP8 stations. Beacons ZB2VHF and CT0WW were at good strength from 1130 on the 22nd but there was no activity. ES, OH2, OZ and IK2 were worked later. 7 September was a good day with propagation to EA6, ZB2, CT, EH7, SM6, ES, YU1/7, SP5 and S5. More SPs were contacted on the 8th.

On 22 August Derek, G8TOK (KNT), completed with OH1LEU/2 (KP20) and OH5TQ (KP30) but is not sure about OH0JFB (JP90). Jon Eastment, GW4LXO (GNS), added D4, ER, HA, LZ, SO and UT for six new countries this summer. Paul Baker, GW6VZW (GWT), is hearing more stations than he can work with 35W so is contemplating getting a 150W PA to give him a better chance in the pile-ups. Even so, he is not doing too badly with 63 countries and over 220 squares worked up till mid-August this year.

A warm welcome to John Edwards, GM7NVA (BDS), who worked some nice DX on 7 September, 1900-1945UTC. Successes included SP8NCJ (KO12), 9A2SB (JN95), IK5NTE (JN86), IK0OKU (JN61), 9A3HZ (JN86), OE6JUD (JN76), YU1EU (KN04), HB9PDP (JN47) and I4YSS (JN54). That's a fine performance from SE Scotland. He also copied beacons CT0WW and ZB2VHF which were audible up to 2030.

70MHZ

THE FOUR METRE band is 40 years old this month. Only now does it seem that amateurs in a few other European countries might get a small 70MHz allocation in the coming years. Belgium and Belarus are mentioned in the September *Four Metres News*. G0TRB has decided to give up on the band due to lack of activity apart from contests. It took Roger *eight years* to collect enough QSLs for the basic RSGB award.

Martyn Vincent, G3UKV (SPE), sent a copy of the report of the Telford and District ARS's July operation from Ulster. The five operators of GI3UKV/P (DWN) used an FT-101ZD transceiver, homebuilt transverter and 50/70MHz dual-band antenna. Some 31 different stations were worked on 28 July from IO64XC.

GW4LXO has been concentrating on the band and Jon has worked about 20 new stations in recent months. With the expected launch of the new Microwave Modules 4m transverter and optional interface unit, coupled with the possibility of more countries on the band in the not-too-distant future, let us hope that activity will continue to grow.

144MHZ

ALTHOUGH THERE were some good tropo openings in the second half of August, there are few reports this month, possibly due to some contributors being on holiday and the earliest of deadlines. G0TRB suggests that with so many people on 6m, it relieved the pressure on 2m enabling him to work CT, EA, EA9, HA, I, S5, YO and YU via Es this summer. The last time he worked the mode was in 1988.

In a contest on 19 August, Nick Gregory, G0HIK (CBA), worked PA and DLs in JO32, 33 and 43. On 2 September he got F8KLW/P (JO00) and F6IFR (JN09) and next day TM6P (JN19). On the 5th he found F/G3DGW/P (JO00) who was using an HB9CV antenna.

Andy Stafford, G4VPM (SOM), writes: "On 12 August I had EB8BTV on the hook but he managed to wriggle free!" There was a good Scandinavian opening early on the 20th, but they were on the edge of it in the west country. He contacted SM7EQL, SM7JUQ, OZ1CLL (all JO65), OZ6TY (JO45), DF0JV (JO33) and DL6BBT (JO43).

Ela Martyr, G6HKM (ESX), worked DLs in JO44 and JO54 on 19 August. On the 20th she contacted Germans in JO30-32, 41-44, 52 and 53 and OZ7ADZ/A (JO46).

The 20th was Danish day with OZ1ALF (JO44), OZ9IT (JO46), OZ1HKW and OZ8QI (JO55) and OZ3GW (JO56) worked. She took part in the six hour section of the Trophy Contest on 2 September in very poor conditions, adding only LX and a GM region for the tables.

Gary Nicholas, GW7EVG (CWD), did not find conditions all that good in spite of the high pressure weather regime which continued for most of July and August. He added G4RKU/P (KNT), G6UQ/P (CHS) and G/PA3EHW/P (HBS) to his annual counties total in September.

430MHZ & UP

ON 19 AUGUST, G6HKM worked DH4LAN (JO44) and DL8VU (JO54) on 70cm. On 23cm the same day Ela contacted OZ6OL and the following day F1DBN/P (JO00), DJ3FI (JO32) and ON4ABJ (JO21).

The only QSO G4VPM mentions is on 70cm with DB4LL (JO44) on 20 August.

Dave Bartlett, G4VIX, wrote on behalf of the Windbreakers and Hadrabs Contest Group concerning G3XDY's comments in the September *RadCom*. John did not hear the SMs and SPs worked on 23cm by G0VHF/P during VHF NFD weekend. Dave writes: "This often seems to be the case from our site at Walton-on-the-Naze, Essex (JO01PU). Quite often we will work stations that are inaudible with other stations just a few kilometres inland. I have heard this called 'Walton Waveguide Effect' by some stations."

He sent a breakdown of the 19 countries worked in 93 squares out of 766 QSOs. DX over 1,000km were OM3TQF/P (JN99), SM5BSZ (JO89), SP9QZT/P (JO90), EA2AGZ (IN91), OM6VHF/P (JN89), OK1INC/P (JO80), OK1AGE/P (JO70) and EA2LU/P (IN93).

G8TOK worked SM6HYG (JO58) on 23cm then 70cm on 18 August on what appeared to be dead bands. Derek knew there was propagation as he had heard many DX UHF TV stations he monitors to detect lifts. Later he overheard a G1 and a G6 in QSO on 23cm discussing his QSO. One of them was convinced it couldn't have occurred as the band was "quiet!" Maybe if people monitored the beacons and TV channels instead of sitting on the DX cluster, there would be more activity.

DEADLINES

THE **JANUARY** deadline is **16 November** and the **February** date is **21 December**. The fax machine and telephone answering device are on 0181 7639457 and my CompuServe ID is 70630,603. Internet users should call up 70630.603@compuserve.com. The BT Gold mailbox is 87:CQQ083. ♦

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Icom IC-751 HF, general coverage transceiver. (DC version). **£629.00**

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Icom IC-751A HF, general coverage transceiver. (DC version). **£749.00**

Alinco DJ-580E, 2m/70cms handheld complete and as NEW. **£350.00**

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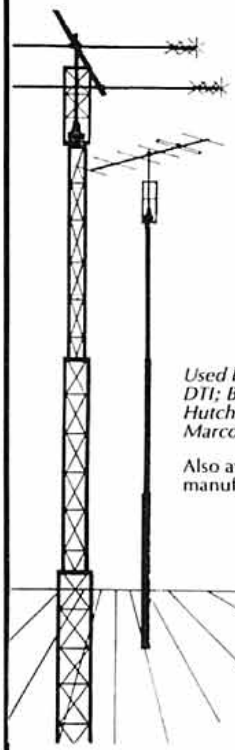

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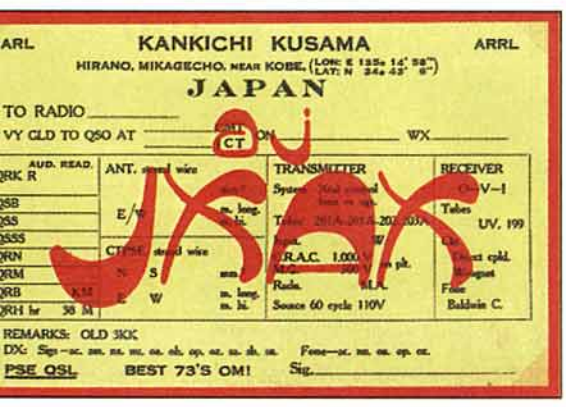
QSL

JOHN HALL, G3KVA
Corfe Lodge, Ipswich Road, Long Stratton, Norfolk NR15 2TA.

JOHN PURVESS, G0FWP, who is QSL Sub Manager for the G8AAA to ZZZ and G0DAA to DZZ call series, is moving house to 389 Otley Old Road, Cookridge, Leeds LS16 6BX.

There is a new Sub Manager for the G0UAA to UZZ series. David Hughes, G0RVW, has now taken over. His address is: 3 Willow Crescent, Moss Lane, Moore, Cheshire WA4 6UX.

There is also a new Sub Manager for the G3RAA to TZZ series. She is Mrs P McVey, G0PXJ, 18 Worlebury Hill Road, Weston Super Mare, Avon BS22 9SP. Derryck Buckley, G3VLX, who was formerly Sub Manager for the G3RAA to TZZ series, is continuing to handle cards for the G4DAA to DZZ and G4RAA to RZZ series. Deryck tells me that a recent criticism by a JA amateur in the RSGB *DX News Sheet* classed the UK as bottom of the table for QSL returns, with a figure of only 10%. Deryck says he finds this difficult to believe although he says that judging from his last consignment of cards from the Bureau, the JA stations do seem to have a knack for working G stations who don't collect cards! Deryck goes on to say that Martin Bayes, W1/G4DZC, who collects his cards via Deryck's Sub Bureau, says JA cards take forever to get through. That seems to be borne out by the fact that amongst the last lot of cards from JA-land that Deryck sorted were a fair number for contacts in 1992 or earlier.



1920s QSL from the first ever Japanese amateur.

Thanks to all those that put me right on the 'prophet' quote I mentioned in the September *QSL* column. For those out there, like me, who are less than well read - Biblically speaking - the source is Luke Ch 4 v 24. John Windebank, G0KJN, tells me that it can also be located in Matthew Ch 13 v 57.

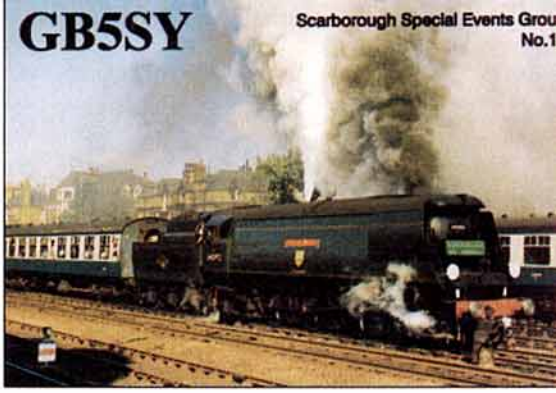
To comment on the cautionary tale sent in by Brian Armstrong. My view is that any envelopes sent to the Sub Manager should be numbered sequentially. In other words, if one sent in 6 they should be numbered 1 to 5 then 'last'. Many wrote in to say: 'the remedy is simple - just number all the envelopes and then forward envelopes to your QSL Sub Manager well before he runs out of them'.

Brian Stone, G3JFC, has encountered a problem allied to Jersey and Guernsey which I drew attention to recently. For those that don't already know, our postage stamps are not valid in those islands so it's pointless sending a SAE bearing a UK postage stamp. Brian says it's a mite expensive sending IRCs or dollar bills just to get a card direct from there and wonders if there is a more economical way around the difficulty - apart from using the Bureau of course. Anybody know of one?

SPECIAL EVENTS

GEOFF BECKETT, G7JHE, is not a happy person. He has an interest in working Special Event stations and collecting, hopefully, the resultant QSL cards. However, he tells me that many special event stations just don't bother to reply. He has lists that prove it too. He is still owed 114 cards for 1993 operations and 239 for 1994. A great number of offending stations are down to Boy Scout and Girl Guide operations, so organisers of such calls please note. More disappointing to me is the fact that several of the alleged offending stations are Society sponsored. Two instances of no reply relate to the Headquarters station!

Whilst on the subject of Special Event calls, Alex Devereaux, who is the GB0 NAA to ZZZ Sub Manager says that it would help enormously if Special Event organisers put the start date for the event on the front of any envelopes they send him. He also says that he has a large number of cards for various VE Special Event stations but no envelopes. Come on chaps - get your act together. There was so much hullabaloo about those special calls one would have thought the operators could at least have bothered to forward envelopes for collection of the QSL cards they generated.



QSL commemorating 150th anniversary of steam locomotives in Scarborough.

SUB MANAGERS

THE RELATIONSHIP between most Sub Managers and their customers is first class. Steve Bryan, G0SGB, produces a newsletter for his customers and sponsors a free award for any amateur working 100 G0S calls irrespective of prefix, ie G, GI, GD. More details can be obtained from Steve who is QTHR. In a recent newsletter to customers Steve makes a plea for sensible size envelopes. He says some he receives are only just bigger than the stamps on them. He also points out the stupidity of some stations having oversize QSL cards and mentions a recent Special Event station with a card 8 x 6in! Needless to say, it had to be folded and therefore damaged.

SPECIAL QSLS

ROY CLAYTON, G4SSH, sent me this beautifully produced QSL card (above) which commemorates the 150th anniversary of the arrival of the first steam locomotives in Scarborough on 7 July 1845. The York and Midland Railway built the 42 mile long line from the coast to the county capital in under a year. The Scarborough Special Events Group went on the air in July of this year to celebrate an event which sparked the dramatic development of Scarborough as a tourist destination. If you were lucky enough to work them then you will get a card like this. It pictures Southern Railway locomotive 34092 'City of Wells' leaving Scarborough for York. The photograph was taken by Adrian Scales (son of G3NRS) Ah, what memories of standing on Crewe station as a lad with my Ian Allan book in my hand!

JAPAN

TAIZO ARAKAWA, GW0RTA, JA3AER, is an RSGB member [see September *RadCom* page 17 - *Ed*] and kindly supplied me with this copy (pictured below left) of a QSL card used by the first ever Japanese ham, Kankichi Kusama, JXAX (later JA3HAM), who is now sadly a silent key. The card bearing that historic call dates from the mid 1920s and I bet there are people out there who worked Kankichi.

Whilst on the subject of Japan, Terry Langdon, W6/G3MHV, tells me that much is made of JARL membership and members of the national society are marked as such in the JARL callbook. Terry asks why we cannot do the same? I don't know - but I might know a man who does. Apparently JARL automatically mails QSL cards to all members on a monthly basis free of charge. Exchanging QSL cards is a big interest in Japan and I must say that most Japanese cards we handle in the bureau are beautifully produced. In addition, I note that most Japanese amateurs put us to shame when it comes to handwriting. Their cards invariably bear details of the QSO in crystal clear printing.

Terry goes on to say that his 'portable' call causes him some problems. He always signs W6/G3MHV and his cards should go via the RSGB to his home call of G3MHV. However, he estimates that 5% of his cards are sent to the W6 Bureau. Terry keeps envelopes at the W6 Bureau for just such eventualities. He has two answers for this type of mistake. First is that some people totally ignore his request to 'QSL via RSGB' and secondly, the bureau sorters do not always sort the cards correctly despite them being marked 'via G Bureau'. Apparently some countries are particularly poor in this regard and even we at Potters Bar have made a couple of errors over the last 10 years! Sorters please note.

DXCC NEWS

TONY BLYTHE, G3LOJ, tells me that he posted his new DXCC application to ARRL on 22 July 1995 and got it back on 08 August 1995. Is this a record he asks? ♦

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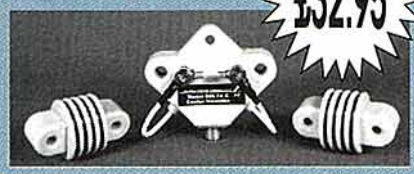

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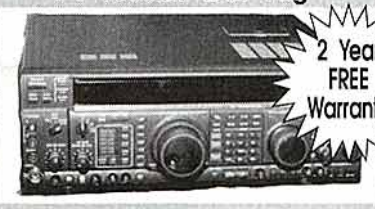

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HF F-LAYER PROPAGATION PREDICTIONS FOR NOVEMBER 1995

The time is represented vertically at two-hour intervals UTC for each band, ie 00=0000, 02=0200, etc. The probability of signals being heard is given on a 0 (indicated by a dot) to 9 scale; the higher the number the greater the probability with 1 meaning 10 to 19 per cent of days, and so on. Additionally F-layer openings at 50MHz and 1.8MHz are indicated by a plus (+) sign in the 28 and 3.5MHz columns, with these latter bands having a probability of 9.

Time / / GMT	28MHz 000001111122 024680246802	24MHz 000001111122 024680246802	21MHz 000001111122 024680246802	18MHz 000001111122 024680246802	14MHz 000001111122 024680246802	10MHz 000001111122 024680246802	7MHz 0000001111122 0024680246802	3.5MHz 000001111122 024680246802
** EUROPE								
MOSCOW	....11....	....122....	....3653....	....6886....	...288884...	11.666678311	87454334346877	++52....3+++
MALTA	....1....	....1222....	....45551...	....77774...	...288881..	3527656686621	99864334346888	+++3....4+++
GIBRALTAR	....	.....11....	....14331...	....36664...	....78881..	121276667772.	78785434586	++++2...25++
ICELAND	....	....	.....21....	.....2541...	....16886...	....67778 51.	4411654578 73	++++32.245++
** ASIA								
OSAKA	....	....	....1......	....3......	....62.....	...163234...	...131124542	.......245.
HONGKONG	....1.....	....12.....	....451.....	....673.....	...26651....	...1443331..	1...11124654	.......24+3
BANGKOK	....111....	....232.....	....565.....	....1677....	...25661....	1...2333311.	2...1124664	.......24+5
SINGAPORE	....111....	....333.....	....5663....	...26775....	...24667....	1...13346211	1...1124675	.......24+3
NEW DELHI	....111....	....332.....	....1565....	...26771....	...34664....	3111133432 12	73...1124678	4.......24++
TEHERAN	....221....	....3331....	...16664....	...37776....	...55567 3...	5333223463 23	8731...124778	+4.......4++
COLOMBO	....221....	....3431....	...15664....	...35777....	...23567 4...	12...2346323	41....124778	2.......4++
BAHRAIN	....211....	....4332....	....26665...	....46677...	....53467 4..	643211346323	972...124778	+4.......4++
CYPRUS	....3322....	....5554....	...27877 2...	...488884...	121766788 2..	776643467755	9963111358 98	++3....25++
ADEN	....2222....	....4444....	...26667 1...	...45578 4...	1..422577 1..	7131..246634	952....14788	+4.......4++
** OCEANIA								
SUVA/S	....	....	....	.....21....	.....354....	....444441..	....311242..	....
SUVA/L	....	....21.....	....531..1..	....7531.3..	.113765426 1.	..2553345 52.	...321.132..	....
WELLINGTON/S	....	....	.....11....	.....231....	.....4554....	....54454...	...1311242..	....
WELLINGTON/L	....	....	....1......	....31...1..	.111631.141.	.123532244 2.	...131.132..	....
SYDNEY/S	....1.....	....132.....	....4651....	....7773....	...37666 1...	...2543551..	....2112451.	.........23..
SYDNEY/L	....	....	.....1.....	....13......	....5531.3GO	....6433363 1	....3111351.	.........2..
PERTH	....221....	....3431....	...16764....	...37776....	...35667 4...	1...2334631 2	1124762	.........44.
HONOLULU	....	....	....	....	.........21..	....2122631.	.11.311242..	..24........
** AFRICA								
SEYCHELLES	....2222....	....4444....	...256771...	...355784...	1..322577 1..	622...246634	84.....14788	+.......4++
MAURITIUS	....3223....	....5445....	...266772...	...355785...	11.322578 1..	641...246644	73.....14788	4.......4++
NAIROBI	....3334....	....55561...	....16668 4...	...355687...	1..422368 2..	7532...367 44	972....14788	+4.......4++
HARARE	....13451...	....34673...	...156786...	...255588...	13.422358 4..	7832...2686 5	972.....3788	+4.......4++
CAPETOWN	.....1563...	....13675...	....35788...	...1455782..	12.432246611	7732...14776	873.....1589	+4.......2++
LAGOS	....35564...	....56776...	....77778 1...	....7656 83..	14.453236721	6945 2..13787	8873....1588	++5.....2++
ASCENSION Is	....14435...	....36657...	....67668 2...	....7655 74..	142.63234631	6983 31..1577	8885 1....279	+++2.....4+
DAKAR	.....4444...	....16667...	....48778 2..	....7766 75..	.33.753357 31	6885 52..2586	8886 2....279	+5+3.....4+
LAS PALMAS	.....3332...	....15555...	....48877 1..	....6888 83..	.211876677 2.	6876 7544578 5	9998 4211258 9	+++5....2++
** S. AMERICA								
Sth SHETLAND	.......12...	....12234...	....35556 2..	....6666 64..	.32.765545 2.	4664533212 33	345431.....1	.22........
FALKLAND Is	....1134....	.....3256...	....26577 2...	....4766 64..	.23.764334 2.	4784531..123	57763 1....2	2443........
R DE JANEIRO	.....1..1...	.....3123...	.....6445 2..	....1755 54..	.23.563334 2.	5884 53...144	8897 3....25	+++4.....2
BUENOS AIRES	.....1..3...	.....2225...	....15446 2..	....4765 53..	.12.764333 1.	4784631..123	7897 31.....3	4++4........
LIMA	.....211....	.....433....	.....7551..	.....7653..	.....63321.	2351.231..11	6886 211....1	3++4........
BOGOTA	.....111....	.....333....	.....6551..	.....7653..	....1263221.	223.4331..21	7875 311....3	5+54........
** N. AMERICA								
BARBADOS	.....211....	.....433....	....26552..	....47553..	.....653242.	2241442..133	87763 1....15	++54.....2
JAMAICA	.....111....	.....122....	.....4541..	.....6652..	.....164331.	111.3331..21	6773311....3	5+54........
BERMUDA	.....1....	.....122....	.....4541..	....16663..	.....365452.	111.2432124 2	7773311...25	+++4.....3
NEW YORK	.....21....	.....2441..	.....4662..	.....166551.	.1...333234 1	6651 3111..24	+++4.....2	
MEXICO	.....21....	.....53....	.....752..	.....26421.	....3134 1.1.	3651 3111...1	O++4........	
MONTREAL	.....111...	.....143...	.....4652..	.....166651.	3343341	6651 3111.124	+++4.....2	
DENVER	.....2....	.....151..	.....563..	.....14322.	364.2.111..1	2++4........		
LOS ANGELES	.....2....	.....41..	.....263..	....1..4421.	253.31121...	.4+4........		
VANCOUVER	.....42..	.....2542.	242.21123111	.4+4........				
FAIRBANKS	.....1...	....1212542.	231.31124322	.234........				

The provisional mean sunspot number for September 1995 issued by the Sunspot Data Centre, Brussels was 12.3. The maximum daily sunspot number was 30 on 22 September and the minimum was 0 on 8,9,10,11,14,17 September. The predicted smoothed sunspot numbers for November, December and January are respectively: (classical method) 14, 13, 12 (±3); (SIDC adjusted values) 11, 10, 9 (±2). August 95 SESC: Solar flux 73.8 Ap 10 Smoothed February solar flux 80.2 Ap 13.3.

NOVICE NEWS

MRS ESDE TYLER, G0AEC
43 Nest Est, Mytholmroyd, Hebden Bridge, W Yorks, HX7 5BH

THE PHOTO below shows Jonathan Morris, 2E1DMJ, working the special event station GB100NT, in celebration of the National Trust's centenary this year.

Jonathan is 17 and is presently the youngest member of the Dragon Radio Club on Anglesey. Here he is seen operating the club station, fully supervised, in the old coachhouse of Penrhyn Castle, Bangor. Although conditions were not at their best, more than 200 contacts were made, mainly on 80 metres.

By now Jonathan will possibly have taken - and hopefully passed - his 12wpm Morse test to be followed in the near future by the RAE course and exam.

My thanks to Dewi Roberts, G0ABL, for the information and the photograph.

TEC ON TARGET

I HAVE RECEIVED an insight into the activities of Thanet Electronics Club (TEC) courtesy of one of its young members. Nick Bray wrote and informed me that the TEC has been running for many years with all sorts of projects including amateur radio and holiday trips. Six young members who took the NRAE recently discovered they had all passed.

Normally, different interest groups do not have a great deal in common with others - especially when there is a probable age difference, but TEC chairman Dr Ken Smith, G3JIX, has established links with locally based Hilderstone Amateur Radio Society. Members of the radio club have taken a keen interest in TEC, offering small prizes where appropriate and the youngsters have given talks to the adults. Earlier this year, four talks were given on the works of Thomas Edison, Benjamin Franklin, Hertz and Marconi - all by youngsters aged 13 and 14.

Ken sent me some interesting information describing a scenario where different generations are getting together to their mutual advantage. However, this cannot happen by magic. With the advent of many young Novices into the hobby, there is possibly a higher percentage of youngsters within amateur radio than for many years. Perhaps the key lies here, as some of the TEC members are licensed and therefore qualify for membership in both organisations.

Some parents do not like the sound of 'youth clubs' without being able to give a specific reason. If they were all run on the lines of TEC, I am sure parents would be eager for their teenagers to join.

The club's 'constitution' requires youngsters to visit the club for a time, and complete a project. Then they are elected by the whole membership to become a junior member, becoming a Clubfriend of a more senior member who helps them in all they do at the club. Juniors become elected members as they show themselves to be responsible and mature enough.

Everyone is expected to contribute to the club and all are encouraged to offer as much as possible at whatever level in whatever field. There are study groups, a newsletter - everyone can take a turn to be editor - and there are trips to science museums and radio rallies.

Every club member has voting rights and all officers except the Chairman, Ken, are democratically elected.

There are just two club rules:

1 No-one should ever upset or hurt another person within the Clubwork.

2 All safety instructions should be followed.

And the watchword is 'co-operation'. Activities include cycling, youth hostelling, electronics, DF outings, camping, craft hobbies and much more. Members may put forward ideas for future activities too.

Many amateur radio clubs now have a 'Novice wing' or have several Novices in the area, who may be members of youth clubs. How about trying to build bridges between the two as has been proved possible in Margate?

Ken is more than willing to give information and advice to anyone interested in this idea. His address is Staple Farmhouse, Staple, Canterbury, Kent CT3 1JX (a SASE would be appreciated) Or telephone him on 01304 812723 or contact me and I will pass your messages on.

If you have a similar scheme up and running, please let us hear about it.

Jonathan Morris, 2E1DMJ, operates GB100NT in celebration of the National Trust's centenary.

CONTEST CHEER

IT HAS BEEN suggested before in *Novice News*, that there is a great deal of fun to be gained - not to mention valuable experience - from contesting.

This is exactly what Stan, 2E1DZA, found when he went to a nearby hill to give a few points away in the fixed 70cm contest and to maybe get some practice. He was not planning to compete. Barry Firth, G4KCT, went long to keep him company. Conditions to the south (from Humberside) were poor and it seemed a wasted exercise. So the antenna - a DL6UW - was turned east and a further call made.

Stan's contact sheets show that between 18.20 and 21.32 he took 57 calls with very few pauses for breath between. There are 36 from Germany, 13 from the Netherlands, one Belgian and seven English ones.

PIONEERS REPLY

AUGUST'S *NOVICE News* wrongly stated it was three years since the first Novice callsigns were heard; it is, of course, four years. (Doesn't time fly when you are enjoying yourselves?)

The item went on to ask for a progress report concerning the experiences of these pioneers. My thanks to those who sent replies - I shall be including some of them over the next few columns. There is one, however, which merits instant attention.

In the September '91 *Novice News*, I told of the phone call received during a Novice class being run by myself and Jennifer Jackson, G8WWO, who was the co-ordinator for Thinking Day On the Air (TDOA). 'From Little Acorns Grow' told the story of how Elizabeth Gaskell and her family became interested in radio and their progress towards their licences.

Matters progressed swiftly following a general invitation to run a TDOA station. Based at a local primary school, the station was to include a construction stand run by husband Richard with Brownie daughter Rowena demonstrating her skill with a soldering iron to build a prototype radio.

The station, GB4KGB, was a great success and when the Senior Novice Instructor paid a visit, he found a ready workshop and four waiting students plus two fathers wanting to tackle the RAE.

Rowena became 2E1AAL and, at 10 years old, was possibly the youngest Novice at that time. With so few other Novices around in 1991, she found 70cm very quiet but with mum Elizabeth in possession of a 2E1 callsign and dad Richard gaining a G7 one, she had plenty of chance to help with special event stations and work under supervision using the club callsign. She was also busy learning Morse and constructing projects for the Harwell ARS construction contests and helping other beginners with their soldering projects. By the start of 1992, both Elizabeth and Richard had gained G0 callsigns - G0RJX and G0REL respectively.

Rowena missed a stage and took, and passed, the 12wpm Morse test becoming 2E0ADA. Between school work and hobbies which included ballet, flute, choir practice and the Guides she found that weekends were the only times free for amateur radio but she did gain valuable experience by operating from the BT Tower and from International camps.

In 1994 when she was 13, Rowena passed the RAE expecting to wait until her fourteenth birthday in February '95 for her final callsign. Imagine her delight when the rules were changed allowing young Novices who had held their callsign for a year to apply early for the full licence. So at 13, she became G0RKJ, taking over a club call.

Since then she has helped with TDOA stations, a series of special event stations for Ranger Guides and Young Leaders at her school and for VE Day.

Of the eight students who took that first Novice course, four now hold full A or B licences while four parents now hold Full A licences. Rowena has chosen the hobby for her Duke of Edinburgh's Bronze Award and is still very actively involved. Congratulations Rowena and thank you Elizabeth for the update. ♦

SWL NEWS

BOB TREACHER, BRS 32525
93 Elibank Road, Eltham, London SE9 1QJ

WITH THIS issue of *RadCom* being posted before the SSB leg of the *CQ* World-wide contest, I have one last opportunity to remind listeners that my October Challenge takes place on 28 and 29 October. I am confident that British SWLs will support the biggest SWL contest of the year. My final reminder is also aimed at Class 'A' licensees who cannot spend sufficient time to enter the *CQ* Contest, and the many 'B' licensees who spend much of their time listening to the HF bands. To swell the British entry even further, it would be interesting to receive entries from these two groups of amateur radio enthusiasts. All that remains is to wish all entrants the very best of luck, with the hope that the bands live up to usual *CQ* WW standards. The results will be available as soon as possible. Once again there will be a specially produced Results Booklet.

HF CONVENTION

ALONG WITH MY XYL, Joan, BRS62088, I attended this year's HF Convention on the Saturday. Unfortunately, no other SWLs were present on the day I decided to attend! However, it was a well organised event which offered plenty to see and do. The main attraction was a full and varied lecture programme, but it was the contest station, GB5HQ, which provided much of the interest for two avid contest SWLs. It is a good few years since I have been involved with a contest station and it was an eye-opener to see how a modern day station, with the benefit of the packet cluster and logging by computer (not to mention the very impressive antenna arrays) works. Conditions were poor, due to a solar flare a few days before, and it was tough going for the operators to build a really big score.

We also paid a visit to the Chiltern DX Club suite and I became the fifth SWL member (BRSs 25209, 25429, 47426 and 48462 are the others). Membership is open to any SWL who has 100 DXCC countries confirmed on the HF bands. An extremely informative newsletter is published by the club six times a year. If any SWL meets the membership criteria, David Mann, G0HXN, will be pleased to send a sample newsletter. Membership costs £12 a year. I also picked up a copy of G3XTT's *Topband News*. There is no subscription, but a contribution (about 60p per issue) to the cost of production is valued. The newssheet provides lots of information about 160 metre activity. If any SWL is interested in topband DX, this will be of interest to you. Further details from G3XTT, QTHR.

Another highlight of our visit was discussing the IOTA programme with G3KMA. Joan was so taken with the Award programme that, when we arrived home, she did some research and found she already had QSLs from 32 island groups. Only 68 to go to get a very attractive award!

The Convention gives SWLs the chance to rub shoulders with some well known DXers, contesters and award hunters. Among those we met were: G4BWP (HF Awards Manager); G4BUO (HF Contests Committee); G3ZAY (recently active /TF and HF Committee); G3GIQ (now an avid 50MHz DXer, too!); G6QQ (recently active/V2 and a few years ago as BRS616); HB9RG (a big signal from Switzerland); G0UCT (recently active from 3V8BB); G0MRF (C56DX and soon to be QRV as ZC4DX); G4LJF (of AH1A fame); and G4BUE (the DXNS editor). Watch for details of next year's event and let me know what you enjoyed most.

RSGB HF AWARDS

AS MENTIONED in October's *SWL* column, Fred Handscombe, G4BWP, has provided details of RSGB awards. It may not be widely known that the Commonwealth Century Award and the W-ITU-Zones Awards (including all the five band, WARC and 160m endorsements) are available to listeners because no certificates have been claimed by a UK based SWL.

Fred, through this column, would be interested to hear if any SWLs would be interested in a DXLCA 'Honour Roll'. The DXLCA award can be endorsed in the same way as DXCC. Fred is willing to organise an annual Honour Roll listing following similar rules as DXCC, which could be published.

Finally, he would strongly recommend to any award chaser the *K1BV Directory of DX Awards*, which is available from the Society priced £14.50 to members and £17.06 to non-members. It is a loose-bound book of 250 pages covering over 2,300 awards. K1BV constantly updates and reprints it at least once a year. In this way, the information is virtually guaranteed to be current. The book specifically mentions SWL availability of the awards against each entry.

Stanislaw, SP9-1227, has been SWLing since 1960 and says he has heard 381 DXCC countries. This, of course, includes deletions (of which there are quite a few). He is SP-DX Club member No 1 and a keen award chaser.

LISTENING TIPS

I HAVE BEEN ASKED by Alan Johnston, RS93643, if there are particular frequencies on HF to be monitored. This depends entirely on what it is you hope to hear. There are many interests - inter-G contacts, HAB, DX Nets, LF DXing, DXpeditions, IOTA, or the unusual. The answer to the question could take up several columns! Therefore, I shall give only a flavour here. If you want to listen to local QSOs, try 1.900 - 1.980, 3.700 - 3.775 or anywhere on 7MHz. HAB frequencies are 7.060 and 3.760. There are far too many DX Nets to mention and not being a 'Nets' man, I do not have current information on the best ones to listen to. (Can anyone provide an up-to-date list of the more choice DX Nets which I can include here?)

For the LF DX enthusiast, try 3.775 - 3.800 (US stations can transmit above 3.8MHz) and around 7.045 on 7MHz (US stations transmit above 7.150). On 1.8MHz, SSB DX can usually be found around 1.845, with CW DX in the CW DX Window around 1.825 - 1.830. The usual HF SSB DXpedition frequencies are: 28.495, 24.945, 21.295, 18.145 and 14.195MHz. The main IOTA frequency is 14.260. The unusual can appear just about anywhere! That's quite enough to be getting on with, I think!

ACTIVITY

THERE'S A MIXTURE of reports this month. Most concerned the 26/27 August Northern Lighthouse Weekend. It appears that only 10 of the 11 stations were active (GB2LL being the missing one). Two reporters (G7JHE and BRS88921) heard all 10, others reported either 7, 8, or 9 heard. Once again a very popular weekend, but conditions on 7MHz were, apparently, not too favourable. I am sure I will receive the official story from Mike Dalrymple, GM4SUC, in due course.

A few reports concentrated on the IOTA Contest weekend. They suggested that there was increased island activity this year. Also, 18MHz figured in some reports, suggesting that the band was becoming a little more reliable for DX. Indeed, I was rewarded with FR5HR for No 226 on one visit to the band in August. Other notable loggings on the band included BV2KI, AA4VK/CY9, JT1CO, TT8NU, 3DA0CA and 5A1A. Most reports centred on 14MHz where I have picked these as the best on offer - BV7FD, ET3AA, E21AOY/8, HL0Y/2, JY1, N7QXQ/HR6, VU2JPS/VU7. Special thanks to BRSs 8841, 44984, 88921 and 96326 for the DX loggings mentioned here.

FINALE

THANKS TO G3DYY, G4IIY, GU4WQP and GM3AWW for information regarding QSL managers for most of the stations referred to in September's *SWL* column. News for the **January 1996** column must be received no later than **6 November**. ♦

Contest Exchange

ANDY COOK, G4PIQ
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G4PIQ @ GB7MXM.#36.GBR.EU

SADLY, WINTER IS once more almost upon us. After a phenomenally dry summer, I spent last Saturday putting antennas on my tower for the 2m Trophy, and in three hours more rain fell on me than we had seen during the last two months! Forget the rain dances to fill those reservoirs - organise a few more contests! However, on a more positive note, the onset of winter means we are getting closer to a high point of the UK contesting calendar; the Affiliated Society (AFS) contests which run from December to February. It's in these events that club members pool their individual scores towards a club total. Last year, we ran a championship table which listed all the clubs who entered at least three of the four AFS events.

The results of all the 94/95 Winter Season AFS contests have been published and **Table 1** shows an increase from 12 to 16 in the number of clubs who had a go at three or more events.

The top three positions are the same as last year and congratulations go to them of course. But particular mention should be made of Harwell ARS, Aylesbury Vale ARS and Telford & DARS who improved greatly on last year's positions, either by improving their scores in particular contests or just getting people on for all four rather than just three of the events. With the first of the 95/96 events coming up at the start of December (the 2m bash), it's now a good time to think about getting your own club organised for the AFS contests. The teams consist of three (2m, 70cm and 80m SSB) or five (80m CW) members. Remember, you don't have to have three or five stations who will all get mega scores to do well; many of the club scores are very close and just a few extra points to the team score can make a lot of difference to the final position. If your *RadCom* collection stretches back far enough, take a look at December 1993 and 1994 *Contest Exchange* for more ramblings about AFS, but most importantly, look up the rules for this year as well!

CERTIFICATES

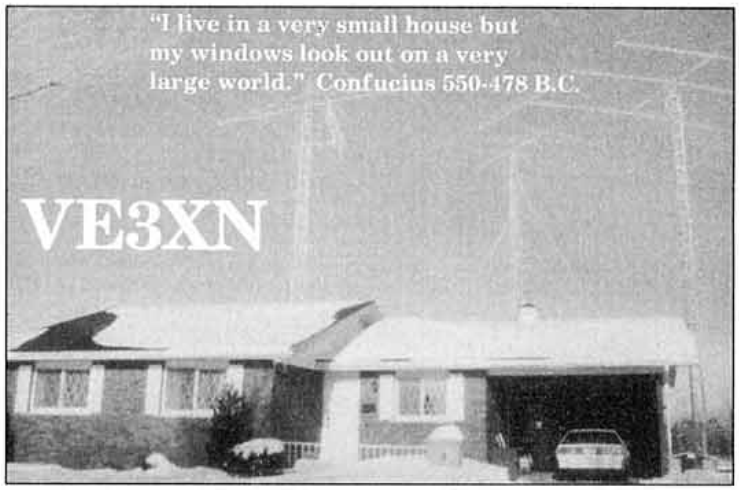
SOME TIME AGO the HF Contests Committee began the process of updating their old style of certificate, and at that time they decided not to issue any more of the old style ones. The job is taking a little longer than anticipated but progress is being made, so please be patient and don't throw too many rotten tomatoes Chris's, G3SJJ, way!

REFLECTORS SET A WIDENING NET

INTERNET IS CERTAINLY extending its reach into amateur radio. The internet is one of those things which can seem a very alien and confusing concept even to the computer literate until you have actually played with it for a while. One of the simplest parts of the internet is E-mail which is very much like private packet radio messaging, but to a universal audience.

An extension to E-mail is the reflector concept where someone sends a mail message to the reflector, and the reflector then copies this message to everyone who has asked to subscribe to that reflector. This makes a very effective discussion forum, and there are a whole variety of radio related reflectors, including a contest one, an HF DX one, several VHF DX ones, a 160m one etc, and anyone with internet E-mail can gain access to these.

There are also reflectors for discussing bugs/features for some of the major contest logging packages (K1EA CT, K8CC NA and N6TR LOG). However, there is now also one for the EI5DI Super-Duper packages. If you have internet mail access, a message to listserv@blacksheep.org with *subscribe sdlist your callsign* in the body will mean that you receive copies of all the mail messages posted to the list. At least traffic on this one is at manageable proportions unlike the amount on the *CQ* contest reflector! I plan to review the status of Super Duper in the next month or so. The program has undergone quite a lot of development in the last year so I think the time is ripe for an update.



Look out for Garry Hammond, VE3XN, in the *CQ* WW contest.

WHAT'S ON?

THERE'S LOTS happening on the contest calendar during November. At VHF there are several cumulative contests underway on 2m (CW), 70cm, 23cm and 13cm (all modes). These VHF cumulatives are a collection of 2.5 hour contests which take place on alternating weekday evenings (8.30 - 11pm local time) and in which only the best three results from a possible five count towards the final score. This style of contest should enable many people to fit a competitive entry around work, family and other commitments. Don't forget the 2m CW contests at the start of the month either.

There are 6 and 24 hour sections and, although this contest has been rather neglected by UK operators in the past few years, there is an enormous amount of activity throughout Europe in this co-ordinated event.

At HF there is the CW leg of *CQ* WW at the end of the month. Just as I described for the SSB leg in October's *Contest Exchange*, there is ample opportunity to take an award if you set your mind to it and choose your target carefully. So even if you don't feel up to an all-band high power entry, why not try a single bander? *CQ* WW is *the* HF contest of the year so don't be left out! On the RSGB front, with two top-band contests, November is definitely the time to re-string that 160m antenna which came down during the summer and that you just couldn't be bothered to put back up.

Firstly, on 11 November, there is the Club Calls contest for which the rules are the same as the 1996 ones published in the contest supplement in September's *RadCom*. This is a CW/SSB 160m event which is particularly about getting club stations and members of clubs onto the band. A week later is the 2nd 1.8MHz CW contest which is co-ordinated with a part of the IARU Region 1 160m contest. This makes for stacks of activity and lets hope that conditions are good. At this stage in the sunspot cycle, conditions on the low bands can be quite excellent - witness the superb openings to the West Coast of the US during *CQ* 160 last year - so it's worth putting a little effort into your low band antenna systems. I guess the down side of this is how poor the high bands become.

As we approach *the CQ* WW contest, it's becoming a little depressing to read on the Internet contest reflector of US stations predicting that the MUF between the US and Europe is likely to even drop below 40m for much of our night/early morning. ♦

TURN TO PAGE 84 FOR CONTEST CLASSIFIED

Pos	Group	2m	70cm	80m CW	80m SSB	Total
1	Martlesham DX & CG	11771	731		10306	2588
2	Lichfield ARS	1218	198	13956	10862	2277
3	Sutton & Cheam RS	3325	980	6769	5940	2171
4	Harwell ARS	3057	1144	4263	4073	1940
5	Crawley ARC	2227		9575	6311	1456
6	Aylesbury Vale RS	2068	577	3640	5112	1412
7	Telford & DARS	354	378	3996	3465	966
8	Scunthorpe ARC	862		7830	3421	949
9	Clifton ARS	1520	60	3452	5213	909
10	Torbay ARS	421		6335	4299	885
11	South Manchester RC	191		6542	3528	810
12	Bromley & DARS	1213	531	1561	690	743
13	Harwich ARIG	1245		4535	1755	592
14	Kings Lynn ARC	532	146	802	3132	519
15	West Kent ARS	1100	271		871	411
16	Lowestoft RC	908		1288	1470	305

Table 1: Results of the 94/95 Season AFS contests.

NEVILLE CHEADLE, G3NUG
Further Felden, Longcroft Lane,
Felden, Hemel Hempstead HP3 0BN

IN SEPTEMBER'S *IOTA* column I mentioned that the IOTA Committee was all set to formalise requirements for island operators to submit evidence in support of their operations. Starting with immediate effect, the Committee will require specific evidence from the operator when the operation takes place from an unnumbered island/group that is being activated for the first time. Information will also be required for operations from other very rare islands or for operations about which doubts have been raised, eg where additional permissions, such as landing or operating permission, are known to be required.

Acceptable evidence could include:

- Dated invoice and receipt from a facility on the island, eg hotel, rented accommodation owner, camp-site manager or shop, in all cases showing company's name.
- Photographs of operators and equipment against a recognisable feature on the island, preferably auto-dated.
- Signed statement from an official associated with the island, such as a lighthouse keeper, boat captain or charter pilot responsible for transportation.
- Landing or operating permission where required.

Where the island is uninhabited and/or has no recognisable features, evidence of transportation will be required together with a photograph of the island taken from the sea or air. These should be accompanied by a large scale map on which the place from where the photograph was taken is marked. Further details about validation will be published in the *1996 IOTA Directory*.

IOTA QSLS

SEVERAL ISLAND chasers have complained to the IOTA Committee that they have been unable to obtain QSL cards for some operations. Sometimes these are from operators who are having difficulty in getting their own contact confirmed where they know that many others have already received their cards. There is little that we can do in these cases. However, where it becomes apparent that an operation has taken place and that a substantial number of cards has not been distributed I will write, as Vice-Chairman of the IOTA Programme, to the operator concerned. On behalf of IOTA I will offer help and ask for clarification of the position.

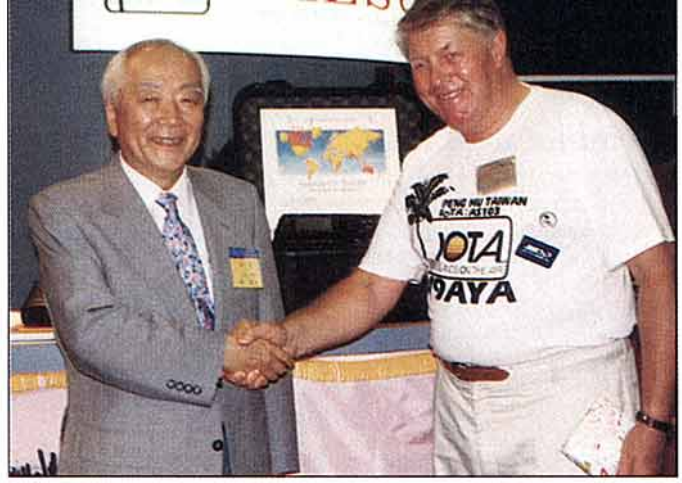
Bob Williams, G4LVQ, has kindly agreed to co-ordinate the collection of data for this exercise. So, if you have been waiting for an IOTA QSL for over six months please write to Bob at 25 Upper Carr Lane, Calverley, Pudsey, W Yorks LS28 5PL. Let him have the callsigns of the stations concerned, the QSO date and QSL route used. Do not send Bob your QSLs! Neither Bob nor I will act as QSL managers. Once Bob has been notified that at least 10 stations are waiting for a particular QSL, he will let me know and I will then write to the station concerned.

9M2 OPERATIONS

I RECENTLY ACTIVATED two fairly rare West Malaysia island groups (AS-046 and AS-073) for a few days on my way to the Tokyo HamFair. It has to be said that August is not a particularly good time to operate from West Malaysia. The bands are very noisy and, with the sunspot cycle at its minimum, I knew it would be tough going. Operating mainly in the evenings I made around 2300 QSOs. More than 77% were with Europe. I was using the Yaesu FT-900AT portable rig that has been loaned to the IOTA Committee as part of a sponsorship agreement (see September's *IOTA* column).

The antennas were a dipole and a G5RV, both at around 45ft. On many evenings the signals were down in the noise but this rig is excellent. I was able to work stations at a rate of about two QSOs a minute on SSB during the short openings. The rig is very selective, sensitive and the automatic ATU is very effective. It is available for loan to potential island activators in Europe. Please contact me if you would like to borrow this portable station. It goes to the Middle East in October with a group of US amateurs and will be used to activate some very rare island groups including two all-time new ones.

The shack on Pulau Babi Besar (AS-046) with the new IOTA flag.



Shozo Hara, JA1AN, President of JARL and Neville Cheadle, G3NUG.

TOKYO HAMFAIR

IOTA RECEIVED A real boost at the recent August HamFair in Tokyo. Yaesu Musen provided excellent support for me including an IOTA booth on their stand. They also arranged to translate the new IOTA brochure into Japanese (an impressive job was done by RSGB member Kaz Naguro, JA1IST) and, in addition, Yaesu provided some car window stickers with the combined IOTA/Yaesu logo. These were very popular indeed. The IOTA portable rig was a particular attraction and Yaesu has now agreed to provide a second portable rig in Tokyo for Japanese island activators. There were 56,000 visitors to the show.

I also received great support from JARL and *CQ* magazine. JARL arranged a key spot in the lecture programme for me on the Saturday. I spoke about IOTA 'The Hottest DX Award In Amateur Radio Today'. It was an interesting experience giving a presentation through an interpreter! I received some good questions so I hope my message got through.

CQ magazine launched the new Japanese version of the *IOTA Directory* at the HamFair. This was translated into Japanese by RSGB member Taizo Arakawa, GW0RTA/JA3AER - another excellent piece of work. More than 150 directories were sold at the HamFair from a special IOTA booth on the *CQ* stand. I believe that in the years to come the number of Japanese amateurs participating in the IOTA Programme may well exceed the number in any other country.

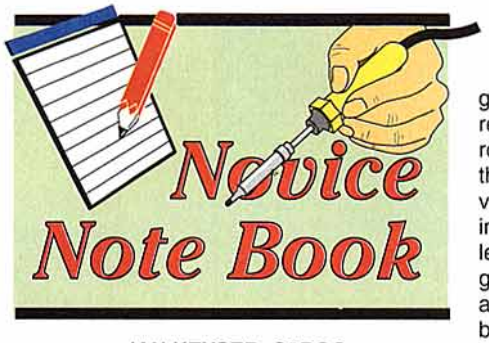
Taizo mentioned my attendance at the HamFair in his column. About 30 people came up to me as a result, said "Hello Neville-san" and received IOTA badges - a nice touch!

CDXC AND IOTA

THE SEPTEMBER issue of the *CDXC Newsletter* (Chiltern DX Club and UK DX Foundation) contains a number of interesting stories about recent IOTA DXpeditions and activities including: 'Cyprus And The 'Other' Island - IOTA 1995' by Don Beattie G3OZF; 'IOTA Contest 1995 From EU-032 Ile de Re' by Bob Whelan G3PJT and 'A CW IOTA 95 Contest Entry From The Solomons - H44XF' by Nigel Cawthorne G3TXF. Other items include 'IOTA 95 - A Layman's Perspective' by John Dunnington G3LZQ; 'Rathlin Island EU-122 Expedition 1995' by Jim Kellaway G3RTE and 'Holiday DXpedition To Malaysia - A Light-hearted Account' by me.

Readers may be interested to receive this copy of the *CDXC Newsletter* and, indeed, to join the club. If so would UK readers please send me an address label and 29p stamp (US$1 from abroad) and I will send the newsletter, prospectus and application form by return of post.

The Autumn 1995 update of the *IOTA Directory* is now available from RSGB Book Sales. ♦



IAN KEYSER, G3ROO
Rosemount, Church Whitfield, Dover,
Kent CT16 3HZ

ANTENNA ERECTION

THIS MONTH'S COLUMN is about raising antenna masts. It was prompted by watching two Novices trying to erect a 70cm beam on a 6m pole. I did not interfere as they were managing but I could not help but be concerned as several times during the lift it nearly went wrong, and would have done so had it been a 10 metre mast! Erecting antennas can be hazardous if care is not taken. A similar episode taught me about planning potentially dangerous operations.

One day I wanted to put a wire off the gable end of my house which is 35 feet above ground. The problem was that under this gable was another ridge roof over our lounge. A roof ladder was placed on the lounge roof to enable me to get to that ridge, then another ladder was hauled up and placed to straddle the ridge and lean on the gable end just where I wanted it. I started to climb up and then I realised just how dangerous it was going to be to drill the wall and fix the pulley I had got ready for the job. I paused at the top of the ladder and decided that the antenna was not going up that way!

Later that day I realised just what a fool I had been to even attempt to fix the antenna in such a dangerous manner. It is sometimes better to look at the problem from other angles, in this case from the inside! I opened the loft and took the step ladders up and positioned them on the inside of the desired gable end.

Then, using a long 1/4 inch masonry drill I drilled right the way through the wall. I then threaded a long length of 3mm galvanised garden wire through the hole until its end touched the ground outside. The insulator and antenna wire was then attached to the fencing wire and hauled up from inside the attic and made fast. The whole job completed in thirty minutes with no danger whatsoever! That antenna has now been up for 15 years and has never come down!

The majority of Novice operators are interested in the VHF and UHF bands and antennas here tend to be more manageable than HF antennas, but care must still be exercised. A 10 metre mast, rotator and beam can easily add up an unwieldy mass of material totalling tens of kilograms. A slip at the wrong moment can very quickly develop into property damage, if not a life threatening situation. It is essential that we plan erection of our systems carefully.

The first aspect to assess is the mast itself, is the material strong enough for the job? Are we using the correct materials? Are our mast couplers strong enough? Let us take those in order. Material strength is easy to assess: as the assembly is to be vertical the stress on the pole is compression and therefore minimal . . . but is it? What about windage? More importantly what about the stresses during erection? It is not so easy so I always over engineer on the base section of my masts. On small systems up to 10 metres I always use a 5.5m length of 50mm aluminium scaffold pole. To couple to the top section I use standard antenna sleeve couplers, never scaffold pole couplers. The top section of the mast does not need to be as strong as the base section as the bending moment here during erection is much less, in many cases 5m of 50mm TV mast is adequate.

RAISING A BIG MAST

FOR LARGER MASTS, like my 30m vertical for 160m, I used 50mm steel scaffold pole for the first 6 metres, then 5.5 m of aluminium, then tapering aluminium tube for the rest. To lift this massive beast I had a 5m base unit set into the ground making the fulcrum that high above ground. This along with gin poles and gin stays enabled me to lift the assembly (in zero wind conditions!) single handed so avoiding risk to others. I would not recommend anyone trying to lift any mast longer than 10 metres without considerable experience and even then taking comprehensive advice from others who have already mastered the art!

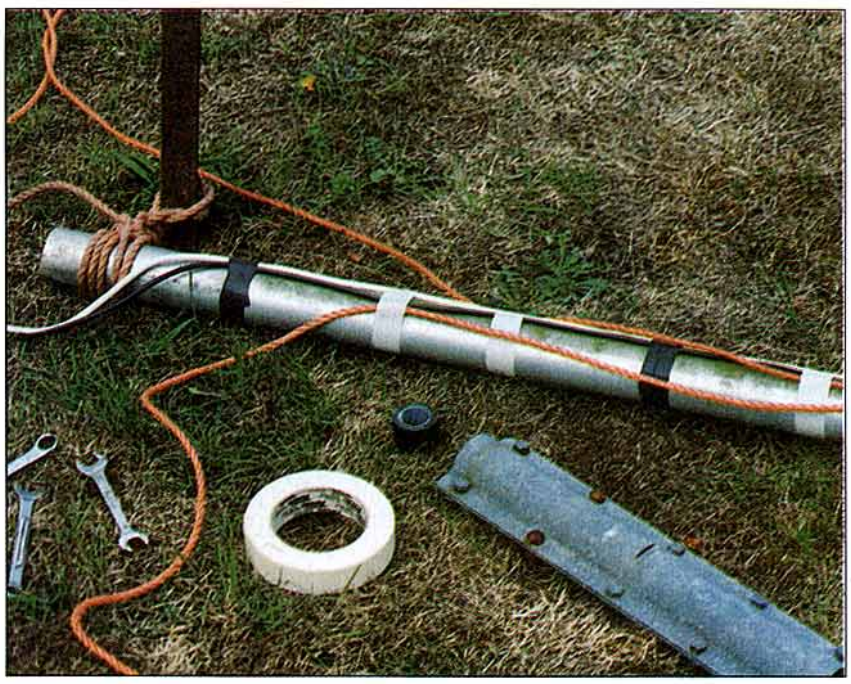
Another mistake I see being made all the time is erectors neglecting to take account of the weight of feeders and guys during the lift. The mast assembly is laid out on the ground and meticulously joined and checked. Then the feeders are connected followed by the guys and the lift started. All of a sudden it is realised just how heavy those feeders and ropes are, especially when the mast is near the horizontal with the ropes are hanging vertically from the fixing points. Before starting, tape the feeders securely to the mast at least every half a metre, then decide which guy ropes are required for the lifting process and which are not. The unused ropes should be taped to the mast every metre using one turn of paper masking tape. By feeding the paper tape underneath guys already taped to the mast, any guy may be released without releasing others (see photograph). This will hold until the mast is vertical and a flick of the wrist on each rope will free it from the tape!

If a post in the ground is not available for lifting the mast it is strongly advised that a stake is hammered in and the base of the mast lashed securely to it. It is almost impossible for you to lash it so securely that it will hinder the lift, but a little experimentation using the base section of the mast only will soon show if the lashing is suitable. Connect the rest of the mast, rotator, feeders and guys and then make a thorough check. Connect and check that the rotator is working and connect rig to feeder and check all appears OK. It is far better to do this with the antenna system on the ground than to get it in the air and have to take it down again because there is a short on the feeder or the rotator cable is miswired. The final thing to do before the lift is to knock four more stakes in the ground equidistant round the mast and about five metres from it, there will be the guy fixing points.

For the lift itself I like four, if not six, helpers.

With four helpers, two should be either side of the mast, one as a manual lifter and one holding a 6m aluminium ladder. The manual lifter, starting at the rotator, lifts the system above his head and walks towards the base. As soon as possible the man with the ladder gets it under the rotator and pushes up to help. At the same time the two helpers on the guys also heave up until the system is almost vertical. At this point the two helpers who did the lifting select two other guy lines and move to their guy stakes. The guys are then pulled until it is agreed that the system is vertical and then securely lashed.

It is safer if there are six helpers as four can be permanently on guys leaving the others to assist as required.



The base of the mast is tied to a ground stake and the feeders and spare guys temporarily fixed to the mast before the antenna is raised.

TIP OF THE MONTH

A TIP ABOUT drilling walls. Using a power hammer drill it is very easy to make an unsightly hole where the drill bit exits the brickwork. To avoid this, drill using the hammer until the last inch and then go on to standard drill and a neat hole will result on the outside providing not too much pressure is applied to the drill. ♦

RADCOM TECHNICAL FEATURE

The Phase 3D Amateur Satellite

The concluding part, reprinted courtesy of *The Amsat Journal*

SINCE SATELLITES MUST get their primary power from a source other than the local power company, some means of carrying energy on board, or using the Sun, is required. Currently, the only practical means of obtaining power, open to amateurs and most other satellite designers, is the use of solar panels.

As stated above, generating the power needed to support the transmitters aboard Phase 3D requires large solar panels. The design which evolved calls for a total solar panel area of 4.46m2 (48ft2) and solar cells of 14.3% efficiency. This array will produce about 620 watts of power at the beginning-of-life (BOL) and at optimum sun angle (B = 0°). After 10 years in orbit, this power number will still be about 350W at a B = 45°. This amount of power is still sufficient to operate at least two transmitters and the other necessary spacecraft systems. Like almost anything else, solar arrays deteriorate with age. This is why their performance after a specified number of years is an important design consideration. The cells for Phase 3D are being obtained through a very attractive agreement with DASA, the German Space Agency. While other sources and configurations of solar cells were considered, it was concluded that this one represents the best trade-off between performance and cost. Solar cells represent one of the single highest cost items which go into building a spacecraft. While solar panels are satisfactory as a sole source of power, some form of energy storage must also be provided. This is accomplished with a battery. Energy storage is necessary, not only to power the spacecraft during times that the Sun is eclipsed by the Earth, but also to operate the arc-jet thruster, described later. It's power requirements exceed the capability of the solar arrays, even under the best of conditions. Actually, the Phase 3D satellite will carry two batteries, a main and an auxiliary. This is to provide redundancy in case of failure of the main battery. The Phase 3D design team evaluated several sources and types of batteries. A final decision was made to select a more or less conventional nickel-cadmium battery, albeit with a new plate design, as proposed by a German firm. Another contender was from a US firm which proposed the use of an assembly of Nickel-Metal Hydride cells for the main battery and a more conventional Nickel-Hydrogen stack for the auxiliary. As in the case of the solar cells, cost was an important factor in reaching this decision.

TRANSMITTERS

IN ADDITION TO challenging the spacecraft power system, higher power transmitters also require careful circuit design, particularly at the microwave frequencies. High power, at microwave frequencies, is hard enough to come by in itself, but in a satellite, more difficult yet. In order to produce relatively high power, and live within the tight power budget imposed by satellite's power system, high efficiency RF power amplifiers are a must. However, attaining high efficiency, particularly at microwave frequencies, is a formidable task. Fortunately, the amateur community has already addressed this problem. It is called 'HELAPS' and stands for High Efficiency Linear Amplification by Parametric Synthesis. This concept has been proven on the 2 metre and 70cm transmitters employed in AMSAT satellites since OSCAR 7.

HELAPS will be a mainstay on the high power amplifiers used in the 70cm (U Band) and 13cm (S Band) transmitters aboard Phase 3D. Designing such amplifiers is a very exacting process, and an approach not understood by very many microwave designers - amateur or commercial. Design, construction, troubleshooting and final checkout of these amplifiers is one of the major tasks that confronted the Phase 3D design team.

RECEIVERS

PHASE 3D WILL HAVE receivers for at least 2 meters (V Band), 70cm (U Band) and 23cm (L Band). In addition, receivers for 15 meters (H Band), 2.4GHz (S Band) and 5GHz (C Band) are planned for inclusion.

LINK PERFORMANCE

ANOTHER OF PHASE 3D'S design features, intended to accommodate smaller ground stations, is the use of spacecraft antennas with higher gains than employed on previous amateur satellites. However, if full Earth coverage is to be provided, there is a limit to how much antenna gain can be used. At Phase 3D's apogee of 48,000 kilometres, the Earth will have a diameter of approximately 13°. A half power beamwidth of 13° corresponds to a gain of approximately 20dBi. On a 2.5 metre (8ft) diameter satellite, such gain cannot be achieved on 70cm or lower. But, for 2.4GHz and above, antennas with such gains are small enough to be accommodated. Thus, above 1.26GHz antenna gain is limited by the desire to provide full Earth coverage, while on the lower bands it is limited by the spacecraft size.

If one considers a ground station with a particular fixed parabolic antenna size, the effective link attenuation on the various microwave bands is the same on each. The rise in antenna gain with frequency compensates for the greater attenuation, the so called 'wavelength factor'. In reality, the difficulty of producing RF power on the higher microwave frequencies, for example 10.5GHz and above, as well as the greater antenna pointing precision required, (receiver sensitivity being no longer a significant factor at least up to 10GHz), results in a preference for the lower microwave bands. On the VHF and UHF frequencies the links tend to be less favourable, as the lower satellite antenna gain has its effect on link performance. In addition, the effective noise temperature is higher at the lower frequencies. Of course, some of these disadvantages can be overcome by higher transmitter power which is easier to come by as one goes to lower frequencies. Nevertheless, it is expected that the microwave links on Phase 3D will significantly outperform those on the lower bands and will become more and more popular as time passes.

IF MATRIX

THE IF MATRIX provides the facility to be able to connect, under control of the IHU, any receiver with any transmitter. It also includes the LEILA, discussed in the following section. The IF frequency is 10.7MHz and the matrix has an input and output level of -15dBm.

LEILA (THE ALLIGATOR EATER)

ONE OF THE PROBLEMS faced since the first transponder amateur satellites has been that of the 'power hog', sometimes also referred to as an 'alligator'. This a ground station which uses much more power than necessary to produce a useful signal through the

satellite. In the past, the only recourse, other than turning the satellite OFF completely, was to warm the offending individual or refuse to talk to the person. But Phase 3D will incorporate a circuit designed to counter 'power hogs'. Its called LEILA which stands for LEIstungs Limit Anzeige (in German) or Power Limit Indicator as a suitable translation. The circuit works at the spacecraft's main IF, and thus is available to all uplink/downlink combinations. If a signal above a certain threshold is detected, LEILA will first put a Morse transmission on the frequency. It might say something like 'PSE QRP'. If that does not cause a reduction in the strength of the signal, LEILA will place a notch on the frequency - which should accomplish the objective. A block diagram of LEILA is shown in **Fig 4**.

ANTENNAS

THE SUBJECT OF antenna design has been a major thrust in the Phase 3D effort. Since Phase 3D will incorporate receivers and transmitters on many bands, a number of antennas will be required. Optimising the gain in accordance with the considerations of the proceeding section, and/or reducing the size of each of these antennas, was another of the major challenges that faced the Phase 3D design team. Because of launch vehicle constraints, effort was concentrated on the use of low profile circularly polarised antennas.

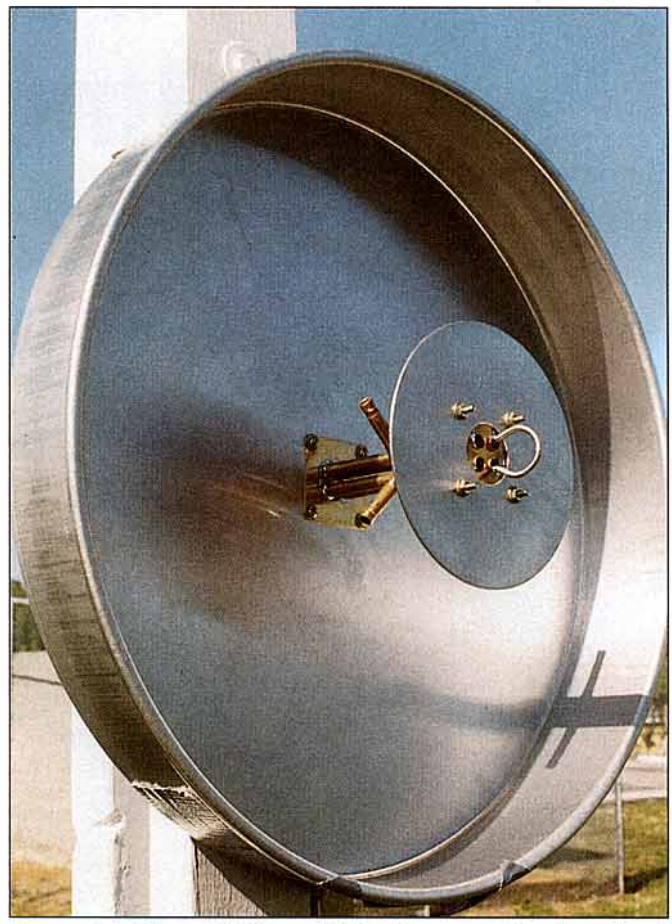
Table 3 lists the types of antennas which have been designed to meet the needs of Phase 3D for the various bands.

As the launch date approaches, the team effort is to transform antenna theories and prototypes into flight hardware. The computer design work is complete as well as the construction of prototype antennas. The feed systems are designed and the required relays selected. Most of the coaxial cable and connectors are already at the integration facility for installation on the spaceframe. The 10 metre antenna design is complete with only the fabrication of the flight hardware to be accomplished.

On V Band, a 1/4 flexible open sleeve antenna will be used for the omni. The final design of this antennas has been established. The V Band high gain antenna design is finalised with prototype testing almost complete. The transmission line to both V Band antennas employs a 4-port relay to interchange the transmitter and receiver between the omni and high gain antennas.

The first U Band patch antenna is now bonded on an inner top panel of the spacecraft. Tests show it to be slightly low in frequency. The impedance is 49.4Ω on the resonant frequency. The U Band omni antenna consists of a pair of 1/4 whips mounted on opposite sides of the V Band whip.

A prototype L Band Short Back Fire (SBF) antenna is presently under test. It consists of a 21cm diameter cavity with a 1/4 high wall forming the cavity. It is, actually, an aluminium pizza pan, the kind you can buy in the kitchenware department of any department store. AMSAT's policy is to use readily available, inexpensive, hardware when it is adequate to serve the purpose. The feed is a turnstile feed with a split-feed balun and mounted 1/4 above the floor of the cavity. A 0.6 reflector is mounted 1/4 above the turnstile. The antenna is similar to a parabolic dish but is easier to build and has more gain at the smaller diameter. The L Band Omni is a pair 1/4 vertical stubs mounted next to the V Band and U Band whips. The flight models of the S Band and C Band parabolic dish antennas are in hand. These are commercial spun aluminium dishes with feed horns designed for amateur frequencies. The highest frequencies, 10.45GHz (X Band) and 24GHz (K Band), will employ conical horn antennas with gains in the 20 dBic range. These will be provided by the constructors of the respective transmitters and mounted directly on the units, protruding through the top of the spacecraft.



The completed Phase 3D flight model L-band antenna undergoing gain and pattern testing at the integration facility's antenna test range. Preliminary gain

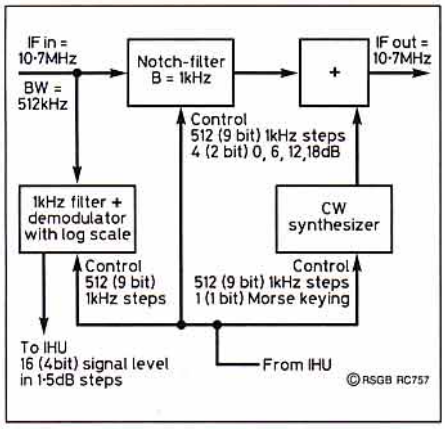


Fig 4: Block diagram of LEILA, the Power Limit Indicator designed to counter 'power hogs'.

SPACECRAFT COMPUTERS

THE PHASE 3D satellite incorporates a primary and several secondary computers. The main computer, the 'IHU' mentioned earlier, is the main spacecraft computer and is tasked with running all aspects of the satellite from power management to attitude maintenance. It is the IHU which will command the turning ON and OFF of transmitters, the switching of antennas etc. It is similar in design to the IHU used on OSCAR-13. As AO-13 does, it employs a radiation hardened 1802 COSMAC processor. While this is a rather old CPU unit, and performance improvements might have been achieved by the use of newer technology, it was decided that it would adequately serve the needs of Phase 3D. It has the advantage of being a 'known quantity' with much of the needed software already in hand.

The Phase 3D IHU incorporates an eight-bit analog-to-digital converter for analog measurements (voltage, power temperature, current and the like). It has 56 independent input and output bits for measurement and control. Some of these bits are used internally, but most are brought out to connectors to route to the rest of the spacecraft. The AO-13 scheme to allow multiplexing many of these bits was expanded for the additional I/O requirements of Phase 3D.

The primary differences between the older IHU and the Phase 3D design may be summarised as follows:

1. Phase 3D has 64k bytes of error-detection-and-correcting (EDAC) memory, compared to 32k bytes for AO-13.

2. The physical size of the IHU modules is different. The one used in AO-13 measures 200mm x 300mm, whereas the Phase 3D module is smaller - 200mm x 270mm.

3. The AO-13 IHU occupied two double-sided PC boards with a wiring harness joining them and attaching the connectors to the rest of the spacecraft, while the Phase 3D IHU is

Operation Band	Antenna Type	Gain
15M (H Band)	Same as 10M	0 dBi
10M	2 El. Deployed Whip	4.5dBi
2 MHz (V Band)	3 Low Profile Dipoles	10+Dbic
435MHz (U Band)	6 El. Patch	13+ dBic
1269 MHz (L Band)	Short Back Fire	15+dBic
2.4GHz (S Band)	Parabolic Dish	18-20 dBic
5.6GHz (C Band)	Parabolic Dish	18-20 dBic
10.45GHz (X Band)	Dual Horn	20 dBic
24GHz (K Band)	Horn	20dBi

Table 3: Phase 3D Gain Antenna Configurations.

Epoch	91 80.0000000
Epoch Rev.	1
Mean Anomaly	0.0000000000 degrees
Mean Motion	1.5000000000
Inclination	63.4343490 degrees
Eccentricity	0.67743780
Argument of Perigee	220.000000 degrees
Rt. Ascension of Ascen. Node	225.000000 degrees

Table 4: Phase 3D Orbital Elements.

on a single, multi-layer PC board with all connector soldered directly to the board. There is no internal wiring harness in the Phase 3D IHU.

4. The AO-13 IHU required a separate command decoder, housed in a separate module. The Phase 3D IHU incorporates the command decoder on its PC board.

5. The Phase 3D IHU also incorporates an experimental networking adapter called the Controller Area Network (CAN) Bus. This is based on an automotive standard widely used in Europe and Japan as well as the US. The CAN bus will be used to tie the IHU into the other spacecraft computer-based systems.

RUDAK

IN ADDITION TO the IHU, Phase 3D will include a digital communications experiment, called 'RUDAK'. RUDAK is an acronym from the German 'Renerativer Umsetzer fur Digitale Amateurfunk Kommunkation'. In case your German is a bit rusty, this translates to 'Regenerative Transponder for Digital Amateur Radio Communication'. The name is from the RUDAK experiment built by radio amateurs in Germany and flown on AO-13.

An improved RUDAK was flown on AO-21. On that spacecraft, it was used for some time in an 'FM Repeater' mode; receiving FM voice transmissions on 70cm, digitising and processing them, and finally retransmitting them as FM voice modulation on 2 metres. This mode became quite popular and did much to bring satellite operation to amateurs not previously familiar with it. Unfortunately, AO-21 ceased operation in October 1994.

The RUDAK to be flown on Phase 3D is being designed, constructed, programmed and commanded by an international team from North America and Europe. It is aimed at providing packet-based communication, similar to that performed by the existing MICROSATs and UoSats, early in the operational life of the satellite. However, it has also been designed to allow changes in the way radio amateurs use digital communications satellites as time passes.

The Phase 3D RUDAK actually consists of two computers. One is based on the NEC V53 processor. it has numerous serial communications ports using direct memory access (DMA) techniques and incorporates 16 megabytes of memory for program and data storage. A portion of this memory uses EDAC for integrity. The second computer is based on the Intel i386EX processor and has its own memory array; likewise using EDAC. It also uses DMA-based serial I/O ports for communications.

Each RUDAK processor is equipped with 9600 bit/sec hardware FSK modems for compatibility with existing digital satellites. In addition, a total of eight DSP-based, frequency-agile modems are being incorporated to allow support of other modulation techniques and communications systems. In this way, RUDAK is aimed at avoiding obsolescence over the expected 10 to 15 year life of Phase 3D. In addition to the tasks outlined above, RUDAK will be used in conjunction with the GPS and SCOPE experiments.

ORBIT

ANOTHER IMPORTANT aspect of the Phase 3D project is the selection of the final orbit for the satellite. Like all of the other design considerations, it too has been engineered to bring the most benefit to as many amateurs throughout the world as possible. Like OSCARs 10 and 13, it will go into a highly elliptical orbit of the Molniya variety. But there, the similarity ends. The apogee (high point of the orbit) for Phase 3D will be much higher than the previous satellites - about 48,000km instead of 36,000km. The perigee (low point) will also be higher, about 4,000km. This yields an orbital period of 16 hours. The significance of this will soon become apparent.

Because the Earth rotates once every 24 hours (twice in 48 hours), a 16 hour orbit results in three complete orbits in the same 48 hours or two days. This two day repetition will make it much easier for us mortals to remember when Phase 3D will return to the same position. Furthermore, because of the 16 hour orbital period, Phase 3D goes through an apogee over North America, one over northern Europe and one over the Far East. Because of this synchronism between the satellite's orbit and the Earth's rotation, it will go through apogee at approximately the same local time in each area every two days.

To illustrate how this will work, take the example of an amateur in the Midwest section of the USA. Phase 3D will be visible for many hours, at a high elevation angle, centred on say 8.00pm (local). It will then drop rapidly and reappear 16 hours later over Asia. But it will be high enough so that it will be within sight of this Midwest location. Thus it will appear to rise rapidly in the Northwest and hang for a number of hours and then drop very suddenly. Sixteen hours later it will do the same thing, this time in the Northeast during its European apogee. But the local times for each apogee will always be centred on 8.00pm - a peak time for amateur activity.

If you have a tracking program enter the elements from **Table 4** and see how Phase 3 will behave at your location.

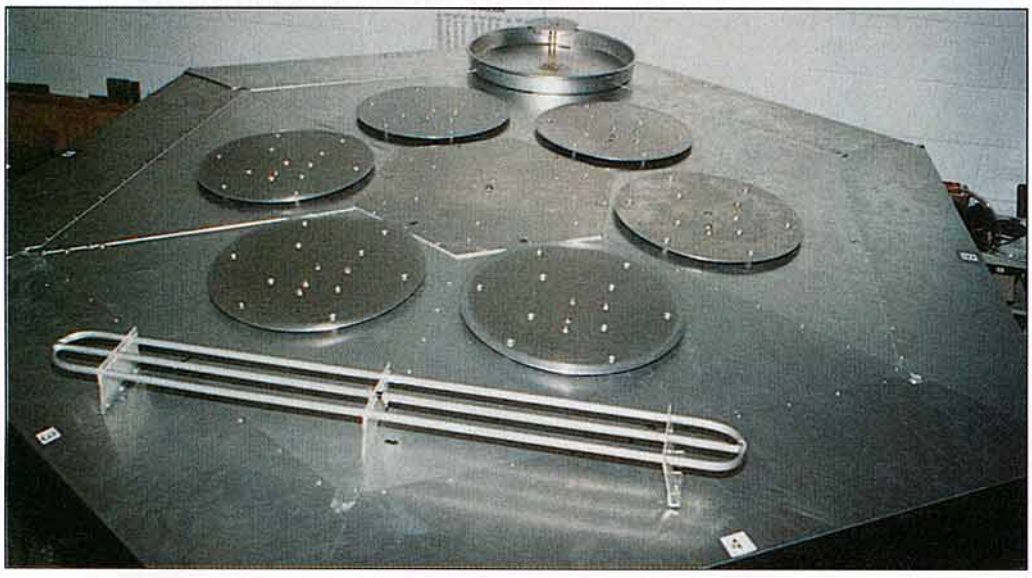
Of course, some of these elements may vary somewhat from the final orbit Phase 3D attains, but they will serve to illustrate what tremendous potential this new orbit.

GPS SUBSYSTEM

PHASE 3D WILL be one of the first satellites, amateur or otherwise, to utilise the GPS satellites. It will be the first to do so in a high elliptical orbit. As used on Phase 3D, GPS will have the following uses. First, it will enable the satellite to determine its own orbit, put this information into the form of Keplerian elements and transmit them to us here on the ground via the telemetry system. In addition, as noted earlier, it will serve as a back-up to the Sun and Earth sensors to provide orientation information.

The GPS Subsystem, consists of an array of eight L-Band antennas (four on the 'top' and four on the 'bottom') and a 24-channel GPS receiver using digital signal processing techniques. Any of the eight antennas can be electrically connected to any of the 24 receiver channels, and unused resources can be powered down.

The L-Band signals from the eight antennas are amplified and routed to the RF portion of the GPS module. The RF sections consist of eight single chip (Plessey GP-1010) down converters. These chips are optimised for GPS use and are complete triple-conversion microwave front ends, incorporating phase-locked local oscillators.



A full scale mock-up of Phase 3D's top panel has been constructed for testing antennas without disturbing ongoing spacecraft integration efforts. Here, one of three V-band dipoles, as well as the U-band patch array and L-band short backfire antennas are clearly visible on the mock-up.

Each of the eight RF sections provides a digital output stream (2-bit sampled) for processing in an array of four VLSI Correlator ICs (Plessey GP-1020). The purpose of the correlators is to extract the weak, spread-spectrum GPS signals and include the final local oscillator and spreading code generators; the correlator chips average the weak signals to improve detection.

They then present the output data in a format suitable for processing by a computer. The computer is based on the AMD 29200 RISC controller. This is a 32-bit RISC machine with high throughput for the demanding real-time filtering and position solution calculations required. Like all other computers aboard Phase 3D, the 29200's memory has EDAC protection. The 29200 CPU completes the digital signal processing of the GPS signals and closes the final phase- and code-locked tracking loops in the GP1020 correlators.

All the oscillators - the phase-locked LOs in the GP1010 chips and the phase- and code-locked loops in the GP1020 chips - are derived from a high-stability crystal oscillator operating at 10.000MHz. The 10MHz signal is also counted down to provide long-term high-stability clock functions.

Data from the GPS experiment will be accurate enough to determine the Phase 3D orbit to within 10-20 meters accuracy. This knowledge will be especially important for evaluating the performance of the arc-jet motor. When operating to determine the spacecraft attitude, the GPS experiment will provide supplementary sensor data accurate to within 0.1 to 0.2°. At the same time, the GPS experiment will known UTC time to an accuracy of better than 1 microsecond.

The GPS unit will communicate with the rest of the spacecraft via the CAN bus, and has a dedicated serial link to RUDAK for backup purposes. It will rely on these data links for controlling its operation, for loading new software, and for sending data to the ground. It is planned that the GPS experiment will send <UI> packet radio frames to the user community giving the GPS-derived Keplerian elements, spacecraft attitude data as well as experiment housekeeping telemetry.

Lou McFadin, W5DID, Phase 3D Integration Manager, holds one of the 12 torquing coils that he manufactured in his garage workshop for the Phase 3D satellite. The coils will be used to help position the satellite in space by working in concert with Phase 3D's reaction wheels, and by interacting with the magnetic field of the Earth. A similar torquing coil system is currently in use on the AMSAT OSCAR 13 satellite.

PROPULSION SYSTEMS

TO MOVE THE spacecraft, from the low-inclination initial orbit provided by the Ariane 5 launcher, to its final orbit, and keep it there, Phase 3D incorporates two propulsion systems. The primary system is a high thrust bi-propellant liquid rocket motor with its associated tankage, plumbing and control circuitry. The other is a much lower thrust Arc-jet system mentioned earlier.

The bi-propellant 400 Newton propulsion system is a repackaged version of the one used successfully in the OSCAR 10 and 13 projects. It incorporates a 400 Newton (95 pound) thruster, being provided by a German aerospace company, that utilises Mono-MethylHydrozine (MMH) for fuel and nitrogen tetroxide (2O4) for the oxidiser. Because of the higher mass of the Phase 3D spacecraft, multiple tanks are required to carry the quality of propellant required for this mission - over 60 kilograms of MMH fuel and 130 kilograms of N2O4 oxidiser. The plumbing used to transfer the propellants from the tanks to the thruster has been designed for simplicity but with sufficient redundancy to assure safety and reliability.

Helium gas from a high pressure storage tank is regulated to a lower pressure by the pulsing of an electrically operated valve referenced to a pressure transducer, used to pressurise the propellant tanks through redundant check valves and feed the propellants to the thruster. A second electrically operated valve in series with the first is ready to take over should the first fail.

The electronics module that controls the motor ignition and burn sequence is the Liquid Ignition unit (LIU). This module contains the circuitry required to validate coded firing commands, initiate the firing sequence by opening and pulsing the Helium isolation valves, control pressure in the propellant tanks, open the motor valves, clock the commanded motor burn time and make safe the system at the end of the burn. This basic system has already proven fully capable of supporting the multiple burns necessary to place the Phase 3D spacecraft in its final orbit.

To provide for stationkeeping and minor adjustments once the spacecraft is in final orbit, a small arc-jet thruster is also being incorporated in Phase 3D. Compared to the 400 Newton thrust of the primary propulsion system, this motor puts out a puny 100 milli-Newtons, but it does this at very high efficiency over very long burn times.

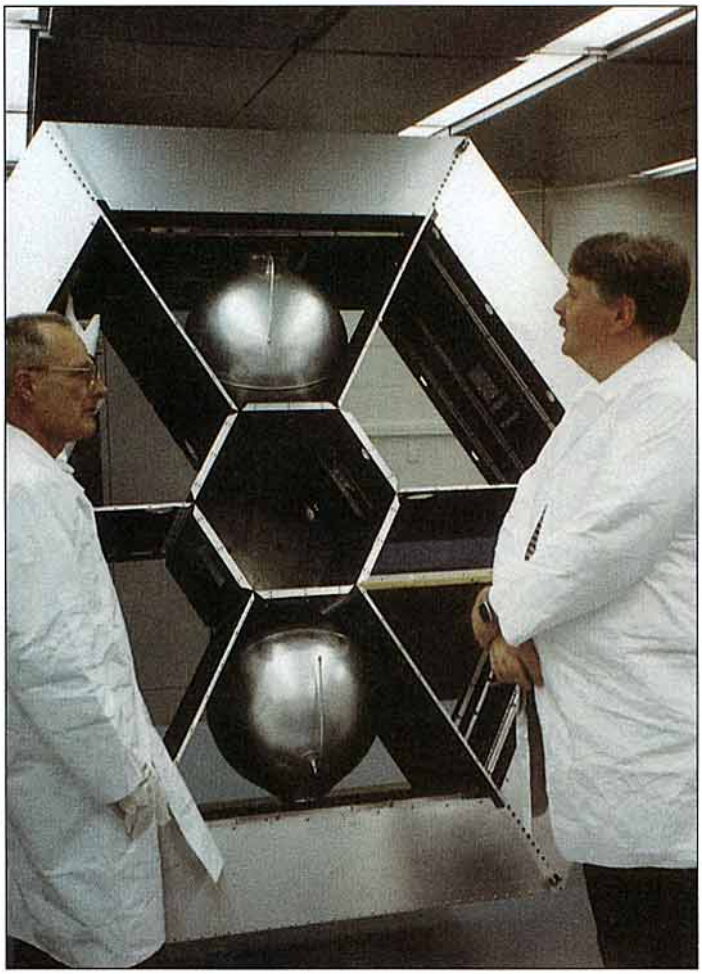
This is accomplished by striking an electrical arc at the tip of the motor, then feeding a small quantity of gaseous ammonia fuel through the arc heating it to very high temperatures, and thus causing it to rapidly expand, and thereby providing highly efficient thrust. The arc-jet thruster will make possible a long term capacity to perform minor orbit adjustments to correct for the kind of orbit instabilities introduced by lunar and solar perturbations that are causing the predicted re-entry of the OSCAR 13 spacecraft in late 1996. Extended testing of the system has been successfully completed at the University of Stuttgart. A plumbing system will convey ammonia from propellan tanks, heat it to a gaseous state and meter its flow to the thruster. An electronic module supporting the Arc-jet will provide the approximately 1kW required to initiate and maintain the arc. It will also provide the electronics necessary to initiate, time and terminate the thruster's burn.

SPACEFRAME AND LAUNCH ADAPTOR

NATURALLY, ALL OF THIS equipment must be housed in something. That something is the spaceframe. Spacecraft payload specialists always insist that the spaceframe should weigh nothing, and the structural engineers always want to construct the strongest 'battleship' to withstand the rigours of the launch environment. This is a technological version of an age-old head-butting confrontation. In the case of Phase 3D, those designing and building the structure were continuously urged to do better and better. Along the way a number of quite good lessons on lightweight aircraft structural construction methods were learned. While the end product is not as light as some would have liked (about 60kg), it has already demonstrated itself to be very strong. The spaceframes for OSCARs 10 and 13 weighed only 7kg, and that fact was held over the heads of the structure design and construction team like a sword of Damocles!

The Phase 3D spaceframe is principally fabricated of thin-gauge sheet aluminium. Its formation, to rather unusually close tolerances for sheet metal structures, caused more than passing concerns by all who were involved in the effort. Typically these tolerances are in the range of 0.2mm (0.008in). The secret to this type of construction is to place all of the load of stresses into the shear plane of the sheet metal, where it is notably strong for its weight. An example of this are

the six Divider Panels, one on each corner of the spaceframe. Three of these will be anchored to the launch vehicle which will get Phase 3D into space. Thus, during launch, these three points will be quite heavily loaded in all motions. The only machined parts in the spaceframe are the six Corner Posts at the outer ends of the Divider Panels. These must be robust enough to carry all of these launch thrust loads into the spaceframe, translating all of those forces into the plane of the 0.8mm thick sheet metal Divider Panels as sheer forces. It is difficult to completely convey these concepts in words and pictures, but those seeing the spaceframe in-person will be able to more readily grasp the concepts employed in the design.



Phase 3D under construction in Orlando, Florida. Seen here are Dick Jansson, WD4FAB, (left) and ARRL representative Steve Ford, WB8IMY.

SBS

SINCE PHASE 3D will be a secondary payload on the Ariane 5 launch vehicle, it must conform to whatever space the European Space Agency (ESA) can make available. ESA already has a conical adaptor which interfaces between the 2624mm diameter bolt circle on the Ariane upper stage to a 1194mm diameter clamp-band used for payloads. However, although hollow, the conical adaptor does not provide sufficient space to house Phase 3D, or any other reasonably sized payload. Accordingly, ESA offered the amateur satellite community the opportunity to launch aboard the new, big vehicle if we would provide a cylindrical 'spacer' that could be mounted between the 2624mm diameter bolt circles on the bottom and the conical section on the top. Phase 3D could then ride to orbit inside this cylinder. But that's not all. ESA also wants to be able to launch another satellite on the same mission, which would sit on top of the conical adaptor. Thus, they require that our cylindrical section must be able to support the launch loads of this other fellow passenger. This means that this 2624mm diameter Specific Bearing Structure (SBS), which we must produce, must be able withstand the load forces imposed by a 4.7 metric ton (10,350lb) satellite load. In order to assure ourselves that our design is capable of handling such a load, extensive computer analyses have been performed (on the same home computer used to accomplish the thermal analysis).

Construction of the 2624mm diameter SBS began with the ordering of machined aluminium rings, called Frames, for the top and bottom of the cylinder that form the bolting flanges. This is a single-piece machining that is about 8-1/2 feet in diameter with a pattern of 244 bolts and 488 rivets for each 2624mm diameter Frame. These have now been delivered to Weber State University in Utah, where construction of the SBS is taking place on a specially fabricated steel table machined, measured and adjusted to be flat to 0.05mm (0.002 inch). This degree of precision is necessary to ensure that the SBS will be a 'true' structure that will fit to the other components of the load-carrying composite 'stack' that support the prime payloads.

On the interior of the SBS, we will provide a supporting structure for the Phase 3D spacecraft. Three of these structures will terminate in three high-strength bolts that are attached to the spaceframe. These bolts each have concentrically mounted springs to provide the 'push-off' forces needed to separate Phase 3D from the launch vehicle, with a velocity of 0.5meters/sec.

These bolts hold the satellite to the SBS with three pyrotechnically operated nuts. The nuts are opened on electrical command to separate Phase 3D from the launch vehicle.

OPERATING SCHEDULE

REFERENCE TO FIG 2 shows that any of the uplink receivers can be cross-linked to any downlink transmitter, except for the 29MHz transmitter, which is a single channel affair intended only for the transmission of bulletins. However, there are two factors which limit which uplinks can be linked to which downlinks. One of these is the power required for the various downlink transmitters. As stated earlier, Phase 3D will have an average power generation capability of about 600W at the beginning of life, decreasing to about 350W after about 10 years or so, as the solar cells age. Thus, even after 10 years, it is still expected that the solar arrays will be capable of producing enough power to run at least two transmitters simultaneously. As the onboard receivers require very little power, they are not a factor. So it is expected that multiple receivers can be operated simultaneously. Therefore, it is apparent that the uplink and downlink combinations, that will be simultaneously available, are limited only by onboard power and the obvious fact that it will not be possible to have an uplink and a downlink activated in the same band at the same time. This will preclude Configurations such as V/V or U/U.

The specific combination of uplinks and downlinks activated in at particular times will be determined by a governing group called 'The Program Board'. This group will be composed of a single representative from each organisation that has, by the time of launch, contributed a specified substantial sum of money toward construction of the satellite. Currently, this Board includes AMSAT-DL, AMSAT-NA, AMSAT-UK, the German Amateur Radio League (DARC) and the American Radio Relay League (ARRL). Decisions of the Program Board will be carried out by the various command stations that will be set up around the world to watch over the health of the satellite and send it appropriate commands to maintain the operating schedule established by the Program Board as well as to ensure Phase 3D's continued proper operation.

A TEAM EFFORT

FROM WHAT HAS BEEN stated in this article, it is apparent that the design, construction, management and financing of the Phase 3D satellite is an international team effort. Without the co-operative effort of all those involved, this ambitious project could not be completed. Whether it is the scientist and engineers who come up with the innovative design approaches, the technicians who fabricate the various spacecraft component parts, those who co-ordinate the arrival of these parts at the required time, or those who have made financial donations, all participants on this team are contributing to the successful completion of Phase 3D. When it is put into orbit on ESA's huge new ariane 5 heavy lift launch vehicle in April 1996, everyone who participated can take justifiable pride in their accomplishment. Because of the dedication of these selfless individuals, amateur radio will be presented with a significant new resource for use well into the next century. ♦

Donations are urgently required to maintain this project. These should be sent to: R J C Broadbent MBE, G3AAJ, AMSAT-UK, 94 Herongate Rd, Wanstead Park, London E12 5EQ. Tel: +44-0181-989-6741. The fee for this article is being donated to the AMSAT Phase 3D fund.

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UR111, 2.3mm, 75 ohm PTFE mini coax	40p/m
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UR70, 6mm dia, 75 ohm transmitting coax	30p/m
Double screened, 75 ohm coax, 8mm dia	40p/m
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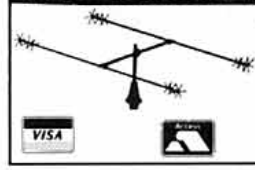

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RADCOM TECHNICAL FEATURE

Three-Band QRP Transceiver for CW

The second of three parts by Bernie Pallett, G3VML*

THE AUDIO PROCESSOR stage is shown in **Fig 3**. The first two amplifier stages, IC1D and IC1C, form Low Pass and High Pass active filters, whose combined lower and upper audio cut off frequencies are 600Hz and 1200Hz respectively.

The signal path from the audio filters continues through an Audio Attenuator, IC2. The amount of signal attenuation is determined by the degree of the positive bias voltage applied to pin 2 of IC2. The dynamic range of this control bias voltage is typically from 0.25V, minimum signal attenuation, to 3V. For a positive bias beyond 4V the attenuator will present a virtual open circuit to the signal path. Part of the signal output from the attenuator is converted to an AGC voltage, by the circuit centred on amplifiers IC1A and IC1B. The resultant AGC voltage is applied, via R18, to the bias input control of IC2, also the AGC circuit provides a Signal Strength Meter output via current limiting resistor R20 and diode D3. During transmit mode, a +12V Mute input, connected to pin 2 via resistor R19, will inhibit the signal flow through IC2.

The circuit centred on amplifiers IC3A and IC3B form a 750Hz narrow Band Pass Active Filter, which can be either switched in or out of the signal path, via relay contacts RLA1. The side tone input, from the Control Circuit, is also connected to the input of the Final Audio Amplifier IC4.

RECEIVE MIXER AND FRONT END

THE RECEIVED SIGNAL is input to this module (see **Fig 4** on page 43) via filters and an RF amplifier in the Transmit Exciter and Receiver RF amplifier module, see block diagram in Part 1. The signal is input to this module via capacitor C1. Three tuned circuits centred on 3.5, 10.1 and 14MHz respectively are used to select the signal to an on chip small signal amplifier, internally connected to pin 1 of IC1 (NE602).

Selection of both the signal path and relative input tuned circuit, are determined by forward biasing the relevant switching diodes, activated when +12V is applied to the desired Band Select input.

The output signal from this on chip amplifier is internally connected to the first of two inputs of an on chip mixer. Pins 6 and 7 are associated with an on chip oscillator circuit, also internally connected to form the second input to the on chip mixer. This oscillator is configured as a twin channel crystal oscillator, the external components are centred around crystals X1 (10.5MHz) and X2 (3.9MHz). Crystal channel selection is determined by forward biasing appropriate switching diodes from a +12V Band Select source. When neither crystal channel is selected, IC1 will act as a straight signal amplifier. The Radio Frequency Chokes RFC5 and RFC6 have been added to give extra isolation between the two crystal select lines. The output of the on chip mixer

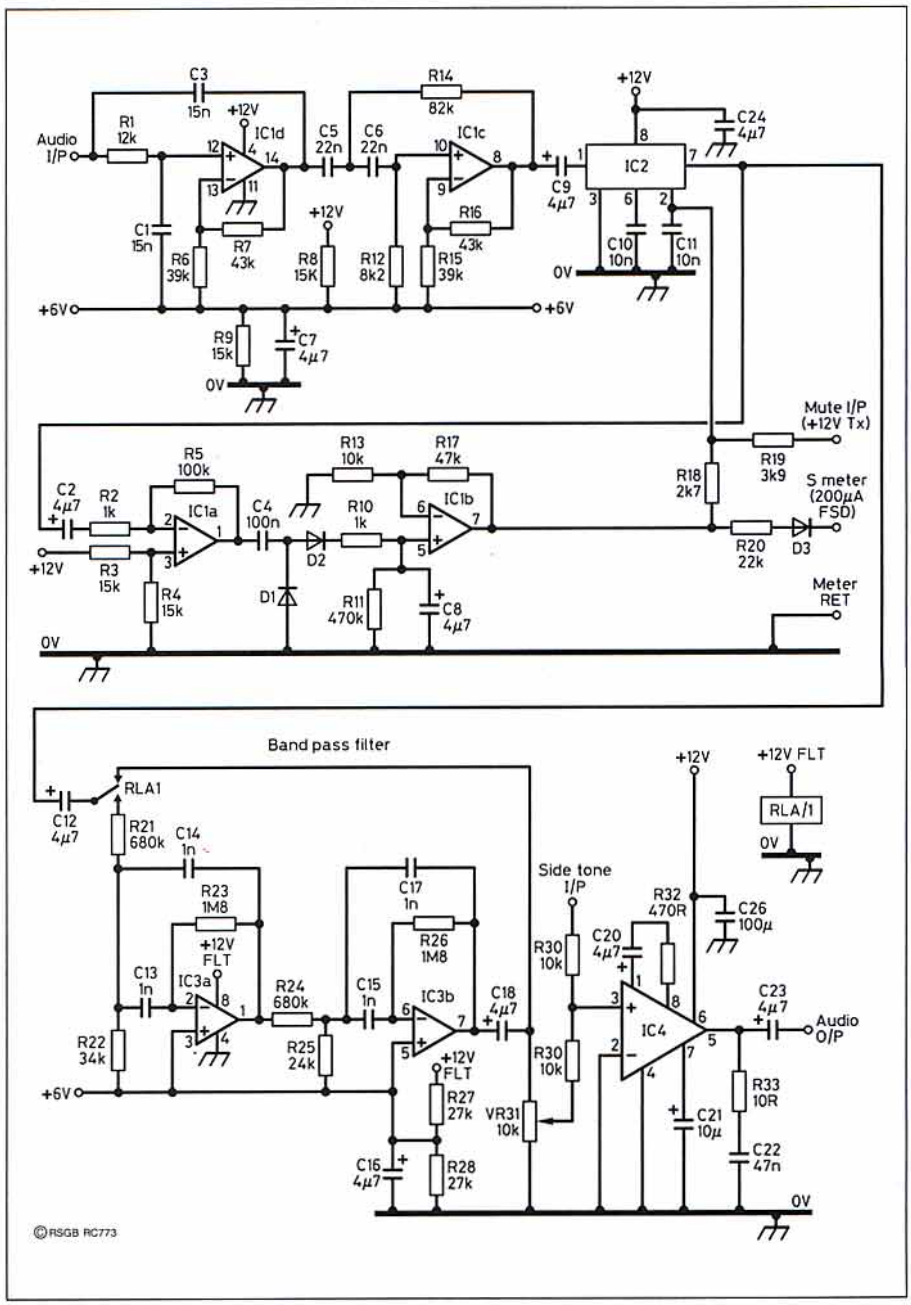

Fig 3: Audio Processor, circuit diagram.

*38 Hayley Bell Gardens, Bishops Stortford, Herts CM23 3HB

COMPONENTS LIST

RECEIVER/VFO, Fig 2

Resistors (1/4 watt 5%)

R1	2k2
R2	390R
R3	12k
R4	2k2
R5, R7, R9, R10	27k
VR6	10k
VR8	10k 3/8in square,22 turn Cermet, preset

Capacitors (all sub miniature)

C1	150pF ceramic
C2	220pF ceramic
C3	2.2pF ceramic
C4	120pF ceramic
C5	560pF ceramic
C6, C12, C20, C22	10nF mono ceramic
VC7	0-25pF air spaced
VC8	2-10pF minature polypropylene
C9	510pF polyester
C10, C11	330pF polyester
C13	22pF polyester
VC14	70pF 5mm ceramic trimmer
C15, C16, C17, C18, C19	300pF polyester
C21	47uF 16V electrolytic
C23	4.7uF 16V electrolytic

Inductors (all Toko KXNK3767EK)

L1, L2, L3	1.2uH

Semiconductors

IC1	MC3362P
IC2	78LO5

Additional Items

X1, X2, X3, X4, X5	8MHz, all 18HCU
RLA	sub miniature PCB mounted OEG PN OUC-SS-112D-12VDC.

AUDIO PROCESSOR Fig 3

Resistors (1/4watt 5%)

R1	12k
R3, R4, R8, R9	15k
R2, R10	1k
R5	100k
R6	39k
R7	43k
R11	470k
R12	8k2
R13, R29, R30	10k
R14	82k
R15	39k
R16	43k
R17	47k
R18	2k7
R19	3k9
R20	22k
R21	680k
R22	24k
R23	1M8
R24	680k
R25	24k
R26	1M8
R27, R28	27k
VR31	10k Log
R32	470R
R33	10R

Capacitors (All sub min)

C1, C3	15nF polyester
C2, C7, C8, C9, C12, C16, C18, C19	
C20, C23, C24	4.7µF, 25V electrolytic
C4	0.1µF mono ceramic
C5,C6	22nF mono ceramic
C10, C11, C25	10nF mono ceramic
C13, C14, C15, C17	1nF polystyrene
C21	10µF, 25V electrolytic
C22	47nF mono ceramic
C26	100µF, 16V electrolytic

Semiconductors

IC1	LM324
IC2	MC3340P
IC3	LF353N
IC4	LM386
D1, D2, D3	IN4148

Additional Items

Relays	
RLA	sub miniature PCB mounted OEG PN OUC-SS-112D-12VDC.

RECEIVE FREQUENCY CONVERTER/FRONT END Fig 4

Resistors (1/4 watt 5%)

R1, R2, R3, R4, R5, R6, R9	1k
R7, R8	1k s.o.t
R10	4K7 s.o.t
R11	15K

Capacitors (all sub miniature)

C1	1nF mono ceramic
C2, C3, C12, C22	820pF ceramic
C4, C6, C10, C14, C15, C17, C23, C24, C25, C27	10nF mono ceramic
C5	1nF mono ceramic
C7	560pF ceramic
C8	330pF ceramic
C9	1nF mono ceramic
C11, C21	120pF ceramic
C13	1nF mono ceramic
CV16, CV18	70pF 5mm ceramic trimmer
C19, C20	220pF ceramic
C26	2.2pF ceramic

Inductors

Chokes (all min axial) Coils (all Toko 10K series)

RFC1, RFC2, RFC3, RFC4, RFC5, RFC6	1mH
L1	5µH KANK 3337R
L2, L3, L4, L5	1.2µH KXNK 3767EK

Semiconductors

D1, D2, D3, D4, D5, D6, D7, D9, D10, D12, D14	BA482
D11, D13	IN4148
IC1	NE602AN
IC2	SL560
IC3	78LO5
TR1	2N3819

Additional Items

Crystals

X1	10.5MHz(HC18U)
X2	3.9MHz(HC18U)

TRANSMIT EXCITER MODULE, Fig 5

Resistors (1/4 watt 5%)

R1, R2, R3	2k
R4, R5, R9, R12	100R
R6, R7,	68R
R8, R13	150R
R10, R11	2k
R14	4k7 s.o.t ceramic
R15	15k

Capacitors

C1	47pF disc ceramic
C2	82pF disc ceramic
C3, C5 C4, C5, C6, C7, C9,C10, C11, C12, C13, C17, VC14, VC15 VC16	8.5-50pF 5mm spaced ceramic
C18, C19	10nF mono ceramic
C8	1nF mono ceramic

Inductors (all Toko KXNK3767EK)

L1, L2, L3,	1.2µH

Semiconductors

IC1	SO42P
IC2	78LO5A
D1, D2, D3, D5,D6	BA482
TR1, TR2	2N3704

Additional Items

Crystals

X1, X2, X3, X4, X5	8MHz(18HCU)

Inductors

RFC 1	1mH min axial
T1, T2	3T+3T, Biflar wound, 28SWG enam copper, on Fairlite balun (28-430002402)

Semiconductors

D1, D2, D3, D5, D6	BA482
D4	IN4148
TR1	2N3819
IC1	SO42P
IC2	78L005
IC3	SL560

Additional Items

X1	2.5MHz(HC18U)
X2	4.1MHz(HC18U)
X3	8MHz (HC18U)

BAND PASS FILTER MODULE Fig 6

Resistors (1/4 watt 5%)

R1a,b,c	2k
R2a,b,c	2k

Capacitors (all sub miniature)

C8a,b,c	10nF mono ceramic
C9a,b,c	10nF mono ceramic
C10	220pF ceramic s.o.t
C11	860pF ceramic

Inductors

RFC1 a,b,c	7 turns, 28SWG enamalled copper wire wound on FX1115 ferrite bead.
RFC2&3	1mH miniature axial.

Semiconductors

D1a,b,c	BA482
D2a,b,c	BA482

Filter A (3.5MHz)

Capacitors (all sub miniature)

C1a, C7a	560pF ceramic
C2a	720pF ceramic
C3a, C5a	47pF ceramic
C4a	330pF ceramic

Inductors (all Toko KANK3334R)

L1a, L1b, L1c	5.8µH

RF DRIVER/POWER AMPLIFIER, Fig 7

Resistors (1/4 watt 5%)

R1	50R
R2	120R s.o.t
R3, R5	560R
R4	270R
R6, R10	10R
R7	180R
R8	390R
R9	1k
R11	82R
R12	47R

Capacitors (all sub miniature)

C1, C2, C3, C6, C7, C8, C9, C10, C11, C15	10nF mono ceramic
C4	0.1µF mono ceramic
C13, C16	1nF mono ceramic
C14	4.7µF 16V electrolytic

Inductors

T1	12 turns primary, 3 turns secondary, 24SWG enamelled copper wire, wound on FT37-43 ferrite toroid.
T2	3 turns primary, 1 turn secondary, 28SWG enamelled copper wire, wound on 2 hole Balun former, Fair-Rite PN 28-43002402.
T3	11 turns, 24SWG enamelled copper wire, biflir wound on FT37-43 ferrite toroid.
RFC1, RFC2	7 turns, 28SWG enamelled copper wire, wound on FX1115 ferrite bead.

Semiconductors

IC1	SL1610
IC2	78LOO5
TR1	2N4427
TR2	2N3866TR3 MRF475

Additional Items

Heat Sinks	Qty 2 type 5F TO-5 push fit, 48° c/w.

LOW PASS FILTERS Fig 8

Capacitors (all sub miniature)

C4, C5, C6, C7	10nF mono ceramic
Relays	Qty 7, Omron G6A 234P, or similar 12V relay, i.e Rapid Electronics 60-0125, Radio Spares 376-997.

LOW PASS FILTER ASSEMBLY (3.5MHZ)

Capacitors (all polystyrene)

C1a	680pF
C2a	1300pF
C3a	680pF

Inductors

L1a,L2a	23 turns, 24 SWG enamelled copper wire, wound on T50-2 (red) toroid.

LOW PASS FILTER ASSEMBLY (10.1MHZ)

Capacitors (all polystyrene)

C1b, C3b	270pF
C2b	510pF

Inductors

L1b, L2b	14 turns, 24 SWG enamelled copper wire, wound on T50-2 (red) toroid.

LOW PASS FILTER ASSEMBLY (14MHZ)

Capacitors (all polystyrene)

C1c, C3c	220pF
C2c	390pF

Inductors

L1c,L2c	13 turns, 24 SWG enamelled copper wire, wound on T50-6 (yellow) toroid.

CONTROL CIRCUIT Fig 9

Resistors (1/4 watt 5%)

VR1	5k, 3/8in² 22 turn
R2	470k
R3	51k
R4	100k
R5	10k
R6	10k Cermet Preset
R7	220R Cermet Preset
R8	1k
R9	2k2
R10	4.7k
VR11	10k, 3/8in square 22 turn
R12	12k
R13	68k

Capacitors (all sub miniature)

C1	4.7µF, 16V electrolytic
C2, C5	10nF mono ceramic
C3	0.47µF, 16V electrolytic
C4	1uF, 16V electrolytic
C6	220µF, 16V electrolytic
C7	10µF, 16V electrolytic

Semi Conductors

D1, D2, D4, D5, D6	IN4148
D3	IN4003
TR1	TP110 or BD677
TR2	2N2905
TR3	2N3053
IC1	CD4001

Additional Items

RLA/1 TRK22 or equiv (Cirkit Pn 46-70070)

Components are available from:
JAB Electronics Components, 1180 Aldridge Road, Great Barr, Birmingham B44 8PB.

is internally connected to pins 4 and 5. The signal path flows via a 14MHz narrow Band Pass Filter to a final small signal amplifier, IC2.

The +5V power supply input for IC1 is derived from voltage regulator IC3. To ensure that the switching diodes associated with crystal channel selection are fully forward biased, it may be necessary to lower the resistance values of R7 and R8, but their values should not be less than 1K8 ohms. These components are marked in the components list and the circuit diagram SOT (select on test). The gain of signal Buffer Amplifier IC2, can be varied by altering the value of resistor R10.

Lowering the value of R10 will increase the gain of IC2, but too much gain will result in excessive circuit noise. To avoid damage to IC2 the value of R10 should not be less than 620Ω.

TRANSMIT EXCITER

THE CIRCUIT FORMED by FET device TR1, (see **Fig 5** on page 46), is a three channel crystal controlled oscillator. Selection of any one of the three crystal channels is achieved by forward biasing switching diodes, activated when +12V is applied to an appropriate Band Select input. The three crystal frequencies for X1, X2 and X3 are 2.5, 4.1 and 8MHz respectively. The output waveform from the crystal oscillator is input to pin 11 of IC1 via matching transformer T1 and capacitor C1, the first input to an on-chip mixer. The second input to this mixer, via R13 and pin 7, is a VFO waveform whose frequency ranges from 6 to 6.1MHz.

The composite waveform output from the on-chip mixer (on pins 2, 5 and 3) is transferred to the module output via matching transformer T2, capacitor C8 and switching diode D5, which is always forward biased during transmit mode.

Small signal amplifier IC3, is used solely for receive. During the receive mode, the input signal from the Band Pass Filter module is connected to the input of IC3 via switching diode D6 and capacitor C11. The amplified signal output of IC3 is routed to the input of the Receive Frequency Con-

CONTINUED ON PAGE 46

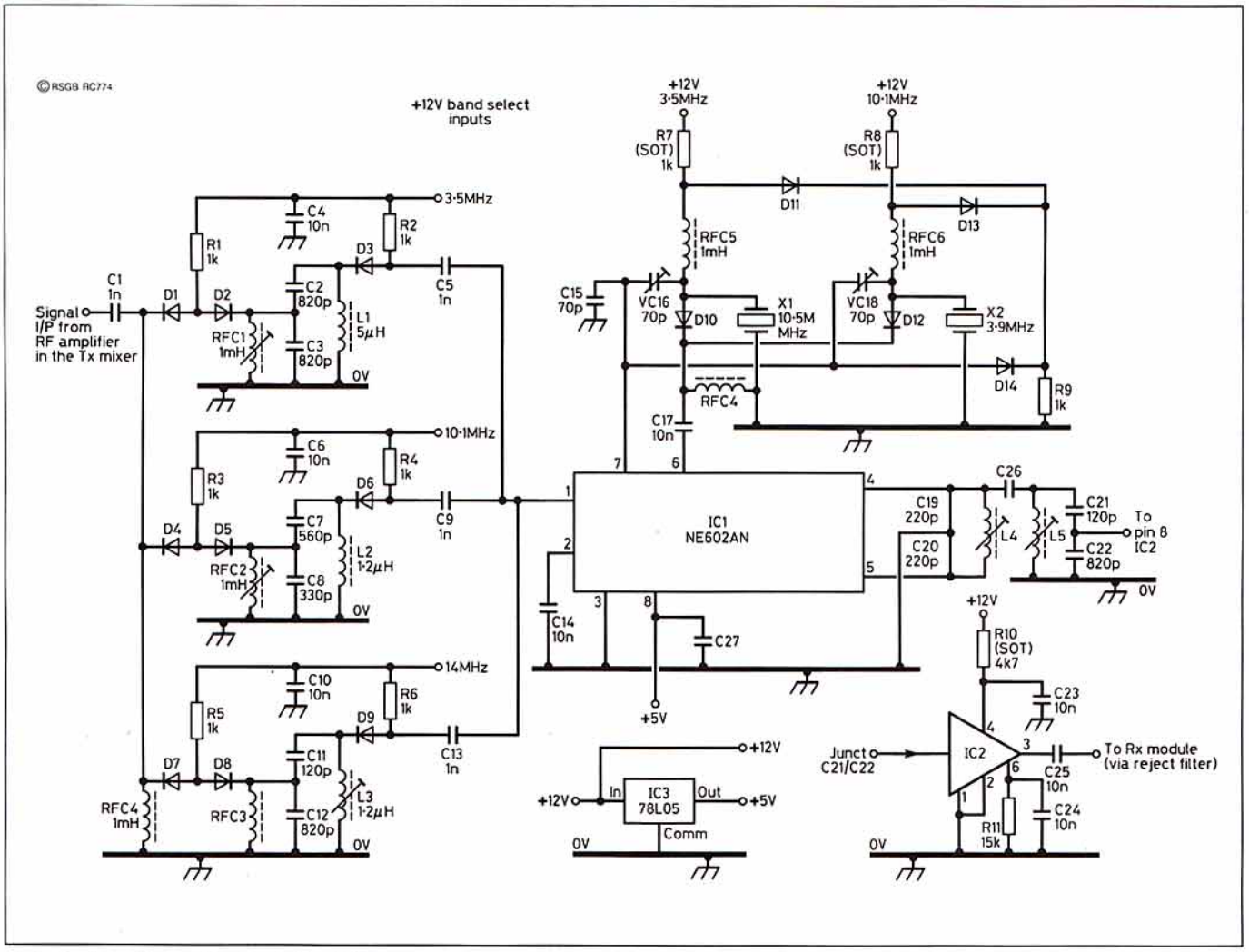

Fig 4: Receiver mixer and front end, circuit diagram.

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CONTINUED FROM P43

verter and Front End. The gain of IC3 is also dependent on the value of resistor R13, which should not be less than 620Ω. However switching in an external 8K2 resistor in series with R14, makes a simple but very effective stepped receive gain control of approximately 10dB.

BAND PASS FILTER

THIS MODULE, shown in **Fig 6**, comprises three narrow band filters, centred on 3.5, 10.1 and 14MHz respectively. Selection of any one of these three filters is achieved by forward biasing the relevant pair of switch diodes. The value of C10 will determine the level of the signals flowing through the filter, especially on the lower band. The prototype value chosen for C10 gave an applied carrier level of approximately 450mV across the output terminals on transmit, the optimum input drive for the next stage.

COMPONENTS AVAILABILITY

COMPONENTS are available from JAB Electronic Components, 1180 Aldridge Road, Great Barr, Birmingham B44 8PB. ♦

. . . to be continued

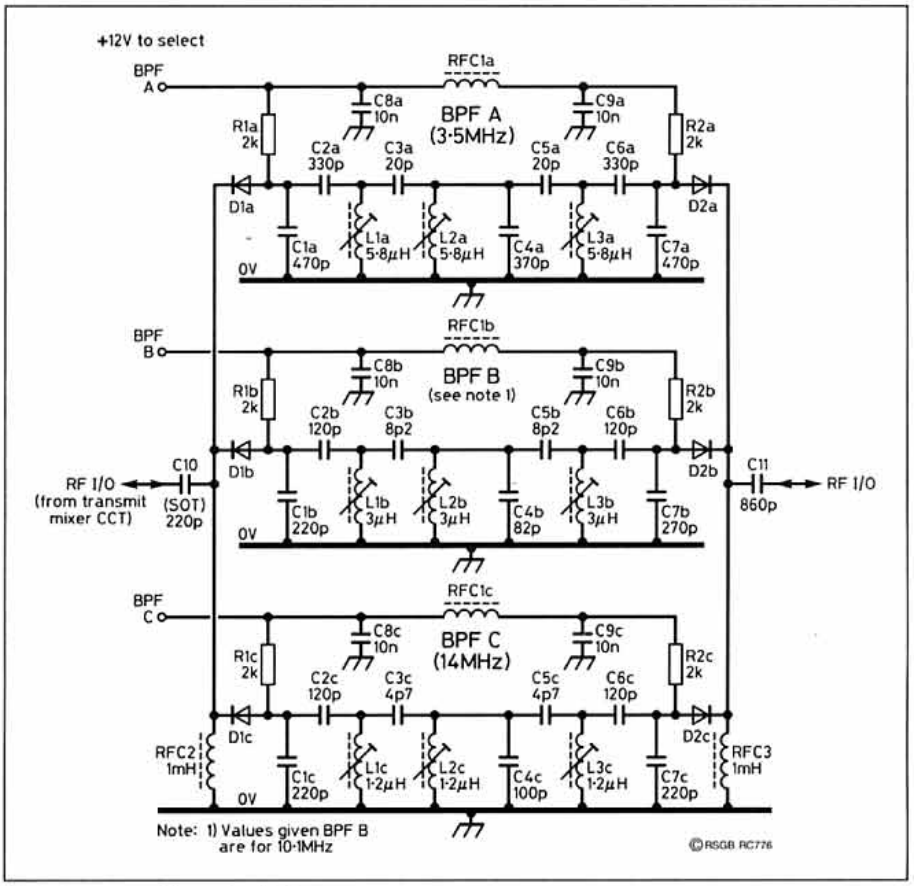

Fig 6: Band pass filters, circuit diagram.

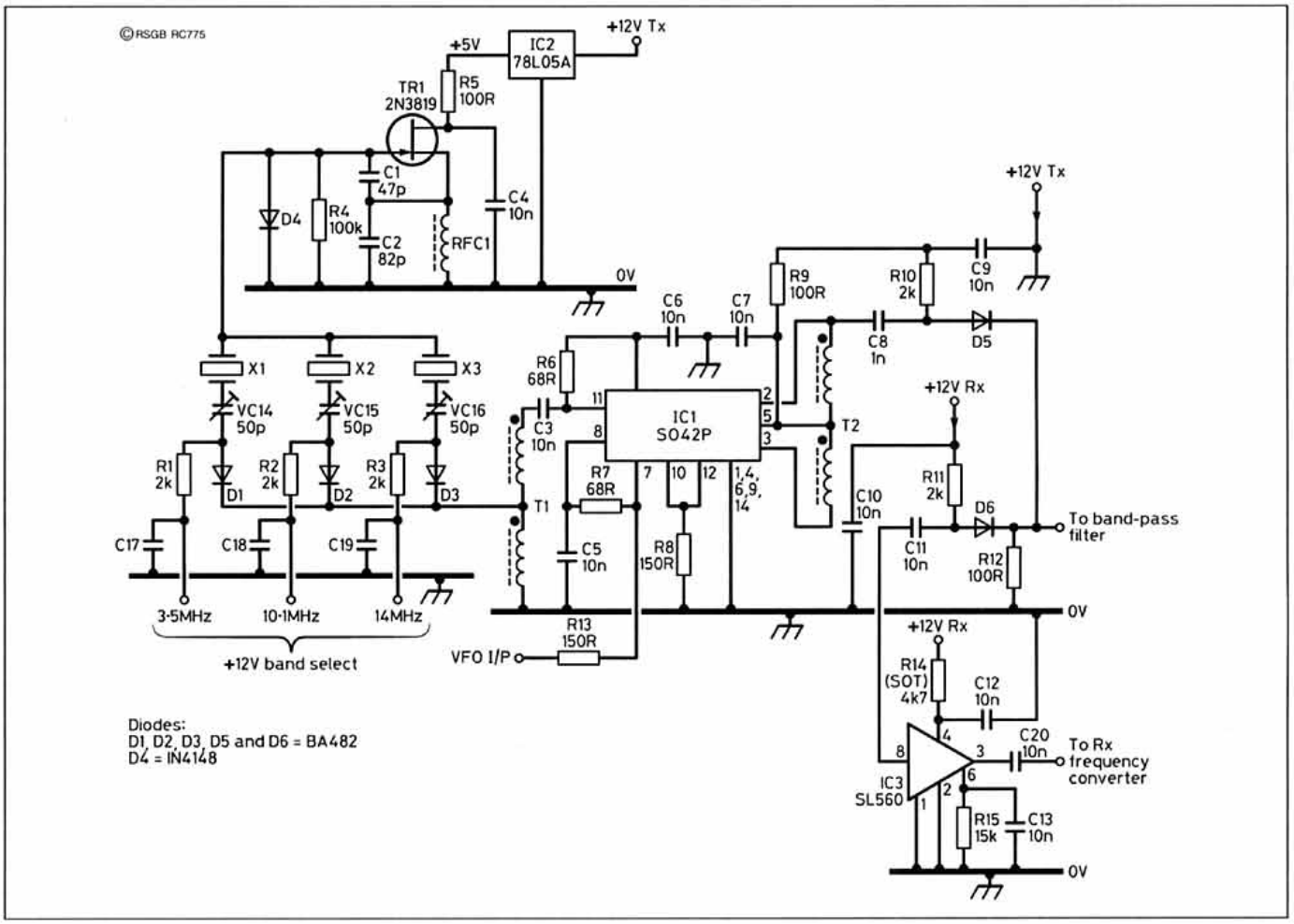

Fig 5: transmitter exciter and receiver RF amplifier, circuit diagram.

RADCOM TECHNICAL FEATURE

A Temperature Controlled Oven

by Jack Hardcastle, G3JIR*

THIS OVEN AND CONTROLLER were constructed to test the level controlled Vackar oscillator described in the October 1995 issue of *RadCom*.

OVEN CONSTRUCTION

THE 'OVEN' IS constructed from scrap expanded polystyrene packaging material 35mm thick although several layers of ceiling tiles could be used instead. The internal dimensions are 130 x 130 x 65mm which is large enough to contain the VFO module and a heater. This heater comprises a contact cooled wirewound resistor fixed to a 100mm square of 16-gauge aluminium (heater plate). The VFO is in contact with this heater plate to maintain its temperature constant.

Also mounted on the heater plate is an electronic thermometer probe and a plastic cased ZT108 transistor which is used as the temperature sensing element for the oven controller.

The base-emitter voltage of a transistor tends to reduce as its temperature increases, an effect usually regarded as a nuisance, but in this instance it provides a sensitive means of monitoring the oven temperature.

CIRCUIT DESCRIPTION

THE OVEN CONTROLLER, see **Fig 1**, consists of the temperature sensor TR1, emitter-follower TR2 and the Darlington pair TR3 and 4 which supply the heater current. This is monitored by R9 to supply negative feedback via R8 to the base of TR1 where it is compared with the current supplied by R4 from the 'Set Temperature' potentiometer RV1. Initially this bias is insufficient to turn on TR1 so TR2 is fully conducting, which drives TR3 and 4 sufficiently hard for them to be 'bottomed', and maximum current is supplied to the heater.

Eventually TR1 becomes sufficiently warm for its base/emitter voltage to fall to a point where emitter current begins to flow and TR1 collector voltage progressively falls until the current supplied to the heater is just sufficient to maintain the oven temperature.

For the present purposes the oven temperature has been limited to 25 to 26°C, some 5°C above ambient, and the rate of increase of temperature has been severely limited so that the final temperature is reached in a couple of hours.

However, the circuit has the potential for supplying and controlling more power if higher temperature and faster heating is required. To do this will require reducing the resistance of the oven heater and at the same time making a proportional reduction in the current monitor resistance R9.

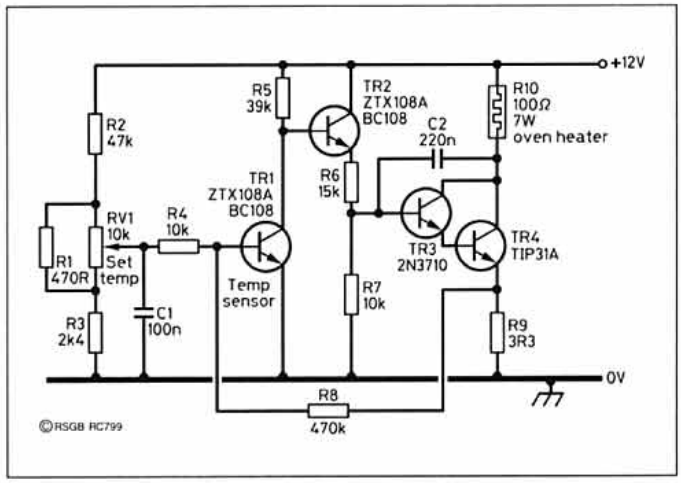

Fig 1: Temperature controlled VFO oven, circuit diagram

CORRECTIONS

IN THE ASSOCIATED article 'Automatic Level Control for VFOs' (*RadCom*, October 1995) Degrees Centigrade was written as C instead of °C.

The expression for C_{max} should be flagged as equation (1) because it is referred to again in the next-to-last line.

$$C_{max} = \frac{(C_2 + C_3) \times C_1}{C_1 + C_2 + C_3} \quad \text{..... (1)}$$

The final equation should read:

$$L1 = \frac{1}{(2\pi f_{LF})^2 C_{max}} = 6.1\mu H$$

♦

*8 Norwood Grove, Rainford, St Helens, Merseyside WA11 8AT

HIGH-Q COILS

WHAT MAKES A LOW-LOSS former material for high-Q coils?

TO ANSWER THIS QUESTION requires a step back to the fundamental properties of inductors, so that we can see where the losses come from. I'll concentrate on the large coils that are typically used in valve PA tank circuits, antenna tuners, traps and loading coils. The types of coils we're talking about are single-layer solenoids, and we learned for the RAE that they generate their inductance by magnetic linkage between the turns. **Fig 1a** shows how all the turns of the coil are linked by the lines of magnetic flux threaded through them. Strictly speaking, the inductance produced in this way is called 'self-inductance', although in practice we tend to simply call it the 'inductance'. So where does the capacitance come from? After all, a coil's not a capacitor, is it? Well, actually it is. As well as each turn of the coil being magnetically linked to every other turn, every part of every turn generates an electric field which capacitively couples it to every other part of the coil. This 'self-capacitance' is distributed over the entire coil, but **Fig 1b** illustrates some of the coupling as small discrete capacitors. To a reasonable approximation the self-capacitance can be represented by a single capacitor connected in parallel with the entire inductance, as shown in **Fig 2a**.

An important thing to notice in Fig 2a is that it is a parallel-tuned circuit, and only behaves as a true inductance at low frequencies where the reactance of the self-capacitance is too high to be important (**Fig 2b**). At higher frequencies the self-capacitance cancels out some of the inductive reactance, so the net inductance of a real-life coil depends on the frequency at which you measure it. At the parallel-resonant frequency the impedance of the inductor becomes very high (theoretically infinite) and this is what we'd normally call a 'self-resonant RF choke'. Above the self-resonant frequency our coil doesn't behave as an inductor at all, but as a capacitor (**Fig 2c**). Normally we like to use coils a long way below their self-resonant frequency, where, for all practical purposes, the inductance is a constant quantity.

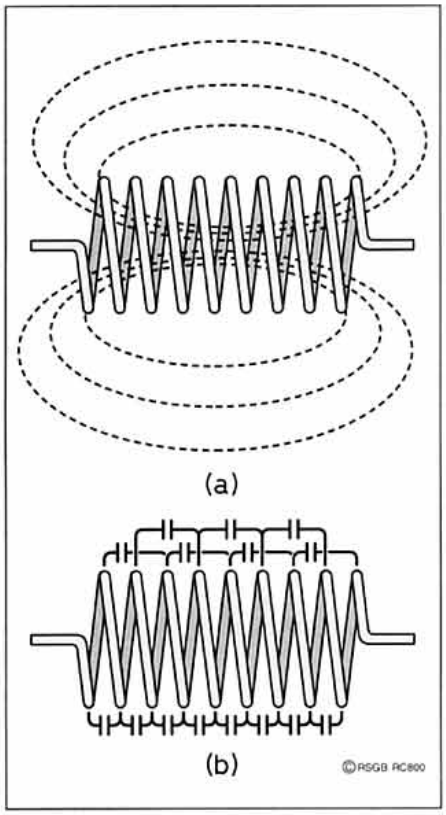

Fig 1: (a) Magnetic flux linkage in a single-layer solenoid inductor. (b) Self-capacitance of the same inductor; although drawn here as several discrete capacitors, the self-capacitance is distributed over the entire coil.

IN PRACTICE

IAN WHITE, G3SEK
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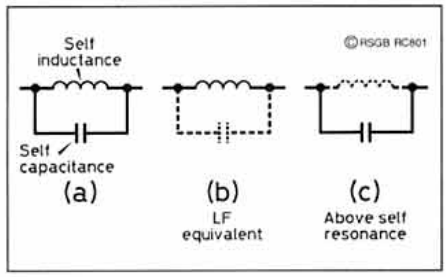

Fig 2: (a) Self-capacitance makes a coil behave as a parallel-tuned circuit. (b) At frequencies well below self-resonance - the normal case at HF - the coil behaves as an inductor. (c) At frequencies above self-resonance, the coil behaves as a capacitor.

Up to now we've been dealing with the ideal world of lossless coils. In the real world, the losses in a coil can be divided into two parts: wire losses and dielectric losses. The wire losses are due to the DC resistance of the wire, made worse by the skin effect (*In Practice*, April 95). The skin effect means that only the outer skin of the wire is available to carry RF currents, so the RF resistance is much higher than the DC resistance. For all practical purposes these losses can be approximated by resistance in series with the inductance (**Fig 3**). There may also be eddy-current losses due to the stray magnetic field of the coil coupling with the chassis or PC board, and a slug-tuned coil or a coil wound on a ferrite or dust-iron toroid will have core losses (not shown in Fig 3). Added to all these losses associated with the inductance are dielectric losses in the self-capacitance. In most types of coil the electric field between different parts of the wire pass through dielectric (insulating) materials such as the coil former and possibly the enamel coating on the wire itself. Because no dielectric is perfect, these create losses in the self-capacitance, which can be represented as a second loss resistance in series with the self-capacitance (Fig 3). What started out as a single idealised inductor is more accurately represented as four components; the self-inductance, the self-capacitance and two separate sets of losses. And even that is a simplification because loss resistances are frequency-dependent.

Thus the Q of a real-life inductor is a complicated function of frequency. Q is defined as if the inductor only had self-inductance L in series with a single loss resistance R_L, so that:

$$Q = (2\pi fL / R_L)$$

However, all you can measure between the terminals of the coil is the net inductance and the net loss resistance of the rather more complicated circuit of Fig 3. If you repeat the measurements at various frequencies and then calculate Q in the normal way, as $(2\pi fL / R_L)$, the Q will usually show a broad peak, falling off at both lower and higher frequencies (**Fig 4**). At low frequencies the Q tends to rise, simply because the reactance $(2\pi fL)$ is proportional to frequency while RL at these frequencies is relatively constant. However, at higher frequencies the strongly frequency-dependent skin effect and self-capacitance become dominant and cause the Q to roll off. Near the optimum frequency, typical values for coils made from heavy copper wire with minimal losses due to any coil former are 150-500.

The design of the winding has a very big influence on the wire-loss and self-capacitance contributions to the Q of a coil. For a given inductance, the lowest wire losses come from coils that are approximately 'square' in side view, ie with a diameter roughly the same as the length. Obviously you should try and use large-diameter wire to reduce the skin losses, but even this can be taken too far because close-wound coils of large-diameter wire will have a high self-capacitance which will cancel out some of their inductance. For any given inductance and frequency there is an optimum set of dimensions, number of turns and wire diameter. W7XC has made a detailed evaluation of these factors at 1.8MHz and has produced a series of graphs to aid the design of Top Band loading coils [1].

But remember, all the above relates to the

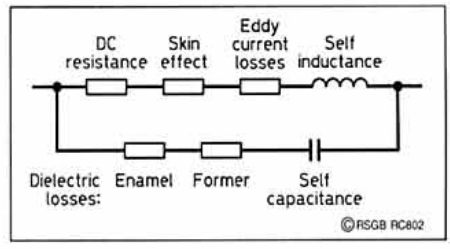

Fig 3: Some losses in a coil are associated more with the inductance, others more with the self-capacitance. Note that the loss resistances are also frequency-dependent.

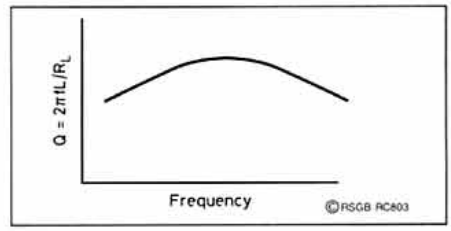

Fig 4: The unloaded Q of a coil tends to show a broad peak with frequency (values depend on inductance and construction).

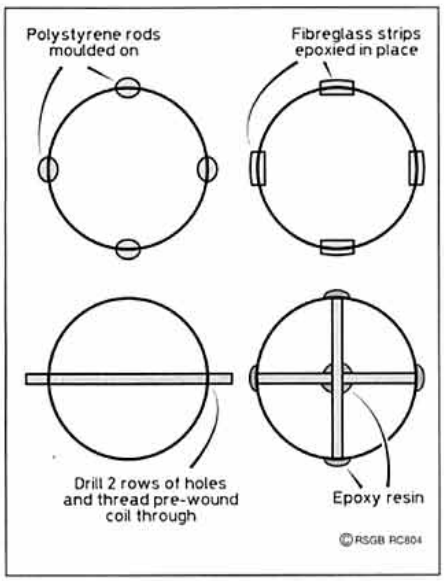

Fig 5: Some methods of using minimal amounts of former material, for coils that are almost self-supporting.

UNLOADED Q of the component measured in isolation. When the inductor forms part of a tuned circuit with some connection to the outside world, the LOADED Q_L of the working circuit will always be less than the unloaded Q_U values for the individual components. The power handling efficiency of a tuned circuit is given by:

$$(1-Q_L/Q_u)\times 100\%$$

and the power losses by:

$$(Q_L/Q_u)\times 100\%$$

This means that in order to avoid significant losses, Q_U must be very much greater than Q_L. In other words, to avoid losses you need to build the circuit with high-Q_U components, and then - crucially - operate it at a low loaded Q_L.

Here's where the problems begin, and where you find strange discrepancies between the behaviour of various coil former materials. If you use a former of reasonably good material and operate the coil at a low loaded Q, you won't notice any significant losses and will probably conclude that the material is satisfactory. But that isn't always possible, and in a circuit with a high loaded Q the same coil may seem to be performing quite differently. In *Low Band DXing* [2] ON4UN quotes the case of a top-loading coil for a 160m vertical antenna, which has a quite respectable Q_U of 200 but has to operate at such a high loaded Q that it will dissipate 30% of all the RF power fed to the antenna! In this situation, if you run significant power the coil will get hot due to inductance-related losses alone. Even if the former is of a low-loss material, it may be melted by the heat of the wire.

Polystyrene is a good example of a material that has excellent RF properties, but softens and melts at a low temperature. One of the advantages of some of the more traditional coil former materials is that even though some do have significant dielectric losses, they can at least cope with the higher temperatures that result.

Plastic drainpipe can make very handy coil formers, but it has a very mixed reputation. While some people have had no trouble at all, others tell horror stories of coils that droop, melt and even catch fire. As I said, what happens will depend very much on the application and the ratio of (Q_L/Q_U) involved. ATUs are a good case in point. For relatively minor impedance transformations between the antenna and the coaxial feedline, a correctly adjusted ATU will run at quite a low loaded Q, so the losses in the coil will be low too. On the other hand, operating the same ATU at a higher impedance transformation ratio (required by either a very high impedance load or a very low impedance load) will greatly increase the loaded Q and the amount of power lost in the coil. If the coil gets hot only on certain bands and not on others, the correct solution is to modify the antenna or its feed system to give a more moderate impedance on those bands.

The ideal way to test a coil former material is to insert a chunk of it into a coil connected to a Q-meter, and see if the Q decreases significantly. Added to this, you have to take account of the mechanical stability of the material and the way it might weather, take up moisture or degrade at higher temperatures. We now have a convenient way of testing for dielectric loss that was not available to the old-timers. Just place the coil former in a microwave oven with a glass of cold water to act as a 'dummy load'. By the time the water has boiled, a low-loss material will still be cool to the touch.

Caution: watch the progress of the experiment carefully, and be ready to switch off at any sign of overheating. Also do not place any metal in the oven, so you can't do this test with a finished coil.

If possible, it's always a good idea to use the minimum quantity of coil former material, if the wire is almost heavy enough to be self-supporting. The 'B&W Miniductor' style of coil construction follows this principle, supporting the windings on four polystyrene rods moulded into place, but coils of this type are not readily available in the UK. **Fig 5** shows this method of construction and also a few other examples. Some amateur constructors have tried to copy the 'Miniductor', for example by using a temporary coil former with lengthwise grooves to take strips of plastic, then winding the coil over the strips and fixing the whole assembly together with epoxy adhesive before removing the former. Epoxy is not a very good RF dielectric, but this doesn't matter if it is used in small enough quantities.

Another method of minimal-former construction, made popular by the original 'Z-Match' ATU design, is to thread the pre-wound coil through two rows of holes in a flat sheet of perspex or fibreglass.

The final proof of any inductor comes from testing it in-circuit using your own RF power. Check carefully for any signs of undue heating. A special note to QRP enthusiasts: since you, least of anybody, can afford to throw away RF power, it pays to borrow a big PA to test out your ATUs, antenna traps and other potentially lossy circuits. A 'smoke test' can be very revealing, but that's hard to do with 100mW!

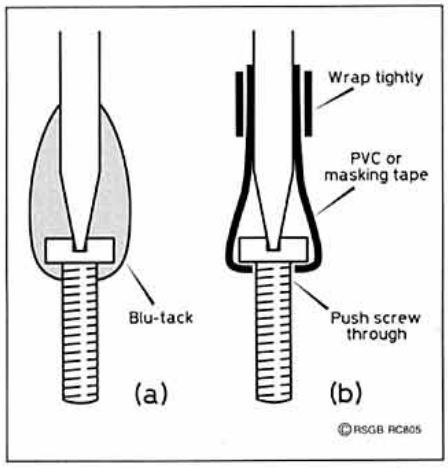

Fig 6: Two of the many ways to start a screw in an inaccessible place.

STARTING SCREWS AND NUTS

ANY IDEAS FOR starting small screws or nuts in inaccessible places?

YOU CAN SEE WHERE the nut or screw needs to go, but you can't get your fingers in there - that's the problem. The main difficulty is just to get the threads engaged, before perhaps changing to another tool to tighten it up. Here are a number of possible solutions:

- Special tools. Use a long magnetic screwdriver or nut-driver with steel hardware, or a three-claw 'pickup tool' that grips the end of the screw or nut firmly enough to get it started.
- Pozidriv screws will balance quite well on the tip of the matching screwdriver, so try turning the work over so that you can insert the screw upwards.
- Find a soft plastic trimming tool of the right diameter to be a push-fit into the nut, yet pull free once the nut is started.
- Use Blu-tack to attach either a screw or a nut to the end of a long screwdriver (**Fig 6a**). To start a nut horizontally, stick it to the flat side of the screwdriver blade. This is often strong enough to let you get the threads engaged, and then the Blu-tack comes away on the screwdriver... well, usually it does!
- PVC tape or paper masking tape (**Fig 6b**). Wrap a few turns tightly around the screwdriver and screw; the tape should tear free once the screw has been almost completely inserted.

IF YOU HAVE NEW QUESTIONS, or any comments to add to this month's column, I'd be very pleased to hear from you by mail, packet or E-mail (see head of column). But please remember that I can **only** answer questions through this column, so they need to be on topics of **general** interest.

REFERENCES

[1] Loading Coils for 160 Meter Antennas by C J Michaels, W7XC. *QST*, April 1990.

[2] *Low Band DXing* by John Devoldere, ON4UN. Available from RSGB. ♦

A DAY TO REMEMBER

PAY ATTENTION! READ THIS...

BARGAIN or BANGER?

You know the scene. Been down to the local store and seen a rig the sales guy says you can't live without. All you can think about is that really clean, (well, it was a bit dirty and marked but HE said it'll clean up OK - ONCE YOU GET IT HOME), YOU'VE got to have it. How many owners has it had? "Search me" says the really nice salesman. (Have you noticed how nice people are when they want your money)? Has it been serviced? "Yeh, the bloke who owned it did, I think". Has it got all the bits? "Yeh, somewhere".

YOU GET THE PICTURE. BUYING A RADIO OR A CAR, WE'VE ALL BEEN THERE.

You can't hold on any longer, you ring up and spew your credit card out like a machine gun. Can I have it tomorrow? What about yesterday replies the salesman!
4 weeks later it turns up. In the light that "really clean" radio looks like its been left in a shed for 10 years. (Funny that, in the dimly lit shop it looked quite good). The handbook is all torn and pages are missing. The lead is damaged because the bozzo who packed it "threw" the radio on top of the plug before it was dispatched. The accessories are noticed because of their absence.

STILL SOUNDS FAMILIAR? IT GETS WORSE.

Just when you think it couldn't get any bleaker, you tell yourself the book isn't really that important. The lead you can borrow off the only other radio in the shack, (you didn't want to use both anyway), the dirt and grime ground into the cabinet that Domestos TRIPLE STRENGTH won't shift and the paint missing doesn't really effect the value. (OH YOU DON'T THINK SO??!!), and who needs ALL the case screws, anyway? You finally pluck up the courage to plug it in. It doesn't work. Then your nightmare really begins.

I WON'T GO ON. MOST OF YOU ARE ALREADY FIDGETTING ABOUT IN YOUR CHAIR. I DON'T BLAME YOU EITHER.

Buying MAIL ORDER, especially if its used, can be real trouble. Retailers in any market place "pop up" and will try and sell you their "BARGAIN". Only when you fork out, get it delivered and the above happens the "RISK" of buying from a less "REPUTABLE" outfit becomes a reality. Yes, you have legal rights. You are usually protected by the credit card company for a start. You are protected by the Trading Standards. But do you really want the hassle? It all takes time and worry. Time that you could have spent ENJOYING your hard earned cash playing with your NEW TOY from a respected dealer.

Whilst other retailers went bust or sold out because of their lack of effort in the CUSTOMER CARE DEPARTMENT, or just plain gave it all away permanently, (a little profit does pay for the engineers, Quality Control, Salesmen who actually know what they're talking about). MARTIN LYNCH continues to make his customers No. 1.

WHEN YOU BUY FROM MARTIN LYNCH

- ✔ The chance of 5 years warranty
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- ✔ The largest choice of new & used amateur radio equipment in Europe

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Make a note in your diary. - that's Saturday 18th November

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Currently our best selling Dual Band Handie. Simple to use, beautifully built.
£479, £79 deposit and 12 payments of only £33.33, ZERO INTEREST

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With the introduction of the new DSP TS-870S, we have a limited selection of its best selling predecessor, the ever so popular TS-850S as "trade-ins"

For those of you that don't have to have the very latest in techno wizardry, the TS-850S, introduced almost 5 years ago, has sold in thousands since its introduction. Due to the new model being announced we have a limited selection of nearly new TS-850's all offered with a "better than new" warranty of a whole FIFTEEN MONTHS. At only £1295 for a TS-850SAT (with tuner) and £1195 without, this represents a massive saving of almost £700 off RRP.

Please call before placing an order. Finance also available.

SAVE £700 OFF NEW RRP!

ICOM IC-775DSP

We've sold the '775 for some six months now. Thirty have found their way into top DX'ers homes, through MARTIN LYNCH alone. They didn't buy because old LYNCHY was the cheapest. (They didn't pay anything like full whack, either). They bought the ICOM FLAGSHIP from a company that understands HF equipment. From a company that sponsors (for no commercial gain) the RSGB HF Convention. Each Year. If you want to speak to any of the 30 satisfied owners who bought their IC-775DSP from MARTIN LYNCH then call him personally. With the owners permission he'll put you in contact. Then you too will be convinced that the extra £50 or £100 quid off LYNCH's price may not be cost effective at all. Perhaps it was the FIVE YEAR WARRANTY, who knows. **If you're serious or just curious call MARTIN direct on 0181 566 1120.**

ALINCO DX-70

If you want a mobile size HF transceiver with 6 metre operation as well then look towards the DX-70 from Alinco. 100 watts and general coverage, the new transceiver "surprised the world" as quoted by Chris Lorek, G4HCL.
DX-70 at only £1095 on FREE FINANCE, £96 deposit and 12 payments of only £83.25. ZERO APR.

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AC model: RRP £2399. LYNCHY PRICE: £1849.00
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Don't complain. It fuels my second hand selection with trade-in's and gives you a great choice. The FT1000MP is the only HF transceiver to sport DSP and good old COLLINS filters, just like your uncle used to use in his famous "S' Line. The result is audio that sounds "alive" and attracts more queries when demonstrated at the London Showroom, than raffle ticket holders around the Yaesu stand at Leicester!

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Only £649.00, or £69 deposit and 12 payments of £48.33

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TX out : 50W 144-35W 432. Coverage: 118-174-400-470

Simultaneous RX both bands Full Crossband duplex Built in duplexer 110 channel memory.

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Heil HC-5 Identical to HC-4, but High Articulation, offering superb SSB quality, rolls off sharply under 350HZ and above 3100HZ, peaking at 2.4KHZ. "Hi-Fi" SSB Audio.**£28.95 incl. VAT**

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CONTACT STEVE JELLY - OUR DATA COMMS EXPERT FOR FULL INFORMATION

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Kenwood UK are 'Co-Hosting' this year's event and the team from Watford will be on hand all day Saturday. Top personnel from Yaesu, Icom and Alinco will also be in attendance, including the Short Wave and PW crew with their excellent range of books. Make sure you visit the best one day event of 1995 - MARTIN LYNCH will actually forking out with Kenwood UK for all the FREE food and drink available all day.

The doors are open from 9.00 to 6.00

Don't forget MORSE TESTS ON DEMAND at Lynchy's open day!

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SPECIFICATIONS

Impedeance: 52 Ohm	Max SWR: 1:5:1
Overall length: 20m	Weight: 2.5Kg
Power Handling: 1kW	Input socket: SO239

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Pat Hawker's Technical Topics

PAT HAWKER, G3VA
London 37/SE22 8SS

TEMPERATURE EFFECTS ON LC OSCILLATORS

AN ITEM ON 'Single-valve Transmitters' which I prepared for the July 1995 *TT*, but which has so far had to be held over on account of space limitations, included criticism by John Roscoe, G4QK, of the Hartley cathode-tap ECO in the rather over-complex valve transmitter by PA3ZFK noticed in the January 1995 *TT*. This surprised me as for many years I made good use of this type of VFO, but G4QK seemed convinced that this circuit contributed to the long warm-up frequency drift of the classic HRO when switched on from cold. He suggested that a possible explanation was that the heater/cathode insulation of most receiving valves was determined more by price than by choice of material with good dielectric properties.

In correspondence I mentioned this to Dick Rollema, PA0SE, who has been busy restoring his HRO (see *TT*, December 1994) and had commented on the warm-up drift (there was no voltage regulator tube in this 1934 design).

In a recent progress report on his HRO PA0SE writes: "For my National HRO receiver I have now constructed a loudspeaker cabinet out of a wooden box that once contained bottles of Bordeaux wine. My wife painted it black and gave it a finish that more or less (less than more) looks like the black crackle finish of the receiver. I also put the power supply in the loudspeaker enclosure. The PSU is not an original National unit and is built on a copper chassis! It had a conventional capacitor-input filter but when the stand-by switch on the receiver was turned off, the voltage rose to nearly 400V in spite of a 33k bleeder resistor.

"This seemed excessive and I have changed it to a choke input filter by disconnecting the input capacitor and putting it in parallel with the output one (which now totals 100µF). The voltage under load is now 205V, still more than adequate, but unloaded (apart from the bleeder) rises only to 270V . . . smoothing with the single LC ripple filter is so good that only with a turned down volume control and my ear near the speaker can a slight hum be heard.

"For further protection of the receiver, I have connected a pilot lamp in series with the centre-tap of the transformer, with a fuse and double-pole on/off switch on the mains (primary) side.

"I do not believe, as G4QK apparently does, that the heater/cathode impedance of the oscillator valve in the HRO is a major cause of prolonged frequency drift. It certainly causes some drift but only during the relatively short period before the valve temperature has stabilised. I noticed that, when, after switch on, the valve starts oscillating the frequency changes very rapidly downwards by some 3kHz on 3.5MHz. But this ceases after a minute or two and then a slow drift starts. I have measured the drift on both 3.5 and 28MHz after a warming-up period of 5 minutes: see **Fig 1 (a)** and **(b)**.

"Measurements were also taken after inserting a cold coil pack into the receiver after this had been switched on for more than 24 hours. This shows, as I had expected, that most of the drift results from the coil packs and probably from the coils themselves.

"Though not impressive by current standards, my feeling is that for a 1934 design, the results are pretty good".

PA0SE's finding that coils are a major cause of drift is a further endorsement of the views put forward in a book first published in 1939 *Theory and Design of Valve Oscillators* by Dr H A Thomas (Chapman and Hall) which stresses the important contribution to frequency drift made by the effect of temperature on the inductance of the tuned circuit. While temperature changes on the maintaining amplifier (ie valves in those pre-transistor days) have some effect, "variations of the parameters associated with the oscillation circuit are responsible for far greater aberrations of frequency" - the effects of temperature on inductances are more important than on most capacitors (although even air-dielectric capacitors can contribute to frequency changes with temperature) unless these have a temperature coefficient specifically intended to compensate for the overall changes.

Dr Thomas provided detailed data on the temperature coefficients of various types of formers and conductors (recommending flat wire, ie copper tape and heat-shrunk windings on ceramic formers). He also showed how complex temperature-compensated coils and capacitors could be constructed. Characteristics of coil formers are important and it would be interesting to know how modern ferromagnetic cores compare with some of the ceramic and PTFE formers used in the days before toroid cores became popular. It is important to realise that although semiconductors reach thermal stability much quicker than valves, the stability of transistor LC oscillators is not necessarily better, and may be worse. For optimum stability an LC VFO should be left running continuously to avoid the effects of heat-cycling on inductances and capacitances.

Following the *TT* item on 'Stable LC Oscillators' (November 1994), R McEwan Reid, G4GTO, pointed out that it omitted the part played in the 1930s by W H F Griffiths of H W Sullivan Ltd. He developed for laboratory use a wide-range LC oscillator which had a long-term frequency accuracy of +/- 100ppm and a short period stability better than 1ppm. The

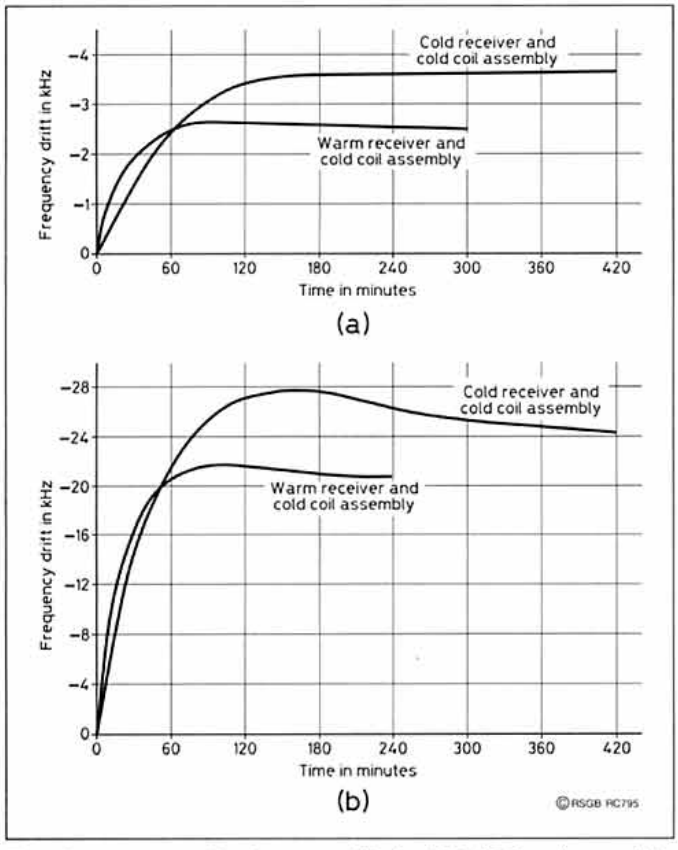


Fig 1: Measurements of the frequency drift of a 1930s HRO receiver made by PA0SE. (a) Receiver tuned to 3650kHz. (b) Receiver tuned to 28,500kHz.

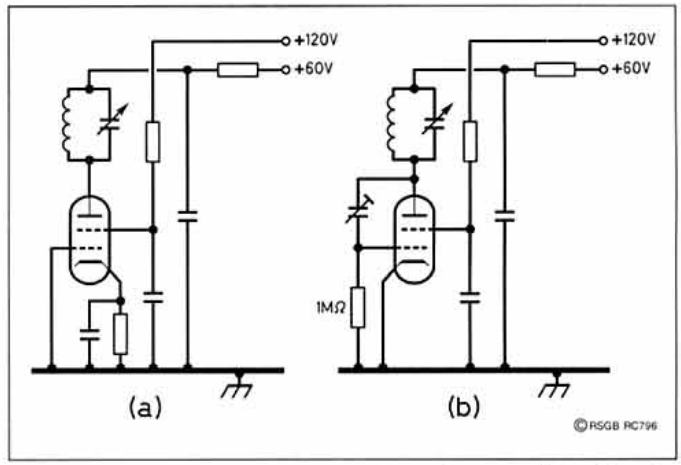


Fig 2: (a) Basic form of the Dynatron negative resistance oscillator. Note that the HT applied to the screen must be much greater than that applied to the anode. (b) Modified form for operation at frequencies higher than about 15MHz.

range of 1000kHz to 15MHz was covered by nine temperature-compensated inductors and a variable temperature-compensated air capacitor all of which had temperature coefficients (L or C) of less than 5ppm (covered by many British Patents of that period). In the mid-1930s the drive was an ACSG screened-grid (tetrode) valve as a dynatron oscillator. Later, when this valve became unavailable, considerable effort was made to use an EF50 pentode valve as a transitron oscillator without impairing the stability. The familiar red aluminium screen of the EF50 had to be removed to reduce the warm-up drift and valve capacitance effects.

Since the inductor was only partly screened, it was unsuitable as a drive for a transmitter. Under normal conditions, in the London area, the oscillator (wavemeter) could be 'pulled-in', over a few Hertz, by the BBC Droitwich long-wave transmitter on 200kHz.

G4GTO believes the fact that both the dynatron and transitron negative-resistance oscillators used 'two-terminal' inductors contributed much to the high degree of frequency stability achieved.

According to Dr Thomas's book, the upper frequency limit of oscillation with the basic dynatron oscillator **Fig 2(a)** was about 15MHz but F M Colebrook developed a modified form **Fig 2(b)** that maintained oscillation up to the VHF region (eg 54MHz). It would appear that the presence of the extra capacitance between anode and control-grid leads to an apparent decrease of negative resistance and consequently an extension of the operating frequency range.

ANOTHER LOOK AT RF SWITCHING DIODES

DAVE FAR, G4HRY, in 'RF Switching Diodes Controversy' (*TT*, July 1995, pp67-78) questioned the wisdom of wholesale substitution of HP 5082-3081 RF PIN diodes for the switching diodes fitted in the front-ends of typical modern HF transceivers. This item interested a number of readers concerned with the development of high-performance receivers including Colin Horrabin, G3SBI. He felt that the performance data provided by G4HRY and earlier by Tom Thomson, W0IVJ, in *QST*, December 1994 (summarised in *TT*, April 1995 with W0IVJ's measurement data in *TT*, July 1995, p67) deserved further investigation.

G3SBI writes: "**Tables 1** and **2** show some IP3 and RF isolation measurements on various diodes popularly used for low-level RF switching. This work was carried out by two vacation students - Mike Smith and Alex Macdonald - using test equipment in the RF laboratory of the SERC at Daresbury.

"The original test circuit (**Fig 3**) was designed to simulate different bandpass filters being switched in and switched out, permitting insertion loss and the isolation in the off condition also to be measured. Note that diodes in the off condition see about 12V reverse bias. In practice we abandoned the bandpass filters in order to widen the range of frequency measurements. However, Fig 3 is shown to provide a possible diode switching scheme for ladder filters. The insertion loss measurements in Table 2 are therefore the total for two transformers and two diodes.

"From the tabulated results, it can be seen

DIODE TYPE	FREQUENCY 1.815MHz		FREQUENCY 7.015MHz		FREQUENCY 28.015MHz	
	(dBm)	(dB)	(dBm)	(dB)	(dBm)	(dB)
BYD11M (@6 & 10mA)	38.0	1.16	45.0	1.23	35.5	1.93
IN4007 (@6 & 10mA)	38.0	0.25	42.0	0.97	37.0	2.0
HP3081 (@6mA)	38.0	3.82	37.0	3.9	36.0	3.36
HP3081 (@10mA)	35.5	2.68	41.0	2.5	35.5	2.84
BA482 (@14mA)	25.0	0.51	38.0	0.81	38.0	2.32
BA482 (@6mA)	18.5	3.49	23.5	0.71	36.0	2.0
IN4148 (@6mA)	21.2	6.61	19.0	7.47	17.3	5.83
IN4148 (@10mA)	12.5	3.61	15.0	4.1	16.5	2.84

Table 1: Third order intercept (dBm) and Test circuit insertion loss (dB)

DIODE TYPE	FREQUENCY 1.815MHz	FREQUENCY 7.015MHz	FREQUENCY 28.015MHz
BYD11m	73.9	53.9	50.0
1N4007	63.0	43.9	35.3
HP3081 @6mA	80.0	63.5	57.0
HP3081 @10mA	81.9	63.9	56.8
BA482 @14mA	80.0	65.0	57.0
BA482 @6mA	84.0	61.8	52.4

Table 2. Test circuit off isolation (dB).

that an important factor with some diodes is the sensitivity of insertion loss to forward current. The HP 3081 diode, severely criticised by G4HYR, shows a marked reduction of loss and hence improved performance as the forward current is increased from 6 to 10mA. As noted by G4HRY the Siemens BA482 (as used in the Ten Tec Omni) shows the lowest insertion loss (this would seem also to confirm G4HRY's view that it is inadvisable to replace BA482 diodes with HP3081 diodes - *G3VA*).

"Clearly anyone contemplating changing the RF switching diodes used in his transceiver must first estimate or measure the 'on' current used in the particular model concerned.

"All the measurements shown in Tables 1 and 2 were made in 50Ω systems. Some transceivers use 200Ω design impedances so that the insertion loss of the switching diode is of less consequence, but in this case the signal voltages are higher so that the IP3 intercept point may be lower.

"We could not achieve the sort of third order intercept figures reported by W0IVJ but it became clear that the IP3 performance of diodes is very much affected by the frequency. One is tempted to suggest that the designer of the 1N4007 diode must have been a radio amateur since its best performance seems to be around 7MHz where we measured an IP3 of +50dB. In fact, it is surprising how well the 1N4007 performs.

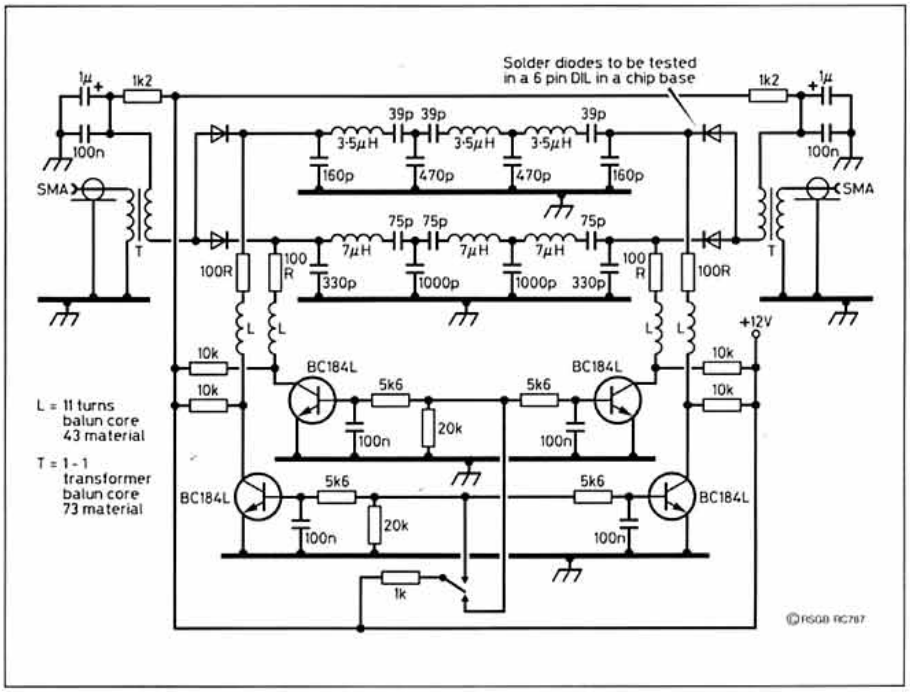


Fig 3: The intended test rig for switching diodes. In practice the bandpass filters were not used but the system could be used to make measurements on ladder filters etc.

"The 1N4007 performance encouraged us to obtain some BYD11M diodes from RS Components (29p each). These are rated as 1000V PIV, 0.5A rectifier diodes and are the same physical size as normal signal diodes. Performance as switching diodes was good: relatively low insertion loss, good IP3 intercept point, and good degree of 'off-isolation' at 50MHz, even with a fairly low 'on' current: see **Fig 4 (a)** and **(b)**.

"It should be appreciated that a very high degree of 'off-isolation' between different bandpass filters is less important in up-conversion receivers (50dB is probably adequate) since the image frequency will be in the VHF region and will be largely taken out by low-pass filters before the mixer. However, in the case of a receiver with a 9MHz IF and a 5MHz local oscillator, the image will fall in the 3.5 and 14MHz bands. In this case, isolation between the filters should be greater than 90dB so that two diode switches in series with a shunt diode would be needed to achieve this degree of isolation. It would be better to use double-pole relays, one bandpass filter to ground. It may then be necessary to use the technique of 'DC-wetting' ie arranging to pass a few mA of direct current through the relay contacts, to improve long-term contact reliability."

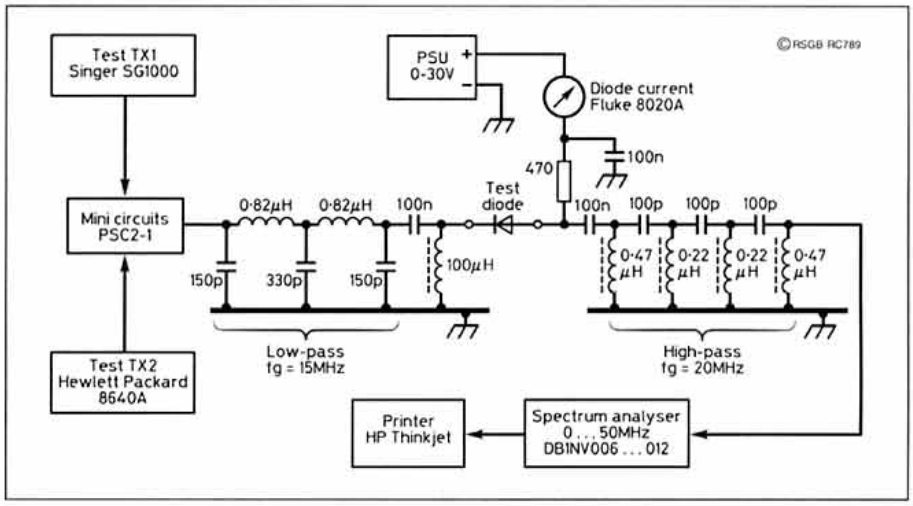


Fig 5: Test rig used by DB1NV for the measurement of intermodulation characteristics of switching diodes.

B J Mitchell, G3HJK, commenting on the strictures by G3LLL on the long-term reliability problems of RF switching by relays (*TT*, September, p68) also draws attention to the better reliability that can be achieved by DC-wetting, a long-established Post Office dodge, both in minimising oxidation and in reducing migration of contact material. This can be achieved with the aid of suitable blocking capacitors and resistors to feed DC across the contacts without changing the biasing of the active devices. G3HJK uses this technique with his FT102 and, despite being a pipe smoker, has not had to replace any of the six RF switching relays over years of use.

Another source of information on the 'Intermodulation properties of switching diodes' is an article which appeared in *VHF Communications* (Vol 26, Spring, 1/1994, pp12-18). Dr Ing Jochen Jirmann, DB1NV, used the measuring rig shown in **Fig 5** to measure intermodulation characteristics of a selection of switching diodes most of which have not been investigated by either W0IVJ or by G3SBI etc at SERC. DB1NV measured both IP2 and IP3. For the IP2 data he used test frequencies of 12 and 15MHz measuring IP2 at 27MHz while varying the diode DC from 2mA to 20mA: **Fig 6(a).** For IP3 he used test frequencies of 6 and 15.5MHz with the IM product evaluated at 25MHz with diode currents of 2mA and 5mA only: **Fig 6 (b).**

The conclusions drawn by DB1NV tend to differ in some respects from those of G3SBI. He wrote:

- Good repeatable intermodulation figures can be obtained only through the use of 'correct' PIN diodes, but they have their price. Miniature relays are even better, but more expensive and bigger.
- Universal diodes misused as HF switches can yield very good results (ISS53) or catastrophically poor results (1N4148). Moreover, it cannot be calculated what effect variations in the manufacturing parameters will have (different production lines, different production methods).
- The relatively good cut-off results obtained in practice from apparatus fitted with tuner switching diodes is not consistent with the poor measurement results from the BA244.
- The existing test rig of Fig 5 needs to be improved or re-constructed in order to check whether sufficient DC is flowing through the diodes. An attempt should be made to set a value of about 20mA . . . It can be concluded from the results that the main cause of intermodulation interference in current amateur HF receivers/transceivers should be sought in the area of the HF input switching diodes.

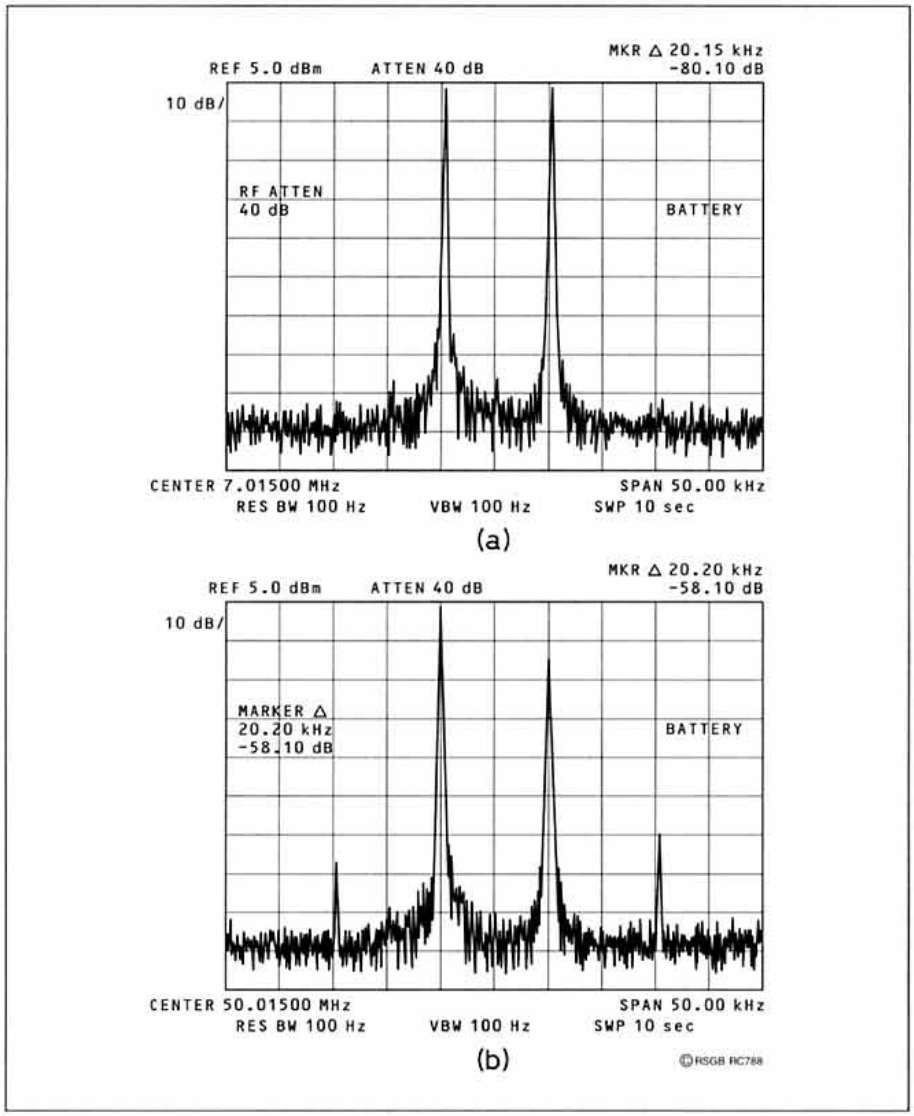


Fig 4: (a) Spectrum of a low-cost BYD11M rectifier diode with 10mA diode current measured at 7MHz (off isolation 53.9dB). BYD11M at 50MHz with 6mA diode current (off isolation 54.5dB).

ANOTHER LOOK AT COAXIAL ANTENNAS

THE AUGUST 1995 *TT* item 'Coaxial Travelling Wave Antenna?', based on the implementation by Australian amateurs of the 1927 patent of Emil Geles, has attracted comment from a number of readers. Several share my own view that it is difficult to see how this structure can provide for transmission an efficient form of non-resonant broadband travelling wave antenna, despite its apparently successful use as such by VK3YX and VK2EHN, especially when powered from a truly balanced feed. The point is made that there must be common-mode current on the outer surface of the tubular mast.

Nic Hamilton, G4XTG, pointed out: "Unless the radius of the tube is large, the field produced by the (inner) wire is completely stopped by the opposite field produced by the balancing current flowing inside the tube. So, as the patent says, the radiation is due to the current flow on the outside of the tube, which is not balanced by the current on the wire. So far, so good. But where does this unbalanced current come from? The balun (a current type) is there to make certain that the currents at its terminals are equal. If this in fact happened, there would be no radiation.

"The unbalanced current on the outside of the tube must be provided by the balun. This may be why VK3YX found it necessary to experiment with some 80 different baluns. It would seem that the antenna will only work well if the balun doesn't! The unbalanced current flows from the outer of the feeder coax, through the balun, and on to the outside of the tube.

"I believe that a better system for this type of antenna would be to dispense with the balun, and to connect the outer of the feed coax to the inner wire of the 'radiating' element, and the inner of the feed coax to the tube of the 'radiating' element. This type of feed is well known; the most recent reference is 'A Modular Coaxial Collinear Antenna' by B Lagoun and L Bertel (IEE Conference on HF Radio Systems and Techniques, July 1994, *IEE Conference Publication No 392*, pp234-238)". (This type of coaxial collinear antenna has been noted several times in *TT*, for example the Coco array in *TT*, September 1987, pp662-3 or *Technical Topics Scrapbook*, 1985-89, pp191-2, see **Fig 7** - *G3VA*).

G4TXG points out that there will be a practical difficulty with this type of feed; the efficiency of the antenna will be higher with the result that the bandwidth will be reduced. It is likely that TVI will return with a vengeance, as it is more or less bound to do with an antenna that uses the outer of the feeder as a radiator.

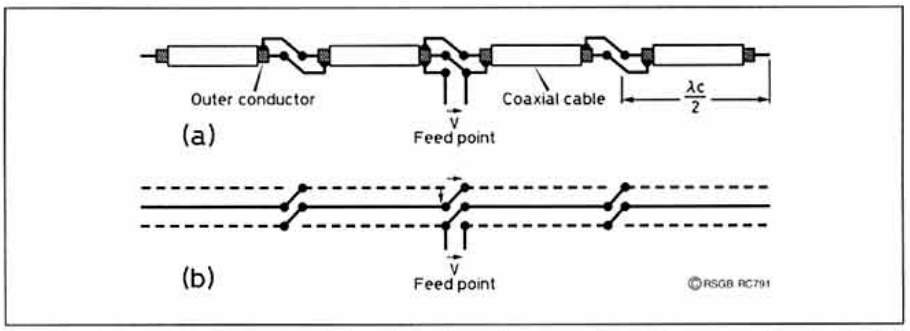


Fig 7: Basic geometry of the 'coco' (coaxial collinear) antenna formed from a series of electrical quarter-wave sections of cable incorporating cable velocity factor and transposing the inner and outer connections.

DB1NV also investigated the IM products resulting from saturated ferromagnetic cores, as used in both the aperiodic case (RF chokes) and for tuned (resonant) circuits. He found, for example, that Amidon ring cores of various sizes and intended for HF applications were practically free from intermodulation effects under normal conditions. He did, however, provide some design tips "some of which are not new, but which have probably fallen into oblivion in Japan". He wrote:

(1) Input filters effectively resistant to IM can be produced only using sufficiently large iron powder ring cores as inductances. They offer the best compromise between the space requirement and the level controllability.

(2) In compact rigs, rod core chokes, such as the Siemens MCC, can be considered as alternatives.

(3) Chokes in the filter structure, eg on the operating voltage feed, are largely non-critical provided they do not resonate.

DB1NV recalled the band-pass filters using ring core coils that were publicised many years ago by VE3TP. He commented: "These were not exactly cheap to construct but . . . solved every receiver IM problem so far . . . (proving) that it is possible to produce receiver input components which can meet today's requirements in relation to sensitivity and high-level signal strength." Dr Rohde's reply to G4HRY's criticisms will be published next month.

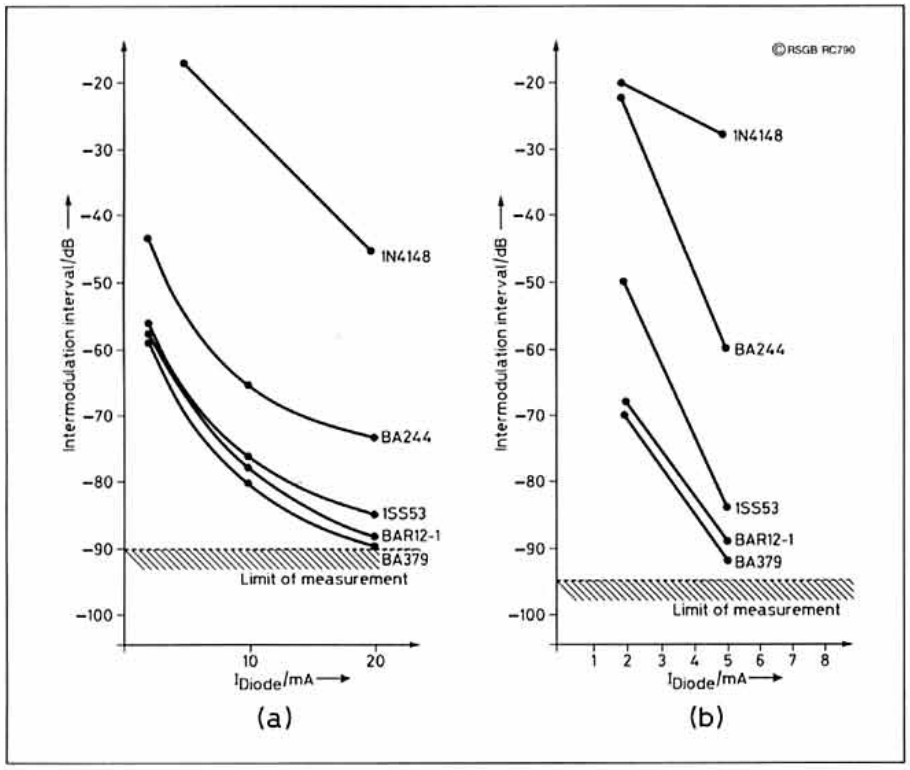


Fig 6: (a) Second-order IMP plotted by DB1NV against diode current (b) Third-order IMP plotted against 2mA and 5mA diode currents.

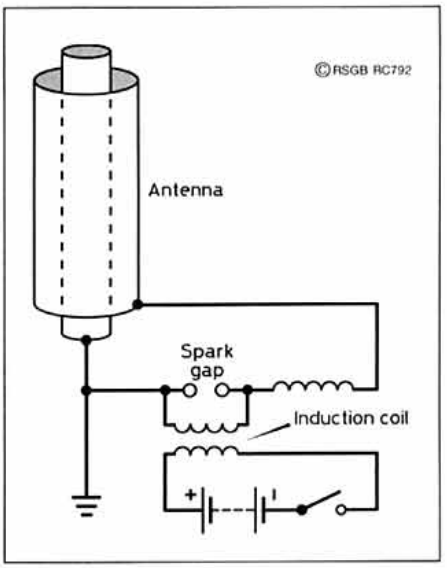


Fig 8: Basic form of Marconi's 1901 concentric cylinder antenna used as a spark transmitting antenna.

He also believes that the logical conclusion with this type of antenna would be to reconfigure it as a quarter-wave vertical with a good ground-plane or elevated radials. He is convinced that in the arrangement used by VK3YX it does not work in the manner intended by its Romanian inventor.

Dr Brian Austin, G0GSF, is similarly puzzled at the description of the system as a broadband travelling-wave independent of frequency. But he also reminds us that the basic idea of using a coaxial (ie concentric cylinder) antenna dates back much further than 1927. W J Baker in *A History of the Marconi Company* writes that Marconi took out patent No 5387 on 21 March, 1900 for a transmitting antenna consisting of two concentric cylinders, the outside one forming the radiator and the inside one earthed: **Fig 8**. The receiving antenna was similar. It is claimed that this "provided a fair degree of syntony"; that is to say it helped to "tune" the spark transmitter fairly sharply with an antenna of limited height.

G0GSF, who has been researching the use of radio communication during the Boer War, also draws attention (**Fig 9**) to Marconi's mobile wireless station of 1901 - intended for army use - with what appears to be a hinged concentric cylinder antenna mounted above a steam Thornycroft vehicle (the antenna lay flat on the roof of the vehicle during travel). The equipment was rejected by the army and transferred to the navy.

To bring the story of coaxial antennas up to the 1970s, John Pegler, OBE, G3ENI, while working in the Ministry of Defence (Navy), tried some experiments on a basically similar form of antenna which was officially recorded in October 1976 to protect the government's interest (under Section 4692) of the Patents Act 1949.

This comprised a coaxial structure a quarter-wave or less long exhibiting an inductive reactance at the base, which is matched to 50Ω by means of the capacitive potentiometer comprising two capacitors. Like the early Marconi antenna this was fed against earth, using the inner of the coax feeder connected to the outer tubing as described above by G4TXG.

G3ENI writes: "From time to time, I have used versions on 7, 3.5 and 1.8MHz and have conducted tests with G3ZUN who currently uses one on 3.5MHz. An unusual feature is the current distribution on the outer. Using a toroid transformer probe the measured current is almost uniform rising to a maximum at the end which seems to indicate a tendency to be a travelling wave."

G3ENI's draft patent specification of 1976 describes the system (**Fig 10**) as a "radio aerial and impedance matching system" with the object of providing a short antenna system of robust construction for reception and transmission of radio signals. "Another object of this invention is to provide an easily adjusted feeder to aerial impedance matching device which makes use of the inherent characteristics of the aerial in its operation. A further object is to provide a low-loss high-efficiency feeder to aerial impedance matching device which avoids the losses in coils often used for this purpose. An embodiment includes an arrangement for exciting with radio frequency energy a part of the structure of a ship, aircraft, armoured vehicle or other metallic structures and to provide a simple means of tuning the aerial to resonance over several decades of frequency.

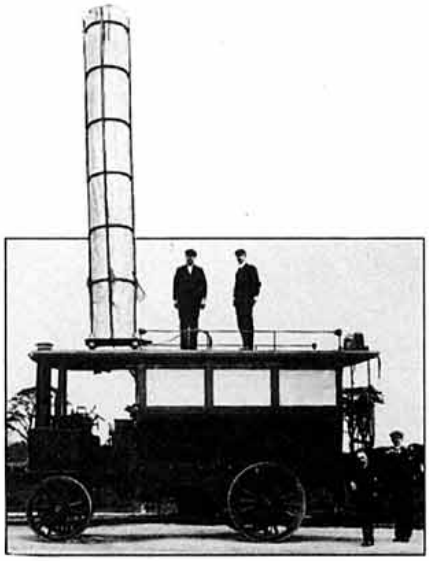


Fig 9: The Marconi mobile of 1901 intended for (but not used by) the army during the Boer War. Apparently it was rejected by the army and transferred to the navy.

"Basically the invention consists of an aerial which is substantially shorter than 90° of electrical length and which consists of an inner rod or wire of high conductivity metal which is coaxially surrounded by a tube of high conductivity metal, and separated by a dielectric. In the case when the aerial is erected vertically, the inner rod and outer tube are electrically connected at their top ends . . ." A further explanation of the coax antenna has come from G4LU and will appear later.

MF DAYTIME PROPAGATION

THE ITEM 'DAYLIGHT PROPAGATION ON 1.8MHZ' (*TT*, August 1994, pp48-49) brought in comments not only from those interested in 1.8MHz but also from the dedicated groups that comb the medium-wave (AM) broadcast band for long-distance or unusual stations. Steve Whitt, G8DKL who is the editor of *Medium Wave News* (journal of the Medium Wave Circle) writes:

"I am a very keen MW-DXer using Beverage antennas and have conducted numerous MW DX-peditions. You may be interested to know that MW trans-polar reception from Alaska has taken place in Scotland at midday in the months of October/November, although not an everyday event. The path has been approximately 40% daylight but with no sign of the signals fading out. Indeed reception becomes established around 0900UTC when transatlantic signals start to fade and present through to 1330UTC when signals from Asia began to interfere.

"For these events we were using good receivers plus Beverage antennas located on the coast near Cape Wrath (extreme north-west Scotland) so we had sea-gain and low interference and noise.

"The most striking aspect noted during DX-peditions is the way MW signals fade about two hours after sunrise and can be chased down into receiver noise rather than atmospheric noise. Also, on many occasions, signals begin to come back up again between three and four hours after sunrise – this has been observed a number of times although we have never measured exact signal strengths. We have heard trans-polar signals on frequencies as low as 660kHz through to 1170kHz but this appears to be limited only by suitable signal sources.

"A measure of MF groundwave daylight propagation is shown by the distance at which some of the recent restricted service licence (RSL) stations have been heard. RSL stations are authorised to use 1W and are intended to provide a maximum range of some 3 miles. Many have been heard at distances up to 20 miles and I recently heard one 85km away on 1413kHz limited only by co-channel interference despite the high groundwave attenuation towards the top end of MW band. The key to such reception is a good antenna, low ambient atmospheric noise and low co-channel electrical interference."

G8KDL who lives in the Suffolk village of Buxhall, a few miles from Stowmarket, has space for Beverage antennas up to 500m long, with the main source of local interference some daytime pulses from electric fences in nearby fields.

Mick, BRS31976 recalls listening in 1968 to the late Stew Perry, W1BB (who did so much to encourage world-wide enthusiasm for 1.8MHz DX) whose transatlantic signals did not fade out until at least one hour after sunrise and also an occasion when G3TZZ (North London), GM3SVK/A (Shetland), GI6TK (Belfast) and an EI station kept a QSO going for most of the day, each hearing and working all the group all the time. BRS31976 (then living in East London) listened most of the time, similarly hearing all participants all of the time. This test was made with SSB, mostly with valve equipment.

Indeed, the last time this topic surfaced in *TT*, a few years ago, there was general agreement that valve receivers still offer useful advantages for MF reception, probably due to the use of front-ends with capacitor-tuned resonant circuits providing good adjacent channel selectivity and fewer noise-like IMD products. ♦

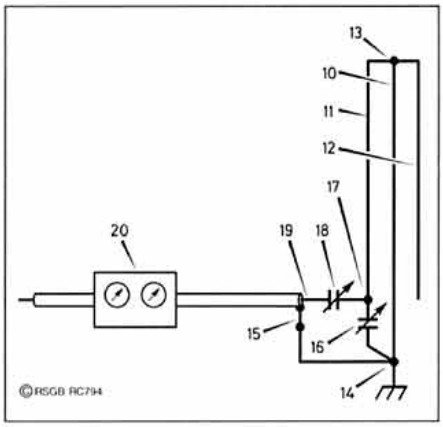
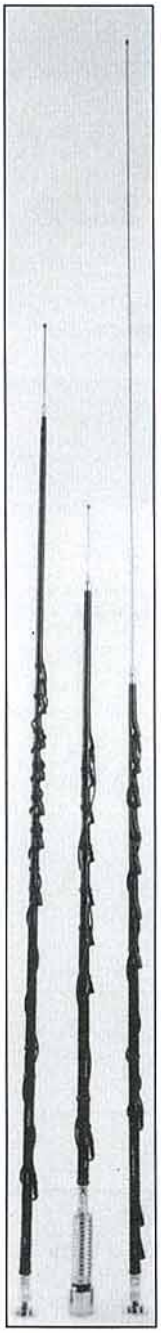


Fig 10: Drawing of the antenna system described by G3ENI in a draft of the 1976 patent specification for a 'Radio Aerial and Impedance Matching System'. It was stated that in practice the length of short element could vary from an electrical length approaching 90°(quarter wave) down to a length at which the physical size of the matching capacitors becomes impracticable.

PRODUCT NEWS

Note: Product news is compiled from press releases sent in by the manufacturers and distributors concerned. Details are published in good faith but *Radio Communication* cannot be held responsible for false or exaggerated claims made in the source material.



JUST bought a new Icom IC-706 or Alinco DX-70 and want to go mobile? **Nevada** has the answer! The new range of **Outbacker mobile antennas** from Australia operates on *all* bands from 80 to 2 metres, including the three WARC bands *and* 6m (not 4m). Outbacker antennas are widely used in Australia, not just for amateur radio but also commercially by the huge 'road trains' which plough across the continent. The **Outbacker Perth Plus** is 1.8m long and rated at 100W. With optional 160m coverage, you can operate on 11 bands - all on one antenna! The price is £249 inc VAT. The **Outbacker Junior Plus** also covers the ten bands from 80 to 2 metres, is 'low profile' in design, and no tuner is required. The cost? £225 inc VAT.

The standard **Outbacker Perth**, which just covers the HF bands, is also available at £199.95.

Nevada now has a site on the Worldwide Web, allowing you to page through details of all their latest products. A unique feature of the Nevada pages is the ability to click on a receiver (eg the Yupiteru MVT-7200) and hear a sound sample of actual received audio from the radio. The Nevada Worldwide Web address is: http://www.ee.port.ac.uk/~arrow_l; or E-mail: info@nevada.co.uk.

Nevada, 189 London Road, Portsmouth PO2 9AE tel: 01705 662145, fax: 01705 690626.

WHAT IS 'the ultimate PC for the shack'? It could just be the new high-performance desktop **multimedia PC** from **FBS Ltd**, fitted with their **ShackMaster** interface unit. It provides the serious amateur, contester or DXer with the following features *built-in* to the PC: VHF / UHF TNC2 compatible packet controller (with mailbox, KISS etc); digital voice keyer for recording and playback of messages and off-air recording; RS232-TTL level converter for rig control; monitoring circuit for HF / VHF rigs via an inbuilt amplifier and speakers; and CW keying interface for computer-generated Morse.

The standard system comprises a 486DX2/66 processor with 8MB RAM and 420MB hard disk, CDROM and SoundBlaster card, which comes bundled with DOS 6.22, Windows, RigMaster (PacketCluster and rig control) and VoiceMaster software. For further details, contact Martin Rhodes, G3XZO at:

FBS Ltd, 21 Halford Road, Ettington, Warks CV37 7TH, tel: 01789 740073.

THE **EAGLE ANTENNA Company** has recently increased their range of purpose-built **satellite antennas** and now offer a wider range than any other manufacturer. They range in price from £99 for the **2M8xc** model, which is a 2m 16-ele (8x) right-hand circular polarisation Yagi with 4.06m long boom and claimed gain of 11.0dBd, up to £175 for the **70CM22xcs**, a 70cm 44-ele (22x) right hand / left hand switchable on a 5.0m long boom and with 16dBd claimed gain.

All models are pre-wired for circular polarity and the cable is fed through the boom to avoid disrupting the radiation pattern. The switchable models require 12V DC to switch polarity. 10% from sales is donated to the Phase 3D project [see *RadCom* October / November 1995 - *Ed*]

For a full product catalogue, please send 50p in stamps, or two IRCs to:

Eagle Antenna Co, P O Box 73, Oswestry, Shropshire SY10 9DJ, tel / fax: 01691 670282.

MAKE THE MOST OF the general coverage receiver in your HF transceiver! The latest edition of the **International Short Wave League's** regular publication, ***Guide to English Language Short Wave Broadcasts to Europe***, is now available. This edition contains the 1995 - 96 winter schedules of all stations broadcasting in English to Europe, and includes details of the time in UTC of the broadcast, country and station name, frequencies and programme details (ie news, sport, religious etc.)

The guide is an A4-size booklet and costs just £2 from:

International Short Wave League, 10 Clyde Crescent, Wharton, Winsford, Cheshire CW7 3LA.

THE NEW **REALISTIC PRO-62 scanner** is now available from **Link Electronics** of Peterborough. It covers 68 - 88, 118 - 174, 380 - 512 and 806 - 960MHz, with AM / FM selectable at any frequency (unusual on a scanner in this price range). The PRO-62 has 200 channels arranged in 10 banks of 20 channels, plus all the usual features such as memory lockout, priority and backlight. The PRO-62 replaces the popular PRO-39 and costs £199.99.

Link Electronics, 216 Lincoln Road, Peterborough PE1 2NE, tel: 01733 345731, fax: 01733 346770.

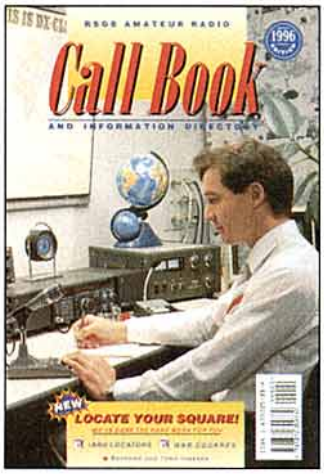
FOR CORRECTING solder errors, a spool of **Spirig 3S-Wick** is a must for any soldering station. 3S-Wick uses state of the art 'no-clean' flux coating and has been manufactured by Spirig for over 25 years. Cobonic Ltd is now offering this prime quality Swiss-made desolder braid at 44p per 1.5m antistatic spool. For a free sample contact:

Cobonic Ltd, 32 Ludlow Road, Guildford, Surrey GU2 5NW, tel: 01483 505260, fax: 01483 300160.

RSGB Books for Christmas

RSGB Callbook 1996 Edition

The 1995 edition sold out within three months! The 1996 publication promises to be as popular, and has been improved yet again - you can now search by callsign, postcode and surname, and you can now easily locate your square as we've done all the hard work for you! An indispensable aid to your amateur radio operations.

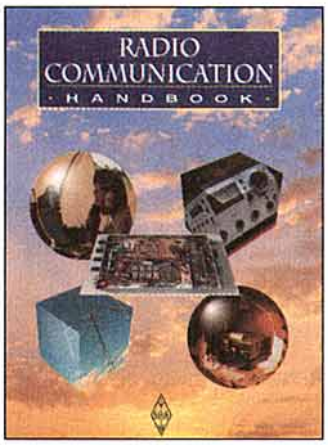


Members' Price
£9.50 (plus P&P)

Radio Communication Handbook

6TH EDITION

Already into its second printing - considered by many to be *THE* book to keep beside you in the shack for constant reference. The second printing has improved diagrams and photos, and constitutes excellent value for money. An invaluable book for radio amateurs everywhere.



Members price
£17.00 (plus P&P)

RSGB 1996 Diary

Following the successful launch of the RSGB 1995 Amateur Radio Diary, we have improved the 1996 Diary to include most of the suggestions put forward by Members. This year's diary includes international and UK maps (including London Underground) and much more amateur radio information. Ideal for carrying around in your pocket - the all-essential diary for the radio amateur.

Members' Price £3.97 (plus P&P)
Plus £2.00 to include your callsign on the front)

COMING SOON - - -

AMATEUR RADIO OPERATING MANUAL 4TH EDITION

RADIO DATA REFERENCE BOOK 6TH EDITION

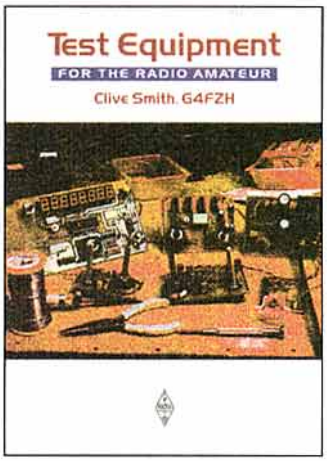
PACKET RADIO PRIMER 2ND EDITION

Test Equipment for the Radio Amateur

by Clive Smith, G4FZH

Describes a range of test equipment and measurement methods which is sure to meet all the requirements of most amateur radio stations.

This edition has been completely revised and is the all-important reference book for your book shelf.



Members price
£7.65 (plus P&P)

Marconi First Day Covers

This Limited Edition First Day Cover is the first amateur radio cover to be over-printed with an RSGB cancellation mark, and will undoubtedly become a collectors item to amateur radio operators and philatelists alike. This is not a purchase but an investment.

Members Price £7.50 (plus P&P)

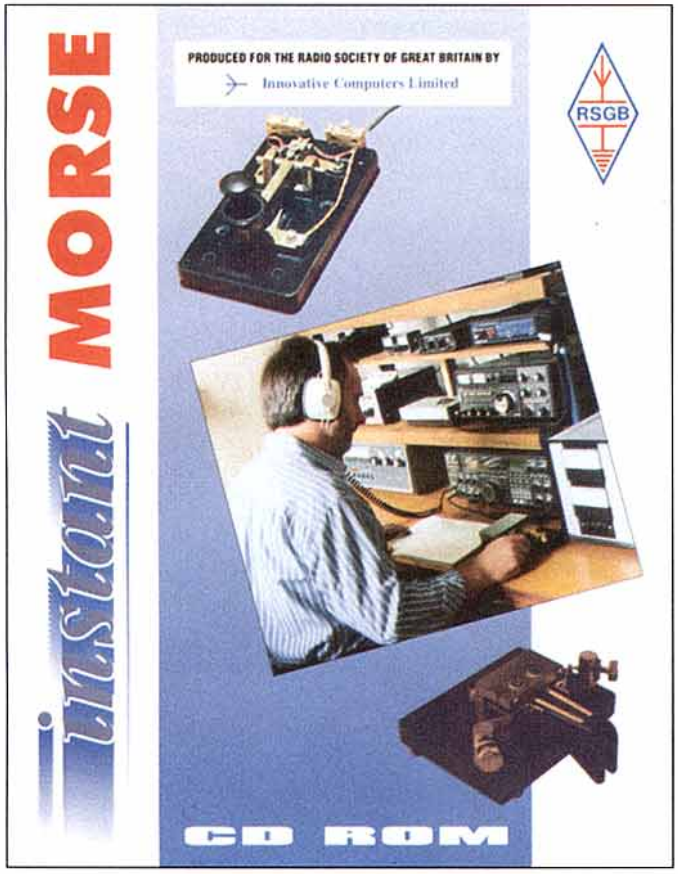
Marconi Christmas Cards

Excellent quality Christmas cards which are extremely well-priced too! Designed jointly by the GEC-Marconi company and the RSGB the painting on the front has been produced specially for the Marconi Centenary by the well-known artist Denis Knight. These cards are printed on high quality card, and measure 236mm (9.25") by 165mm (6.5") and are offered at the fantastic price of 16p each.

25 for £4
50 for £8
100 for £15
(all plus P&P)

SEE PAGE 92/93 FOR FULL BOOK LIST.

RSGB Books for Christmas



Instant Morse CD ROM

Learning Morse Code has never been this easy or this much fun! Produced by the RSGB in association with Innovative Computers Limited.

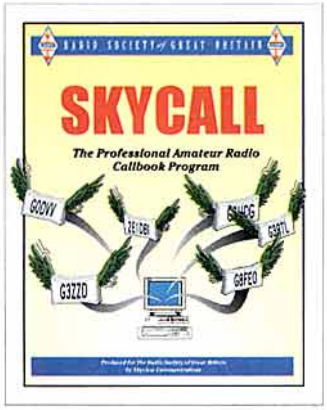
Instant Morse is based on a series of successful lectures and seminars over the past few years. This CDROM is a complete 'Morse Course' providing you with all the lecture facilities at home, and is all you need to take you from your Class B Licence up to that Full Licence. You can test yourself as you go, and go back over previous sections whenever and as often as you like, and then when you feel you are ready to take the test it even tells you how to prepare and where to apply. The Instant Morse is suitable for the UK Morse Test and the slightly different American version - you just click on which country's Code you are studying.

This interactive CDROM is ideal for those who previously considered Morse beyond them - and is another *FIRST* for the RSGB. (See page 89 for more information).

Members' Price

£36.62 (plus P&P)

SkyCall Version 2



The RSGB's Amateur Radio Callbook on disk has been updated, and further improved.

This new version includes all the callsigns up to G0WJF; G7VOT; 2E0AMO and 2E1EIZ - and also gives you a list of the UK BBS stations and a list of 2m and 70cm repeaters.

You can search on callsign, surname or postcode.

Skycall runs on MS-DOS using Microsoft Windows 3.1 or 3.11 on any 80386 IBM compatible computer with 4Mb RAM.

Members' Price

£22.50 (plus P&P)

Skycall Update Disks

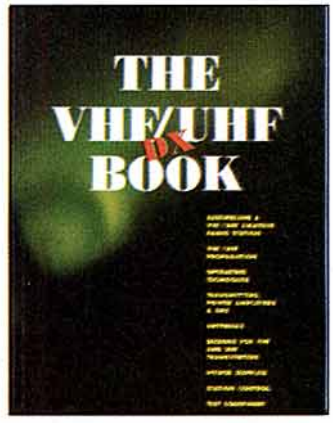
For those of you who have already purchased Skycall, the Update Disks are now available. These cover the new callsigns issued by SSL for use in the 1996 RSGB Call Book and Information Directory, and will bring your version of Skycall completely up to date!

Members Price

£14.95 (plus P&P)

The VHF/UHF DX Book

Edited by Ian White, G3SEK



This excellent publication has been reprinted and is the ideal reference book for working DX on the VHF and UHF bands. If you are a keen VHF operator and ever wondered how to make those far-away contacts to exotic places, then this is the book for you!

Members' Price

£15.72 (plus P&P)

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Rexon Handhelds

- 70 cm handy or
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- 5w output
- 20 memories
- Keypad entry
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Quality at a low price

RL102 2mtr **£189**
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New dual band amplifier

Boost the output of your 2/70cm dual band h/held to 10 or 25W.

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272H ..... 25 Watts
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Free Short wave antenna ..... worth £59.95
Free 240V AC mains adaptor ..... worth £12.95
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- 100 kHz - 30 MHz + optional VHF
- Competition class receiver
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80 mtrs to 2 mtrs VHF!
All on one antenna!
Ideal for the new
Icom IC706 & Alinco DX70

Perth Plus
80 mtrs to 10 mtrs plus 6/2 mtrs.
All on one antenna - just change the tip for 6/2 mtr operation
Power 100 watts Length 1.8 mtrs
Price ..... £249 + p&p £8

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Smaller version of the Perth.
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One antenna does it all 160 - 10m without the need for an ATU

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OB Full size ..... 80 - 10m 6ft £189
OB(T) Full size ..... 160 - 10m 6ft £219
OB Perth ..... 80 - 10m 7.5ft £199
OB (T) Perth ..... 160 - 10m 7.5ft £235
OB Spring Base £59

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A superior range of HF mobile antennas designed for the DXer. Slimline design & rated at 500W for top performance.

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PHF-20 ..... 20m whip £19.95
PHF-30 ..... 30m whip £19.95
PHF-40 ..... 40m whip £22.95
PHF-75 ..... 80m whip £24.95
PHF-160 ..... 160m T.band £54.95
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. . . a word in your ear.
See this month's Practical Wireless for the article on 'DXpertise' written by our Boss Mike G3 SED!

- 73 G0AFF

GAP Verticals

We are pleased to be appointed distributors for these super Verticals from the USA. Using an elevated feed system and no traps, coils or transformers these antennas dramatically reduce losses so more RF radiates into the air! Gap Verticals do not require tuning just assemble the antenna & your ready to go with full band coverage (at less than 2:1 SWR)

- **Eliminates most earth loss**
- **No traps, coils, transformers**
- **Requires no radials**

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Cvrs:- 2, 6, 10, 12, 15, 20, 40, 80 Mtrs.
Height:- 31.5 ft £259

Titan DX
Cvrs:- 10, 12,15, 17, 20, 30, 40, 80 Mtrs.
Height:-25 ft £289

Eagle DX
Covers 10, 12,15, 17, 20, 40 Mtrs.
Height:- 21.5 ft £269

Voyager DX
Covers 20, 40, 80, 160 Mtrs
Height 45 ft £399

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Base Antennas

TSB 3301 ... 144/70, 6.5/9dB £64.95
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TSB 3303 ... 144/70, 3/6dB £34.95
TSB 3304 ... 144/70, 6/8.4dB £89.95
TSB 3603 ... 144/70/23, 6.5/9dB £85.00

Mobile Antennas

TSM 1002 ... 144,4.1dB £22.95
TSM 1320 ... 144/70cms, 2.15/3.8dB £21.95
TSM 1339 ... 144/70cms, 3/5.5dB £22.50

Tonna Beam Antennas

20505 ... 5 El, 6mtr, 10dB £72.95
20624 ... 23 El, ATV, 18.1 dBi £48.95
20804 ... 4 El, 144 MHz, 8.9 dBi £42.95
20809 ... 9 El, 144 MHz, 13.1 dBi £44.95
20817 ... 17 El, 144 MHz, 15.3 dBi £92.95
20818 ... 9 El, crossed 144 MHz £86.95
20909 ... 9 El, 432 MHz, 13 dBi £43.95
20919 ... 19 El, 432 MHz, 16.2 dBi £52.95

Japanese Low Loss Coax

8D-FB Double screened good to 3 GHz, 9mm diameter, 0.051 dB/metre @ 144MHz 5 KW RF £1.95/mtr

MFJ Antenna Analysers

Are you in tune?

MFJ make easy work out of antenna tuning with these antenna analysers.

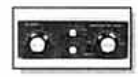
MFJ 259 - Covers 1.8 - 170 MHz with LCD frequency display and resistance bridge. £249

MFJ 249 - Covers 1.8 - 170 MHz as 259 but without resistance bridge £229.95

MFJ 209 - An economy model without freq counter. Utilises analogue read out. £129.95

Wire Tuner

Global AT2000 -



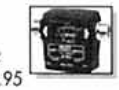
Long Wire Tuner with Q Selector to prevent interference. (100KHz - 30 MHz) £95

Meters

Revex W520

SWR/PWR meter. 1.8 - 200 MHz. Power 2/20/2 KW
Special Price £69.95

TSA 6601



Compact in-line meter. 140 - 150, 430 - 450 MHz
Power 60W £39.95

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For "off air" tune-ups we keep a wide selection of dummy loads:-

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Low pass TVI filter 9 pole Chebyshev design 1.5KW
Price £49.95

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AKD HPF1 ..... High pass filter £8.50
AKD TR ..... Toroid rings (pair) £3.50

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Check your frequency with these British made wavemeters.

WA1 ..... 2m,120 - 450 MHz £29.95
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Japanese high quality easy to use and a must for safe mobile operations.

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Headset mic with earphone and lockable PTT will suit most radios.
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- Metered
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John Gordon John is our Scanner/ Shortwave specialist

Mick Honeywell Mick is our HF/VHF specialist G0ABB

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At Nevada we don't just sell radios - we use them every day on the air! Call the Nevada team for unbiased, expert advice.

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- Decodes RTTY/AMTOR/CW/SITOR/FEC
- Includes CW tutor mode
- Complete stand alone unit

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AM, FM Wide FM.
125 memories
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All modes with AGC **£239**

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This is just a small part of our product range - give us a call if you don't see what your looking for here

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- Software Supplied For PC Upload/Down
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A general purpose and SSB freq. counter.

- Range 10Hz - 3GHz
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A quality wideband stainless steel discone. Range 25 - 1300 MHz with 'N' type connector.
Transmits on 2m, 70cms **£49.95**

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A low noise pre-amplifier with selectable band pass filters to optimise the receiving range of your choice. 25 - 1500, variable gain & attenuation. Powered from batteries or 12V DC ... **£69.95**

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Portable shortwave receiver

- 500kHz - 30 MHz
- 87 - 108 MHz
- 118 - 137 MHz

Price **£599**

Vectronics AT100

Active antenna and pre selector (300 kHz - 30 MHz)
Ideal indoor antenna/tuner **£79.95**

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Commercial grade wide-band scanning receiver

- 100 kHz - 2063 MHz
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Special £999 **£899**

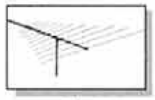
AR300A Plus Customised version with narrow AM filter, tape rec relay & Ready for SDU500 ..... £1099 **£995**

AR SDU5000

Spectrum display unit for use with AR3000A, Icom R7100 & R7000

Price **£799**

Wideband Beam - CLP 5130-2



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High gain beam for Scanner and Amateur radio enthusiasts ..... **£199.95** + £8 p&p

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Lowe HF250

A superb new receiver from Lowe built in the UK to high standards. Covers 30 KHz to 30 MHz with a host of features £799

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R5000 ..... Competition class £959.00

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Introducing The New Drake R8A

- 100KHz - 30MHz wide coverage
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The new R8A with its full compliment of filters as standard now boasts -

- Improved ergonomics
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- Expanded RS232 control
- Tone control
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The R8A's performance is truly staggering, it has a full compliment of filters; synchronous AM detector; multiple scan facilities; 440 memory channels; plus all mode coverage. Why not part exchange your old receiver for this latest model from the USA, we offer excellent PX deals - call our hotline now! £1295

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MARTIN LYNCH. The only company able to offer the RadCom team a new IC-706 for review in this month's magazine.

With a big thanks to Brian Taylor, G3AKF for delaying his delivery for the good of the RadCom review!

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A new IC-706 including FIVE YEARS PARTS & LABOUR WARRANTY for £1195.00. Delivery £10.00 UK Mainland. Cash Cheque or Credit Card welcome. Super Low cost finance also available. Deposits from only £159.00, full written details available on request. Part Exchange welcome.

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RADCOM USER REVIEW

IC-706 Eleven Band Transceiver

A user-review by HQ Staff.

TAKE A LOOK around your shack. You've probably got most of the following: an HF transceiver, a 6m transceiver, a 2m multi-mode, a general coverage receiver, a VHF scanner, an electronic keyer, a speech compressor and an AM/FM broadcast radio. What if you could replace the whole lot with one box retailing at under £1200? And what if the box were so small you could fit it all in the car or in your holiday hand-luggage? A pipe dream? Not at all with the latest from Icom.

The Icom IC-706 is the smallest 100W HF/VHF transceiver presently available.

FACILITIES

THE IC-706 MEASURES just 167W x 58H x 200Dmm and weighs in at 2.5kg. In this package, you get 100W on all HF bands, 100W on 50MHz and 10W on 144MHz, together with a receiver covering long wave to 200MHz, and whole lot more. The front panel detaches for remote operation using the optional separation cable.

Included with the radio is a sturdy double-fused 12V power lead, a hand microphone, spare fuses, and plugs for connecting a TNC, RTTY equipment, Morse key etc.

There are over 100 memories. 99 can contain independent transmit and receive frequencies, mode, CTCSS frequency or 1750Hz burst, and an eleven character name (eg 'Repeater R0' or 'Club net'). Two more contain scanning limits and another - the Call Channel - which is available on 144MHz only. The dial is not automatically locked during memory mode so once a memory is selected it performs in a similar (but not identical) way to VFO mode - this can lead to confusion.

Two VFOs are provided and memory contents can easily be transferred to either VFO - handy for rapidly switching between, say, 1.831MHz CW, 14.333MHz USB and 144.750 NBFM with repeater offset and CTCSS. Tuning steps are variable between 1Hz (200Hz per knob revolution) and 1MHz.

Up to ten Memo Pads are provided for the temporary storage of frequencies and modes (for instance of contest multiplier stations you are waiting for). These can be recalled at any time.

The acid test for many DX operators is "how easy is it to work split?". The answer is: "very easy". The 'quick split' option - pressing a function key for about a second - equalises the VFOs (or selects a programmable offset) and activates split operation. The transmit frequency can be monitored by a single button push. The word SPLIT appears prominently on the display to remind the operator to re-set after use.

For repeater operation it is possible to use the main tuning dial, having programmed in a -600kHz offset (using the quick split function described above) and a 1750Hz toneburst. However it is much more convenient to use the memories because individual CTCSS tones can be set and the quick split function can be retained for HF use.

Rear view of IC-706 showing the dual antenna sockets and many other connections.

CONTROLS

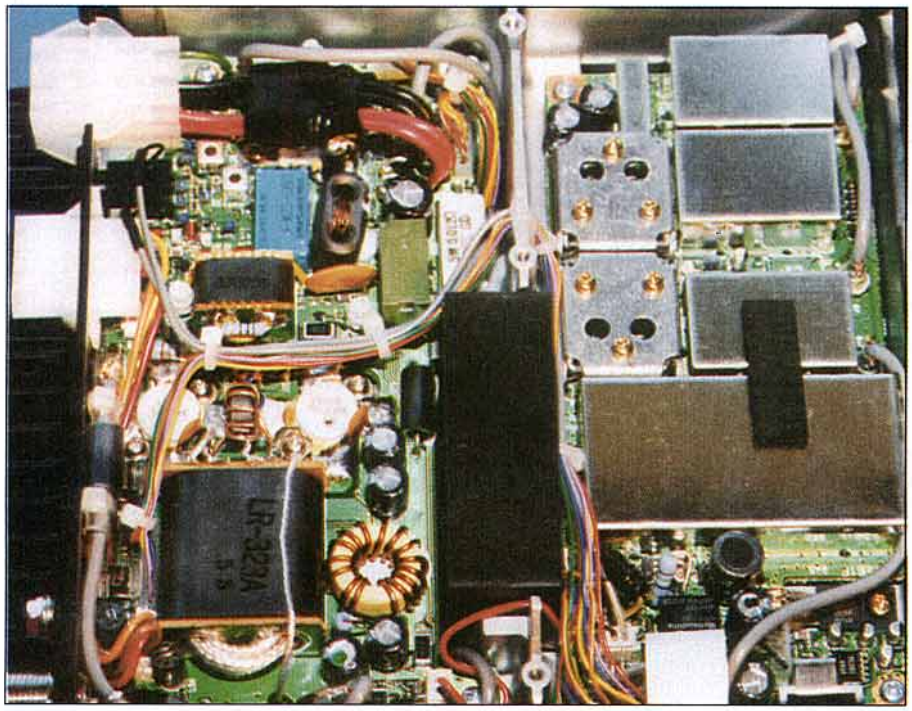
THE FRONT PANEL is crowded but, with the exception of the RIT button, is very accessible. The tuning knob, which occupies almost the whole height of the panel, includes a finger-hole and is a pleasure to use, even at the slowest setting.

Rotary controls are fitted for AF Gain and either Squelch or RF Gain, RIT shift and IF Shift. A miniature jack socket is provided for headphones.

All of the other controls are push buttons, the majority of which operate in conjunction with menus on the display. These handle facilities such as pre-amp/attenuator, memories, noise blanker etc.

Mode changing is simply a matter of pressing the Mode button the appropriate number of times. Band changing is achieved by pressing the TS button to select the band option, and then using the tuning knob.

The display is backlit bright yellow which makes the black LCD letters very easy to read. Many of the displayed items are user-selectable or only appear when the appropriate menu is accessed so the resultant display



Inside view underneath the IC-706.

is not over-crowded. Visible all the time are the mode in use, 'Split' when accessed, a clear readout of the entire frequency (to 1Hz if selected), options such as 'NB' for noise blanker, the VFO in use, the memory in use, a bargraph and the current menu.

The rear panel is very crowded. It contains a large heat-sink, two 'UHF' (SO-239) antenna sockets - one for below 60MHz and the other for above, a ground terminal, an accessory socket, jacks for external speaker, RTTY, remote control and key/paddle, a microphone socket (this is in parallel with one just below the front panel), 12V DC input and a socket for the optional automatic antenna tuner.

Usefully accessible through holes in the side panel are adjustments for speech compressor level, beep/sidetone level, VOX and Anti-VOX.

RECEIVER

THE RECEIVER is specified from 300kHz but the review model tuned down to 30kHz. It provides continuous coverage to 200MHz (automatically switching aerials at 60MHz) with relatively few 'birdies', none of which interfered with amateur bands reception. Note that this means yet another amateur band - 4m - is available, but only on receive.

Modes covered are USB/LSB, CW, CW - reverse, RTTY (FSK), AM, NBFM and wide (broadcast) FM. Filter bandwidths are shown in the Specifications box opposite. Fitted as standard are additional narrow filters for AM and NBFM, the latter being useful for future 12.5kHz channel spacing or for operating on 29MHz. Disappointingly, a narrow CW filter is available only as an optional extra at £65 (500Hz) or £69 (250Hz).

Three pre-set levels of sensitivity are available from the front panel: normal, pre-amp and 20dB attenuator. These proved adequate for most purposes. However, if finer control is needed the Squelch knob can be set to act as an RF Gain control when used on CW, RTTY and SSB, whilst retaining its Squelch function on AM and NBFM.

A tuneable IF offset is provided to help reduce adjacent QRM. It comes with a novel miniature graphical display showing how the wanted signal relates to the filter edges.

The noise blanker proved effective on static and man-made noise in CW and SSB modes, but it completely ruined AM reception by badly distorting the wanted signal.

Tiny fingers are required to activate the RIT ON button. If care is taken not to 'nudge' the RIT Shift control, the RIT could be left on permanently. The button lights up to warn that RIT is on. A shift of up to 1kHz in either direction is permitted.

Slow or fast AGC time constants can be selected, but there is no facility to link AGC speed to the mode switch, so if fast AGC is selected for CW, slow AGC must be separately selected for SSB use.

The S-meter is an LED bargraph and, although no substitute for a real meter, it is well designed with fast attack, slow decay and an optional 'peak hold' facility.

Scanning is available either between programmed limits, on all memory channels or on selected memories. There are several methods of resuming the scan after a signal is detected.

In the short time the IC-706 was available for test, it was not possible to check one of the more esoteric facilities, the Simple Band Scope. This uses the dot matrix display to show graphically the activity over a band of frequencies.

The IC-706 was air-tested during the SAC CW Contest which provided a high level of activity. No problems were noticed once the RF gain was set to a sensible level. The receiver performed well on the medium wave with no cross-modulation, despite the high powered Brookmans Park BBC transmitter being only six miles away. One flaw emerged when tuning on the quiet 10m and 4m bands: The synthesiser was quite noisy, giving the impression of a busy band, until the knob was halted whereupon the 'signals' disappeared. The noise seemed to have been picked up on the long-wire antenna in use and would probably not have been prevalent on a remote coax-fed aerial.

An interesting facility is wide FM which allows the IC-706 to be used as a sensitive VHF broadcast receiver, albeit without stereo or squelch. This, together with the long and medium wave coverage, would allow the IC-706 to be used in a car in place of the broadcast set.

The loudspeaker was disappointing. It faces upwards, producing a good, clear, sound, but had a tendency to buzz on CW signals. Its frequency response was ideal for communications purposes but very poor for broadcast signals, even on AM. An external speaker sounded fine, though, and the volume could be turned up quite loud without noticeable distortion.

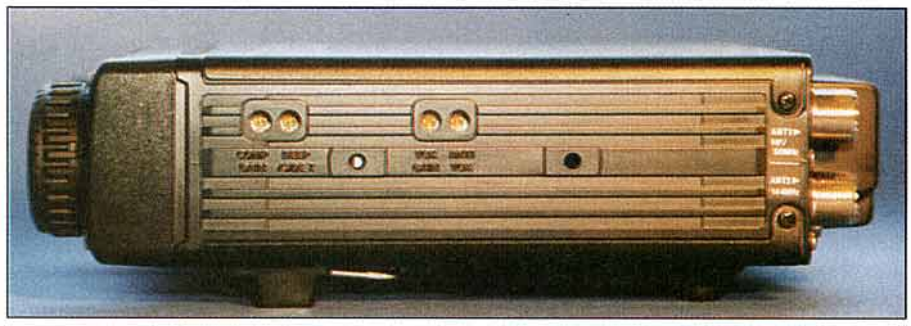
TRANSMITTER

MODES AVAILABLE on transmit are: CW, USB/LSB, RTTY, AM and NBFM. Output is reduced to 40% on AM. The provision of 100W on 50MHz puts the IC-706 ahead of several of its rivals.

The supplied microphone felt good and has only the most basic controls - UP/DOWN buttons, a LOCK slide switch, and a lightly sprung transmit switch. The buttons can control frequency or memory channels.

Power output is continuously variable from a nominal 5W to 100W (1 to 10W on 2m). Transmit is inhibited outside amateur bands and Martin Lynch tells us that initial attempts to provide transmit on 4m have proved unsuccessful (looks like time for a bit of home-brewing!) The fan, which runs continuously - even on receive - speeds up noticeably on transmit.

The front panel bargraph can be switched to display relative power out, SWR or ALC. This latter is important when setting up the



Side view showing screwdriver adjustments for VOX etc.

built-in speech compressor. VOX is available and adjustments can be made without opening up the box.

Icom have for some time incorporated an electronic keyer into their budget rigs, and the IC-706 is no exception. This means that yet another separate box has been done away with and greatly enhances the radio's value to the CW operator who enjoys portable working. Anyone who has forgotten their key on an expedition and has made QSOs by tapping wires together will appreciate the novel facility of being able to use the microphone's UP/DOWN keys as a Morse paddle - amazingly easy to use! In addition to taking a standard paddle (normal or reverse), the keyer can be configured to take a straight key or mechanical bug for those who prefer more personalised Morse.

Full or semi break-in is provided, together with 'no break-in' ie an external switch. Delay times are fully adjustable. Full break-in worked OK but the clattering of a relay on each dot proved very distracting. CW sidetone is adjustable from 300 to 900Hz.

HANDBOOK

THE 60-PAGE manual is helpful and is written in reasonably good English. It describes all of the controls with helpful flow diagrams for the numerous Menu driven functions. It does, however, assume a knowledge of amateur radio terms and practice, unlike some other handbooks. Diagrams are used extensively and no problems were experienced in understanding the radio 's facilities. Usefully, Split and Repeater operation have a page each. No circuit or block diagrams are included.

EXTRAS

OPTIONAL EXTRAS include a voice synthesiser (switchable English or Japanese), a high stability crystal unit, filters (250Hz, 500Hz, 2.8kHz or 1.9kHz), an automatic ATU, mobile mounting bracket, loudspeakers and many more. Note that, although the additional filters can be installed by the user (ie they are plug-in), only one at a time may be installed.

CONCLUSION

THE IC-706 IS straightforward to drive and has a very usable front panel considering its size. On the air reports were all positive. And what fun to be able to listen to broadcast FM whilst automatically checking the local 2m net frequency every second or so!

Two things disappointed - the lack of a narrow CW filter and the synthesiser noise on 28 and 70MHz.

Having said that, this is a rig which can replace virtually all of your shack in one go at a price which is almost covered by the sale of your existing gear!

There's plenty to interest the keen Class B licensee, too, with 100W on 6m and a VHF general coverage receiver to check the progress of sporadic E. What is more, this really is a complete multiband station for taking mobile or on holiday. The IC-706 is set to become the ubiquitous rig of 1996. Now where's my cheque book . . .

The front panel is easily removed to allow for easy installation in even the tightest spaces.

AVAILABLITY

THE IC-706 IS available from a number of *RadCom* advertisers (though currently demand appears to be exceeding supply). The review model was very kindly loaned by Martin Lynch - Amateur Radio Exchange Centre (see advertisement on page 62) and we are most grateful to him and to the customer of his who was prepared to forego the pleasure of playing with his new toy for 48 hours whilst we checked it out. The price from Martin Lynch is £1195 and you can try one out for yourself at 'Lynchy's Open Day' on 18 November. ♦

SPECIFICATIONS

Source: IC-706 Handbook

General	
Receive frequency coverage	300kHz - 200MHz *(but see text)*. Specifications guaranteed only on amateur bands listed below.
Transmit frequency coverage (UK version)	1.800 - 1.99999MHz; 3.500 - 3.9999MHz; 7.000 - 7.300MHz; 10.100 - 10.150MHz; 14.000 - 14.350MHz; 18.068 - 18.168MHz; 21.000 - 21.450MHz; 28.000 - 29.700MHz; 50.000 - 54.000MHz; 144.000 - 146.000MHz.
Modes	SSB, CW, AM, FM, WFM (receive only), RTTY.
Memory channels	102 (split memory 99; scan edge 2; call channel 1).
Antenna impedance	50Ω nominal.
Usable temperature range	-10°C to +60°C (+14°F to +140°F).
Frequency stability	Less than ±7ppm from 1 min to 60 min after power on. After that, rate of stability change is less than ±1ppm/hr at +25°C (+77°F). Temperature fluctuations 0°C to +50°C (+32°F to +122°F) less than ±5ppm.
Power supply requirement	13.8V DC ±15%.
Current drain at 13.8V	Transmit 20A; Receive squelched 1.5A; Receive max audio 1.7A.
Dimensions	Millimeters: 167(W) x 58(H) x 200(D). Inches 6.56(W) x 2.28(H) x 7.88(D). Projections not included.
Weight	2.5kg (5.5lb).
Transmitter	
Output power	HF & 50MHz: 5 - 100W (AM 2 - 40W); 144MHz 1 - 10W (AM 1 - 4W).
Spurious emissions	HF - better than -50dB; 50 and 144MHz - better than -60dB.
Carrier suppression	Better than 40dB.
Unwanted sideband suppression	Better than 50dB.
Microphone impedance	600Ω.
Receiver	
SSB, CW, AM, RTTY, FM	Double conversion superheterodyne
WFM	Triple conversion superheterodyne
Intermediate frequencies (approx)	SSB, AM, CW, RTTY: 69MHz and 9MHz. FM: 69MHz, 9MHz and 455kHz. WFM: 70.7 and 10.7MHz.
Sensitivity with pre-amp on (* not guaranteed outside amateur bands)	SSB, CW (for 10dB S/N) 1.8 - 29.9950MHz*, 50 - 54MHz, 144 - 148MHz: less than 0.16µV. AM (for 10dB S/N) 0.5 - 1.8MHz less than 13.0µV; 1.8 - 29.9950MHz*, 50 - 54MHz, 144 - 148MHz less than 2.0µV. FM (for 12dB SINAD) 28.0 - 29.7MHz less than 0.5µV; 50 - 54MHz, 144 - 148MHz less than 0.3µV. WFM (for 12dB SINAD) less than 10.0µV.
Squelch sensitivity threshold(pre-amp on)	SSB less than 5.6µV, FM less than 0.3µV.
Selectivity	SSB/CW >2.3kHz (-6dB), <4.0kHz (-60dB); AM >6.0kHz (-6dB), <20.0kHz (-40dB); FM >12.0kHz (-6dB), <30.0kHz (-50dB); FM narrow >8.0kHz (-6dB).
Spurious and image rejection ratio	More than 70dB (HF bands only).
Audio output power	More than 2.0W at 10% distortion with an 8Ω load.
RIT variable range	±1.0kHz max.

ALINCO - "NOW YOU'RE TALKING"

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"Award Winner - absolute delight to use - Amazing first venture into HF"
- Rob Mannion G3XFD
- Editor, Practical Wireless

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PREVIEWED IN JUNE *HAM RADIO TODAY*

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"Performed very well indeed during CQ worldwide contest"
- Mike Dennison G3XDV
- Editor, Radio Communication

"Very good transmit & receive audio" - Andy Durrant G7OEC
- Coastal Communications

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The **ALL-NEW** DJ-G5 compact dual band handheld transceiver replaces the well known DJ-580 which was a best-seller worldwide. Packed with state-of-the-art features including CTCSS tone encode & decode. 200 memory channels. Alinco's amazing 11 channel Monitorscope & new high efficiency power MOSFET module. Includes wideband receive coverage: 108-174MHz & 420-470MHz. Also 850-950MHz included.

REVIEW THIS MONTH

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WATERS & STANTON ELECTRONICS

RADCOM USER REVIEW

Alinco DJ-G5 Dual Band Handy

Reviewed by RSGB HQ Staff

ALINCO HAS A reputation for producing first class hand-helds and the DJ-G5 is no exception. Designed to replace the very popular DJ-580, it is smaller and covers the 144MHz and 430MHz bands. It is capable of running up to 5W on each band (with an external supply), and provides a huge range of 'bells and whistles'.

The radio comes with a helical antenna, a NiCad battery pack (4.8V), belt clip, hand strap, battery charger, instruction manual and a credit card sized aide-memoir for the most used controls.

The two bands are described as left (L) and right (R), corresponding to the display position. Each band can be designated Main or Sub and the priority of a number of the radio's operations depends on whether the Main or Sub band is selected. It is possible to use either band, simply by switching between the two, or receive on both bands or transmit on one and receive on the other (full or half duplex).

Four VFOs are provided, two on each band, plus up to 107 memories per band. Six memories are used for programming scanning limits, and one is a Call channel. The memories will contain receive frequency, split, transmit frequency, tuning step, tone setting, tone frequency and DSQ information (see below). Memory contents can easily be transferred to any of the VFOs.

DESCRIPTION

THE DJ-G5 FITS comfortably into the hand and has a good solid feel to it. Its size is just 57W x 138H x 27Dmm, plus the knobs and antenna. It weighs in at just 350gm, complete with antenna, belt clip and the supplied battery pack.

The front panel is absolutely full. It contains no less than 20 buttons, almost all of which carry out two or three roles dependent on whether a function button has previously been pressed. The buttons include ON/OFF, band switching, frequency input, shift, scan etc. Two LEDs indicate an open squelch or transmitter on. There is a speaker close to the top of the front-panel and a microphone at the bottom - the radio can be held just like a portable telephone if required.

Pressing the buttons produces a variety of 'beeps' which can no doubt help to confirm an action in poor light or when initially setting up the radio. After a while this facility can become annoying and it can easily be switched off. The front-panel buttons can be disabled if required, as can the frequency knob on the top.

A quarter of the front is occupied by the LCD display which can be backlit for use at night. This includes two displays of frequency, repeater shift direction (+ or -), transmitter output setting (L, M or H), and tone squelch status. Displays common to both bands (or applying only to the Main Band) include a bargraph, battery status, auto power off, battery save, and whether duplex operation has been selected.

One side of the DJ-G5 carries the 'function' button, the main push-to-talk switch, a programmable push to talk button, and a MONI button which temporarily opens the squelch. Also on this side are the controls for volume and squelch which look at first glance to be thumbwheels but are actually UP/DOWN buttons linked by a piece of rubber. These are comfortable to use and facilitate single-handed operation.

On the other side is just a DC IN socket covered by a rubber plug.

In addition to a BNC aerial socket, the top has speaker and mic sockets (again covered with a rubber plug) and a rotary knob. This knob, which has a positive 'clicky' feel, is a good size and performs several user-programmable functions, including tuning, so if you hate tuning by UP/DOWN buttons this rig is for you. Tuning can be in 5, 10, 12.5, 15, 20, 25, 30 or 50kHz steps. Direct frequency entry is still available from the keyboard, of course.

Repeater operation is straightforward once programmed. A single RPT button selects repeater operation and pressing REV switches the receiver to the transmit frequency. Initial setting up allows any repeater shift in 100kHz steps up to 15.9MHz in either direction and a wide selection of CTCSS tones.

Two functions save valuable battery power: Auto Power Off disables the rig after a programmable period of non-use; Battery Save cycles the radio on and off in a programmable ratio.

Raynet groups may like to use the cross band repeater option (under official permit, of course). This relays the output of the VHF receiver on a UHF frequency or vice-versa.

TRANSMITTER

WITH THE SUPPLIED battery, the power output is approximately 1.5W on 2m and 1.0W on 70cm. Larger, optional batteries will give up to 4.5W on each band, and an external 12V DC supply allows a full 5W to be achieved. It would be quite feasible, then, to use the DJ-G5 as an FM base station, powered from the shack 12V supply, when not in use portable. Lower power can be selected from the front panel and a bargraph shows relative power output.

The second push-to-talk switch, just below the main one, can be programmed to transmit at low power, to precede the transmission with a 1750Hz tone or to transmit on the Sub band.

CTCSS tones are supplied as standard and may be selected in VFO Mode. However, the reviewer was unable to store these in Memory Mode, though this is clearly a design facility. Also supplied is DSQ Code, a DTMF selective calling system. DTMF tones can be output manually, too. An Auto Dialer sends pre-set DTMF tones, presumably for phone patch which is not permissible in the UK.

RECEIVER

THE MOST NOTICEABLE thing about this receiver is the length of time it can be used on a single charge of the supplied battery. Plainly, a small battery will support only a small amount of transmitting time, but too often there is only an hour or so of monitoring time, too. The receiver will function long after the BATT (recharge due) indicator shows.

The receiver is sensitive and has a stable squelch. As supplied, it can be tuned over the whole of the two amateur bands. Extended receive coverage to 108 - 174, 420 - 470 and 850 - 950MHz is available (the instructions for this are contained in a typed leaflet produced by Waters & Stanton) as is AM reception. Transmission is restricted to the amateur bands.

A Bell facility produces 'beeps' when a signal is received - could be useful if you are prone to leaving the volume down but, fortunately, this can be switched off. In case of overload by adjacent transmissions, a 15dB attenuator can be switched in - this seems a most useful facility.

Three types of scanning are possible: the whole band, between one of three sets of programmable limits and all programmed memories. Scan resume can be programmed for 5 seconds after finding a signal, or 2s after the signal disappears.

The bargraph produces an 'S' meter display or, more interestingly, Channel Scope - a graphical display of the strength of signals on 10 adjacent channels (either in VFO or Memory mode). This can be most useful when monitoring for activity on a quiet band, or for instantly locating a free channel to move to from the calling channel. Channel Scope will display VFO channels or memory channels, and monitors in real time without interrupting the audio from the frequency you are listening to. Sweep Scan is similar to Channel Scope but the display moves with the scanning functions described above.

Priority Watch allows a favourite channel - say the local net frequency - to be checked for 0.2 seconds every 5s and, if a signal is received an alarm sounds and the receiver stays on the net channel for 2s.

For selective receiving, CTCSS Tone Squelch can be enabled using any of 50 tone frequencies. Alternatively, a 'DSQ code' using DTMF can be programmed in so that only stations using your code will open the squelch.

The two receivers (L and R) can be used for monitoring two bands at the same time with independent volume and squelch settings. It is also possible to receive simultaneously on two parts of the same band.

HANDBOOK

IN KEEPING with the rig's size, the handbook is only 128 x 182mm (a little smaller than A5) so it could be carried in an overcoat pocket, perhaps. It comprises 72 pages, extensively cross-referenced, with copious diagrams of the front panel and display. The most basic functions are dealt with in the earlier chapters with the most complex at the end. The book could be clearer, given the complexity of the radio, and even the most experienced reviewer found difficulty in discovering how to program individual CTCSS tones into the memories.

A troubleshooting guide is included and advice is given on how to connect a TNC for packet operation.

ACCESSORIES

OPTIONAL EXTRAS include a remote control microphone with UP/DOWN buttons; 9.6V NiCads to give 4.5W RF output on either band, or 4.8V NiCads with twice the capacity of the supplied battery (for longer transmit time); rapid chargers; a filtered 12V cigar-lighter lead and soft cases.

CONCLUSION

THE DJ-G5 IS A fine piece of engineering, robust and sophisticated yet very small. It is ideal for the experienced operator who wants both 2m and 70cm in a compact handheld, plus a wealth of features.

It does require a good read of the handbook before very much operation can take place and a one page 'get you started' sheet would be handy.

If you can only afford one rig, the DJ-G5 can be run off a 12V shack supply to use as a fully-featured 5W dual-band base station, and with external microphone and loudspeaker, it will work mobile in a quiet car.

AVAILABILITY

THE RADIO RETAILS at £479 and is available from Alinco dealers across the country. The distributors, Waters & Stanton Electronics of Hockley (see p66), are thanked for the loan of the review model. ♦

SPECIFICATIONS

Sources: DJ-G5 Handbook and Waters & Stanton Electronics

General

Modes	F2E, F3E (FM).
Antenna impedance	50Ω.
Operating temperature range	-10°C to +60°C.
Supply voltage (rated voltage)	4.5 to approx 16 VDC (rated at 13.8VDC external or 4.8VDC with internal NiCads).
Current consumption (regulated supply voltage)	Tx Hi output with 13.8V external or 9.6V or 7.2V NiCads: approx 1.4A on VHF and approx 1.5A on UHF. Tx Hi with 4.8V NiCads: approx 1.0A on VHF and approx 1.2A on UHF. Tx Mid with 4.8V NiCads: approx 0.8A. Tx Lo with 4.8V NiCads: approx 0.5A. Rx squelched (twin band): approx 85mA. Rx squelched (single band): approx 50mA. Rx with battery save on (4:1 ratio twin band): approx 25mA.
Ground	Negative
Dimensions (including projections)	63W x 155H x 31.5DD mm.
Weight (including antenna, belt clip and supplied NiCad)	350gm.

Transmitter

Frequency range	144.000 - 145.995MHz; 430.000 - 439.995MHz.
Modulation	Variable reactance
Maximum deviation	±5kHz.
Power output	With external 13.8VDC supply: approx 5W. With 9.6V NiCad: approx 4.5W. With 7.2V NiCad: approx 3.5W on VHF and 3.0W on UHF. With 4.8V NiCad: approx 1.5W on VHF and 1.0W on UHF.
Spurious emissions	better than -60dB.

Receiver

System	Double conversion superheterodyne
First IF	VHF - 38.9MHz; UHF - 45.1MHz
Second IF	455kHz
Frequency ranges	144.000 - 145.995MHz; 430.000 - 439.995MHz (can extend to: 108 - 174MHz; 420 - 470MHz and 850 - 950MHz).
Sensitivity	(spec guaranteed only within amateur bands) 144 -146MHz: better than -16dBμ when using Left band; better than -12dBμ when using Right band. 430 - 440MHz: better than -12dBμ when using Left band; better than -15dBu when using Right band.
Squelch sensitivity	better than -20dBμ(0.1μV).
Selectivity (-6dB / -60dB)	more than 12kHz / less than 30kHz.
AF output at 10% distortion	100mW into an 8Ω load.

IDEAS FROM ABROAD

TRANSLATED AND EDITED BY ERWIN DAVID, G4LQI

Early detection of approaching thunderstorms permits timely disconnection of radios and earthing of antennas. **Pierre Poilbarbe, F1FBH**, has 50 years' experience on the subject and described his latest approach in ***Radio-REF*** 5/95. Here are the electrical details. The DIY hardware and adjustments follow next month.

THERE ARE TWO KINDS of lightning crashes: those from electromagnetic waves from every discharge within a cloud or between a cloud and earth, and direct electrical discharge along a path which may include ionized air, antennas, masts and a radio proper. While the first kind does no physical damage, the second can be very destructive if adequate precautions are not taken[1]. In short, I needed to know when to disconnect radios and earth antennas.

Fifty years ago the best equipment to monitor the approach of a thunderstorm was a *Branly* coherer[2] which, when excited by a 'signal' from a good antenna/earth system, would turn conductive and the increase of current in the circuit world activate a buzzer. The vibrations from the buzzer would shake the iron filings in the coherer, 'rearming' that detector for the next operation. The intervals between buzzes gave a good indication of the development of thunderstorm activity in the area.

Between then and now, a long-wave broadcast receiver tuned to an unused frequency has served the same purpose but I wanted something not subject to QRM and consisting of a simple detector plus amplifier with quantifiable output. The range 10 to 30kHz proved suitable, and ferrite-rod antennas work well at those frequencies.

THE ELECTRONICS

THE BLOCK DIAGRAM OF the system is shown in **Fig 1.** The sensor consists of a ferrite rod wound with 2200 turns of wire and is installed horizontally and away from local sources of switching transients. A 10kHz selective amplifier raises the sensor output to a level adequate to trigger a monostable multivibrator. Its output pulses are integrated to provide a DC signal which can be read on a meter and which also activates a buzzer or relay at a preselected 'repetition frequency' of crashes.

To be independent of mains power and mains-borne transients, a solar charger for the built-in 9V 0.1Ah ni-cad battery is provided.

THE CIRCUIT

THE FIRST AMPLIFIER STAGE, IC1, has a gain of 101x with low-frequency cut-off provided by R2-C2 (340Hz) and high-frequency cut-off by R3-C3 (59kHz); see **Fig 2**.

The second op-amp is configured as a second-order bandpass filter centred on 10kHz. The frequency response, on a linear voltage scale is shown in **Fig 3** on page 70. 10kHz was chosen as the sensor can be tuned to it with reasonable values of C1. The op-amps are current FET-input models.

The op-amps require a centre-tap on the power supply, which is provided by the voltage follower IC3. Its use causes less power drain than lower values of R5 and R6.

TR1 drives the trigger input of the ICM7555 MOS multivibrator. The duration of its output pulses is given by the formula t=1.1RC in which t is in seconds, R in ohms and C in Farads. Here, a 1MΩ resistor (R11) is used with a choice of three capacitors, C11, C12 or C13. To push the meter to half scale takes one crash with C13, three or four crashes within a ten-second interval on C12, and a rapid train of crashes on C11. Full scale corresponds to a steady 'state 1' of the 555, ie constant 'on'. This corresponds to a thunderstorm right overhead.

The voltage across the meter is fed to the Darlington transistor TR4 which was chosen for its low base current. If the applied voltage exceeds the transistor's base-emitter voltage plus the voltage drop across the diodes D2...D5, collector current will flow and activate the alarm. With two 1N914 diodes, this happens at approx. 30% of full scale on the meter. The PCB provides for up to four diodes.

THE ALARM

AS A SOUND ALARM I use a *musical post card* which draws 0.2mA at 1.5V. R14 drops the supply voltage to that level. A buzzer or a relay coil may be connected in lieu of the musical card.

The R14 connections would then be jumpered and C15 omitted. If installing a relay without a built-in reverse-voltage diode, one should be installed in place of C15. A reed relay with a 5V coil of no less than 5kΩ would be suitable. The user can choose the device to be activated by the relay contacts, including other, bigger relays which earth antennas and disconnect radios.

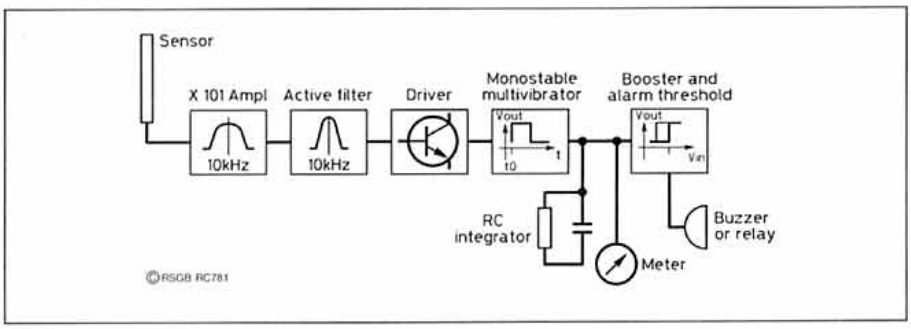


Fig 1: Block diagram of the F1FBH thunderstorm warning system.

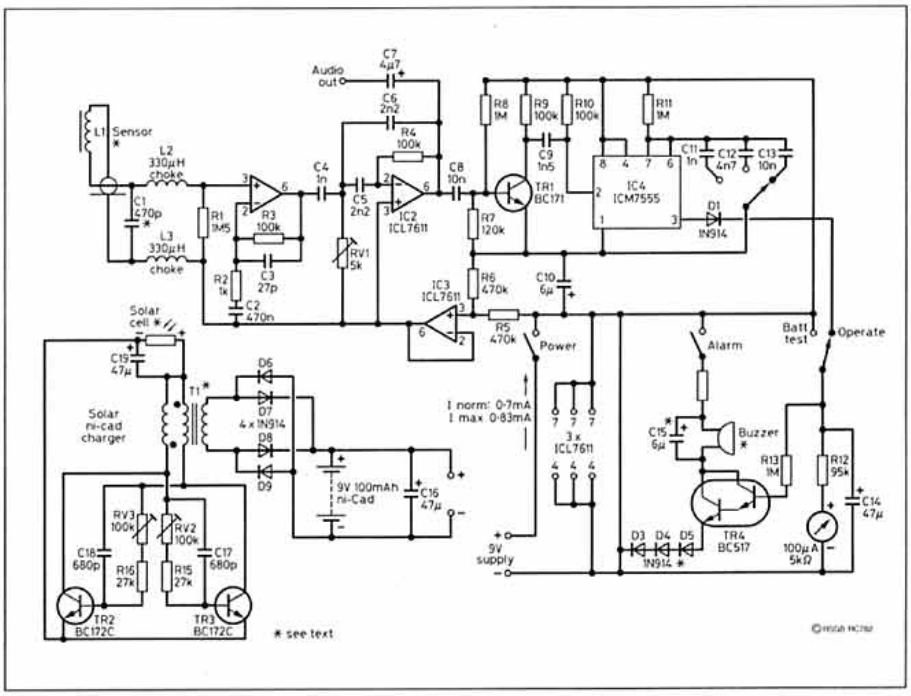


Fig 2: Circuit diagram of the F1FBH thunderstorm warning system and its solar battery charger.

THE SOLAR POWER SUPPLY

THE STAND-BY CURRENT DRAIN of the circuit is 0.7mA, equivalent to 2.1mA during eight daylight hours. I assumed a charger efficiency of 50%, average illumination of 5000 Lux and a maximum continuous charging current for this type of battery of 10mA. I chose a *Monacor* type SC-30 solar cell rated 3V @ 80mA, ie 0.24W in full sun light, yielding 0.12W, ie 10.2V @ 11mA after the DC-DC upconverter, which is a standard chopper circuit with a pair of transistors BC172C (the suffix C is important!).

Pushing the spring-loaded TEST switch turns the moving coil meter into a voltmeter reading the battery voltage (full scale 10V).

RESULTS

AT MY QTH NEAR TOULOUSE, and with C13 selected, thunderstorms coming in from the Atlantic can be detected when they are near Mont-de-Marsan or Pau (about 100 miles away). With C12 in, their approach can be monitored. The third position, C11, gives the indication that immediate protective action is required.

It is interesting to connect an audio amplifier and headphones to the AUDIO output. One hears all kind of machine harmonics, eg from blowers, vacuum cleaners and even nearby AM CB transmissions. None of these generally influence the reading of atmospheric phenomena.

NOTES

[1] A definitive article on lightning by Alan Martindale, G3MYA, appeared in *RadCom* 1/84 and one on lightning arresters by G R Jessop, G6JP, in *RadCom* 1/72. Both articles, and a 1989 update of the latter, are included in the RSGB *HF Antenna Collection.*

[2] Edouard Branly, 1844-1940, invented this detector in 1890. ♦

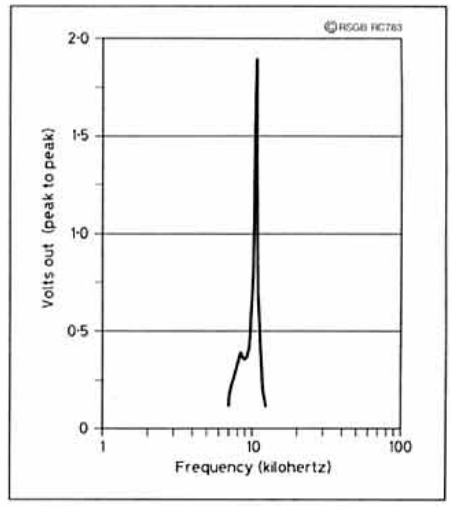


Fig 3: The frequency response of the system, including tuned sensor, amplifier and 10kHz active filter.

Technical Update

CURRENT TRANSFORMERS AND RF MEASUREMENT -

THE JS 'SNAP ON' RF CURRENT PROBE, described in the June 1995 RadCom, *by J B Smith, VK9NS, is designed specifically for comparitive testing of antenna radials, using low power antenna excitation. It is not suitable for measuring current on an antenna element because of the RF choke effect of the lightly loaded transformer. A design, by Dennis Walker, G3OLM, for measuring absolute values of RF current is given below.*

A system for measuring current should present a low resistance so as to ensure minimum disturbance to the circuit conditions. Low is of course a relative term and in the context of measuring current on aerial wires and transmission lines it is the effective characteristic impedance which determines what is an acceptable value. This characteristic impedance will normally lie in the range 50 to 1000Ω. As long as the current measuring system has an input resistance of not more than 0.5Ω there should be little problem in disturbing the conditions by introducing the system.

With the wide availability of small ferrite rings it is possible to take a small current sample in a precise proportion. Rectifying the sample and applying the output to a moving coil meter provides a predictable and reliable method of current indication which will tolerate large overloads, is linear scaled and will respond quickly. Let's design a system to provide a full scale indication of 1A when using a 100μA moving coil meter. The circuit is shown in **Fig 1**.

The essential property of a current transformer is that the ampere turns on the primary are precisely balanced by the ampere turns on the secondary so that with a single turn on the primary side and 50 turns on the secondary we can expect precisely 20mA to be available to circulate in the secondary for each amp of primary current. In dealing with torroid ring cores a 'turn' simply means a pass through the central hole - it does not need to be complete.

The other necessary condition is that the secondary load must be low enough to allow the current to circulate, otherwise we do not have a current transformer! A value of 470Ω is suitable as this will reflect into the primary an equivalent resistance of 470/2500 or 0.18Ω which is low enough to meet the conditions outlined above. (Resistance is transformed according to the square of the turns ratio).

Now with 20mA circulating in 470Ω we will have 9.4V RMS available for rectification corresponding to 13.2V peak. We can expect to lose approximately 0.5V at the detector diode leaving a DC voltage of 12.7 to drive the moving coil meter. To obtain full scale deflection of 100μA with 12.7V requires a total resistance of 12.7kΩ. The meter itself will contribute about 800Ω so a practical 12k resistor will fit the bill with negligible error. Finally the effective resistance of the detector circuit will be much greater than the 470Ω so there will be negligible error due to loading here.

On the subject of suitable cores for this application the magnetic requirements are quite undemanding and almost any small ring of half to one inch diameter will be found suitable as long as it is intended for RF usage — I have not yet found one which does not perform as expected. The final circuit configuration is shown in the accompanying figure.

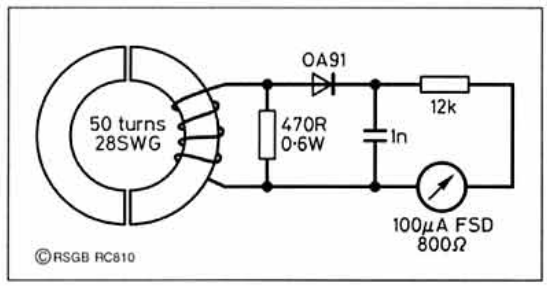


Fig 1: Snap-on probe for measuring absolute RF current in an antenna element.

This arrangement is particularly useful when combined with a Monimatch SWR meter; you can even use the same meter movement for both SWR and current with a little ingenuity. This enables one to determine the RF power output directly if there is a good SWR. It is also possible to employ the current meter to calibrate the SWR indications to extend the power or current measurements well outside the range of the basic current meter!

NEC - MININEC - ELNEC - EZNEC

AS MENTIONED IN Eurotek 6/95, Mininec and its derivatives such as Elnec and MN never could adequately model horizontal antenna wires less than 0.2λ above earth, or transmission lines and stubs as used in phased arrays. NEC-2 had accuracy problems with connected wires of different diameters.

W7EL has just announced EZNEC (he pronounces it easy-nec), a user-friendly NEC-2 based program that eliminates these problems, is faster than ELNEC and permits the modelling of systems with up to 500 segments.

Hardware requirements are a 386, 486, or Pentium processor with co-processor (built into 486DX and Pentium) with 2Mb of RAM. 9Mb of HD space are required if the full 500 segments.

Hardware requirements are a 386, 486 or Pentium processor with co-processor (built into 486DX and Pentium) with 2Mb of RAM. 9Mb of HD space are required if the full 500 segments are to be used; 2Mb will do for up to approximately 200 segments.

The program costs USD89.00 + 3.00 for overseas airmail with substantial discounts for registered ELNEC customers.

Erwin David, G4LQI

THE PETER HART REVIEW

Index QRP Plus Transceiver

by Peter Hart, G3SJX*

IN THE OCTOBER 1995 *Radio Communication*, I reviewed a number of QRP rigs for the HF bands. The Index Laboratories QRP Plus transceiver looked a particularly interesting design, but was unfortunately in short supply at that time. The supply situation has now been resolved and a sample obtained for review.

GENERAL FEATURES

THE QRP PLUS provides a general coverage receiver tuning 1.8 to 29.7MHz and a 5W transmitter for all the HF band allocations on SSB and CW modes. A summary of the features is given in the table together with the measured performance, in a form which enables a direct comparison to be made with the other radios in the October 95 review. The radio uses a novel single superhet design with an up conversion IF to 50MHz. This enables the whole HF range to be covered without gaps and without spurious or image problems. An SSB bandwidth IF filter is implemented at 50MHz using six miniature crystals in a ladder configuration. This filter is also used to generate SSB on transmit directly at 50MHz. It remains to be seen whether such a filter maintains a sufficiently stable characteristic with ageing and temperature extremes. Another novel feature is the provision of variable receiver bandwidth from 100Hz to 2.4kHz in 100Hz steps, implemented as cascaded high pass and low pass switched capacitor audio filters under microprocessor control. This seems very effective and with audio derived AGC taken after the audio filter, this filtering handles much like narrow IF filtering.

The QRP Plus is the only QRP rig reviewed which includes a frequency synthesiser. Tuning is in 10Hz steps at 4kHz per revolution tuning rate or fast for rapid tuning. Split frequency operation and IRT are provided, together with 20 memories which also provide bandchange. The built-in iambic keyer has a speed range of 10 to 45WPM in steps of 1WPM under microprocessor control. The radio is very solidly constructed in a substantial aluminium case measuring 140W x 115H x 185Dmm and weighs a relatively heavy 2.2kg. The circuitry is contained on five PC boards. The current consumption on receive was about 140mA and on transmit peaked at about 1.4A for 5W output power.

ON THE AIR

THE TRANSCEIVER was very easy to use and the receiver clean with good sensitivity and overall gain. The receiver suffered somewhat less from strong signal overload problems on the LF bands than the other QRP rigs reviewed although there were a few phantom signals on the higher bands with a multiband antenna system. The audio quality on SSB receive and transmit seemed a little 'boxy'. This was due to the peaky characteristic of the IF filter. This measured only 1.3kHz wide at -6dB (figures in the table relate to the widest bandwidth setting of 2.4kHz). The narrower bandwidths on CW with the audio filter were very effective indeed. No microphone is provided, but any dynamic microphone will drive the transmitter and should be fitted with a stereo 3.5mm jack plug for audio and PTT. The full break-in CW performed very nicely but the review radio suffered from PA instability into even a 50Ω load. This was observed during measurements as high levels of spurious outputs and noise on the carrier. Checking further stock by the supplier showed that this was a one-off fault on the review radio and not the normal situation. Such is luck!

CONCLUSION

AT £699, THE QRP Plus is more expensive than all the QRP rigs reviewed in the October 1995 review, but it does have the best overall electrical performance, a higher level of features and covers all nine bands as well as general coverage receiver. The flexibility of audio filtering provided is not matched by any other receiver on the market, even the top end models costing £4000.

A matching miniature hand mic is available for £19.95.

The Index Laboratories QRP Plus is now readily available from Waters & Stanton Electronics, 22 Main Road, Hockley, Essex SS5 4QS (tel: 01702 206835) and I would like to thank them for supplying this equipment. ♦

The Willows, Paice Ln, Medstead, Alton, Hants GU34 5PR.

Frequency range	1.8 - 29.7MHz
Modes	CW / SSB
Frequency display	6 digit LCD
Supply	12V nom
S meter	yes
TX meter	relative power
IRT	yes
TX power	5W
Built-in keyer	yes
IF bandwidth	0.1 - 2.4kHz
Phone jack	yes
Noise blanker	no
RX attenuator	yes
Built-in speaker	yes
Price	£699

Table 1: Summary of facilities

Supply voltage	13V
Frequency band	14MHz
Sensitivity for 10dB s+n/n	0.6uV
IF rejection	60dB
Image rejection	68dB
3rd order intercept	+7dBm
3rd order dynamic range	85dB
Selectivity -6dB bandwidth	1.3kHz
Selectivity -60dB bandwidth	6.2kHz
S meter S1	1.1uV
S meter S3	2uV
S meter S5	5.6uV
S meter S7	18uV
S meter S9	70uV
TX power output CW	0 - 8W
TX power output SSB	3W
TX harmonics	-50dB
TX spurii	see text
TX SSB intermod products	-20dB
Freq display accuracy	600Hz

Table 2: Measured performance.

Data Stream

ROGER J COOKE, G3LDI
The Old Nursery, The Drift, Swardeston,
Norwich NR14 8LQ

THE REACTION I received to September's *Datastream* was most encouraging which I found heartening. Hopefully it will continue! However, please don't forget that the success of the column largely depends on the feedback I get from readers. The column can only survive with sufficient material and input from you.

PASSWORD CONFUSION

I RECEIVED A letter from Dan Sleigh, GM4BBF, who recounted an amusing episode involving passwords. I know Dan will not object to my relating his story. He decided to take his lap-top, and 2 meter hand-held to Benidorm on holiday, so that he could stay in contact with his son Iain, 2M1CGG. After a week of monitoring he managed to find EB5HLN on 144.625. Logging on presented Dan with a screen full of Spanish from which he eventually managed to decipher the message "contact Eduardo on the phone to get a password" from the Sysop. As it happens, Eduardo speaks no English and Dan very little Spanish, but he did manage, in poor Spanish to figure out the words: "Please speak more slowly."

After some trial and error, Dan discovered that "Please speak more slowly" was his password! So, Dan managed to send a message to his son back home. It was received four days after Dan returned from holiday!

ACORN INFORMATION

THE FOLLOWING DATA comes from Rick Sterry, G4BLT. The files themselves will be updated frequently but the Internet information will remain as stated. There is a growing interest in Archimedes and RiscPC machines. Indeed there are a few in Norwich, but compared to the ubiquitous PC, it is a small band of dedicated followers. It reminds me of the competition between VHS and Betamax video recorders. VHS won the overall battle with the market, but speak to any engineer and I feel sure he will confirm that, technologically speaking, it should have been the reverse.

Amateur radio software for the Acorn RISC machines (including Archimedes and RiscPC) is available for FTP on the Internet as follows:

Site: demon.co.uk

Dirs: /pub/ham/archimedes

/pub/archimedes/hamradio (get the file "!List.txt" first)

If you use this facility and download any of the files, please let Rick know as he would like to be able to judge the amount of interest there might be. His address is: I Richard Sterry I - Internet E-mail - I - Packet Radio - II Wakefield UK I richard@waveg.demon.co.uk I G4BLT@GB7WRG.#19.GBR.EU I

UPACK/WINPACK

PERHAPS THE HEADING should be the other way round! I seem to have stirred a minor hornets nest with the amount of bulletins on the network regarding which came first. The main reason for publicising both programs is to give credit to British authors. I feel sure that users of either program could not really care less which appeared first, only that such good software is being produced in the UK.

THE OLD XT

A LETTER FROM Roger Lee, G4JTK, has been passed to me in which Roger states that he has updated his old Spectrum set-up and has bought a Sinclair PC200. This is an 8086 based PC of the old XT type and Roger is struggling to get programs such as JVFAX and HAMCOM to run on this machine. He states that there is no hard disk drive at all and, without this, I fear his efforts may be in vain. A hard drive is a mandatory device in a PC these days. In fact, I have just had problems with my 130Mb hard drive and have had to update it to a 400Mb drive. Roger also states that he only has 500kb RAM - another limiting factor.

HIGH SPEED MODEM

A RADIO MODEM which provides high speed data transfer over normal narrow band radio channels has been designed by Matthew Phillips, G6WPJ, and John Ferguson, G8STW.

The Vfast28.8 GMSK is small and easy to interface to a range of packet radio Terminal Node Controllers (TNCs). A method of data modulation known as Gaussian Minimum Shift Keying is used to pass data as fast as practicable in the radio channel. GMSK modulation and demodulation and the modems control and data coding are done using the latest in integrated circuit devices. This gives a compact design and layout which is easy to build with high performance.

The Vfast28.8 modem provides the following features:

- Half Duplex data transmission between 3600 b/s and 38400 b/s.
- Easy bit rate selection by wire links.
- Simple plug fit to most types of TNC and PC based packet radio cards.
- Fits to TNC2 20 way modem disconnect header without modification.
- Fast receive data bit synchronisation and Data Carrier Detect generation.
- Built-in Data Scrambler and Descrambler.
- Suitable for use in 12.5 25 or 50kHz channels.
- True Morse code generation to meet Radio Authority license requirements.
- Built in PTT time-out timer.
- Easy to calibrate and modem set-up mode.

THEORY OF OPERATION

Frequency Shift Keying (FSK)

The simplest method of sending data signals over an FM radio is to use a frequency shift in one direction to represent a logic 1 and a frequency shift in the other direction to represent a logic 0. As an example, a transmitter may operate on a carrier frequency of 144.500 MHz and move its carrier down by 3kHz to 144.497 to signal a logical 0 and up 3kHz to 144.503MHz to represent a logical 1. Note that no audio sub-carrier is used. This is shown in **Fig 1**.

This method, known as FSK, in fact works well and is used widely at present on the UK network with the usual 2 meter and 70cm rigs. However, it has been shown that an efficient form of FSK occurs when the frequency shift (dF) is half the data rate (DR) of transmission. This form of FSK is known as Minimum Shift Keying (MSK). Expressed in mathematical terms, the definition of MSK becomes:

$$dF = DR/2$$

In the example in Fig 1 the total frequency shift is 6kHz. It can therefore be inferred that if MSK is being used with this deviation the data rate must be 12000 bits/sec. A further requirement of MSK is that the change from signalling frequency to the other must be done with a continuous waveform and with no phase discontinuities. This may not be true when using the Vfast28.8 modem but has no practical effect on its actual performance.

It is apparent that although the Vfast28.8 modem is described as a (G) MSK modem, this will only be true if the radio peak deviation is set up to be half the data signalling rate eg 7200Hz for 14400 b/s transmission speed.

GAUSSIAN FILTERS

The main reduction in bandwidth comes from the use of frequency shaping before FM modulation takes place. This is done by taking the square waves of the serial data signal and passing them through a low pass filter. One type of suitable filter is the Raised Cosine Filter which is used in some radio modem designs.

The Vfast28.8 modem uses a so called 'Gaussian Filter'. A Gaussian low pass filter is a filter which, when excited by a single impulse at its input, gives a Gaussian shaped output response. The shape known as a Gaussian curve is also sometimes known as a Normal Distribution curve.

The Gaussian filter provides an excellent shape for radio data applications. If the basic

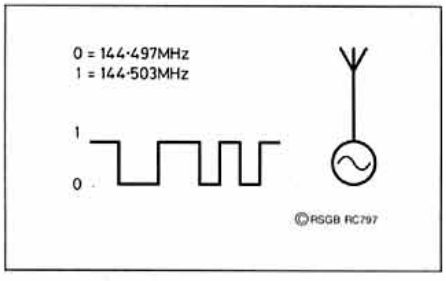


Fig 1: Using frequency shift keying, an FM radio can transmit in one direction to represent a logic 1 and in the other to represent a logic.

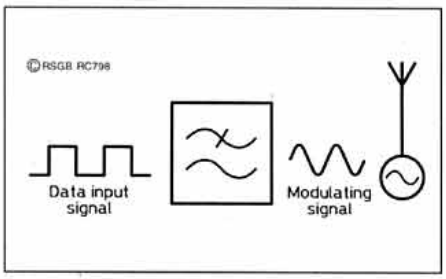


Fig 2: Resultant bandwidth reduction with the use of a Guassian Filter.

FSK transmitter is modified by the use of MSK and the addition of a Gaussian input filter to give a GMSK system, the resultant bandwidth of the data signal is now much reduced and is suitable for transmission by a narrow band FM radio. This is illustrated in **Fig 2.**

The frequency at which the low pass Gaussian filter starts to filter has a direct influence on the bandwidth used for transmission. The lower the frequency relative to the data rate of the signal, the narrower the transmission spectrum, but the higher the likelihood of bit errors during transmission. The ratio of the -3dB point of the low pass filter (F1) to the data rate is known as the BT value. This can be shown by BT=F1/DR.

The Vfast28.8 design provides the ability to select two BT values (0.5 and 0.3) for each data rate.

As a guide, the following figures can be regarded as the maximum data rates which can be achieved in different channel bandwidths using BT values of 0.5 and 0.3:

BT=0.5	BT=0.3
4800 b/s in	12.5kHz 8000 b/s in 12.5kHz
9600 b/s in	25.0kHz 16000 b/s in 25kHz
19200 b/s in	50.0kHz 32000 b/s in 50kHz

GMSK as a method of transmission is simple and effective. It does, however, require care with some points. These mainly concern the transmission of long strings of '1's and '0's.

A string of 1000 logic '1's will appear as a single frequency shift at the beginning of the string and a further frequency shift at the end of the string. This can lead to problems with the receiver not being able to track the incoming signal correctly. Both bit timing and lever information can be lost. When a BT value of 0.3 is being used, problems also occur with single bits bounded by their complement being sent repeatedly. For example, the bytes '00010000' or '11111110' sent many times over can cause the GMSK demodulator to give out bit errors.

All problems of this type can be avoided by the use of a data scrambler or randomiser in the modem design. The Vfast28.8 modem includes this function in the modem controller device. As the data will still contain some low frequency content, the radios must be able to carry without distortion frequencies as low as 30Hz in transmit and 40Hz in receive. The upper frequency limit required is dependent on the data rate used.

The modem uses only four integrated circuits and will fit inside most types of TNC. Changing speed does not need changing components on the PCB. A true Morse ident code is also sent to ensure operators stay within the terms of their licence. The modem is supplied as a minimum kit of parts, which contains a high quality double sided PCB with full ground plane, a pre-programmed microcontroller and the full manual. The manual contains complete theoretical and circuit descriptions, parts lists and circuits. Bench and air tests have been carried out to demonstrate compatibility with the G3RUH 9600 baud modem.

Sysop 17 delegates gather during a break from the debate.

The price for the PCB, micro-controller and manual is £39.50 including postage and packing. The manual can be obtained on its own for £10 which is fully discounted from the full kit price when ordering the remaining parts. A built and fully tested modem can also be supplied for £84.50.

Further details can be obtained by writing to GMSK Products, 80 Colne Road, Halstead, Essex CO9 2HP.

The Norfolk AX25 Group is hoping to install a regenerating repeater soon on 23cm, and will be using these modems at both the repeater (GB3NP) and BBS sites running the German Gigtech radios. This should help with the hidden node syndrome and also take all traffic off the lower bands, providing more user access and improve the coverage for the local area.

FOCUS ON SYSOP 17

LIVELY AND SOMETIMES controversial debate ensued at the Sysop meeting held in Coventry on 8 July. The meeting lasted virtually the whole day with an opening address from Tom Lilley, G1YAA, the Chairman of the DCC.

During the question and answer session that followed, Tom stated that the introduction of passwords had been negated with the suggestion that having passwords would provide a challenge to the 'bad apples' .

However, after a lengthy discussion, the meeting convinced Tom to go back to the Radiocommunications Agency and discuss the subject again. It was pointed out that there are several systems which could be introduced which would be very difficult to break and could deter most, which is the object of the exercise.

Several subjects were discussed, among which was the use of 7plus. This was considered to be a useful feature of the BBS if used sensibly and according to the Guidelines. Holding locally generated bulletins was also recommended and frequent sysop editing of the BBS to prevent abuse of the system was suggested.

The photo (above) shows the majority of those who attended the meeting. The picture was taken by someone whose callsign I have unfortunately mislaid! If he sends me a packet message I will credit him for the photo in the next *Datastream*.

PRIVACY ENSURED

ON THE THORNY SUBJECT of passwords, Leigh Porter, G7IUB, suggests using PGP, Pretty Good Privacy, which is a very effective and popular public key encryption system, written by Phillip Zimmerman in the USA.

DESCRIPTION

If two people, call them A and B, want to send messages to each other over an insecure network, their best method would be to use cryptographic methods to do so. The problem with most cryptographic systems is that they base the encryption on a password, which obviously must be exchanged on a secure network, but if such a network were available in the first place, there would be no need for cryptography to be used!

The answer to this problem is in the form of public key cryptography, as implemented by PGP. Public key cryptography works by having two special 'keys'. One key is a secret key, this key *must* be kept secure on your system. The other key is a public key, this key would be spread amongst everybody over the network, be it secure or insecure.

With public key cryptography you need both keys to decode a message, but only one key to encode the message, hence when A wants to send a secure message to B, all A does is to encode the message with B's public key, and send it out to B over the insecure network, where any interceptor of that message would be unable to decrypt the message.

When B receives this message, he will use his special secret key to decode the message and read it.

ELECTRONIC SIGNATURE

The PGP software, which incidentally is free to be used by anybody, and is perfectly legal, has a neat feature that we can put to good use.

This feature is called the electronic signature. This puts an electronic signature at the end of all your messages, this signature is based on the secret key and the contents of the message will ensure that *only you* can possibly have sent that message, and any-

CONTINUED ON PAGE 77

Emergency

GREG REILLY-COOPER, G0MAM
PO Box 98, Northwich, Cheshire CW9 5SZ.
Telephone: 0606 783270.

TWO FULL YEARS HAVE passed since I first took up the duties of Emergency Communications Officer. I can say in all honesty that the time seems to have flown. It is a rare privilege to be entrusted by so many of you with your confidence and support and I am most grateful to you all for your help - especially when it is realised that you do all the work and I just sit out here in Cheshire and talk about it!

The network is on a very much firmer footing now than it has been for some time. As I have often remarked, we are all members of one network and we see evidence of this time and time again, when members travel to other groups, sometimes across the country, to help out with larger events which the host groups may have had difficulty manning without help. Nevertheless, I am often asked if I can say how we have chosen in the 'affiliation stakes'. It's a fair enough question - a bit like motorists wanting to know how many other motorists joined the AA, the RAC, or preferred to go it alone. I suspect that the answer may surprise some of you. The current situation, expressed as percentages of the whole network is as follows:

Member Groups of RAEN - 33.5%. RSGB-affiliated Groups - 27.8%. Autonomous Groups - 33.5%. Groups with a foot in both camps (affiliated with the Society and members of RAEN) - 5.2%. The figures are derived from an audit of the Groups on the ECO database and not from individual membership totals. Individual membership totals are less reliable and more volatile but indicate a change to the order shown above.

It is clear from those figures that no one section of the network can legitimately claim to be *the* Raynet and perhaps the one thing we need to bear in mind, therefore, is that no one section should unilaterally take any action which affects, or is likely to affect, the whole of the network. Since Raynet must not be allowed to stagnate, however, changes are inevitable. We obviously need some kind of liaison among the three sections. Is this something which the RSGB ECO should continue to try to achieve or is there a better alternative? If you have any ideas, please let me know.

VOX-OPERATED RECORDING

THERE IS OFTEN AN application in our Raynet activities for a vox-operated recording of our radio traffic but the commercial equipment designed for the task is very expensive. A member of one group has now designed a very efficient and affordable transceiver-cassette recorder interface which should put the facility within reach of any group and the prototype is already available for field-testing. Once field-tests have been completed, it is anticipated that the construction details will be made freely available but the designer would very much like to have the prototype put through its paces first. If any group would like to do that for us, please contact me as soon as possible.

GLOBAL POSITION SATS

I WONDER HOW MANY of you have heard of Global Position Satellites (GPS) - that wondrous technology which allows you, with the aid of a box little larger than a pocket calculator, to know exactly where you are? Yachtsmen already use such equipment and the APRS packet software used by some Raynet groups was written to allow the changing positions of key personnel carrying GPS equipment to be shown on a constantly updated map on a PC screen whilst operational message traffic is being relayed via packet. Until quite recently, the cost of GPS equipment was prohibitive but it has now become available at very much more reasonable prices.

It is hoped to carry a review of one such unit in the next *Emergency!* column but, in the meantime, I should like very much to hear from anyone who has experience of using GPS and who could comment upon its potential value for Raynet applications.

BAR-CODE READERS

SEVERAL MONTHS AGO, I posted on packet a request for help in obtaining affordable bar-code readers on behalf of a member who felt the readers might have an application within our operations. No-one was able to help at that time. Now, however, the member concerned is asking for help interfacing such readers to packet. He has apparently solved the supply problem but would like some help to link the reader directly into packet. If you think you can help, please let me know.

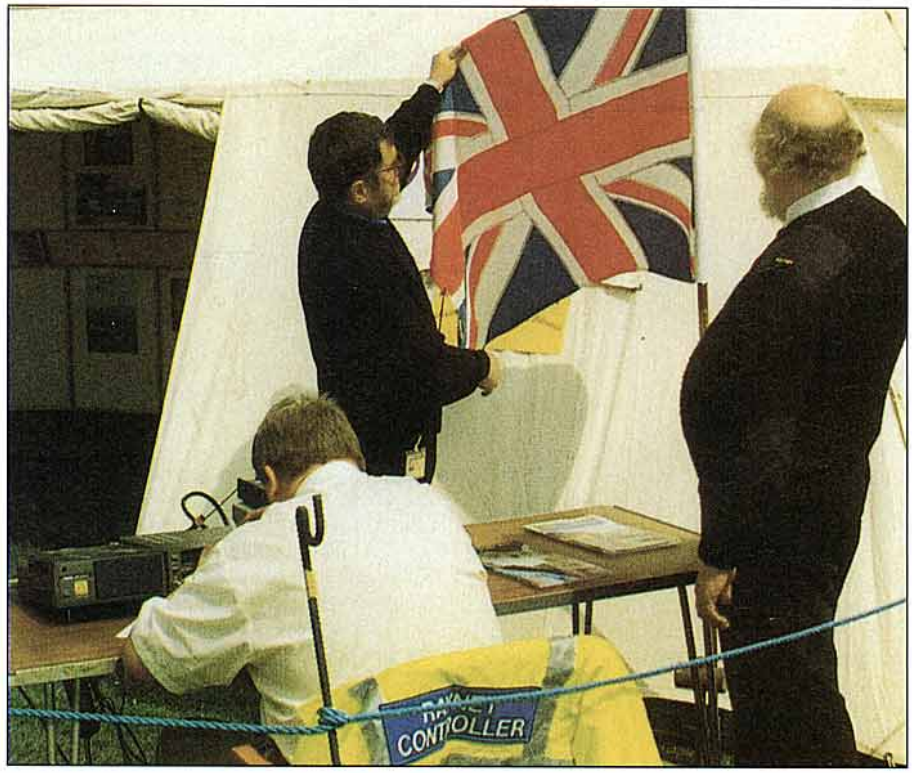
HOME OFFICE COLLEGE

THE ANNUAL COMMUNICATIONS Workshop at the Home Office Emergency Planning College near York takes place in October each year. This year has seen a new course leader, a changed itinerary and a massive rise in attendance fees (500%, after allowing for the 50% discount given to voluntary agencies such as Raynet). This combination has deterred many members from attending this year and I would very much like to hear from anyone who did go. Is the new itinerary of benefit to Raynet? How many of our members attended? What were your overall feelings about the course?

HEAD FOR THE HILLS

USERS OF PACKET WILL know that I am a great believer in the concept of inter-group support and regularly re-post invitations from groups hosting large events to any volunteer willing to travel and join them. One such regular event which I am always happy to promote is the annual District Mountain Advisors' Challenge in the Lake District, run by Sunderland Raynet who provide safety comms for Sunderland Venture Scouts.

The attraction of this event is the combination of learning experiences which it presents for visiting operators. The topography is challenging in both physical and RF-path terms. The comms requirements of the organisers are extensive and subject to alteration at any time as the event develops, and the operators are invariably drawn from a mixture of groups well outside both the Lake District and Sunderland groups' home territory. The Scouts' planning is incorporated neatly into an exemplary operational plan drawn up by the group and distributed in good time to all operators. It really is an event not to be missed if you can spare the time to help. ♦



Are you sure it's the right way up now, Frank? From left: Terry Elliot, G0EHX; Jim Emerson, G0BAN; Frank McLoughlin, G1GAD.

Satellites

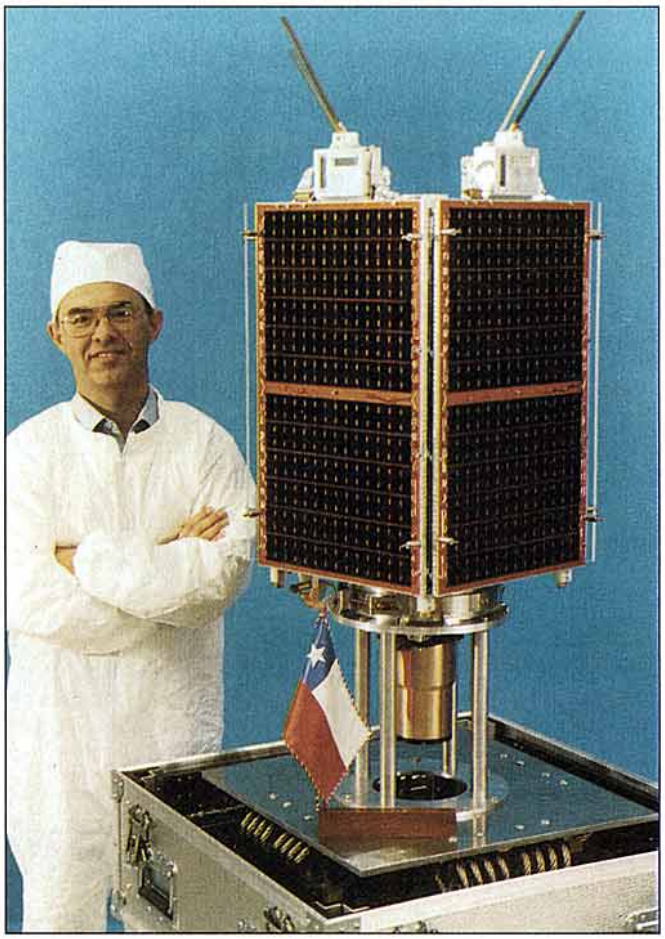
ARTHUR GEE, G2UK
21 Romany Road, Oulton Broad, Suffolk
NR32 3PJ

SSTL - SURREY SATELLITE Technology Limited - must be one of the most laudable establishments to come to the fore in recent years. Formed at the University of Surrey in 1985, the firm set about making the cost-effective small satellite technique - developed by the university's UoSAT researchers - available to the commercial market. Although independent from the university, SSTL retains close links with the advanced research and educational facilities on the campus.

As a professional company specialising in satellite activity, its aim is to provide sophisticated, rapid, reliable and cost effective solutions to customers' space requirements, offering a complete service from order to orbit.

In the last five years SSTL has built and launched more than 10 microsatellites for commercial customers requiring communication services, remote sensing, technology verification and space science missions. The company has also completed highly successful satellite technology transfer programmes for emerging space nations - helping them take their first steps into space and supporting their growth toward increasingly demanding missions.

Spacecraft are assembled by ESA-qualified personnel working under strict clean-room conditions. They use well-tested procedures for integration and environmental testing which is designed to achieve the very best space craft ready for launch, on time and in budget. Once a satellite is in orbit, the SSTL Mission Operations Centre can support commissioning, housekeeping and payload operation. The SSTL Mission Operating Centre is presently responsible for eight microsatellites in low earth orbit, tracking up to 80 transits per day with a fully automatic satellite tracking and data collection system. To date it has more than 35 orbit-years experience in space craft control and operations. The missions completed are as follows:

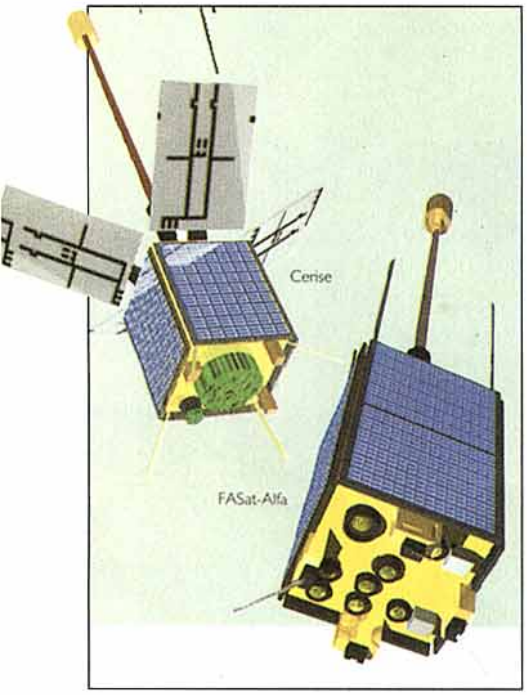


Professor Martin Sweeting, OBE BSc PhD CEng FIEE FRAE FBIS with the Chilean satellite FASAT-Alfa, the latest in the series of small satellites built by Surrey Satellite Technology Limited.

- UoSAT-1: Launched 1981. Delta launcher. The first experimental microsatellite from Surrey carried research, technology demonstration and educational payloads.
- UoSAT-2: 1984. Delta. Built in only six months. Carries the first modern digital S & F communications payload and prototype CCD camera.
- UoSAT-3: 1990. Ariane. The first of SSTL's modular microsats. Launched on the ASAP. Carries an operational S & F communications payload for SatelLife and Data Trax Inc (USA).
- UoSAT-4: Ariane. Launched alongside UoSAT-3. The microsat operated perfectly for two days before a failure occurred in the downlink.
- UoSAT-5: Ariane. 1991. Carries S & F communications and Earth Observation payloads, replacing those which were lost on UoSAT-4.
- KITSAT-1: 1992. Ariane. Korea's first satellite achieved via a technology transfer programme with SSTL - carries S & F communications, DSP and Earth observation payloads.
- S-80/T: 1992. Ariane. An industrial research microsatellite built by SSTL for Matra and CNES (France) to carry out 'little LEO' communications service experiments.
- PoSAT-1: 1993. Ariane. Portugal's first satellite achieved through a technology transfer programme with SSTL. Carries S & F, DSP communications and Earth observation payloads.
- KITSAT-2: 1993. Ariane. Korea's second satellite - built in Korea - via the technology transfer programme with SSTL. Carries S & F, DSP communications and Earth observation payloads.
- Healthsat-2: 1993. Ariane. S & F communications satellite operating in the SatelLife 'HealthNet' LEO satellite communications network for remote regions.
- CERISE: 1995. Ariane. A military research microsatellite built for Alactel and DME (France).
- FASAT-Alfa: 1995. Tsyklon. Chile's first satellite achieved through a technology transfer programme with SSTL. Carries S & F DSP communications, ozone monitoring and Earth observation payloads.

The latest project, FASAT-Alfa, will cost a mere three million pounds, which will include the training of eight engineers and a tracking ground station in Santiago.

I am sure that those involved from the start, when UoSAT was launched, will join me in congratulating Martin for the way he has led his team of workers at SSTL. He deserves praise for the remarkable progress the firm has made in achieving success from humble beginnings in such a short time. His OBE is well deserved. ♦

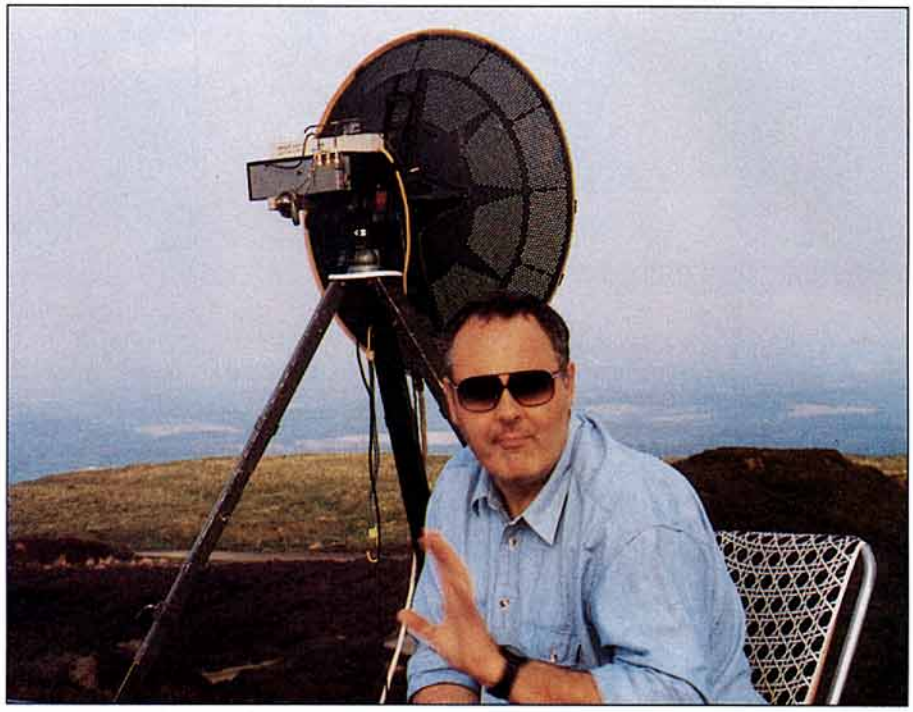


SSTL's two most recent microsatellites-CERISE and FASAT-Alfa.

Microwaves

MIKE DIXON, G3PFR
'Woodstock', Gazebank, Norley, Warrington, Cheshire WA6 8LL

THE NOW CUSTOMARY November Round Table at Martlesham, courtesy of British Telecom management and the Martlesham Radio Society, is to be held on Sunday, 12 November at BTRL, Martlesham Heath near Ipswich. For security reasons the entry arrangements are, as usual, by advance booking only. More information and tickets are available, free, from Roy Smith, G0RRC, 'Lykkebo', The Street, Burstall, Ipswich, IP8 3DN, on receipt of an SASE. It is necessary to give the names of all the applicants if you are applying for more than one ticket. The event will commence at 1000UTC and will include Round Table sessions as well as test equipment and bring-and-buy facilities. This month's programme will no doubt address the question of 24 and maybe 47GHz operating, as these seem to be topics of the moment!



Martyn Vincent, G3UKV, on Brown Clee, Shropshire, on 10GHz with the Telford and DARS during the 10GHz Trophy contest.

LADDERS UPDATE

THE POSITION ON the ladders, as of mid-September, is as shown in **Table 1** (1995 Operating Ladder) and **Table 2** (All-Time Squares/DX Ladder, extended to cover both 10 and 24GHz). There have been a number

Band GHz	Pos	Callsign	Stns Wkd	Best DX (km)	Multiplied Score
10	1	G4FCD	85	1022	86870
	2	G0VHF	71	877	62267
	3	G4DDK	41	901	36941
	4	G4BRK	55	561	30855
	5	G3FYX/P	58	435	25230
	6	G3PHO/P	53	422	22366
	7	G3GNR	47	423	19881
	8	G3FYX	35	538	18830
	9	G4EQD/P	35	423	14805
	10	G8LSD/P	39	375	14625
	11	G(W)4BRK/P	26	509	13234
	12	G8VOI/P	38	338	12844
	13	G8DKK	24	522	12528
	14	G3JMB/P	34	282	9588
	15	G8APZ	22	426	9372
	16	G3JMY/P	30	307	9201
	17	G3UKV/P	32	279	8928
	18	G4JNT/P	32	260	8320
	19	GI3UKV/P	16	434	6944
	20	G3ATM/P	20	294	5880
	21	G1MPW/P	21	277	5817
	22	G3UKV	13	279	3627
	23	G3NWU/P	8	335	2680
	24	G3CU/P	11	203	2233
	25	G3PHO	2	469	938
	26	G8AYY/P	7	93	651
	27	G3JMB	2	87	174
24	1	G4KNZ/P	13	154	2002
	2	G4DDK	6	268	1608
	3	G3FYX/P	8	154	1232
	4	G3PHO/P	6	126	756
	5	G3WDG	3	135	405
	6	G8AYY/P	3	93	279
	7	G4EQD/P	1	85	85
47	1=	G4KNZ/P	1	25	25
	1=	G8KMH/P	1	25	25

Table 1: 1995 Operating Ladder positions (from 1 January 95) as at 13 September, 1995.

Band GHZ	Pos	Callsign	Locator	Squares	Countries	Best DX (km)
10	1	G3WDG	IO92RG	53	16	1135
	2	G4KGC	IO92RG	50	15	1135
	3	G4FCD	IO91KX	44	13	1062
	4	G4BRK	IO91DP	33	12	1115
	5	G0VHF	JO01PU	30	6	877
	6	G8APZ	JO01DO	26	8	1026
	7	G4DDK	JO02PA	26	8	901
	8	G8BCH/P	IO90JO	25	7	*1177
	9	G3GNR	IO70WT	25	8	819
	10	G3FYX/P	IO91GI	25	9	787
	11	G3KEU/P	IO91GI	22		787
	12	G4LDR	IO91EC	18		1118
	13	G3JMY/P	IO81RM	17	5	1137
	14	G4KNZ	IO91PJ	17	6	1052
	15	G8DKK/P	IO91VX	16	5	578
	16	G3PHO/P	IO93EH	16	4	338
	17	G4MAP	IO82WJ	16		309
	18	G8LSD/P	IO90TV	16	4	304
	19	G3JMB/P	IO90TV	15	4	304
	20	G3UKV	IO82RR	15	7	494
	21	G4PMK	IO93GT	14		958
	22	G4RFR/P	IO80UU	14		414
	23	G4JNT	IO91IV	14	4	339
	24	G8VOI/P	IO90MX	13	3	338
	25	G8AGN/P	IO93EH	12		338
	26	G3NWU	IO94JQ	11	4	634
	27	GW4MAP/P	IO82JG	11		311
	28	G3ZME/P	IO82QL	10		270
	29	G0API	IO80XS	9		405
	30	G0API/P	IO80UU	8		277
	31	G3NWU/P	IO94MJ	5	2	335
	32	G3PHO	IO93GJ	4	3	618
	33	G3JMB	IO91WA	4	1	87
24	1	G4DDK	JO02PA	4	2	*268
	2	G3PHO/P	IO93AD	3	2	126
	3	G3WDG	IO92RG	3	1	135
	4	G4KNZ/P	IO83RO	3		120

*UK Record

Table 2: All-Time Squares/countries Worked. As at 13 September, 1995. Ranked on Squares Worked.

of very significant changes since the ladders were last published, notably that new UK records on 10 and 24GHz have both been established. Another landmark is that Charlie Suckling, G3WDG, has passed the 50 Squares Worked mark on 10GHz and his XYL Petra, G4KGC, has reached the 50 Squares milestone (see Table 2).

Please remember, that for entry to the All-Time table, all contacts must be made from one location, unlike the Operating Ladder where entries can be made from any location, fixed or portable (the only thing being, please keep the fixed and /P entries separate!).

An account of the recent five day DXpedition to GI and EI by Martyn Vincent, G3UKV, and other members of the Telford and District Radio Society, makes interesting reading and had some effect on the tables. I must apologise for lack of advanced notice for this expedition; it arrived too late for inclusion in this column. The dates were 27 to 31 July inclusive, with the prime site of operation Aughrim Hill, Co Down, Locator IO64XC at 820ft ASL. Overnight damp "got to the TWT PSU", so that Martyn's station ended up running 1W (solid state) instead of the beefier TWT. Despite these difficulties, 18 stations were worked, all two-way, except for G3VKV and G4UVZ.

Stations over 300km included G4FCD (402km), G4MAP (322km), G3KEU/P and G3FYX/P (434km), G3PHO/P and G4NWU/P (327km), G3WDG and G4KGC (419km), G4PBP (310km), G4BRK (400km) and G3GNR (a real struggle at 387km). 'One ways' included G3VKV (362km) and G4UVZ (398km). Two of the most remarkable contacts were with G0IVA/P (Sutton Common, Cheshire, at 278km) and G3FNQ (Southport, at 204km) who were both S9+30dB during the afternoon for long periods of time. This suggested some kind of sea duct over the Irish Sea, although Martyn's location was well above sea level!

It was interesting to note that G3FNQ's personal beacon signal was typically S2-3 each morning, peaking to S9+ on three days out of five in the early afternoon. Meanwhile, Dave Hall, G8VZT, part of the same expedition, had a successful time on ATV using 'legal' permission from the Eireann licencing authority to conduct 10GHz and 24GHz experiments. New 'firsts' included GI8VZT/P to EI2AK/P and EI/G8VZT/P to G3FNQ (219km). The first GI to GI ATV contact on 24GHz took place over a few kilometres. There was no opportunity to use what was believed to be the first 24GHz permit in EI. Well done, all those who took part.

Finally, can I remind all microwave operators that the microwave calling frequencies (144.175MHz and 432.350MHz) are just that. Call there, then move off to an adjacent frequency. There have been some recent complaints that these frequencies are used as 'natter' channels and not just for calling.

FINALE 1995

AS THIS IS THE LAST column of '95, I would like to wish all microwave operators a very Happy Christmas and a prosperous and successful 1996.

I believe that over the next year or two we're going to see even more successes in operating achievements; the results improve steadily year by year.

However, we're also going to see some fairly drastic changes in the shape and size of our cherished microwave bands. This is principally because of commercial pressures within and outside Europe but also, to a great degree, due to bureaucratic pressures from within Europe - more specifically from CEPT/ERO, which represents the most heavily populated region of ITU Region 1.

Nonetheless, Region 1 includes vast areas of Asia and Africa where I'm sure the pressures on the microwave spectrum are not nearly so great.

I must admit I find it difficult to comprehend why we need thousands of MHz of radio spectrum space for broadcasting so many mindless programmes when amateurs, worldwide, ask for a few hundred MHz of widely spread primary exclusive microwave spectrum for experimental and self-training purposes.

The trouble is that once it has gone, it will never be replaced and we are perceived as already having too much spectrum which we don't use! The Christmas message this year is: *use it or lose it!* ♦

The E-mail given for Martyn Kinder, G0CZD, in September's *Microwaves* column was incorrect. Please note that his E-mail is: M.g.Kinder@wak0103.wins.icl.co-uk .

CONTINUED FROM P73

body with PGP and your public key can see that the electronic signature is correct and that the message did indeed come from you. Nothing in the message is encrypted and the contents are fully readable.

PGP only takes a second, if that, to check each message and it could even be incorporated into an M-filter if needed. This method ensures that not everybody has to run PGP, but those who do can be sure that their messages are neither tampered with en route, and that nobody may send out a pirated message without it being checked and held if necessary.

The way public keys are handled is also very important, to avoid 'key spoofing', where a pirate sends out a fake key, PGP has special key management features that require each key be suitably authorised by the sender, and that whenever a key is replaced, it is done so with a special 'Key Replace' message that can only be sent by the holder of the secret key.

Leigh states that he is willing to write the needed servers for FBB/Linux/JNOS etc that will find any message with a PGP signature on the end, and check it with the sender's public key, this key previously being distributed by sending it to say PGPKEY @ GBR. All these servers will build up a database of user's public keys. Leigh also says that PGP has been in use for some time now on his local TCP/IP network. PGP is also used on the Internet where it has helped to reduce considerably the amount of spoofed mail and news.

Personally, I feel it is about time we instigated some of these password and/or security systems on every BBS, to avoid some of the crass bulletins emanating from questionable people.

BARTG ON THE WEB

BARTG NOW HAS pages on the World Wide Web. The address is: http://cs.nott.ac.uk/~ibx/BARTG/

Anybody is welcome to browse the pages there. Secretary of BARTG Ian Brothwell updates the pages regularly. Other handy Internet addresses for BARTG members are as follows:

- G3ZYP (Chairman and publicity) g3zyp@anglianet.co.uk
- G4EAN (Secretary) ibx@cs.nott.ac.uk
- G0ARF (GB2ATG Editor) bcanning @kc3ltd.dircon.co.uk

While on the subject of Internet, I have the ability to receive mail and files etc via the efforts of a very good friend and local amateur, Mark Taylor, G0LGJ. I have not invested in the system myself as yet (I am still only just considering a fax machine!). Mark has provided me with lots of information from Midi-files for my music keyboard to the latest information from TAPR and Keps for my satellite server. If you wish to send any information for inclusion in this column, the address to use is as follows: mtaylor @uk.mdis.com ♦

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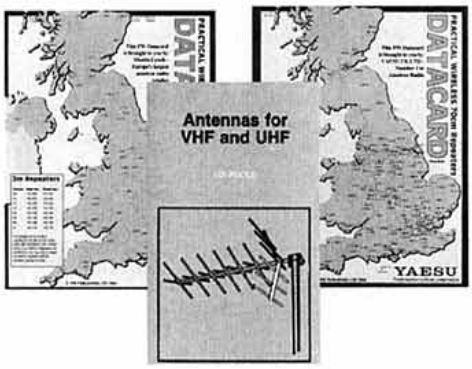

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RADCOM CONTEST FEATURE

RSGB National Field Day 1995

by Chris Burbanks, G3SJJ*, Chairman VHFCC

CONTESTING IS a unique and important aspect of Amateur Radio, in that it offers the self-training and technical challenges that are very much an integral part of the service. National Field Day continues to contribute to these challenges, whether they be antenna design and construction, band and propagation knowledge, computer techniques or just keeping a generator going for 24 hours.

An excellent Sporadic E opening on 28MHz during Sunday morning with lots of European activity brought good news for stations located in the west, but not so good for others. Astute operators had been monitoring the band during the previous week and had noted openings to Spain and Central Europe although these were mainly in the afternoons.

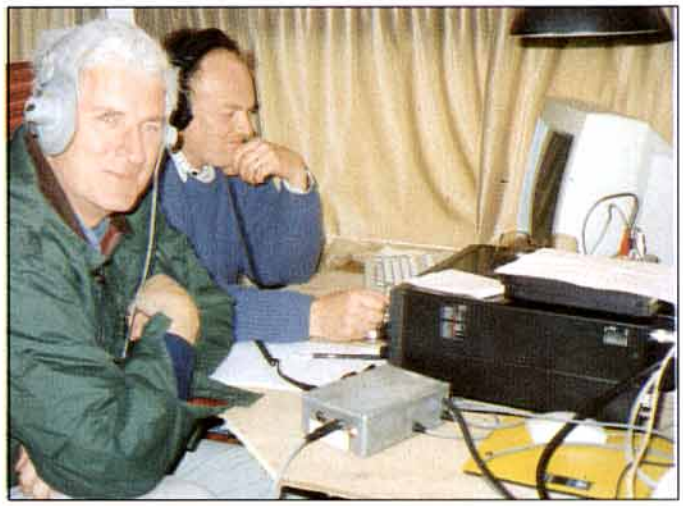
Technology and Ingenuity

IN THE PAST, the **Open section** has been dominated by lots of metalwork: mobile towers, multi-element beams on the higher bands and more recently two-element 7MHz beams. This year saw a change in philosophy by the **Parkair Electronics team, G3KHZ/P**, who successfully used a typically Restricted section antenna system strung between two 20m masts to win the section by a comfortable margin. Making full use of the computer interface available in modern radios, the group used CT logging program to control band changing of radio, computer and antenna matching unit. The three operators, **G3KHZ, G3PJT** and **G3TMA** used a three hours on and six hours off rota, with two hour stints at the end to provide a relaxed operating schedule.

There was a substantial battle for second place, resulting in just 10 points separating two groups on claimed score. Logging accuracy became the deciding factor and **Addiscombe ARC, G4ALE/P**, won with their well-established team consisting of **G3SJX, G3UFY, G3VYI, G3WRR** and **G4CZB**. It is always interesting to read the Group's comments so I will let Quin, G3WRR, take up the story: "Generally the aerials worked well. On 160m we had a full-wave horizontal loop at 60ft; on 80m an inverted V at 60ft plus the loop; for 40m an inverted V dipole at 40ft, a full-wave vertical loop and the horizontal loop. On 20/15/10, a Cushcraft A4 at 45ft plus dipoles at a quarter wave high. This year's 'folly' was the low dipoles (we always have a folly - an antenna which seems foolish and probably won't work, but just might!) ELNEC antenna modelling software predicted that they should give more high angle radiation than the beam and thus be good into Europe. In fact, they were doubly foolish as they had been tried a few years ago and had not worked then. I was truly convinced that we knew what we had done wrong and that we should try again. They lived up to the true tradition of follies by not working this time either. Never mind, one year we will find one that does work!"

De Montfort University ARC, from **Leicester, G3SDC/P,** came back in style with a technique from the past using five teams consisting of an operator and a logger. A total of 11 callsigns were listed on the summary sheet. A concerted team effort which paid off, although incurring a higher error rate.

It is in the **Restricted section** where perhaps the most rivalry exists amongst the top groups. Once again, the **Gravesend Radio Society, G3GRS/P**, trio of operators **G4BUO, G4FAM and G4IFB** clinched first place and highest overall score. Well proven Search and Pounce skills put them well clear of their closest competitors in spite of only four contacts difference on claimed score.



Dennis Andrews, G3MXJ, and Clive Penna, GM3POI, at the leading Scottish station and 14MHz band leader, GM3POI/P.

Lichfield ARS made a significant improvement on previous years by operating from their mountain side location, although suffering badly from high winds and torrential rain. Operators **G3LNS** and **G3NKC** used a four hour operating rota and made good advantage of the Sunday 28MHz opening. **Table 1** shows a comparison of points per contact between the two top groups in the restricted section and clearly highlights the difference between hunting for the four point /P stations and mainly calling CQ.

In third place, the **Orkney Radio Group, GM3POI/P,** managed extremely well with a 35ft vertical. Operators **GM3POI** and **G3MXJ** did not have the advantage of the 28MHz opening or else they may have been strong contenders for top spot. As they say, "1996 may be our turn!" Despite the inherent antenna inefficiency on the two lower bands, a creditable score was nevertheless obtained there.

Band Reports

1.8MHZ. Band leader was **Bracknell ARC, G4BRA/P,** who decided on a single band entry for something different. They found the approach most enjoyable arriving on site at 1500 and were home in time for breakfast. Their 211 contacts earns them the certificate they were competing for! Multi-banders **G3KHZ/P** and **G3GRS/P,** leaders in their respective Open and Restricted sections, were within one contact of each other. Again, the search and pounce techniques of the Gravesend group paid off with a difference of some 35 points, equivalent to another four or five contacts. It is interesting to note that these two groups were only 23 contacts down from the single band effort of Bracknell. Action began earlier this year with stations appearing from 2000. There was plenty of DL activity although lower than usual from European countries not participating in Field Day. No DX was reported.

Call	1.8	3.5	7	14	21	28	Overall
G3GRS/P	3.66	3.71	3.63	3.43	3.60	3.52	3.60
GW3LNS/P	3.67	3.47	3.45	3.31	3.31	3.11	3.41

Table 1. Points-per-contact of top two stations in Restricted section.

*16 Colgrave Rd, Plumtree, Nottingham NG12 5NX.

RSGB HF National Field Day 1995 - The Results

RESTRICTED SECTION

POSN	GROUP	CALL	160		80		40		20		15		10		QSOs	SCORE
1	Gravesend RS	G3GRS/P	184	1344	233	860	219	789	182	616	140	507	97	668	1055	4784
2	Lichfield ARS A	GW3LNS/P	179	1288	198	679	217	751	206	670	115	376	140	456	1055	4620
3	Orkney RG	GM3POI/P	162	1184	148	551	213	756	336	1059	76	266	59	376	994	4193
4	Red Dragon CG	GW8GT/P	137	990	185	638	147	529	225	684	72	235	174	1054	940	4129
5	Three A's CG	GW0AAA/P	141	1052	172	636	208	729	159	506	59	206	159	948	898	4078
6	South Downs CG	G4FNL/P	159	1132	190	680	170	600	176	586	102	361	100	682	897	4042
7	Mid-Beds CA	G4MBC/P	148	1102	198	711	208	737	166	561	91	320	88	586	899	4016
8	Chiltern DX Club	G3OZF/P	161	1210	211	775	209	766	172	580	61	230	59	426	873	3988
9	Reading & DARC B	G3ULT/P	126	918	161	589	206	704	233	763	112	383	92	610	930	3967
10	Oxford & DARS	G5LO/P	140	1068	202	725	190	684	143	494	85	306	88	602	848	3880
11	Newbury & DARS	G3WOI/P	132	984	117	629	207	736	144	477	50	184	120	822	830	3833
12	Echelford ARS	G3UES/P	140	1038	198	688	196	711	117	382	104	369	72	486	827	3675
13	Cornish RC	G4CRC/P	81	590	144	521	165	609	168	575	58	209	132	872	748	3376
14	Cumbria CC	G3IZD/P	111	808	170	642	150	525	190	610	11	34	105	684	737	3304
15	Sutton & Cheam RS	G2XP/P	139	1044	117	444	159	573	168	543	91	312	51	328	725	3245
16	Lincs Poachers CG	G3PDL/P	124	900	191	678	194	735	176	549	63	234	22	144	770	3241
17	Stratford on Avon	G0SOA/P	123	972	163	593	161	596	128	418	92	337	39	276	706	3192
19	Taunton & DARC	G3XZW/P	134	998	119	464	129	473	102	355	58	204	88	600	630	3096
20	Windmill CG	G0FBB/P	127	938	167	617	129	455	101	320	45	163	77	558	646	3053
21	East Barnet ARCC	G6KQ/P	140	998	177	635	192	708	101	320	18	52	36	262	664	2976
22	Crawley ARC	G3WSC/P	144	1014	141	531	160	532	123	394	54	201	40	258	662	2929
23	Tollesbury CG	G3GLL/P	142	1056	136	518	137	521	125	437	21	80	35	254	596	2866
24	Scarborough ARS	G4BP/P	128	964	140	507	150	550	101	358	21	78	24	180	564	2638
25	Southgate ARC A	G3ZVW/P	104	808	127	480	118	431	133	451	44	163	39	268	565	2601
26	Gloucester ARS	G3MA/P	108	770	118	433	178	615	150	462	21	64	29	184	604	2529
27	Ilford RSGB Group	G3XRT/P	123	888	103	393	158	551	143	488	3	12	21	156	551	2489
28	Leicester RS A	G2AA/P	124	898	115	398	112	420	189	601	21	80	12	90	573	2488
29	Chesham ARC	G3MDG/P	59	428	134	519	172	599	140	451	13	52	47	310	565	2360
30	Norfolk ARC	G4ARN/P	77	600	147	553	178	651	90	293	5	15	27	206	524	2319
31	Reading & DARC A	G0RSR/P	38	270	83	310	140	473	106	340	59	204	106	718	532	2317
32	S Manchester RC	G3FVA/P	68	502	116	391	103	392	130	429	29	110	64	424	510	2249
33	Havering & DARC	G4HRC/P	113	748	176	573	161	515	60	211	20	69	4	28	534	2144
34	Chelmsford ARS	G0MWT/P	60	470	160	564	186	627	80	278	38	136	8	62	532	2138
35	Greenock DARC	GM3ZRC/P	0	0	81	294	102	393	155	517	76	264	14	84	428	1554
36	Strathmore ARC	GM3GBZ/P	10	78	96	335	109	362	239	721	2	8	2	16	458	1521
37	Stirling & DARS B	GM4TMS/P	9	72	60	215	198	625	55	196	74	248	18	120	414	1477
38	Bracknell ARC	G4BRA/P	207	1460	0	0	0	0	0	0	0	0	0	0	207	1461
39	Glenrothes RC	GM4GRC/P	83	636	42	147	61	222	85	263	10	34	9	64	290	1367
40	Meirion ARS	GW4LZP/P	57	418	49	184	71	266	51	186	13	46	21	142	262	1242
41	Lowestoft RC	G4KDL/P	0	0	380	1181	0	0	0	0	0	0	0	0	380	1182
42	Southdown ARS	G3WQK/P	69	476	65	221	58	221	20	58	43	129	0	0	255	1105
43	Cheshunt & DARC	G4ECT/P	0	0	15	48	94	328	74	255	27	97	26	184	236	913
44	Horndean & DARC	G4FBS/P	0	0	95	317	69	269	0	0	32	124	19	140	215	851
45	Reigate ATS	G5LK/P	13	94	20	72	139	464	24	128	0	0	0	0	196	758
46	Leicester RS B	G3LRS/P	3	24	53	129	10	38	0	0	0	0	0	0	66	192

OPEN SECTION

POSN	GROUP	CALL	160		80		40		20		15		10		QSOS	SCORE
1	Park Air Electronics	G3KHZ/P	183	1274	212	746	276	940	151	496	82	276	86	592	992	4325
2	Addiscombe ARC	G4ALE/P	158	1120	189	683	186	652	184	585	109	356	100	698	926	4093
3	De Montford Uni ARC	G3SDC/P	142	1024	153	568	194	688	195	593	119	406	119	790	922	4070
4	Torbay ARS	G3NJA/P	136	930	150	532	201	684	162	497	108	345	147	930	904	3918
5	Stirling & DARS A	GM6NX/P	114	850	143	519	202	711	230	720	117	402	116	700	922	3902
6	East Notts CG	G3TBK/P	161	1140	208	714	195	672	131	421	52	183	90	610	837	3741
7	Kilmarnock & Loudon	GM0ADX/P	118	830	158	529	151	541	170	571	62	214	87	564	746	3251
8	Edgware & DARS	G3ASR/P	148	1098	163	565	175	631	194	578	23	80	35	260	738	3211
9	Weston Super Mare	G4WSM/P	106	766	123	441	181	643	184	626	89	302	46	318	729	3097
10	Telford & DARS	G3ZME/P	100	750	174	585	125	454	113	344	39	130	127	804	678	3067
11	Scunthorpe ARC	G4FUH/P	114	870	179	659	177	638	109	360	21	72	62	396	662	2997
12	Southgate ARC	G3SFG/P	134	974	135	507	152	555	128	426	32	110	55	396	636	2970
13	North Wakefield RC	G4NOK/P	81	538	130	458	134	444	165	511	56	185	135	816	701	2954
14	Guildford & DRS	G5RS/P	109	806	174	619	209	701	95	339	29	101	33	226	649	2792
15	Melton Mowbray ARS	G4FOX/P	81	580	157	554	168	607	136	442	57	195	60	402	659	2780
16	Banff & DARC	GM3GG/P	108	810	96	348	263	897	133	427	31	107	25	180	656	2769
17	Gt Yarmouth RC	G3YRC/P	120	890	139	472	136	475	92	270	48	175	24	176	559	2459
18	The Lincoln Lancs	G5FZ/P	98	660	193	604	142	490	87	280	76	237	26	168	622	2440
19	Thatcham AR CG	G4RKO/P	107	774	115	411	149	501	46	175	40	140	31	186	488	2186
20	South Essex ARS	G4RSE/P	82	642	118	443	38	140	122	376	21	65	26	214	407	1880
21	Maidenhead & DARC	G3WKX/P	67	494	100	378	87	335	92	315	17	70	32	220	395	1814
22	Clifton ARS A	G3GHN/P	104	810	67	268	0	0	167	519	3	10	6	34	347	1644
23	North Kent RS	G4CW/P	105	754	35	129	56	195	65	209	12	40	15	98	288	1426
24	Burton & DARS	G3NFC/P	73	604	47	154	31	238	53	174	0	0	0	0	204	1171
25	Bromsgrove & DARC	G3VGG/P	0	0	0	0	390	1161	0	0	0	0	0	0	390	1162
26	Grimsby ARS	G3CNX/P	0	0	0	0	358	1114	0	0	0	0	0	0	358	1115
27	Easter Ross RC	GM4MFL/P	31	232	76	287	53	173	76	254	23	86	0	0	259	1032
28	Farnborough & DARS	G4FRS/P	0	0	0	0	299	964	0	0	0	0	0	0	299	965
29	Lichfield ARS B	G3VHB/P	22	150	17	54	130	458	24	75	0	0	26	186	219	924
30	Bredhurst RATS	G0BRC/P	0	0	304	840	0	0	0	0	0	0	0	0	304	841

LOW POWER SECTION

POSN	GROUP	CALLSIGN	160		80		40		20		15		10		QSOs	SCORE
1	Stockport RS	G6UQ/P	96	738	102	373	131	491	28	100	0	0	8	60	365	1762
2	Reading & DARC C	G0LHZ/P	52	410	72	280	52	193	53	182	19	76	17	136	265	1277
3	Sempar Peratus CG	G3HJF/P	15	104	2	8	15	56	26	76	0	0	7	52	65	297

Check logs gratefully received from: G2FSR, G2HLU, G3NKS, G3OOU, YU7SF, LZ2VP/P, LZ1QZ, LZ2AU, LZ2LE, LZ3AB.

3.5MHz. Congratulations to **Lowestoft Radio Club, G4KDL/P**, for a magnificient single band Restricted section entry. This was the first time operators **G4KDL, G4RLS** and **G0RRI** had tried NFD and their 380 contacts earns top place. They reported the band open into near Europe for most of the time, although the period between 0900 and 1300 was hard going. It is during this time, with the sun at its highest angle, that absorption of 80m signals is greatest, so their experience lines up quite well. Another single band entry came from **Bredhurst RATS, G0BRC/P**, with 308 contacts. Clear winners of the multi-band groups was **G3GRS/P** with 233 contacts.

7MHz has traditionally attracted several single band entries and this year saw competition between three groups. **Bromsgrove & DARC, G3VGG/P,** emerged as clear winners using an interesting selection of antennas, namely, a five-element sloping dipole array, a horizontal dipole and a horizontal loop. **Grimsby ARS, G3CNX/P,** provided strong opposition with their 358 contacts from a dipole at 35 feet. Also in there was **Farnborough & DARC, G4FRS/P,** using a delta loop to make 299 Qs. A creditable effort by **G3KHZ/P** with 276 contacts puts them well ahead of the multi-banders, whilst in the Restricted section, **G3GRS/P, GW3LNS/P** and **GM3POI/P** were all within six contacts of each other at 219, 217 and 213 respectively. That search and pounce technique employed by the Gravesend guys showed through again with a substantial lead over the other two groups.

14MHz. Strangely, there were no single band entries this year, which is puzzling considering that the Frank Hoosen Trophy is available for the highest score on this band. Whilst scanning the results list though, an interesting statistic became clear - three of the four highest scores were made by Scottish teams. **Orkney RG, GM3POI/P**, were clear leaders with 336 contacts using a half-wave vertical. **G3ULT/P** were ahead of the others on points, although they made around the same numbers of QSOs as **GM3GBZ/P** and **GM6NX/P.**

21MHz. The band seemed better than in the last few years with most groups finding something to reward their efforts. **G3GRS/P** found a good opening into Europe to put them top of list with 140 contacts.

28MHz. As previously mentioned, keen groups had been monitoring the band signs of Sporadic E openings, which are common during June and July. On Friday afternoon prior to Field Day, Spanish and middle European countries were to be heard and expectations raised that twenty four hours later, the band would be buzzing with activity. Well, this proved wrong, but what did happen was an excellent opening during Sunday morning! Whilst in previous years, southern stations have benefited from inter-G activity, this time it was the turn of stations located in Wales, the south-west and north who are all well placed for the skip into Europe. The highest score was from **Red Dragon CG, GW8GT/P,** with 174 Qs. Other notables ones were **Three A's CG, GW0AAA/P,** with 159; and **Torbay ARS, G3NJA/P,** at 147. Perhaps the **Cumbria CC, G3IZD/P,** sums up the situation: "I wonder if there was a duct between Cumbria and HB9 as some signals from there were quite enormous!"

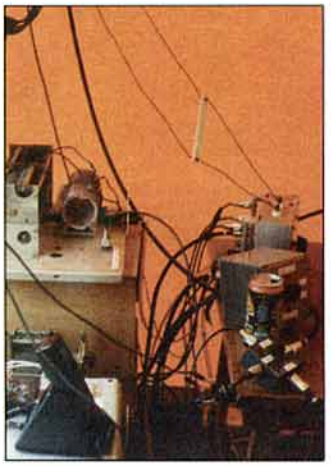
Inspections

AS IN PREVIOUS years, members of the First Class CW Operators' Club assisted with inspections and are thanked for their efforts. No problems were reported, although one group reported sightings of an inspector in a hedgerow, in case of any infringement of the 24-hour set-up rule. Now that's what I call entering into the spirit of the contest!

Computerised Logs

THESE ARE WELL integrated into contesting now. This year some 80% of entries were on disk. Unfortunately several were not in the correct format and needed additional effort to extract the data required. If you are using a non-commercial logging program, ie *not* SD, CT or LOG, please make sure your entry conforms to the RSGB standard for logs submitted on disk. In future, logs not conforming will be returned!

For entry submission, a disk containing the log file, given the name G3SJJ-P.LOG for example, is required plus the signed Summary Sheet. We do not need paper logs, band cover sheets or even a note of when the various operators were on duty.



And this is supposed to be called 'wireless'! G4ALE/P shack (above) and just some of the wire antennas at G4ALE/P (right).

The Rules

WE INTRODUCED a rule change for this year's event, which allowed the use of a second receiver, thereby legalising the FT-1000 and similar radios (although not addressing the additional power these rigs are capable of). The intention was also to encourage the use of outboard receive facilities, and so it is interesting to note that only three groups took advantage of providing an additional receiver: G3SDC/P, G3ZME/P and G3NFC/P. By way of comparison, there were ten FT-1000s, three TS-950s and one IC-781. The TS-930 still remains popular amongst contesters with seven in use.

There is no doubt that experienced groups using an FT-1000 have the capability of two transmitters, as well as two receivers, if they configure the station and operating rota accordingly. Judging from the comments received, it is likely that only one or maybe two groups used this technique this year, but this is likely to increase if action isn't taken. Banning the use of these radios would be a retrograde step, but it is obvious that a further change in the rules is required 'to keep the playing field level'. Maybe a small change like limiting the computer logging capability or perhaps we should consider a major revamp of the rules. This could encompass an Open section which really was 'Open', with amplifers and no limit on equipment or antennas, and a 'real' Restricted section with specific limits on equipment and computer interface. We have already published the rules for 1996 [in the *RSGB Contesting Guide* in September 1995 *RadCom - Ed*] but your comments would be welcome so that we can address future events.

The Team

THIS YEAR's NFD organising team was much reduced with the introduction of computerised log checking. David Hill, G4IQM, did an excellent job of handling the registrations, inspections and incoming logs. Chris Swallow, G3VHB, keyed in the paper logs and manipulated the checking program whilst the report was written by Chris Burbanks, G3SJJ. Had it not been for a faulty generator, the two Chris's operating G3VHB/P would have probably have been in with the Trophy winners (see **Table 2.**) Oh, well, here's to next year! ♦

Trophy	Club	Callsign
NFD Shield	Gravesend RS	G3GRS/P
Bristol Trophy	Park Air Electronics	G3KHZ/P
Gravesend Trophy	Lichfield ARS	GW3LNS/P
G6ZR Memorial Trophy	Addiscombe ARC	G4ALE/P
Frank Hoosen G3YF Trophy	Orkney RG	GM3POI/P
Scottish NFD Trophy	Orkney RG	GM3POI/P
Reading QRP Trophy	Stockport RS	G6OI/P

Table 2: NFD 1995 Trophy winners

Gravesend Radio Society, G3GRS/P, shows that even simple antennas can be very successful.

CONTEST CLASSIFIED

All rules should be read in conjunction with the General Rules published in *Contest Classified*

HF RESULTS

21 / 28MHZ CW CONTEST 1994

Most of the 24 UK participants in this event were victims of the concurrent Worked All Germany contest, as it appears that DL stations were generally unwilling to work Gs as were most of those taking part in WAG from outside Germany! On the other hand, there were many complaints from DX participants that there were not enough G stations to work. To make matters worse, there was also an EA contest in full swing for much of the time. As G3UFY exclaimed, "What a (censored) struggle!".

Others experienced problems of a different sort - G3TBK's computer log 'lost' a great number of QSOs, relegating David to a much lowlier position than he normally occupies, and G3GMM found that the contest coincided with a family visit to Devon which meant that a compromise antenna system had to be pressed into use at the /P location.

For those who persevered, there was steady traffic and DX to be had with the leaders managing contacts with VK, ZL, JA and ZS. North and South America were also in evidence, although it seems that eastward propagation was better. Stations from EU were conspicuous by their absence this year.

s expected, 21MHz carried the bulk of the traffic although 28MHz produced a few surprises for those who ventured there.

G logs were good with no unmarked duplicates in evidence. The same cannot be said for the Overseas logs although the final results were not affected. Congratulations, and the T E Wilson trophy, go to Peter Miles, G3KDB, with certificates to the runners up: leading multi-op station G3WOI, QRP station G2HLU, and the equivalent positions amongst the Overseas entrants.

Finally, apologies are due for the late publication of these results. Murphy struck repeatedly with one disc suffering corruption and a subsequent submission failing to turn up!

G4IOM

UK ENTRANTS

Posn	Call	21MHz QSO/Mult	28MHz QSO/Mult	Total Pts
1	G3KDB	257/60	18/15	61875
2	G0IVZ	203/56	18/17	48399
3	G3WOI*	219/50	9/9	40179
4	G4ODV	169/51	13/9	32520
5	G3UFY	181/43	11/10	30316
6	G4NOK*	193/47	2/2	28469
7	G0FUN*	151/46	2/2	21504
8	G3PMR	130/35	7/7	17094
9	G3PJT	97/39	5/5	13376
10	G2QT	95/35	2/2	10804
11	G3TBK	109/30	—	9660
12	G3VYI	102/31	—	9486
13	G3JYP	99/29	—	8497
14	G3GLL	75/31	2/2	7590
15	G2AFV	80/23	3/3	6474
16	G3RSD	65/34	—	6369
17	G0IDE	70/23	1/1	5112
18	G0LZL	65/22	—	4290
19	G2HLU~	51/23	—	3519
20	GM3CIX	38/17	—	1938
21	G6QQ	29/17	1/1	1548
22	G3GMM/P	29/13	1/1	1204
23	G4KDL	24/10	—	720
24	G4RLS	19/12	—	660

OVERSEAS ENTRANTS

Posn	Call	21MHz QSO/Mult	28MHz QSO/Mult	Total Pts
1	UT1IA@	118/46	—	12880
2	EA6ZY@	69/36	—	6840
3	W2HG@	61/38	—	5548
4	HA8EK	53/29	5/5	5270
5	K2SX/1	44/29	—	3828
6	YO4KCC@	49/30	—	3030
7	VE3HX	42/23	—	2898
8	UR5IPD	37/24	—	2664
9	UR7QM	35/25	—	2550
10	UA9MX	27/20	—	1620
11	VE3JKZ	20/18	—	1062
12	TA2ZO	22/15	1/1	1040
13	UY5TE@	36/24	—	1032
14	RA3VY	19/15	—	855
15	OH2YL~	15/14	—	616
16	VK2AYD	14/13	—	546
17	LY2OU	16/9	—	351
18	VE1KB	14/10	—	350
19	K4UK	12/10	—	340
20	SP4EAK	7/6	—	120
21	PA3ELD	5/5	—	75
=	JF3NLQ	5/5	—	75
=	JP3EZD	5/5	—	75
=	JA3UWB	5/5	—	75
25	JA1AB	4/4	—	48
26	JF3IUC	4/3	—	33
27	YU7SF	3/2	—	18
28	VK4XW	2/2	—	12
29	SM6PVB	2/1	—	6

Checklogs gratefully acknowledged from G0JQN, GW3YSL, RA3XO, RX3DRU and VK4OD.

* = multi-op ~ = QRP @ = Unmarked Dupe(s)

LOW POWER FIELD DAY 1995

80 metres held up well during the contest, although most entrants had probably worked each other before the lunch break. On the other hand, many stations found it hard going on 7MHz and there appeared to be a considerable difference of opinion as to when to be on each band. It is significant, however, that the winning stations in each section spent more time on 7MHz than other entrants, ending with a more or less equal QSO total on each band. The winner of the Houston-Fergus Trophy for Section A was Derek Stanners, G3HEJ/P, from a location in Surrey. In Section B, the Southgate Trophy was won by Richard Hall, G0OGN/P, operating from Warwickshire. Many congratulations. The Certificate for the QRP fixed station submitting a check log and giving the most points to entrants goes to Derrick Webber, G3LHJ. Check logs are gratefully acknowledged from G0KZO, G3BPM/P, G3GMM, G3LHJ, G4KTI, G4IRC/P and G5LP.

G4DUS

SECTION A (MAXIMUM 10W)

Pos	Call	3.5MHz	7MHz	Points	Code
1	G3HEJ/P+	56	56	1,325	2C3
2	G6UQ/P+	73	45	1,170	2C?
3	G4FOX/P+	58	34	1,085	1C1
4	G3RAL/P	53	40	1,025	2C?
5	G4KZD/P	59	42	1,020	2C?
6	G4RCC/P	45	37	905	2C?
7	GW3SB/P	37	25	750	1C2
8	G8CA/P	45	16	740	2W3
9	G3CQR/P	41	19	730	1C3
10	G3TRF/P	46	13	665	2C?
11	G6OI/P	39	17	560	2C1

SECTION B (MAXIMUM 3W)

Pos	Call	3.5MHz	7MHz	Points	Code
1	G0OGN/P+	58	60	1,292	1C2
2	G4ARI/P+	62	35	1,147	1C3
3	G3LX/P+	54	48	1,010	1C?
4	G3LRS/P	58	19	850	1C3
5	G4OGB/P	46	11	700	1C3
6=	G3SAD/P	48	9	690	1C2
6=	G2HLU/P	30	21	690	1C1
8	G3NEO/P	40	6	600	1C2
9	G3NFC/P	28	13	490	1W?

\+ = Certificate Winners

LOW POWER FIXED CONTEST 1995

Congratulations to Graham Wood, G3VIP, who wins the 1930 Committee Cup for the overall winner. Certificates to G3HEJ and G4PZO for their second and third places. The highest placed entry using all home-made equipment goes to G2HLU and the highest entry using 1 Watt or less goes to G3NEO, who in fact was the only entry. Welcome to G4WBN in his first contest, which he says he enjoyed very much.

Conditions on 7MHz continued to be poor with high noise levels and long skip. Only G3HEJ was able to work more than a handfull of stations, using a 168ft doublet at an apex of 50ft and having the 80 / 40m ATUs connected together.

There was a high percentage of stations using either fully homemade gear or at least a homemade PA to comply with the rules. Many thanks to G3BPM, GU4YBW and G0ADH who sent in check logs, and G4IFB who obtained 575 points using 5W (measured) but unfortunately was using a PA that could deliver 100W (try an outboard transistor PA). They all helped in the overall checking of the logs.

G3RXP / G4EBK

Posn	Call	3.5MHz	7MHz	Total	Pwr	Eqpt
1	G3VIP	840	30	870	5W	FT301S
2	G3HEJ	725	115	840	5W	TS130V
3	G4PZO	755	60	815	5W	Arg2
4	G4EDG	720	35	755	3W	H/B PA
5	G3YAJ	660	20	680	5W	Ten tec
6	G2HLU	670	—	670	5W	H/B Tx/Rx
=	G3NEO	670	—	670	1W	FT101+ H/B PA
=	G3KKQ	610	60	670	5W	HW9
9	G4TLS	645	20	665	5W	TS940+ H/B PA
10	G0KZO	595	—	595	5W	SB101+mod PA
11	G0VQR	570	15	585	5W	FT747+mod PA
12	GW3JSV	565	—	565	5W	Syncal 30
13	G3JKY	545	—	545	5W	H/B Tx+FR100 Rx
14	GW3KDP	540	—	540	3W	H/B
15	G4CZB	480	—	480	2W	H/B
16	G3CQR/P	430	—	430	5W	H/B
17	G3GMS	345	—	345	5W	H/B
18	G4WBN	325	—	325	5W	H/B
19	GW3SB	320	—	320	3W	HW8
20	GD0LCE	290	—	290	4W	TS120V
21	G0RRI	190	—	190	5W	Ten Tec
22	G4PVB	60	—	60	3W	HW8
23	G3ILO	45	—	45	2W	IC737+H/B PA

HF RULES

CLUB CALLS CONTEST AND 1.8MHZ CONTEST

The rules for the 1995 **Club Calls Contest**, which takes place on **11 November,** and the **2nd 1.8MHz CW Contest**, which takes place on **18/19 November**, are the same as the rules for 1996, which have already been published in the *RSGB Contesting Guide* in the September 1995 *RadCom*.

HF CONTESTS CALENDAR

28/29 Oct	CQ WW DX SSB (Oct 95, p24)
4/5 Nov	Ukrainian DX Contest CW/SSB (Nov 95, p20)
11 Nov	Club Calls Contest
11/12 Nov	OK/OM DX Contest CW/ SSB (Nov 95, p20)
18/19 Nov	IARU Reg 1 160m cw contest (Nov 95, p20)
18/19 Nov	2nd 1.8MHz CW Contest
25/26 Nov	CQ WW DX CW
14 Jan	AFS CW (Sep 95)
17 Jan	LF Cumulative (Sep 95)
20 Jan	AFS SSB (Sep 95)
21 Jan	LF Cumulative CW (Sep 95)
22Jan	LF Cumulative CW (Sep 95)
25 Jan	LF Cumulative CW (Sep 95)
28 Jan	LF Cumulative CW (Sep 95)
29 Jan	LF Cumulative CW (Sep 95)

VHF CONTESTS CALENDAR

26 Oct	432MHz Cumulative (Jun 95)
29 Oct	1.3/2.3GHz Fixed/SWL (June 95)
30 Oct	144MHz CW Cumulative (May 95)
2 Nov	1.3/2.3 GHz Cumulative (June 95)
4/5 Nov	144CW 6-hr (June 95)
4/5 Nov	144CW 24-hr (July 95)
10 Nov	432MHz Cumulative (June 95)
16 Nov	1.3/2.3 GHz Cumulative (June 95)
27 Nov	432MHz Cumulative (June 95)
3 Dec	144 AFS/ Fixed /SWL (July 95)
4 Dec	1.3/2.3 GHz Cumulative (June 95)
12 Dec	432MHz Cumulative (June 95)
26-29 Dec	70/144/432 Fixed/Portable (Aug 95)
14 Jan	144MHz CW (Sept 95)
21 Jan	70MHz Cumulative (Sep 95)
28 Jan	70MHz Cumulative (Sep 95)

FOR THE FULL 1995 RSGB NATIONAL FIELD DAY RESULTS TABLE AND REPORT, SEE PAGES 81-83

VHF RESULTS

2ND 144MHZ BACKPACKERS 1995

Contest dates are set some eighteen months before the event to allow publication lead-time. Unfortunately, this event was set on the same day as the *Practical Wireless* QRP Contest, which was a little unfortunate in as much as the starting times were different and the Backpackers required a county contest exchange! Thanks to Neill, G4HLX, and *PW* for helping to publicise that, for this event, Backpacker's entrants did not have to start their first QSO with serial 001. However, both these combined contests proved to be extremely popular and well-supported. So much so that next year's event will be co-ordinated to start at the same time and the County exchange will not be required.

G4RUL/P just about summed up most people's comments, "Nothing special, long QSB but glorious sunshine". Conditions were about average, but there was a great deal of activity, even though there were not many continental stations audible to the majority. GW7TQR/P found things "Hectic!" I'm not surprised as they amassed an absolutely terrific number of QSOs and multipliers to win their section by a convincing margin. I believe this is a QSO record for the Backpackers series of contests. GI7JYK/P commented on "The amount of stations worked in rare squares in GM". Well done to G3IZD/P who wins his second consecutive event from Cumberland. Who says the stations on the East Coast have it all their own way? Congratulations to all section winners and runners-up for a first-class event.

David Johnson, G4DHF

10W SINGLE OPERATOR

Pos	Call	Pts	QSO	Mult	Loc	Ant	Best DX	km
1*	G3IZD/P	34609	81	53	84KD	10Y	G3MPD/P	475
2*	G7GUC/P	31494	95	58	82QJ	13Y	ON4AIQ	471
3	G0SOO/P	25380	89	54	91SE	9Y	G1JKX/P	481

10W MULTI-OPERATOR

Pos	Call	Pts	QSO	Mult	Loc	Ant	Best DX	km
1*	GW7TQR/P	104890	171	85	81KW	2x17Y	PA3FJY	649
2*	GW4MGR/P	64368	135	72	83JA	13Y	ON4AIQ	532
3	G3WGV/P	42900	98	60	84KJ	9Y	G4RUL/P	447
4	GW6EOL/P	37874	100	58	81FP	17Y	PA3FJY	685
5	G8NWM/P	33705	73	63	92TR	4x9Y	DL0WAE	603
6	G4MHC/P	26992	97	56	82TA	9Y	G0PWE/P	371
7	G8PNN/P	18170	59	46	95CK	2x17Y	G0FIG	519
8	G4FUR/P	9048	66	39	91VG	6Y	GW4MGR/P	284

3W SINGLE OPERATOR

Pos	Call	Pts	QSO	Mult	Loc	Ant	Best DX	km
1*	G0HIK/P	66451	108	77	84KF	13Y	G3MPD/P	484
2*	G0GRI/P	32302	89	62	91AI	D'Quad	GM0CLN/P	502
3	G0LBO/P	26840	72	55	84KI	9Y	G8DDY/P	437
4	GI7JYK/P	26676	55	57	74DT	9Y	G1WOR/P	563
5	G4IDF/P	24168	86	57	82TC	8Y	G1JKX/P	366
6	G7AFE/P	21150	94	45	83XG	8Y	G0PZR/P	416
7	GW0RTP/P	16770	63	43	81FP	8Y	ON1ALJ	516
8	G0VTK/P	15100	58	50	93KA	8/8Y	EI6ETB/P	451
9	G7OZE/P	14916	72	44	93AG	7ZL	GS7UEG/P	441
10	G0HDV/P	13416	46	43	93SP	9Y	GU3EJL	551
11	G7OMO/P	11835	57	45	81UB	HALO	G0LBO/P	370
12	GW7LQD/P	11644	53	41	82KW	9Y	GM0JCN/P	459
13	GW8ZRE/P	10414	54	41	83JA	7ZL	G4RKV	353
14	G1JDM/P	8284	42	38	90RV	9Y	G0HIK/P	411

3W MULTI-OPERATOR

Pos	Call	Pts	QSO	Mult	Loc	Ant	Best DX	km
1*	G4RUL/P	14670	44	45	00EX	10Y	G3WGV/P	330
2*	G0HAC/P	10290	55	42	83XH	9Y	GM0JCN/P	412

➤

◀ Pos	Call	Pts	QSO	Mult	Loc	Ant	Best DX	km
3	G1WKS/P	8132	36	38	01ED	13Y	G3IZD/P	409
4	GW0SYG/P	7280	29	35	71LU	9Y	F6ETI/P	457
5	GW7EVG/P	6240	31	32	83EC	5Y	GM0JCN/P	434
6	GW6TTL/P	6222	31	34	71SX	HB9CV	G1WOR/P	307

* Certificate winners

3RD 144MHZ BACKPACKERS 1995

This 3rd event coincided with VHF NFD and so there were bound to be fewer participants, as many regulars were committed to help man local club stations. As it turned out, entries were only slightly down on this year's trend, which could suggest that some operators 'sneaked off' for a while!

Conditions were certainly worth it, with some excellent distances being worked as listed in the 'Best Dx' column. It is a great shame that the extensive Sporadic E openings which occurred the day previously were not so widespread during the contest. Even so, two contacts were made via this mode providing valuable points and multipliers to those fortunate stations. What was even more annoying was the fact that the band opened-up into EA9 only ten minutes after the end of the contest! Never mind, at least the weather was sunny and warm which seemed to please everyone.

Congratulations to G8NWM/P, G7GUC/P and G1WKS/P who are first time winners of their respective sections, while G0HIK/P accomplishes yet another well-deserved victory. Likewise, congratulations to all runners-up.

David Johnson, G4DHF

10W SINGLE OPERATOR

Pos	Call	Pts	QSO	Mult	Loc	Ant	Best DX	km
1*	G7GUC/P	26157	77	37	93WH	13Y	DJ2QV/P	594
2*	GW8ZRE/P	24849	97	33	83JF	7ZL	EA/DL3MGL	1375
3	G0SOO/P	19565	77	35	91SE	9Y	GM0FRG/P	576
4	G3WGV/P	17577	75	27	80WP	9Y	G0PWE/P	524
5	G8DOH/P	7172	34	22	01QD	HB9CV	OZ1THY/P	771

10W MULTI-OPERATOR

Pos	Call	Pts	QSO	Mult	Loc	Ant	Best DX	km
1*	G8NWM/P	32080	90	40	92TR	4x9Y	EB5IFI	1430
2*	GW7TQR/P	23258	112	29	81KW	17Y	GM4VVX/P	685
3	GW4MGR/P	22020	117	30	83JA	13Y	ON7RB/P	531
4	G4AES/P	17024	85	28	93AS	6Q	GJ4ZUK/P	505
5	G4MHC/P	10028	78	23	82TA	9Y	EI4GRC/P	501
6	G8PNN/P	6340	39	20	95DI	17Y	G4BRA/P	508

3W SINGLE OPERATOR

Pos	Call	Pts	QSO	Mult	Loc	Ant	Best DX	km
1*	G0HIK/P	27748	107	28	84KF	13Y	F1CVU/P	560
2*	GI7JYK/P	18750	60	25	74DT	9Y	GJ4ZUK/P	667
3	G4RUL/P	15540	70	30	00CT	9Y	OZ1THY/P	848
4	G7AFE/P	15496	116	26	83XG	8Y	F1RYW/P	430
5	G0HDV/P	12475	61	25	93SP	12ZL	G0HXO/P	441
6	G4IDF/P	11622	72	26	82TC	8Y	GM3BSQ/P	537
7	GW0DRM/P	10752	83	24	82KW	9Y	F6KBF/P	438
8	G0VTK/P	9225	65	25	93GC	8/8Y	GM4VVX/P	578
9	G0RXA/P	8736	59	24	83XH	9Y	EI4GRC/P	499
10	G7OZE/P	8127	73	21	82XJ	7ZL	ON4AMT/P	505
11	G7OMO/P	3780	52	15	81UC	HALO	G4ZAP/P	364
12	G1JDM/P	3150	33	18	90RV	9Y	G0HIK/P	410

3W MULTI-OPERATOR

Pos	Call	Pts	QSO	Mult	Loc	Ant	Best DX	km
1*	G1WKS/P	13888	56	31	01ED	13Y	GI7JYK/P	576
2*	GW0SYG/P	8436	34	37	71NP	9Y	G4ZAP/P	420
3	G6TTL/P	7199	39	23	01OI	14Y	OZ1THY/P	757

* Certificate winners

NEXT MONTH: FULL 1996 VHF FIELD DAY RESULTS AND REPORT!

● THE *VHF Contesting Handbook* compiled by the VHF Contests Committee (see April *RadCom News*, page 15) is now available from RSGB HQ at £4.00 per copy. It includes sections on choosing a site, equipment, antennas and recent rule changes and should appeal to contesters of all levels of ability and experience. ♦

ALL* VHF AND HF CONTEST RULES FOR 1996 WERE PUBLISHED IN THE SEPTEMBER *RADCOM

Winner!

MFJ-1798 HF ANTENNA COMPETITION

SEPTEMBER RADCOM, PAGE 77

*CONGRATULATIONS to **Mr G R Marley, G0VFV,** whose entry was the first correct one out of the hat. The correct answers were: (c), (c) and (a). He wins the review model of the MFJ-1798.*

Waters & Stanton Electronics, who generously donated the £300 antenna, hoped to make the presentation of the prize at their stand at the Leicester Show.

Those entrants who did not win are eligible for a special offer on the antenna and their details have been passed to Waters & Stanton.*

* As indicated in the competition rules, where specifically requested names and addresses have remained confidential to the Society.

Charity Bid

SEPTEMBER RADCOM, PAGE 20

As part of our Amateur Radio Stamps feature, we offered three radio stamped envelopes, which had been donated by G4KGT, plus an Irish Marconi stamp cover. These would go to the member making the highest offer in a sealed bid auction, with the proceeds going to the Radio Amateurs Invalid and Blind Club.

The highest bid came from **Laurence Robinson, G0LHR.**

Members' Advertisements

RSGB Members wishing to place an advertisement in this section must use the official form incorporated on the label carrier of Radio Communication. This will prove membership and must be for the current month. No acknowledgment will be sent. Ads not clearly worded, or which do not comply with these conditions will be returned. If an ad is cancelled no refund will be due. An advertisement longer than 60 words will be charged pro rata. Trade or business ads, even from members, will not be accepted. Traders who wish to use this facility must send a signed declaration that the items for sale are part of, or intended for, their own personal amateur station. The RSGB reserves the right to refuse ads, and accepts no responsibility for errors or omissions, or for the quality of goods for sale or exchange. Each advertisement must be accompanied by the correct remittance, as a credit card payment, cheque or postal order made payable to the Radio Society of Great Britain. Please note that because this is a subsidised service to members, no correspondence can be entered into. Licensed members are asked to use their callsign and QTHR, provided their address in the current edition of the RSGB Amateur Callbook is correct. RS members will have to provide their name and address or telephone number. Please include your town and phone number in the free boxes provided to assist readers. Advertisements will be placed in the first available edition of *RadCom*. The closing date for copy is six weeks prior to publication date.

Warning: *Members are advised to ensure that the equipment they intend to purchase is not subject to a current hire purchase agreement. The 'purchase' of goods legally owned by a finance company could result in the 'purchaser' losing both the goods and the cash paid.*

FOR SALE

AP1086 issue 1 (RAF radio stores ref nos) also AP1186 A-B-C-D-E all sections & APs relating to radio radar equipment. Would purchase post-war to current magnetrons, klystrons, T/R cells, ignitrons, thyratrons, microwave planar-tubes, TWTs & special CV types, required R1355 10P/13032 IFF_Rx R3002, R3067, R3121 control-unit type 17 or 18 all unmodified, excellent price offered, telephone or fax anytime. 0171 511 4786 (London).

CAPCO AMA3 & AMA5 magnetic loop antennae covering all bands 10M-80M complete with control unit; £200. G0LCY, QTHR. 0181 845 9384 (Ruislip).

COLLINS 75S-3C Rx; £395. 0171 727 2892 (London).

FREE 50ft h/duty tower to include Explorer 14 HF beam 4 ele, 5 ele Tonna for 50MHz 2 x 13 ele Tonna's 144MHz, 19 ele Vargarda - 432MHz when you buy/rent my QTH, 3 bed detached chalet bungalow on established private estate. 3 mins walk to beach front, located 1.5 miles East of Bognor Regis town centre - IO90QS. Excellent take-off in all directions; £650 pcm, min 6 m, freehold sale; £90,000. FT767GX 1.2Kw HF amp. QRO station on all bands inc 2, 6 & 70 will be left if you long term rent, no offers. G0NMG, QTHR. 01243 583616 (eves only). (Middleton on Sea).

HEATHKIT HW100 100W RF 3.5-30MHz, PSU/mic/spkr, working order; £100 or swap KW2000A-E. G0KSB. 01952 274978 (Telford).

HF tcvr JST135 with NBD520 power supply by JRC. The Collins of Japanese radio. All bands & all modes. 5-150W output. Full coverage rcvr. Bxd, mint condx; £800.Clarke. 01483 275461 (Guildford).

IBM PS/1 486 SX33 computer 2hdd 85+85mb 1 FDD 1.44mb 4mb RAM; SVGA monitor; IBM JAZZ16 sound card; IBM dual speed external CD-Rom, bxd; £475 ono. Buyer collects or pays carriage. Amstrad SM2400 stand alone modem unused, bxd; £25. 01986 798524 (Woodbridge).

ICOM 760 identical 761, all modes, all filters excellent condx & performer, box mans, Adonis 303G mic and Yaesu SP102 spkr; £1095 ovno. 01527 541502 (Redditch).

ICOM IC-726 HF/50MHz tcvr inc. PSU; £650. AVO valve characteristic meter MK III plus hundreds of valves; £150. BBC model B issue 7 computer with 80/40 dual drive & Sanyo RGB monitor; £100. Many other items of eqpt & components. Send SAE. G4BXT. 01322 277401 (Dartford).

ICOM IC-R1 scanner 1-1300MHz with mains charger, spare battery holder, instructions, mobile mount & cable, bxd; £220. G4KCN, QTHR. 01582 462158 (Harpenden, Herts).

KENPRO KT-400 70cm thumbwheel handheld, bxd with rubber duck, manual, circuit diagram etc. Ideal novice starter rig; £100 ono. James GW0UDM. 01745 886473 (Prestatyn).

RADCOM 1976 to 1984 inclusive (July 81 and July 88 missing). Practical Wireless Feb, 1987 to December 1994 inclusive CQ 1988 to 1994 inc. The lot for £10. Buyer collects. 0141 776 2065 (Kirkintilloch).

RETIRE to Scarborough, mature three bedroomed two receptions extended new kitchened detached house on large corner plot, two miles north town centre but convenient for local amenities/schoools 60ft heavy duty versatower (with full PP) HF/WARC log yagi rotor antennas for 30/40/80/160 included in price, property in excellent decorative order; £79,950. Further details G4OBK, QTHR. 01723 370532 (Scarborough).

STRUMECH 60ft tower, Ham 2 rotator. Create 4 ele HF beam; £300 takes all; Yaesu FT101E, nice; £250. Drake T4XC with power, clean; £225. BC221; £20. RF27 units; £40. Might swap early gear - G4ERU, No 5, Luther Rd, Winton, Bournemouth. 01202 510400 (Bournemouth).

TH3 MK3-S Thunderbird 3 ele beam, good condx; £175ono. Buyer inspects & collects. Dressler D200 2M power amp 360W output; £325 ono. 0181 949 5549 (New Malden).

TOP quality archery equipment stylist recurve bow 68in 44lbs @ 28in ACC and eastern arrows Arten Olympic sight V-bars stabiliser includes all ancillary equipment needed to partake. Wish to exchange for amateur radio equipment looking for quality ATU TH79E handheld or PC computer related items. Value around; £400. S/H. G0SEF. 01904 793931 (York).

TRIO TS-530S (with 35S mic) & Kenwood remote VFO-120 £400. Katsumi (EK150) electronic keyer; £50. TR-220GX 2m tcvr (with mic); £40. Kenwood LF30A (low pass filter) £10. Altai 3amp PSU; £10. 01242 672705 (Cheltenham).

TS530S HF tcvr digital readout; £425 ono, bxd man. FT790R tcvr 70cm; £245ono. Both excellent condx, also many computer spares for sale MFM. SCS1 hard drives etc plus Packratt 232 TNC man software; £115 ono. John, 01203 450476 (Coventry).

VINTAGE homebrew linear uses pair of 813s. Finished in black wrinkle; £150. S meter for valve Rx; £25. Wanted; Army inductance aerial No 1. (High power vario for W/S 19 RF amplifier) W/S 48. W/S 21, mint PSU for W/S 19. scrap 19 and 22 sets for spares. Morris G4GEN, QTHR. 01825 712205 (Nutley).

VINTAGE radio enthusiasts clearout. 100s of magazines (1920-1950), wireless sets for restoration, (inc. bakelite cases), various spares, 100's of valves, bases, capacitors, transformers, chokes, valve tester, etc, some ex military old equipment, prefer to sell in one lot at; £395 but callers welcome to offer for smaller lots/individual items. Please make appointment to view (sorry no lists - 100s of items!). 0121 472 3688 (Birmingham).

WANTED for early Apple Mackintosh, internal and external floppy drives (400kb) GM0IRZ. 01382 644663 (Dundee).

70MHz Storno 634 tcvr; xtals four channels; 12/24 volts; 80 pages documents; £30. WK9 order G4DDW, QTHR. 01455 552599 (Rugby).

AERIALS ZA7/ZA14 coax end fed zepps 7/14MHz as new; £25 ea. £40 pair. Dressler ARA30 active aerial 200kHz/40MHz + £35. Icom 735 fitted 500hz filter excellent; £580. Dewsbury electronics star morse keyboard; £50. Trio PS6 DC power; £35. All plus carriage. 01252 548561 (Farnborough).

ALTRON AQ 6-20 mini beam 3 or 4 ele in good order, at a reasonable price. G0UHS. Rob. 01253 767775 (Blackpool).

AOR2002 desktop scanning rcvr 25-550 800-1300MHz, very good condx; £225. 01736 757721 price includes carriage by courier (Hayle).

ATARI STE cad, bureau, desk top publisher all in one£7. Also morse & RTTY tcvr, ideal for learning morse £5 each. Write Mr V McClure, 43 Roman Way Seaton, Devon. EX12 2NT. 01297 23421.

ATTENUATOR Precision R&S DPR 0-100dB; £25. Marconi TF2002B AM/FM sig.gen 10kHz-88MHz; £95. Philips PM2522 digital multimeter IKV DC; £30. Polar T1200 transistor fet curve tracer & comp. analyser; £60. All gwo, used 4CX350s; £25 pair. Carriage extra on all. 01403 864222 (Horsham).

ATU Yaesu FC-700 80-10M bxd, man; £85; 7 element crossed 2M Yagi; £25. G0LOZ, 01299 401558 (Bewdley, Worcs).

B40 rcvr 0.64 to 30.5 MHz cont. works ok but would benefit from service very heavy buyer collects cheap; £25. 01205 360700 (Boston).

BEESWAX blocks for coil sealing etc (Sept 95, RadCom) send £1 coin (taped onto card) and return address to: G4XAT, QTHR 95., or phone 0181 462 2831 (Hayes, Bromley).

BT2522B dial modem, new 24K band ideal for e-mail; £30. PC286 mono, 20Meg h/d 51/4in h/d. Ideal packet; £70. Rank Xerox Rx400 fax machine 4 speeds man, some paper; £20. ono. BBCB 32K sidways ram 51/4 dd. packet Rom RTTY software offers. G0ARF, QTHR. 01544 388350 (Leominster).

CAPACITORS 470uf 450 volts working, size 120mm 50mm ideal linear amplifier PSU brand new £3. ea. P&P extra. G4DBX, QTHR. 01270 522369 (Crewe).

CHANGE of QTH forces station sale! Icom IC25E 2mFM (box & man); £140. Ham International Concorde II 10M multimode C/W authority; £85. Kenwood TS850SAT (box & mans) with Adonis AM303G desk mic & micrsoet PC30 PSU. Excellent condx; £1100. G0RTH. (Alan). 01268 413598 (Basildon).

COLLECTORS item wartime panoramic adapter 455kHz input working but no handbook; £40. TA33 tribander good condx; £40. Buyer collects. GW4DYY. 01938 580280 (Welshpool).

COLLINS 30L linear moded for WARC bands also large home brew ATU suitable for use with linear; £500 the pair ono. Call 01352 711115 (Holywell).

COMPLETE 6M station, FT690R, all-mode, as new, 6M 100W amplifier, mic/mod new 6M lowpass filter, new, all bxd; £400. G4ABS. 01789 297158 (Stratford on Avon).

CUSCHRAFT R5 10/12/15/17/20M half wave vertical; £125. Bandedle 10/15/20M trap vertical; £30. G4UWK, QTHR. 01773 853459 (Amberlate, Derbys).

DRAKE R8E all mode + RTTY narrow CW general coverage. Rx/mint; £800 ono. Kenwood TS120V mobile HF 10/20/40/80 bxd with mic & circuits; £300 ono. Yaesu FT790R new NiCads case & antenna; £250 ono. Reace QRP power SWR modulation meter 10W max; £15. Intel 80387-33; £25. PC-case desktop including PSU; £10. National HRO receiver mint condx, minus spkr; £75 ono. 0956 544202 (NW London).

DRAKE TR7, RV7, remote VFO, MN7 ATU, PS7 power supply, full workshop manual AUX7, card TR7A spec astatic mic; £850. 01342 843866 (South Godstone).

EDDYSTONE 940 Geniconi; receiver plinth spkr; £125. RadComs late 50s to date offers and universal bridge B150; £25. Commodore 128 + PSU; £35. G4EJY, QTHR. 01494 530018 (High Wycombe).

FREE Sinclair QL with mans, 51/4in disk. Mains transformer & 4EP7 CRT ex CD711S oscilloscope. Ham Radio magazine 1976-89. G3SBA. 01582 460815 (Harpenden).

FRG-8800 Rx 150kHz-30MHz as new. Internal 2M module. AT-1000 2M mag aerial. ATU operating & service manuals; £375. 01270 761120 (day) 01270 582748 (eves), G8UHT. QTHR. (Sandbach).

FRG8800 HF receiver 50kcs to 30MHz plus VHF module hardly used as new. G0PUD. 01706 32502 (Rochdale).

FT101Z + FM fist & base mic man; £425 ono. FTV 901R transverter 2 & 70 fitted man; £150 ono; £535 for both. 100W linear 2M all mode; £80 ono. 01603 754734 (Norwich).

FT101Z tcvr, working rig but some features need attention; £260 ono. When phoning ask for John, G0IZC, (eves only) 01494 441906 (High Wycombe).

FT101ZD FTV901R FV901DM FC902 SP901 butterfly 5 band HF5B ant. A99 HF ant 40-10 mtr vertical. Buyer inspects & collects. 01946 810043 (Cumbria).

FT101ZD WARC bands Yaesu desk mic inc; £320. Trio R2000 with VHF module mans for both; £340. Derek, G3RQG. 01444 452452 (Haywards Heath).

FT102 FV102DM FC102 SP102 vgc; £850 ono. No splits. 01289 382464 (Berwick).

FT102 needs attention with FC102 ATU all with manuals all reasonable offers considered, buyer collects. 01328 701470 (Mileham Kings Lynn).

FT290RI 2 meter multimode, bxd; £190 microset 2 metre linear amplifier 25W O/P 6mths old; £70. Sangean ATB03A as new; £95. Paul, G7SRV. 01444 458372 (Haywards Heath).

FT726R 2m/70/60m satellite board boxed workshop manual ex condx; £775 ono. Microset 70cm 45w linear pre amp ex condx; £120. Tonna 6m/5 ele; £30. 0151 523 4140 (Liverpool).

FT736R inc 6m module; £115. FT747 fitted FM board; £475. BNOS. L144-3-180 linear; £185 BNOS LPM 50-20-50 linear; £100. Icom 23cm GaAsFET masthead preamp; £55. B & W portable antenna 40m to 2m, ideal for holidays; £50. all mint, bxd. Steve, G4YTK GM6LZO. 01698 331730 (Hamilton).

FT900AT with FT800 matching power supply/spkr; YSK900 remote mounting kit; mic adaptor for boom ics or desk mics; scanning mic, all as new, never been mobile; £1550. inc freight UK only. GM4KLO. Mike 0141 639 2729 (Glasgow).

FT901D with FM SP901 spkr FC902 ATU; £475 Nice HF line up. Steve, G4YTK QTHR. 01543 278902 (Cannock).

FT902DM 9-band HF tcvr, vgc; £450. Standard C528 dual band h/h, gwo; £175. Kenwood TR7500 2m mobile, ideal as 1st rig or for packet; £100. Icom IC-3PE 3amp psu/spkr; £15. Please tel Peter 01246 290250 (Sheffield area).

ICOM AH2a AH2b mobile AATu suit IC735 or earlier models brand new bxd; £250. Kenwood remote VFO240 suit TS530S or TS830S; £25. Icom filters FI53 FL30 FL70 FL83 UT16 UT23 UT48 UT51 UT63 offers. Tokya HX240 VHF to HF transverter as new, bxd; £165. GM0SHD, QTHR. 01241 828559 (Friockheim).

ICOM communication receiver with side band; £275. 01775 722940 or 01775 768148 (Spalding).

ICOM IC726 tcvr good order; £575 including carriage, Ron, G0UQC, QTHR, please ring after 6pm. 017687 72418 (Keswick).

ICOM IC729 HF/50MHz tcvr, mic, man & original packing, mint condx; £800. AMT-3 RTTY & AMTOR terminal unit with Commodore Amiga software; £75 70MHz Yagi, 3 element; £15. Revex W160 144/430 SWR & power meter, mint, £30. G0DEZ. 01404 891029 (Devon).

ICOM IC735 fitted FL32A ew filter; £520. IC720 recently serviced by castle electronics; £285. MFJ1278/1279 with pactor; £130. all one owner, bxd, handbooks. AR240A 2mhh case, spkr/mic, charger handbook; £70. Powerscan colour 4 hand scanner or Amiga. 17.6m colours, new unused; £110. Kent twin paddle key; £30. HB keyer; £15 the two for £40. Two Totsuko TR2100m xvr's 2m SSB/CW plus spare board circuit & handbook working receive only; offers. RadComs from 1956, SWMs PWs; offers. All plus carriage, G3MTQ, QTHR. 0121 440 1384 (Birmingham).

ICOM IC735 tcvr. BNOS 25A PSU. Datone FL3 filter. Daiwa CN602A SWR meter. KAM TNC, antenna, other 2m equipment including IC255E etc QRT sale; £700. 01395 264541 (Exmouth).

JAYBEAMS 16 elements for 2m, 2 off £50 each Tonna 2m power splitter new; £70. All 3 £140. Nolton Nova 242 4m AM/FM crystalled 70.260.280.425.4374.450.4675 provision for 4 more. 25W £60 Panasonic LF7010E 1

gigabyte read/write optical drive (SCSI) power lead + SCSI lead, no disk but can be seen working; £2000 new will accept £450 ono. G7LRQ, Anthony, eves. 01923 448285 (Watford).

KENPRO 400RC rotator with controller & cable. Overhauled excellent condx; £110. FT290 MK1 with NiCads, charger & SWR meter; £230. Straight key on slate base; £30. Kent twin paddle; £40. G4ZPY twin paddle; £40. All carriage extra. Stan, G0BYA, QTHR. 01785 55794 (Stafford).

KENWOOD 930S late model excellent condx, bxd with workshop man; £750. 2M wave meter; £15, Goodmans video; £45 (VHS). G0SVD. 01707 265025 (Hatfield).

KENWOOD SP120 spkr, as new; £30. Heathkit HD1250 solid state dip meter, 1.6MHz to 250MHz little used, £40. 572B valves 1 new, 1 part used; £45. the pair. Bob, G3MSL, please call after 6pm. 01252 621446 (Fleet).

KENWOOD TH42E 70cm handheld case SMC32 spkr/mic DRP2 keypad charger dry cell case. 12V cable bxd excellent condx ideal for novice; £230. TS50S automatic ATU immaculate bxd; £850. 01222 753622 (Cardiff).

KENWOOD TH75E dual band h/held plus PB8 & PB6 NiCads two chargers BT6 dry cell case fist mix. Bxd handbook etc; £325. Sony ICF 7600D SW rcvr with SSB; £100. G1WSN, QTHR. 01425 477957 (Ringwood).

KENWOOD TH78E 2m/70cm h/held, case swivel bracket e/mem module immaculate, in original box with handbook; £325, QTHR. G4CGZ. 0181 677 9309 (London).

KENWOOD TH78E 2m/70cm handheld cigar lead charger eartalker mag-mount with antenna bxd immaculate condx; £325 ono. G6MFT, QTHR. 0181 449 7754, 0181 449 0174 (eves). (Barnet, Herts).

KENWOOD TH79E 2m/70cm hand-held spare PB32 nicad, soft case, SMC33 multi-function spkr/mic. Like new (warranty to Aug 97). Bargain; £355. KSC-14 rapid/trickle charger for TH22/42/79E. Hardly used, bxd; £65. Diamond RH-770 3/5.5db dualband telescopic aerial. Mint; £29. G0EOL,QTHR. 01606 554857 (Winsford, Cheshire).

KENWOOD TS140S 100W tcvr, with MC-435; £500 also automatic antenna tuner AT-250 bxd man & leads; £250. G4IGY, QTHR. 01964 533331/532874 (Hornsea).

KENWOOD TS450-SAT as new; £900. Daiwa PS30X MII PSU; £70. Trio TS515 tcvr Tx needs attn; £100. Icom IC-201 two metre 10W tcvr multi mode CW FM SSB; £80. 01509 266316 (Loughborough).

KENWOOD TS520S HF tcvr mic, man, good condx; £250. 01562 824518 (Kidderminster).

KENWOOD TS830S with remote VHF 240, hand mic. Recent service, all bands Op and full service mans, buyer collects. John G7LWF; £530. 01372 375573 (Leatherhead).

KENWOOD TS850SAT very good condx; £995. Mutek TVVF144A MK1 2m transverter; £140. MM 70cm transverter; £80. Versatower 40ft no ground post; £200. 386SC-33 motherboard with 2mb ram; £60. Cirrucs 1mb vga card; £25 all ono. 01223 570679 (Cambridge).

KW Atlanta tcvr, spare pair PA valves; £210. Marconi Atlanta marine rcvr 15KHz-18KHz spare valves built in power supply good condx; £90. Maplin Morse decoder; £45. Tel eves; G0LNV 0114 2553103 (Sheffield).

KW202 Rx KW204 Tx clean & in working condx with mans; £100 the pair, BC312 1.5MHz to 18MHz Rx with manual, BC453 200kHz to 550kHz Rx both U.S army 1940s vintage fair condx; £10 the pair. Buyer collects. GM3EWC, QTHR. 01224 310179 (Aberdeen).

LOWE NRD535 ECSS BWC 1.8kHz crystal; £1350,Drake 2-C W CQSP extra crystals valves; £180. AVO sig gen MKII original box; £80. KW Vespa MKII; £75. Leader audio gen LAG26; £15. GM0KMG, QTHR. 0141 649 4345 (Glasgow).

MFJ 20CW tcvr barely used; £50. Welz SWR power meter 2.5-200W microsoft windows for work groups users guide; £15. G4VCV, QTHR. 01761 434224 (Bath).

OUTBACKER Junior. HF antenna, as new. Half-price £90. To personal caller, (no offers), not postal. Stuart, G0LOE. 0161 330 8149 (Dukinfield).

PHILIPS PRC2000 HF manpack, & accessories; £500. Racal TRA 931 Syncal-30 HF manpack with batteries, charger, accessories; £475. Yaesu FT-290 mark 1 with Mutek frontend. Sperry Chobham navigation system for 1960/70s military vehicles; £10. Soviet image intensifier; £300. Sell or exchange/px for small (2m) military radio shelter/cabin, Icom IC-725, Icom IC-32E, Racal PRM.4041, AOR Spectrum analyser. Bob, 01527 64885 (Redditch).

PK232 can be seen working; £160, six position antenna switch MFJ 1701; £25. G0MCE, QTHR. 01902 783299 (Wolverhampton).

QTH three bedroomed semi detached house Wimpy built 1960 gch, garage hard standing continental TV area residential garden estate close to all channel ports attractive seaside town; £49,000. Send for details Williams 27 Beech Drive, Broadstairs, Kent CT10 2LL.

REALISTIC HTX100 10 metre SSB/CW mobile tcvr, mint condx, bxd, mans plus mobile mic, good performer any trial; £135 or exchange magnetic loop. Cash adjustment either way. G4XSM. 01284 768084 (Bury St Edmonds).

SILENT key items FT101Z mic & manual; £335. Tr7500 mic & manual; £110. Telomast 12m; £95. Datong PC 1; £60. BBC 'B'; £40. Bird QRP Wattmeter; £50. Helper instruments 'Sinadder'; £50. Europa 70MHz. Packet; £36. Racal RF unit; £50. Atlas 210X; £200. G5HD, QTHR. 01409 281342 (N. Devon).

SKIPTECH 15/20 amp DC PSU as new; £50 ovno. (list; £80). VFA all band HF antenna 7ft 6in in three sections. This is updated version of Joystick; £35. (list £64). Diamond dual band VHF/UHF magmount; £10. Buyers test and collect, regret no packing facilities. G3ADZ, QTHR. 01394 275820 (Felixstowe).

SOLARTRON CX1441 oscilloscope, Myra megohmmeter model 35A offers, 3.5 digit LCD panel meter; £10. 2 off 4CX250B valves; £35 each unused. 01209 612953 (Camborne).

STANDARD C58 tcvr 2M multi mode NiCads & mobile cradle; £180 ono. Belcom LS20XE tcvr 2M FM; £60 ono. G8SZX. 0116 2335744 (Leicester).

STRUMECH 30ft BP30 versatower tilt-over & wind up with base plated post & two head sections; £150. G3IWA, QTHR. 01453 762244 (Stroud).

TB3 triband 3el antenna. unused/boxed; £295. Icom IC02AT 2m 2/5w handheld, C/W H/D NiCads, CTCSS, soft case, unused/boxed; £200. Apple II Europlus computer, twin dd, VDU, peripherals, various s/w, vgc; £75. Printer available.01243 812206 (Chichester).

TEN-TEC argonaut 515 QRp tcvr, exc condx, man. Sale includes an adjustable voltage regulator (0-11v) also an active CW filter; £275. G4GLC 01729 822299 (Settle).

TEN-TEC scout 555 C/W 7 MHZ module and mic, very little used. House move forces sale; £450. 01566 776108 (Launceston).

TEST gear clearout scopes telequip D54; £35. Scopex 12-4D, advance 05250; £40. 05255; £45. Farnell DTV 12-14 small modern; £55. Meters taylor 172A 6in scale V/V +M / leads manual; £25. PSU Farnell SB30/5 variable 30V.5A; £25. Farnell SW mode +5+12+24-5-12; £35. RF & AF. Genyis, transformers, eves. 0151 489 9620 (Merseyside).

TILTOVER tower BX1 3 section type 60G including ground post power winch CDR HamM rotator buyer collects located Ryton tyneside apply to G5RI, QTHR. 01434 603100 (Northumberland).

TOWER sections, triangular, h/duty 13 feet long, 3 availble ; £20 ea. Large diecast boxes 10.5in x 6in x 3in deep fully weatherproog, ideal for remote atus/antenna switching; £10 ea. Wavemeter class D no1 mk2 collectors item??:£10. Geloso VFO model 4/102/V complete with large Geloso analogue dial diagrams etc. Homebrewers delight or collectors item? £10. RF signal generator Nombrex model 31. 149kHz-350MHz as new, bxd, circuit etc; £20. Audio recording tape on 7in spools 1/4in x 2400FT brand new + sealed; £3 ea. G3XBN, QTHR. 01273 557766 (Brighton).

TRIO 100W HF mobile TS120V; £300 bxd with circuits, Yaesu FT790R mark 1 with new nicads, case antenna; £300 ono. FT101Z mint condx, no mods; £325. Microwave modules 2m transverter with 10m IF mint; £120 ono. Datong AD370 antenna; £45. Drake R8E 0.1-30MHz all mode communications receiver; £750 ono 5MHz? mini scope; £25. Scoupole antenna; £10. Discone with 2m/70cms mint; £30. 0956 544202 (London-NW6).

TRIO R2000 Rx, 150kHz-30MHz with VC10, 118-174MHz convertor, both excellent and C/W VHF ant & mans; £325 ono. GI3HCP, 01247 460251 (Bangor, Co Down).

TRIO TS-130S 100W, WARC bands, mic, handbook; £395. Yaesu FL2100B linear, recent new valves; £295 or both for £650. Daiwa DK-210 electronic keyer; £40 IC-50 converted to 10FM; £25 all vgc. GW4WJO. 01407 762330 (Holyhead).

TRIO TS430S FM board & narrow SSB filter fitted, bxd, excellent condx; £550. G0CDO, QTHR. 01789 740574 (Stratford-upon-Avon).

TRIO TS930S +270Hz filter outstanding; £700. BNOS LPM 50-10-100 10W in 100W out linear; £100. Epson PC-AX 286 laptop, built-in modem, case; £150. W9GR, DSP filter; £100. Westlake W103 co-ax 100M drum new; £65. G3OZF. 01296 748354 (Aylesbury).

TS130V WARC QRP to 20W; £280. ICO2E handheld keypad £75. both good condx. 01843 589113 (Ramsgate).

TS180S gwo WARC bands filter; £250. Cobweb antenna new assembled not erected, see RadCom June 1993; £130. Gm3GJB 01324 623608 (Falkirk).

TS830M Tx/Rx mic handbook, excellent condx; £475. MFJ 949D deluxe tunel with 300W dummy load; £95, mint. G4SEN. 01260 275192 (Congleton).

TS830S tcvr for sale CW filter vgc; £400. Buyer collects also FT902DM with hand mic. GWO; £350 buyer collects G4RND, QTHR. 01254 399281 (Accrington).

VERSATOWER 40ft. wall mounted head unit winches & base mount; £200. Buyer collects. Sony PRO80 handheld receiver 150kHz to 223MHz AM/FM/SSB; £125. 01737 354497 (Banstead).

VERSATOWER EW45; £300. Cushcraft A35 3 ele tri bander; £175. Keyboard MFJ-496; £60. ATU Kenwood AT200; £75. Keyer MFJ 486; £60. All mint. 01677 423750 (Bedale).

WATKINS Johnson VHF receiver 20-90MHz all mode with spectrum display; £200. Butternut mini HF beam; £120. Mini circuits balanced mixers same spec as SBL1-X; £2.50 ea. Wanted IC735 preferably with box & man. Calls after 6pm weekdays, any time weekends. 01788 815506 (Rugby).

WESTERN DX tri-band antenna 10-15-20, good condx ask any VK; £75 or exchange 5 band vertical buyer must collect. G4TLY, Ted, QTHR. 01666 822935 (Wiltshire).

WURLITZER two manuals valve electronic organ, late 1950s. Wooden harpsichord style, beautiful condx; £195. Please phone after 6pm. G4TLY, Paul. (not QTHR). 01249 782554 (Chippenham).

YAESU FT11r excellent condx, 2M handi air band included. Little used, genuine; £185. G0DLP, QTHR. 01737 553920 (Croydon).

YAESU FT290 Mk 1.2m multi mode complete with mobile mount, case; £210. HQ1 minibeam 20-10 all gwo; £100. G4PFF, QTHR. 01767 677792 (Nr Sandy).

YAESU FT650 6/10m tcvr 100W 24-60MHz tcvr showroom condx; £800 ovno. IC2E with spkr mic DC-DC converter two batteries; £120. Kenwood TS50 heavy duty PSU; £120. 0181 441 2028. 0973 429064 various accesories also available please phone G0LCS, QTHR. (North London).

YAESU FT7 80/40/20/15/10 20W onput. Zetagi linear for 40/20/15/10 200+W output. GWHIP mobile antenna for 20/15/10. SWR meter ideal station for mobile or base operation. Manuals; £270 ono the lot or would split if suitable interest. GW0HDY 01291 629905 (Chepstow).

YAESU FT726R 2M + HF 1-12-15 bxd mans one owner v.g.c; £650. Yaesu 400RC rotator with bottom bracket g.w.o; £125, after 8pm. 01903 690518 (Worthing SX).

YAESU FT726R 70/2/6m satellite as new; £775. Icom IC725 HF general coverage comes with AT150, FM & MMB; £775. G0BNR. 01733 844388 (Peterborough).

YAESU FT790 CM5 radio; £250. Butternut vertical HF6; £90. Drake WH7 PWR SWR meter; £70. KPC-2 paket terminal; £80. all ono. 01782 395017 (Stoke-on-Trent),

YAESU G4OO rotator with lower clamp brand new; £180. 70cm module for FT726R; £150. G7DPS, QTHR. 01253 395380 (Blackpool).

WANTED

PRIVATE museum owner with limited funds will offer the best cash price in strictest confidence for any early wireless equipment, crystal sets, horn spkrs, valves, pre-war televisions, books etc. Particularly wanted are any items by Marconi, GEC (Gec phone) sterling, Pye, Western Electric, RI (Radio Instruments) & anything from the first world war. Thank you. Mr Yates, The Hewarths, Sandiacre, Nottingham. NG10 5NQ. 0115 939 3139.

23CM module for Yaesu FT736R, will consider complete FT736R with 23cm module. Any 23cm aerial array & preamp. Cash waiting for right priced & condx equipment. Anthony, eves. 01923 448285 (Watford).

ANEMOMETER pole mounting type as used on airfields etc, also morse practice oscillator 1 valve or 2 valve as marketed by Webbs Radio, London in the 1940's. 01934 833265 (Avon).

CORSAIR HF rig, your price paid write to N Cameron, 16 St Marys Cres. Westport, Mayo, Eire. EI4DZ, no telephone.

EDDYSTONE EC10 EC10 MK II, EB35, 870A, 960, 652, 31A, EM34, 962, 720. Marconi 6689. 810 for cash. collection possible. Peter Lepino. 0374 128170 (Leatherhead).

HF tcvr must be compact, solid state with WARC bands eg IC-735. Funds limited but enough. also wanted; JST-100. John. 01963 240319 (Castle Cary).

IC735 with CW filter, PSU or FT757 mark 2 & matching PSU. G2FXS, QTHR. 0191 2572582 (Newcastle).

ICOM 735 unmarked & boxed or TS50 with or without power supplys ext spkr ATU, etc G0IJJ, Steve. 01922 712708 or 0850 745894 (Wolverhampton).

ICOM IC2E in gwo, complete with battery pack & rubber duck antenna. G3ADJ, QTHR. RG40 4JE. 01734 734882 (Wokingham).

ICOM LSI SC3062A chip for Icom IC211E tcvr. G3JMB, QTHR. 01444 413889 (Haywards Heath).

KENWOOD SM230 station monitor GM0VPG. 01463 220125.

KENWOOD Trio AT130 good condx, essential. G3KIW, QTHR. 01734 713644 (Reading).

MARCONI Electra wanted please phone John, G0LXY, 011295 721 511, thanks.

NON working Drake R4, Eddystone heathkit 840 888 940 EA12, heathkit HW7 HW8 HW100 RGI SB101 SB102 SB104 SB400 Yaesu FT200. 01766 781105 (Harlech).

PLUG in coils for national FB7 FBX-A Rx. CW filter F455Q-5 for 75S-1. Audio output XFMR for AR88. GM2FVV, QTHR. 01786 811237 (Stirling).

PYE car radio short wave converter or similar G6NJO. 01845 578030 Parkhouse Cottage, Topcliffe, Thirsk, Y07 3PG.

PYE PF70 batteries & general spares to support existing units. Anything considered. Also anyone got upgrade info for Heathkit HW101 trncv? eg, Rit mod or new band additions. Call Ralph, GM4MHE or e-mail on ralph.musto@gecm.com. 01506 673514 (West Calder).

QUAD, leak, Radford etc valve, hifi, also Eddystone rcvrs working or not, will pay cash & collect. 01245 381961 (Chelmsford).

SERVICE manual to cover Howard Gem rotavator will pay all costs. EI8FC, QTHR.

SHEET metal guillotine, minimum 1 metre cut. Valve tester, complete & working. Have Kenwood R5000 rcvr with CW filters. Any offers? G3WCE, QTHR. 01603 250910 (Norwich).

SPECTRUM analyser in dead or alive condx also Motorola GP300/P210 HT800. VHF/UHF 2-way radio's G4ZOW. Phillip 01582 461952 (d/time). (Harpenden).

SQUEEZE key ele-key model EK-150 or very similar i.e, mains powered with integral audio amplifier etc. 01652 634819 (Barton-on-Humber).

TANDY minimus 0.3 80hm sprks, 1 pair rqrd cat no 40-1250C, Mike G6ZEL, QTHR. 0181 599 2541 (Romford, Essex).

TECHNICAL mans for Radiac set type 1320X No2 MKII cat no; 6665-99-104-5870, also AP2890A or L for H25. G4WWX, QTHR. 0151 722 1178 (Liverpool).

TR1133 TR1143, or TR9 reqd for Hawker typhoon cockpit restoration project, working or non working, anything considered. 01666 860936 (Malmesbury).

WANTED Yaesu FT290 MK2 in good condx, also TS530S. GW3NSP, QTHR> 01222 753622 (Cardiff).

YAESU FT404 crystal controoled 70cm h held tcvr working G7PWH. 01444 441460 after 8.30pm/ (Haywards Heath).

EXCHANGE

COMMODORE C64 slim type with 1541-II disk drive all new & complete still bxd, will exchange for FT-470 in working order or W.H.Y Commodore MPS801 printer in working order with tractor feed; £75 post paid tel; Mike on 01704 892088 (Ormskirk).

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YAESU FT-77 80-10M 100W HF tcvr + FC-700 ATU bxd with mans, leads & microphone. Exchange for Icom 271E + Icom 471E VHF & UHF multimodes or dual band VHF/UHF multimode. Contact G4XPP after 5pm or write to QTHR. or sell together for £525 ono. 01388 745787 (Willington Crook).

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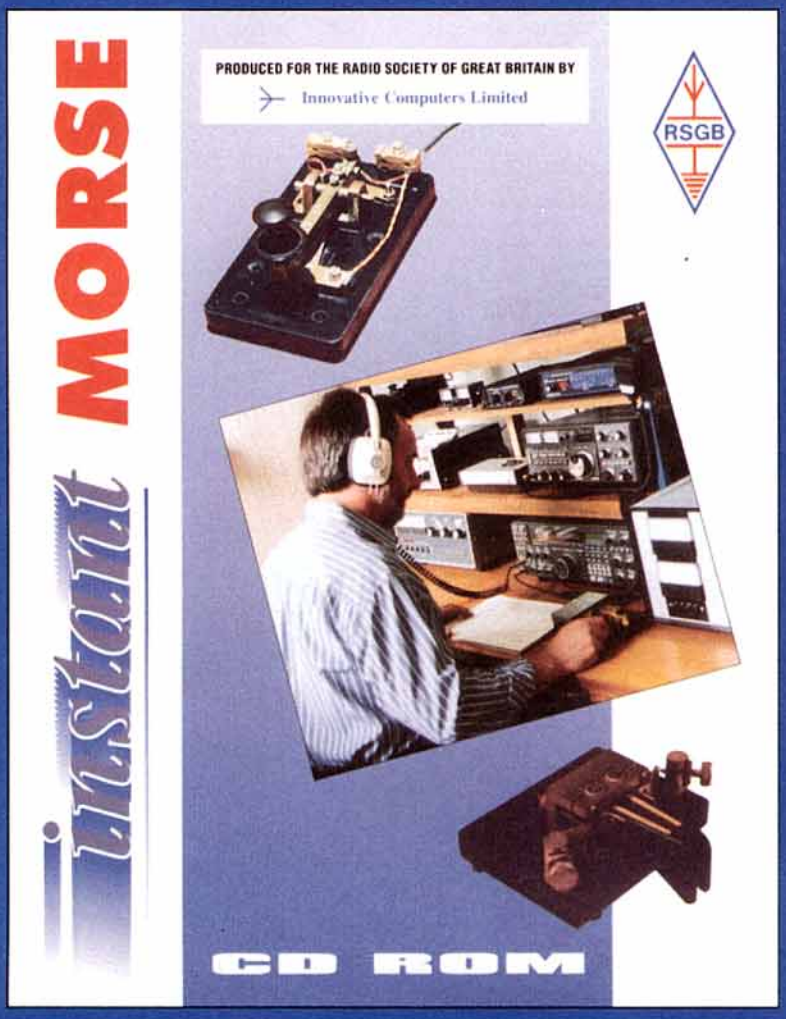

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Newsletter and magazine prices include postage. This does not apply to back numbers which incur postage as above. Overseas Airmail and first class UK post prices are available on request.

AVAILABILITY. Goods are available over the counter at RSGB Headquarters 9.15am to 5.15pm, Monday to Friday. However, you are strongly advised to confirm availability of goods by telephone before visiting Headquarters.

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NEW!

The 1996 RSGB Diary

WE ARE PLEASED to announce the publication of the RSGB diary dedicated solely to radio amateurs *and* shortwave listeners. At last information will be at your fingertips (or in your pocket!) wherever you go. This attractive, black finish, gold embossed diary has been printed by Letts and published by Bambers with cooperation from the RSGB. This year's diary has gold corners and a much more luxurious finish. Contents include:

- **1996 Rally dates**
- **International Q Codes**
- **RSGB Committees**
- **Latest Bandplans**
- **RST codes**
- **First Aid Section**
- **Equipment Log**
- **Contest dates**
- **RSGB Honorary Officers**

AS WELL AS MANY ARTICLES . . .

. . . such as Cracking the Code, Listening Via The Bureau, Good Operating Practices, AMSAT UK, WAB Awards, IOTA, Amateur Television . . . Contributing authors include: Hilary Claytonsmith, G4JKS; Roy Clayton, G4SSH, Chief Morse Examiner; Ray Pyman, RS1257; Ray Eckersley, G4FJT; Ron Broadbent, G3AAJ and Peter Kirby, G0TWW . . .

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Radio Society of Great Britain
Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE

CLUB NEWS

DEADLINE - Items for inclusion in the January 1995 issue must be sent to HQ marked "Club News - DIARY", to be received by 20 November latest. If news is received by the published deadline, it should appear in the listing. It is your responsibility to ensure that items are sent DIRECT to HQ in good time. News items should be sent in writing, preferably typed or written legibly, and be signed by the club secretary or the person responsible for publicity.

NOTE: This is primarily a service for clubs affiliated to the RSGB, to whom priority will be given.

AVON

BRISTOL ARC - 2, 'Your Multimeter and You'; 9, HF SSB; 16, Amateur TV; 23, QRP; 30, VHF; December 7, Projects in Hand; 14, HF CW/SSB. Details 0117 9654886.

RSGB CITY OF BRISTOL Group - 28, Construction contest. Details 0117 9672124.

SOUTH BRISTOL ARC - 1, On the air evening; 8, Club forum - Members' Suggestions; 15, AGM; 29, QSL card evening; December 6, Annual club darts match; 13, Christmas social. Details 01275 834282.

BEDFORDSHIRE

SHEFFORD & DARS - 9, Talk 'Steam Models' by Jim, G4BHO; 23, Quiz night; December 7, The G1GSN challenge to build a radio receiver in one hour; 14, Chairman's mince pie night. Details 01462 700618.

BERKSHIRE

BRACKNELL ARC - 8, Junk sale; December 13, 25th Anniversary cheese and wine party. Details 01344 420577.

READING & DARC - 9, Construction contest; 23, Low power radio telemetry; December 14, AGM & cheese and wine. Details 01734 698274 (eves).

BUCKINGHAMSHIRE

AYLESBURY VALE RS - 1, Talk 'EMC' by Tim, G8PTP; 15, Talk 'Optimising Receiver Front-end Design' by Ian, G3SEK; December 6, Construction contest. Details 01296 437720.

CAMBRIDGESHIRE

CAMBRIDGE & DARC - 3, Talk on solar winds; 17, Talk 'Radio eaten by SHARC'; December 8, Talk 'Naval Video' by David, G3FKS; 15, Xmas social. Details 01954 200072.

CHESHIRE

CHESTER & DARS - 14, Talk '73 Years of Radio Part 3' by Dave, G2FVA; 21, Video night; 28, Construction contest. Details 0151 608 3229.

MID CHESHIRE ARS - 1, On the air evening; 6, Committee evening; 8, Discussion; 15, On the air evening; 22, Software swap night. Details 01606 592207.

STOCKPORT RS - 8, Talk 'Origins, History and Development of Practical Wireless Magazine' by Rob, G3FXD; 22, Construction contest; December 13, AGM. Details 0161 432 3741.

WARRINGTON ARC - 14, Talk 'Gee-H Navigation' by G4YFH. Details 01925 762722.

CLEVELAND

EAST CLEVELAND ARC - 3, Talk 'Experiences of Antenna Construction' by Robert, G7SMB; 10, Talk on Raynet by John, G8YDC; 17, Discussion evening; 24, Demonstration evening - Fitting coax plugs; December 1, Talk ' The Internet' by Matthew, 2E1CIQ. Details 01642 475671.

HAMBLETON ARS - 9, Talk 'Work with the RSGB' by Peter, G4EJP. Details 01642 710886.

CLWYD

CONWY VALLEY ARC - 1, Talk 'Effect of Lightning on Aerial Installations' by Ray, GW7CMF; December 6, Talk 'Control by DTMF' by John, GW3JGA. Details 01745 855068.

CORNWALL

CORNISH RAC - 3, Bring and buy sale. Details 01209 820118.

POLDHU ARC - December 12, Anniversary of first transatlantic broadcast from club site in 1901. Details 01326 240144.

ST AUSTELL ARC - 6, Talk 'Satellite Technology' by Jim, G8GLI; 20, Junk sale; December 4, Slow Scan by Keith, G0KTD and Dave, G4KNI. Details 01726 72951.

CO DOWN

BANGOR & DARS - 3, Surplus equipment sale. Details 01247 466557.

DERBYSHIRE

BUXTON RA - 14, AGM. Details 01298 25506.

DERBY & DARS - 1, Junk sale; December 5, Junk sale; 13, Constructors contest. Details 01773 852475.

DEVON

APPLEDORE & DARC - 20, Radio quiz. Details 01237 476124.

AXE VALE RC - 3, Talk 'Measurement of Time' by G3AHX. Details 01297 445518.

TORBAY ARS - 17, Talk 'Use of Amateur and Commercial Satellites' by Ernie, G3ABU. Details 0803 526762.

DORSET

BLACKMORE VALE ARS - 14, Talk by a mystery guest; 28, On the air evening; December 12, Quiz night. Details 01935 814055.

EAST SUSSEX

SOUTHDOWN ARS - 6, Talk '100 Years of X Rays and Radiation' by Dr Craig, G3SGR; December 7, VHF contest night. Details 01825 763022.

ESSEX

CHELMSFORD ARS - 7, Recycling of previously used equipment sale; December 5, 'Centenary Marconi Lecture' by Stanley Wood. Details 01245 256654.

COLCHESTER RA - 30, Talk 'Computers - Too Simple for Words' by Jonathan, G0DVJ; December 14, Local clubs hospitality evening. Details 01206 383510.

FIFE

GLENROTHES & DARC - Please note that club secretary is Dave Hobden, GM3XMY. Tel 01333 422562.

GLOUCESTERSHIRE

CHELTENHAM ARA - December 1, AGM. Details 01242 242336.

GRAMPIAN

ABERDEEN ARS - 3, Junk sale; 10, AGM; 17, Presidential address. Details 01224 628005 (office hours) or 01569 731407 (evenings).

GREATER LONDON

ACTON, BRENTFORD & CHISWICK RC - 21, Talk 'The Computer in Amateur Radio' by G4LIC. Details 0181 992 3778.

BROMLEY & DARS - 21, Slide show. Details 0181 777 0420.

COULSDON ATS - 13, Talk 'The Prelude to Radar' by Brian, G3GDU; December 11, AGM. Details 0181 684 0610.

CRAY VALLEY RS - December 7, Talk 'Optical Communications re-visited' by G0FDZ. Details 0171 739 5057 (office hours).

CRYSTAL PALACE & DRC - 18, Surplus equipment sale. Details 0181 699 5732.

EDGWARE & DRS - 9, Talk 'The Novice Licence' by Rob, G40BE; 23, Talk 'Astronomy' by Brian, G3ZKE; December 14, Junk sale. Details 0181 204 1868.

SILVERTHORN RC - 10, Construction contest; 17, On the air evening; 24, On the air evening; December 1, Junk sale; 8, On the air evening. Details 0181 505 1871.

SOUTHGATE ARC - 9, G6QM competition and Brains Trust; 23, On the air evening; December 14, AGM. Details 01707 850146.

SUTTON & CHEAM RS - 16, Junk sale. Details 0181 644 9945.

WIMBLEDON & DARS - 10, AGM; 24, 24, 'A Day Trip to Mars'. Details 0737 351313.

GREATER MANCHESTER

BURY RS - 14, Surplus equipment sale; December 12, AGM. Details 0161 762 9308.

ECCLES & DARS - 7, Talk 'Interfacing SCSI Devices' by G6MEI; December 5, AGM. Details 0161 773 7899.

OLDHAM ARC - 16, Talk on Raynet by Peter, G4EJP; December 14, Talk '1994 British Mount Everest Medical Expedition' by Dr A Taylor, G4SSC. Details 0161 627 1639.

STOCKPORT RS - 8, Talk 'The Origin, History and Development of Practical Wireless Magazine' by Rob, G3XFD; 22, 'All Time Best of Home Brew' display; December 13, AGM. Details 0161 439 4952.

GWYNEDD

DRAGON ARC - 6, Talk by Gwyn Roberts; 20, Talk by Mr C Latham; December 4, Surplus equipment sale. Details 01248 600963.

HAMPSHIRE

ANDOVER RAC - 7, Picture quiz - 'Whose Antenna is That?'; 21, 'IBM PC Memory Management'; December 5, AGM. Details 01980 629346.

BASINGSTOKE ARC - 6, Presentation on amateur satellites; 26, Fox hunt. Details 01256 26050.

HORNDEAN & DARC - 28, Talk 'Digital TV' by Bruce Randall. Details 01705 472846.

ITCHEN VALLEY - 10, M Peg 2 (Transferring data using compression to typically 150:1); 24, Visit to Videotron, Southampton; December 8, The Radio Amateur's Workshop. Details 01703 813827.

THREE COUNTIES ARC - 8, Talk 'Grey-Lining - HF Propagation' by G4ZEJ; 22, Talk 'Bee Keeping'; December 6, Skittles evening. Details 01428 606298.

WINCHESTER ARC - 17, Talk from homebrew expert Gerry, G2DBT. Details 01962 860807.

HEREFORD AND WORCESTER

BROMSGROVE ARS - 14, On the air evening; December 12, Technical topics. Details 01527 542266.

DROITWICH ARC - 7, RSGB Videos. Details 01905 778794.

HERTFORDSHIRE

CHESHUNT & DARC - 1, Talk on satellite TV by Roger, G4OAA; 22, AGM. Details 01992 464795.

DACORUM ARTS - 4, Barn dance and supper; December 5, Video about clandestine radio during World War Two. Details 01582 620507.

HODDESDON RC - 9, On the air evening; 23, Talk on Raynet by Trevor, G4KUJ. Details 01992 460841.

WELWYN - HATFIELD ARC - 4, WARC Constructors Open Challenge; 5, Fireworks - Ware Round Table; 6, Talk on ATV Repeaters; 20, Talk 'Spies and Radios' by Pat Hawker, G3VA; December 4, AGM. Details 01920 462241 (eves) or 0181 982 7298 (day).

HUMBERSIDE

HORNSEA ARC - 1, Talk 'Happy Chickens' by G1IKT; 22, 'the History of Number' by G0TPS; 29, AGM; December 6, Talk 'Paddle Steamers' by G7NNT; 13, 'The Last Word?'. Details 01964 562258.

NORTH FERRIBY ARS - 10, Visit from the Rev George Dobbs, G3RJV; 17, Night on the air; 24, Visit from Peter Sheppard, G4EJP. Details 01482 656324.

ISLE OF MAN

ISLE OF MAN ARS - 6, Talk 'A Really Hi Tek Electronics Company'; 11, Annual dinner; December 11, AGM. Details 01983 294309.

KENT

EAST KENT RS - 3, Talk 'Radio Interference' by Trevor, G3XZT; 17, Inter-club Quiz; December 1, Talk 'Playing with Antennas' by Erwin, G4LQI. Details 01277 743070.

MAIDSTONE YMCA ARS - 3, Junk sale. Details 01622 729462.

MEDWAY R & TS - 10, Talk 'Magnetism Caused by Rotation' by Lars Harstad; 24, Fish and chip supper. Details 01634 710023.

LANCASHIRE

PRESTON ARS - 9, RSGB video evening; December 7, 'Own Choice Kit' construction competition. Details 01772 686708.

LEICESTERSHIRE

LEICESTER RS - 6, On the air evening; 13, On the air evening; 27, On the air evening; December 4, Talk 'Forensic Science'; 11, On the air evening. Details 0116 2917250.

LOUGHBOROUGH & DARC - 7, Talk 'Amateur Radio in Oman' by Dave Hibbin; 14, Talk 'Maritime Mobile - On the Canals' by Pat Bower; 21, On the air evening; 28, Talk 'Amateur Radio Satellites - Are They Still Up There?' by Art, G3KWY; December 12, Talk 'Titanic - the Radio Connection' by Ian, G8SNF. Details 01509 231289.

LOTHIANS

LOTHIAN RS - 8, A series of mini talks; 22, Novice Night; December 13, Video evening. Details 0131 314 2689 (office hours).

MERSEYSIDE

LIVERPOOL & DARS - 7, Oscilloscope demonstration by G8FHD; 14, On the air evening; 21, Talk by G4GEB; 28, Surplus sale. Details 0151 722 1178.

WIRRAL ARC - 1, Ten pin bowling; 8, Talk 'Train Driving' by Brian, G4ZQP; 22, Home construction judging and presentations; 29, Club Xmas dinner; December 13, Chairman's night. Details 0151 606 8989.

WIRRAL ARS - The club has a new secretary: T R Lennon, G7IIP, 'Hamnavoe' Uplands Road, Spital Park, Bromborough, Wirral, Merseyside L62 2BZ.

NORFOLK

NORFOLK ARC - 1, Surplus equipment sale; 8, On the air evening; 14, Video of club events during 1995; 22, On the air evening; 29, Talk 'SWR Measurements' by Stuart, G3XYO; December 6, Christmas dinner; 13, Talk 'A Club's View in Russia' by Terry, G0IRQ. Details 01603 789792.

YARMOUTH RC - 2, Talk 'Locator Systems' by G3YYQ; 16, AGM; 30, Used equipment sale. Details 01493 721173.

NORTHAMPTONSHIRE

Northampton RC - 2, AGM. Details 01295 760640.

NOTTINGHAMSHIRE

SOUTH NOTTS ARC - 1, Talk on crime prevention; 8, Construction and on the air night; 15, Computer logging demo and practice; 22, Construction and on the air night; 29, Visit to Royal Mail Sorting Office; December 6, Open forum. Details 01509 672734.

WORKSOP ARS - 28, AGM. Details 01909 487741.

SHROPSHIRE

SALOP ARS - 9, Quiz night; 23, Contesting with Bob, G4UJS. Details G7SBD QTHR or @ GB7PMB.

TELFORD & DARS - 1, On the air evening. Details 01952 261923.

SOMERSET

TAUNTON & DARS - December 1, 'The GDO and Its Uses' by Graham, G0GTR; 8, Christmas dinner. Details 01823 680778.

WEST SOMERSET ARC - 7, Oscilloscopes; December 5, Quiz night. Details 01984 631470.

WINCANTON ARC - 6, Talk 'Direction Finding' by Bert, G2FIX; 20, Open night; December 4, Talk 'HF DXing' by Ian, G3KZR. Details 01963 370352.

YEOVIL ARC - 2, Talk 'The Pitney TRF Receiver Part 1' by G3PCJ; 9, Talk 'Aspects of Time' by G3KSK; 16, On the air evening; 23, Talk 'QRPP' by G3MYM; 30, Committee meeting; December 7, Talk 'The National VHF Post Code Charity Challenge' by G3ZXX; 14, Talk 'Workshop Practice' by G7SDD. Details 01258 473845.

SOUTH YORKSHIRE

BARNSLEY & DARC - 6, Great Northern Hamfest briefing; 13, Hamfest post mortem; 20, Talk by G4RCG on contests and DXing; 27, Demonstration on Transmitter Fingerprinting by Ernie, G4LUE; December 11, Talk on radar by Jack, G4JJ. Details 0836 748958.

DRONFIELD & DARC - 6, On the air evening; 20, AGM; December 4, Novice on the air evening. Details 01246 290250.

SHEFFIELD ARC - 6, Bonfire night; 7, Raynet meeting; 13, Talk by Morris, G7PSR on a mystery subject; 14, Ten pin bowling; 28, Swimming; December 4, Talk 'Antennas On A Shoestring' by Andrew, G0HSA; 11, Christmas dinner. Details 0114 244 6282.

SUFFOLK

FELIXSTOWE & DARS - 13, Talk by Frank, G3FIJ; 27, RSGB video night; December 4, Talk on antennas by Richard, G0RZG; 12, Christmas video. Details 01394 273507.

SUDBURY & DRA - 7, Talk on ATV and 1296MHz by Barry, G1UGJ; December 5, Quiz night. Details 01787 313212 (before 10pm).

SURREY

ECHELFORD EARS - December 14, Christmas party. Details 01344 843472.

TAYSIDE

DUNDEE ARC - 7, Construction evening; 14, Talk 'Oscilloscopes and How to Use Them' by Les, GM0TGG; 21, construction evening; 28, Talk 'Packet Radio' by Drew, GM1JTK; December 5, Construction evening. Details 01382 739179.

TYNE & WEAR

SOUTH TYNESIDE ARS - 27, AGM; December 11, Christmas party. Details 0191 537 3602.

TYNE & WEAR REPEATER GROUP - November 5, Auction. Details 0191 388 2913.

SILENT KEYS

WE REGRET to record the passing of the following radio amateurs:

G0CQA	Mr J A Roberts	January 1995
G0DIZ	Mr W G Butler	13.07.95
G0JBU	Mr P J Pitman	24.07.95
GM0KND	Mr V Lang	28.5.95
G0PMR	Mr W Marley	5.05.95
G0RJZ	Mr C Lowe	08.05.95
G1KXS	Mr C W Leitch	08.05.95
GW3BGP	Mr J Wilson	04.08.95
G3CKK	Mr N F Hobbs	08.07.95
G3CSG	Mr F N Kendrick	27.07.95
G3FIU	Mr W B Gray	
GI3RNY	Mr R Williamson (Bertie)	09.08.95
G3JIC	Mr A Renwick	27.04.95
GM3MMB	Mr G Kinnaird	22.07.95
G3RMB	Mr S J Lees	28.08.95
GM3SHB	Mr W Blanchard	15.6.95
G3SYP	Mr H Parker	January 1995
G3TSN	Mr D Newbould	18.06.95
G3WFU	P J Neal	30.08.95
G4FUQ	Mr W T Cox	29.05.95
G4IQN	Mr R Espiau	21.12.95
G4LBG	Mr A England	05.08.95
G4MBP	Mr R W Bethell	10.07.95
G4UMZ	Mr C Talbot	23.07.95
G4ZGA	Mr Chaney	21.08 95
RS96704	Mr A Yuen	19.07.95

WARWICKSHIRE

MID-WARWICKSHIRE ARS - 14, Talk 'Packet Explained' by G0FBY; 28, Programme discussion. Details 01926 424465.

STRATFORD-UPON-AVON RS - 13, Talk 'A DXpedition' by Vincent, G0MLX; 27, Talk 'Baluns and Matching' by David, G3PDQ; December 11, Open evening. Details 01789 773286.

WEST MIDLANDS

COVENTRY ARS - 10, On the air evening. Details 01707 659015.

WEST SUSSEX

CHICHESTER & DARC - 7, Talk on Industrial Archaeology by Chris, G4EHG; December 5, Christmas party. Details 01243 573541.

MID SUSSEX ARS - 3, Talk 'BBC World Service' by Richard, G3TDL; 17, Christmas quiz; 24, Children in Need: GB0KIN operating on HF, VHF, UHF, packet and ATV. Details 01403 214400 (office hours).

WORTHING & DARC - 8, Junk sale; 22, Construction contest. Details 01903 753893.

WEST YORKSHIRE

DENBY DALE & DARS - 1, AGM; 15, Constructors Trophy; December 6, Talk 'Sky Update' by Phil, G4FSQ. Details 01484 861782.

HALIFAX & DARS - 21, Talk 'In the Beginning' by Ron, G6RO. Details 01422 202306.

KEIGHLEY ARS - 9, 'Horse Racing at the Cricket Club'; 30, Films; December 7, Night on the air. Details 01274 496222.

WAKEFIELD & DRS - 14, Talk 'Desktop Dithering' by G4BLT; 21, Talk 'World Scout Jamboree' by 2E1DGD; 28, On the air evening. Details 0113 282 5519.

WILTSHIRE

SWINDON & DARC - 2, Talk 'Life in Broadcast Radio' by Ian Dyer; 16, Talk 'Automotive Electronics Systems' by Richard, G7ORG; December 7, Christmas dinner. Details 01793 822705.

TROWBRIDGE & DARC - 1, Constructors Cup entry judging. Details 01225 864698.

RALLIES AND EVENTS

This is a list of all rallies, hamfests, exhibitions and conventions notified to HQ (as at press date). Items are given in detail for the next three months inclusive and in brief thereafter. Please send detailed information, including contact callsign and telephone numbers direct to HQ and marked 'Rally News - DIARY'.

4 / 5 NOVEMBER

NORTH WALES Radio/Computer Rally - Aberconwy Conference Centre, Llandudno. Details Barry Mee, GW7EXH on 01745 591704.

5 NOVEMBER

NORTH DEVON RADIO Rally - Details from G8MXI on 01409 241202.

11 NOVEMBER

AMS '95 Computer & Electronics Show - Bingley Hall, Staffordshire Showground, Stafford. Off A518 Stafford-Uttoxeter Road - Signposted from J14 on M6. Bus shuttle from Stafford BR. Doors open from 10am to 4pm. Features amateur radio, computers, multimedia, satellite, electronics, bring and buy. Details 01473 272002.

12 NOVEMBER

COULSDON ATS Radio and Electronics Bazaar - HQ4 Purley Scout Group, Access via public car park in Liongreen Road, Coulsdon. Open from 10am to 1pm. Features flea market and traders' stalls plus sale of new and secondhand equipment. Lucky number raffle from admission ticket priced 50p. Details 0181 684 0610.

THE GREAT NORTHERN Hamfest - Matrodome complex in Barnsley town centre, near to the bus and railway interchange. The venue is less that two miles from the M1, Junc 37, the A61 and A628 roads. Follow the Metrodome signs and (Hamfest) signs. The venue is all one level with excellent disabled facilities. RSGB Morse tests available on demand. The event features all the usual amateur radio traders and computer dealers plus many specialised groups, repeaters groups, packet, TV, large bring and buy and a large restaurant and bar. Talk-in on S22. Doors open at 11am, 10.30am for the disabled. Details from Ernie, G4LUE on 0386 748958.

MARS-STOCKLAND Radio/Computer Rally - Stockland Green Leisure Centre, Slade Road, Erdington, Birmingham. Open from 10.00am until 4.00pm. Admission priced £1, children free. With free Christmas draw, large free car park, trade stands and special interest exhibits. Plus a licensed bar. Details Norman, G8BHE on 0121 422 9787.

MICROWAVE ROUND TABLE - BT Laboratories, near Ipswich, Suffolk. The event starts at 10am and will include table sessions, testing facilities and a bring and buy. For BT Labs security requirements all access is by advance booking only. Please send the names of all persons attending if multiple tickets are requested. For tickets send an SASE to Roy, G0RRC, Lykkebo, The Street, Burstall, Ipswich, Suffolk IP8 3DN.

18 NOVEMBER

CARRICKFERGUS ARG Rally - Downshaw School, Downshaw Road, Carrickfergus. Doors open at 12pm until 4pm. Admission price is £1. Details from GI0JPR on 01960 361627.

ROCHDALE & DARS TRADITIONAL Radio Rally - St Aldan's Vicarage, Sudden, Rochdale. With components, loads of 'junk'. Bring and buy. Tables for non-trade also available at £5. Doors open at 11.00am and close at 4.30pm. Talk-in on S22. Details John, G7OAI on 01706 376204.

RSGB HQ Saturday Opening - Open 10am to 4pm. Bookshop, Museum, Library and GB3RS. Morse tests available on demand between 11 and 12.30pm.

19 NOVEMBER

BISHOP AUCKLAND RAC Rally - The Newton Aycliffe Leisure Centre. Doors open 11am, 10.30am for the disabled. Bar and cafe also available. Details from Mike Shield on 01388 766264.

26 NOVEMBER

BRIDGEND & DARC Radio Rally - Bridgend Recreation Centre, Bridgend. Easy access off junction 35 and 36 of the M4. With traders selling complete radio/computer systems plus software, electronic components and second hand equipment. RSGB Morse test on demand but two passport-size photos must be produced. Doors open at 11am, 10.30am for disabled visitors. Admission £1. All car parking free, talk-in on S22. Details Maurice, GW0JZN on 01656 864579.

WEST MANCHESTER Radio Club's 'Winter' Rally - Horwich Leisure Centre near Bolton. Junc 6 off the M61. Details Albert, G7RZW 01204 62980.

2 DECEMBER

RSGB AGM - (see Annual Report)

3 DECEMBER

GLASGOW RADIO, ELECTRONICS & COMPUTER Rally - Maryhill Community Centre, just along from junction 17 of the M8. Doors open at 11am, 10.30am for the disabled, until 4.15pm. Admission price is £2 for the disabled, UB40 holders and £2.50 for all other visitors (children under 14 accompanied by a parent get in free of charge). All monies raised from the event will go to the funds of the SDX Cluster Support Group Amateur Radio Club. Details John, GM0OPS on 0141 638 7670.

PORTLAND ARC Rally - Burton Cliff Hotel, Burton Bradstock, Bridport, Dorset DT6 4RB. Doors open at 10.30am. Admission price is £1. Attractions include traders, crafts, displays, bring and buy, raffle. Talk-in is on S22 and SU22. Details 01305 823373.

THAMES VALLEY Electronics Rally - Kempton Park, Racecourse, Sunbury on Thames, Middx. Open 10.30am to 4.30pm (10am - free entry to bring and buy stand). With major manufacturers and retailers, accessory supplies, antenna supplies, bring and buy stall, computers and component retailers and specialist groups. Admission £1.50, OAPs £1, children up to 14 years free. Details 01494 450504.

VERULAM ARC Rally - Watford Leisure Centre, Horseshoe Lane, Garston, Watford, Herts. Off A405 near M1 junction 6 and M25 junction 21a. Open 10am to 4pm. Features trade stands, bring and buy, grand raffle, cafe, licensed bar and free car parking. Details Ian, G0PAU on 01923 222284.

16 DECEMBER

RSGB HQ Saturday Opening.

21 JANUARY

OLDHAM AR CLUB MOBILE Rally - Queen Elizabeth Hall, Civic Centre, West Street, Oldham, Lancs. Doors open at 11am, 10.30am for disabled visitors. Event features the usual traders and a bring and buy stall. Morse tests available on demand. Talk-in on S22 commencing at 7.30am. Mobile contact prize up to 2pm. Details 01706 846143 or 0161 652 4164.

4 FEBRUARY

LANCASTRIAN Rally - Details Sue Griffin on 01374 290088.

SOUTH ESSEX ARS Radio Rally - Details David, G4UVJ on 01268 697978.

CONGRATULATIONS

To the following who our records show as having reached fifty years continuous RSGB membership this month:

Mr L E J Manders, G2CRD
Mr B Sykes, G2HCG
Mr G W Alderman, G3BNE
Mr N S Lilley, G3INN
Mr J E T Lawrence, GW3JGA

11 FEBRUARY

CAMBRIDGE & DARC - Details John, G0GKP on 01954 200072.

NORTHERN CROSS Rally - Details 0113 238 3622.

18 FEBRUARY

RSGB VHF Convention - Details Norman, G3MVV on 01277 225563.

24 FEBRUARY

11th RAINHAM Radio Rally - Details Martin, G7JBO on 01634 365980.

25 FEBRUARY

BARRY Mobile Rally - Details Brian, GW0PUP on 01222 832253.

2 MARCH

WEST WALES Amateur Radio & Computer Rally - Details 01545 580675.

17 MARCH

NOBRECK Amateur Radio, Electronics and Computing Exhibition - Details Peter, G6CGF on 0151 630 5790.

TIVERTON SOUTH RADIO's 10th Rally - Details 5 Butter Leigh Drive, Tiverton, Devon EX16 4PN.

14 APRIL

BURY RS RALLY - Details Laurence, G4KLT on 0161 762 9308.

21 APRIL

WHITE ROSE ARS 1996 Rally - Details 0973 189276.

28 APRIL

MERSKE-BY-THE-SEA Radio Rally - Details 01642 475671.

6 MAY

MID CHESHIRE ARS Rally - Details 01928 511470 (office hours).

12 MAY

DRAYTON MANOR Radio & Computer Rally - Details Norman, G8BHE 0121 422 9787 (evenings).

18/19 MAY

YEOVIL CLUB Amateur Radio Convention - Details 01935 813054.

30 JUNE

39th LONGLEAT Amateur Radio and Electronics Fair - Details Gordon, G0KGL on 0117 9402950.

14 JULY

SUSSEX Amateur Radio and Computer Fair - Details from Ron, G8VEH on 01903 763978 or 01273 417756.

21 JULY

COLCHESTER Radio and Computer Rally - Details Richard, G7BIV on 01376 571239.

1 SEPTEMBER

BRISTOL Radio Rally & Computers & Electronics Market - 01275 834282.

GB CALLS

The list below shows special event stations licensed for operation during this month. The information was taken from the HQ computer. These callsigns are valid for use from the date given but the period of operation may vary from 1-28 days.

NOVEMBER

1	GB2FAM	Fleet Air Arm Museum
2	GB2SR	Stelar Radio
3	GB13FRI	Friday the Thirteenth
	GB4RSL	Royal Signals Llandudno
4	GB4CIN	Children in Need
5	GB2OAY	Old Anniversary Year
6	GB4RSL	Royal Signals Llandudno
8	GB2TAM	Tangmere Air Museum
10	GB0WSF	Worldwide Sikh Festival
	GB2TT	Transatlantic Times
11	GB0CIN	Children in Need
	GB2SEC	St Elisabeths Church
15	GB0CDS	Coastal Defence 'S'
18	GB2HA	Hood Association
23	GB2DHS	Deerness, Holm & St Andrews
24	GB0KIN	Kids in Need
30	GB0KHL	Kinnaird Head Lighthouse
	GB2SR	Stelar Radio

The LAST WORD

THE MORSE REQUIREMENT DEBATE

As may be imagined, we have received a tremendous postbag on this subject - both pro and anti the Morse requirement - far too many letters to publish, in fact. All letters have been read carefully and are being forwarded on to the RSGB Licensing Advisory Committee. This is the body which is liaising with the Radiocommunications Agency on this matter, so rest assured that your voice will be heard by those directly involved in the debate. Please turn to page 15 for the latest correspondence from the RA on the Morse requirement.

THE KEY TO SUCCESS

In answer to Steve Thompson's, GW8GSQ, query (*The Last Word*, October 1995), not *all* manufacturers of Morse keys use ball bearing races to pivot key arms. This is a gross misuse of bearing races, as any engineer will tell you. A ball bearing race is meant to rotate, and not rock back and forth for a few thousandth of an inch.

There is very little difference in the friction area of a ball race and a bush type bearing. Dirt can even penetrate screened ball races, causing an impediment. Self-lubricating bush bearings will give a slight advantage over the type mentioned by Steve.

Providing the key arm is virtually friction-free, neither of these bearings will be of much advantage in the short term. Speed only comes with experience. For ease of sending, the contact gaps should be set as close as is comfortable for the individual operator. The smaller the contact gap, the less spring tension is required, minimising the risk of a 'wooden' wrist.

A key must be well balanced (not negative or positive rake) and be of low profile. It should also have a stable base with no feet. A heavy key is not entirely necessary, because if used correctly, it should not wander all over the desk.

Gordon Crowhurst, G4ZPY

THANKS FOR FREEWARE

I think that Roger Barker, G4IDE, should be praised for his contribution to amateur radio. For those of you who are not familiar with his work, he has written the Winpack packet software, and although it would easily sell for, say, £15 to £30, he insists that it should be Freeware and the only charge to be made is for the cost of disks and postage. He even states in his licence agreement that this should be no more than £1, unless it is for club funds. I have no connection with Roger other than being a well-satisfied user, and would like to publicly say 'thankyou' for his efforts.

Alan Ralph, G8XLH

HELPLINES REALLY WORK!

May I say thank you to fellow members for all the help received after my request for information in *Helplines* (*RadCom* September) regarding my recently-acquired Heathkit GD1U dip meter. I have even just received a letter of help from Paris. The response was tremendous and I am now finally fixed up with offers of coils and manual.

E McFarland, G3GMM

AMATEURS: VICTIMS OF PROFITEERING?

For many years numerous letters have been published in the amateur press regarding the immense profits that retailers and distributors have been making out of the unsuspecting amateur. Is it true? After a little insight into the market trends and company costs the answer to the question should become clearer.

Historically most of the companies participating in the market place have started by being hobby driven, the owner being a radio amateur who wished to combine his hobby with his work, a good concept if it is possible.

As with any business, the proprietor must have an understanding of business and overheads, a concept so often clouded by enthusiasm, which inevitably ends with failure. In some cases the proprietor manages to learn enough about survival in the early stages to make a go of it constructing a healthy business.

A healthy business is good for both the seller and the buyer. After all, the buyer does not want his local supplier to go out of business leaving him without warranty backup or the facility to obtain more goods in the future. At the same time, he does want a good deal. Part of that deal is that the seller should make at least enough profit to survive. So what is enough, and where do the costs come from?

UKRAINIAN UK FAN

I guess that the following information will be to your liking. What is it? Simply the best - my impressions about your magazine. First of all, the choice of contents is quite well done - thanks to the person who is responsible for this. Then I can't but mention such regular articles as *HF News, QSL, GB Calls* and of course *Technical Topics*, especially if it deals with antennas. But at the same time I'm fond of reading of what may be considered by you to be 'distant' articles for me - *Rallies and Events, Club News* and of course *Members' Ads*. I've been to your great and beautiful country twice and during all my visits I tried to participate in every event dealing with ham radio (a great thank you to Mr Paul Essery, GW3KFE, who helped me during my visits to the UK.) That is why actually *any* article in your magazine is very close to me. So I reckon that any person who considers himself / herself to be a radio amateur should read your magazine. Without reading it the world seems to be dull!

At the same time, I'd like to have a pen pal of any age, from any part of the UK - it doesn't matter. I am 20 years old, studying English and German at university, a member of a number of European and American clubs and foundations, like CW, and much more.

Anyway, thank you very much for a very good magazine. Thanks for the attention and all the best, 73,

Anton Koval, UT7CT, Box 322, Cherkassy, 257000 Ukraine

Since the early stages of the 'black box', they have originated from Japan (there are of course notable exceptions to this, such as KW Electronics). In the early 70s the exchange rate between the Japanese yen and the pound sterling was very favourable, in the order of 500 yen to the pound. This is a situation that has changed dramatically in the 90s, resulting in higher equipment costs. The rate is now in the order of 135 yen to the pound, yet the cost of equipment has not risen by four times!

The manufacturers have invested in automated machinery to construct equipment at far lower prices, the advent of computer-aided technology has produced more efficient design concepts and advances in component technology has reduced costs. On the other hand, retailers' overheads have not reduced, property costs have increased and with them commercial rateable values have soared. Wages increase, banks are forever finding new ways to enhance their percentage, and import duties and shipping costs all contribute to the end user price.

The current value of the yen is so high that Japanese exporters are finding it difficult to attract customers. This does not only affect the amateur market, it is affecting all markets. The Japanese are well-known for the pyramid structure and 'just in time' procurement methods. Pyramid means that a host of smaller manufacturers produce parts or sub-assemblies for delivery to the ultimate manufacturer. 'Just in time' is a method of reducing component stock holdings (and so costs) but what happens if the smaller businesses fail? This is where second sourcing becomes critical. However, if a number of smaller businesses fail, the ultimate supply of equipment could be endangered and costs could rise.

There are a large number of small businesses that produce finished items in house, such as RF amplifiers, co-ax switches and many other devices. These companies are finding business difficult to such an extent that many of them are likely to disappear. Those with foresight have been looking towards China, Taiwan and Korea as cheaper manufacturing bases, and for some it has been successful.

In the 60s and 70s Japan was looked on by the West as low-quality 'copy' manufacturing. Since then the situation has changed. Japanese goods are now revered, while Taiwanese products are seen as low quality. Taiwan is improving rapidly, producing many products for the amateur market. Companies such as ADI, Rexon and Kendoo are now producing good quality handheld transceivers at very competitive prices, prices which are stabilised by their costs being US dollar related rather than yen based.

There is no doubt that Taiwanese technology is not yet close to the Japanese, but it is improving and buyers should not dismiss these products. In the years to come it is highly likely that Taiwan and Korea will outpace the Japanese in this market sector.

It is likely that amateurs will see a large number of VHF handhelds originating from previously unknown manufacturers. One reason for this is that Hong Kong, Taiwan and Korea have all been heavily employed manufacturing high power freedom phones, to such an extent that the market is now saturated. They have to produce an alternative product and handheld transceivers would seem logical as they employ similar technology. The glut that follows may well mean that we will see some very interesting prices in the future.

On the negative side of these trends is the apparent lack of interest from these 'new' manufacturers to produce HF equipment. Their reasoning is sound enough. Based on quantity manufacturing, they cannot justify the effort for the market size. Consequently the Japanese may well keep this market sector - if they wish to! Of course, the Japanese will also be looking at the viability of the market which would be adversely affected by the loss of the VHF / UHF market, and they could choose to look elsewhere for their sales, then where will we all be?

It is unfortunate for us all that world-wide interest in amateur radio is falling. Look around your local radio club - what has happened to the average age of the membership? Certainly computing has not helped our hobby in its essence and may ultimately be the cause of its demise.

Looking at the market leaders' turnover and net profit / loss figures bears out the argument that the situation is far from healthy in Japan, with all manufacturers showing a downward trend.

Kenwood and Yaesu have both changed the method of distribution in the UK and other markets. Kenwood already had their own distribution chain for audio products, it was therefore logical to incorporate the amateur product in this distribution facility and so minimise the overhead. Yaesu sought to follow Kenwood's lead and from October '93 opened their own storage / distribution point near Heathrow.

However, in the case of Yaesu they have had to create this facility which is bound to mean an increase in their overheads. Combining this cost with the fact that they reduced the landed cost of equipment does show a commitment to the market.

Another player in the market that we have not heard much about of late is Standard. They have recently terminated their previous arrangement in the UK and are yet to indicate how they will re-enter the market.

Returning to the UK retailer, with the change in sourcing Japanese equipment to the manufacturers' own depots who do not retail, all the retailers are apparently on an even basis. With the earlier arrangement companies such as Lowe and SMC have had to uphold the retail price and rely on their reputation of good service to generate their retail business. They had no option than to adopt this policy as other retailers who purchased items from them for resale would not have been at all happy to then be undercut by their supplier. With the new arrangement, Lowe and SMC are free to be as competitive as the next company, but where does it all end?

Competition is good for the customer - or is it? With the offer prices that are now being advertised, some retailers are making as little as 5% on the sale of a

Please note that the views expressed in *The Last Word* are not necessarily those of the RSGB. We reserve the right to edit letters for publication. All letters are acknowledged and may be passed to the relevant department or committee.

RadCom NEWS Continued from p15

Radio Amateurs Help in Fire Emergency

The long, hot summer created serious fire dangers in many parts of the country, and Staffordshire was no exception. The local Raynet group there was on call for 36 days, from 31 July to 4 September, the longest ever continuous operation in the UK.

At the end of July, the Staffordshire Fire and Rescue Service was receiving calls at over twice the normal rate and placed the Raynet group on alert. Raynet sent teams overnight to spot recurring fires in woods and on heathland, and to radio the fire crews, thus allowing other crews to rest or be reassigned. Raynet was also asked to undertake fire monitoring and prevention on Cannock Chase, which was at serious risk. Between eight and 11 groups were active every day. With Staffordshire taking the night calls, afternoon and evening back-up was organised from Warwickshire, West Midlands and Hereford & Worcester. Leicestershire also helped, as did visitors from other counties.

The operation involved about 60 operators for some 1,200 hours. Raynet took some of the pressure off weary fire crews and helped to spare Cannock Chase from the ravages it suffered during the last major drought in 1976.

New Hampshire RLO

The recently-appointed RLO for Hampshire is Ian Bennett, G6HNJ, Ravenswood, The Shires, Hedge End, Hants SO30 4BA, tel: 01489 787868.

CGLI to Allow Use of Licence Schedule in RAE

The City and Guilds of London Institute has announced that the Terms, Provisions and Limitations Schedule will be included with future Radio Amateurs' Examination papers, with effect from the May 1996 examination. The Schedule lists the frequency bands, status of amateur allocations in the UK, the maximum permitted power level, and permitted types of transmission. Consequently, candidates will no longer have to learn these details.

The change is intended to enhance the practical nature of the RAE paper and will bring the RAE in line with the Novice Radio Amateurs' Examination, which already supplies the Novice Licence Schedule, with NRAE papers.

It is hoped that the changes will also eliminate the problem which has sometimes occurred when the Schedule has been revised after the examination paper has already been compiled.

New EMC Co-ordinator

A new EMC Co-ordinator has been appointed in South Wales. He is Mr W Holt, GW0SGG, 14 Heather Cres, Sketty, Swansea, W Glam SA2 8HE, tel: 01792 299510. Your nearest EMC Co-ordinator should be the first point of contact if you have an EMC problem which you cannot deal with yourself; a list was published in the April *RadCom*, or may be found in the *RSGB Call Book*.

Martin Lynch Open Day

Martin Lynch and his team will be holding their fifth annual open day on Saturday 18 November, between 9.30am and 6.00pm. The location is their showroom at 140 - 142 Northfield Ave, Ealing, London W13. This year, Kenwood UK are co-sponsoring the event and will have their entire range of products on show.

Lynch will be offering Morse tests on demand, enabling visitors to take their 12WPM Morse tests for the class A licence during the open day. RSGB staff will also be on hand with a book stall.

RSGB / Radiosport Ltd

Following a review of recent jointly-sponsored RSGB / Radiosport events, the Society has decided not to continue with this liaison for the 1996 rally season. The Society will continue to promote the RSGB VHF Convention at Sandown, the RSGB National Mobile Rally at Woburn Abbey and the RSGB International HF Convention at Windsor, as well as continuing with its policy of attending a large number of exhibitions and rallies throughout the United Kingdom. The Society would like to thank Radiosport for their co-operation throughout 1995.

New Committee Chairmen

Ian Suart, GM4AUP, is now Chairman of the RSGB **Licensing Advisory Committee**, and John Morris, GM4ANB, has recently been appointed Chairman of the **VHF Committee**. Colin Thomas, G3PSM, is the new chairman of the **HF Committee**.

Young Amateurs Rewarded

The 1995 Young Amateur of the Year presentation took place at the RSGB International HF Convention at Windsor on 10 September. The winner, 16-year old Leroy Kirby, GW0ULC, from Cardigan in Dyfed, was presented with a cheque for £300 by Roger Louth, Director of Mobile Services at the Radiocommunications Agency. He also received a certificate signed by President of the Board of Trade Ian Lang, MP, and was invited on a guided tour of the RA's Monitoring Station at Baldock. RSGB President Clive Trotman, GW4YKL, presented Leroy with a Sony general coverage receiver from the Society and, as a keen packet user, Leroy was no doubt pleased to win a Mini-Pak packet radio modem from Siskin Electronics. Other prizes included a Morse Supa-Tuta from Derek Brandon, G4UXD, and a one-week residential course at Wray Castle, joining students on a full-time programme of electronics and communications engineering. The course costs were met by Wray Castle and the accommodation costs paid for by the Mobile Radio Users Association.

The runner-up, 15-year old Charles Banner, G7UBA / 2E1CHY, from Birmingham won a £50 cheque from the RA as well as a tour around the Monitoring Station. From Icom UK, Denis Goodwin presented Charles with an Icom handheld transceiver, while from Lowe Electronics in Newbury, Julian Swift-Hook presented a cheque for £75 on behalf of the Japan Radio Company. Like Leroy, Charles also won a G4UXD Morse Supa-Tuta from Derek Brandon.

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transceiver. With a market the size of the UK, it is not possible to survive on these margins.

Purchasing pressures also contribute to the dealers' dilemma. Companies such as Yaesu offer greater discounts to their major customers, but only if they achieve specified turnovers. The dealer realising he is short of his target may dump stock at cost to maintain his extra discount level. Fortunately for the dealer, some suppliers offer guarantee back-up at the supplier's cost! Operating under this strategy forces the retail price down to rock bottom, ultimately serving no-one.

Ever wondered what happened to 'grey importing'? Well it is still there, but not so well publicised as it has been. Grey importing is the activity of importing a product via alternate routes to the manufacturer's official agent. There are pitfalls to purchasing equipment imported in this manner, such as little - if any - factory backup, and no operator's manual. Prices of grey imports were often lower than those offered by the agent, as the grey importer did not have to suffer the marketing costs nor purchase in the quantities that the agent did, not to mention not having to support a dealer network. Equipment imported from the US often had different specifications and Japanese domestic models had different type numbers and sometimes different mains transformers.

These days, with the manufacturers distributing themselves, most of the problem has been eliminated, but the grey importing practice continues with other products, such as antennas and accessories. The grey importer purchases his products from overseas dealers who have the same quota target problems mentioned earlier and are therefore more than willing to supply the product at low prices to external market places - in other words, without ruining their own market place.

The practise is not restricted to opportunist dealers, but can also originate with the manufacturer. The manufacturer has production lines to keep full and does not always appreciate that the end user market has contracted for his particular product. Rather than changing agents which can be difficult and disruptive they simply start supplying another company. Actions such as this just further complicate the distribution chain and market stability.

Historically the major manufacturers have to accept some responsibility for creating the environment that generated grey importing, as for reasons better known to themselves they always supplied the US market at lower prices than the rest of the world. Maybe they supplied the US with their minimum production quotas at reduced cost in order to keep the production line occupied, whilst supplying the rest of the world with the product at higher cost to produce the profits?! Who knows, but this type of differential between the UK and US is certainly not limited to amateur radio equipment. Just look at satellite TV: film royalties are charged against audience size. Consequently supply and demand should not enter the equation, however, in the US the subscriber pays approximately 50% less for his viewing, and so the list goes on. One thing is certain, and that is that it is not the retailer who is making a killing.

Most retailers attend rallies, amateurs take it for granted that this will happen, but have they ever considered the costs involved for the retailer? Hire vans, stand costs, hotel costs, staff costs and even equipment theft costs. Twenty years ago the rallies were an effective sales medium, but not now with takings probably down by 60%.

The likely conclusion is that over the next few years the number of amateur retailers will reduce and mail order will become more popular. This in turn means no more trips to the corner shop to get the part you wanted today, you will have to wait.

Furthermore as the shop is no longer there, the proprietor will not be able to take a quick look at your faulty radio and hopefully effect a quick repair, it will have to be sent away. The choice of equipment that we currently enjoy may become more limited, owing to the Japanese situation and the contraction in the market place. Is it really worth paying the lowest possible price for your equipment today without any concern for tomorrow? The real answer is to support your dealer now.

Richard Diamond, G4CVI

[Richard Diamond, G4CVI, is well known as a former director of SMC. However, he resigned from this position earlier this year and has no commercial connections with amateur radio at present. He points out that all comments relating to costs presupposes that duty and VAT have been paid on imported equipment - Ed*]*

RSGB – at Your Service

SOME OF THE RSGB'S TEAM OF VOLUNTEER EXPERTS — AVAILABLE TO HELP YOU

Zonal Council members

Zone A (North of England): Peter Sheppard, G4EJP, 89 St Catherines Drive, Leconfield, Beverley, North Humberside HU17 7NY. Tel: 01964 550397.

Zone B (Midlands): David Whalley, G4EIX, 1 Lees Farm Drive, Madeley, Telford, Shropshire TF7 5SU. Tel: 01952 588878.

Zone C (SE England and East Anglia): Neil Lasher, 29 Sefton Avenue, Mill Hill London NW7 3QB. Tel: 09567 09568.

Zone D (SW England): Julian Gannaway, G3YGF, Dean Hill Barn, East Dean, Salisbury, Wiltshire SP5 1HJ. Tel: 01794 40008.

Zone E (Wales): E Paul Essery, GW3KFE, 287 Heol-y-Coleg, Vaynor, Newtown, Powys SY16 1AR. Tel: 01686 628958.

Zone F (Northern Ireland): Ian Kyle, GI8AYZ, 1 Portulla Drive, Pond Park Road, Lisburn, Co Antrim BT28 3JS.

Zone G (Scotland): Post vacant, in locum until 31/12/95 - Ian Suart, GM4AUP, 37 Meldrum Mains, Glenmavis, Airdrie, Lanarkshire ML6 0QR. Tel: 01236 765937.

For general advice and details on local clubs, or if you don't know who to contact:

Your **RSGB Liaison Officer** see this page and October *At Your Service*.

Specialists

Antenna Planning: Booklet free to members from RSGB HQ. Planning application refused – RSGB Planning Panel, via RSGB HQ. Planning Advisory Committee Chairman – Geoff Bond, G4GJB, QTHR.

Audio Visual: Library Co-ordinator – David Simmonds, G3JKB, QTHR.

Awards: For contest awards, refer to the appropriate contest committee. For other awards, enquiries and applications go to either the: HF Awards Manager – Fred Handscombe, G4BWP; IOTA (Islands on the Air) Awards Manager – Roger Ballister, G3KMA or VHF (and Microwave) Awards Manager – Ian L Cornes, G4OUT. Trophies Manager – David Simmonds, G3JKB.

Band Plans and operating practices: See the *RSGB Call Book* or April 95 *RadCom* for latest bandplans. For policy, contact the appropriate spectrum manager or committee chairman: HF Committee Chairman – Colin Thomas, G3PSM, QTHR; VHF Committee Chairman – John Morris, GM4ANB, QTHR; Microwave Committee Chairman – Steve Davies, G4KNZ; HF Manager – Post vacant; VHF Manager – Dave Butler, G4ASR; Microwave Manager – Mike Dixon, G3PFR.

Beacons: HF Beacon Co-ordinator – Prof Martin Harrison, G3USF, QTHR. VHF Beacon Co-ordinator – John Wilson, G3UUT, QTHR. Microwave Beacon Co-ordinator – Graham Murchie, G4FSG, QTHR.

RSGB Contests: First contact the appropriate contest adjudicator (see the contest rules). For policy, contact the respective Committee Chairman: HF Contests Committee – Chris Burbanks, G3SJJ, QTHR; VHF Contests Committee – David Johnson, G4DHF, ARDF (direction finding) Committee – Post vacant.

EMC: Advice on solving breakthrough and other electromagnetic compatibility matters: First contact your local EMC Co-ordinators - see April *At Your Service*. Committee Chairman – Robin Page-Jones, G3JWI, QTHR.

Emergency: Emergency Communications Officer – Greg Reilly-Cooper, G0MAM, PO Box 98, Northwich, Cheshire CW9 5SZ.

Exhibition & Rally Committee: Chairman – Norman Miller, G3MVV, QTHR.

History: Society Historian – George Jessop, G6JP, 32 North View, Eastcote, Pinner, Middx HA5 1PE.

IEE: Liaison Officer – Peter Saul, G8EUX, QTHR.

Licensing: LAC Chairman – Ian Suart, GM4AUP, See zone G (left).

Membership Liaison: MLC Chairman – Peter Sheppard, G4EJP, see Zone A (left).

Morse: Morse Practice Transmissions Co-ordinator – David Pratt, G4DMP, 11 Moorleigh Close, Kippax, Leeds LS25 7PB. Chief Morse Test Examiner – Roy Clayton, G4SSH, QTHR.

Packet Radio: Datacomms Committee Chairman – Tom Lilley, G1YAA, QTHR.

President: Clive Trotman, GW4YKL, QTHR.

Propagation: Propagation Studies Committee Chairman – Charlie Newton, G2FKZ, QTHR.

QSL Bureau: Outgoing cards – PO Box 1773, Potters Bar, Herts, EN6 3EP. Incoming cards – your QSL sub-manager (see *RSGB Call Book* or July/Aug *RadCom* for a list). QSL Bureau Liaison Officer – John Hall, G3KVA.

Repeaters: Repeater Management Group Chairman – Geoff Dover, G4AFJ, QTHR.

Spectrum Abuse: Packet – Via Datacomms Committee. Repeaters – Via the Repeater Management group. Other – Via Licensing Advisory Committee. Intruder Watch Co-ordinator – Chris Cummings, G4BOH.

Technical & Publications: Committee Chairman – Dick Biddulph, G8DPS, QTHR.

Training and Education: Committee Chairman – John Case, GW4HWR, QTHR. Radio Amateur's Examination – George Benbow, G3HB, QTHR. Novice RAE – Hilary Claytonsmith, G4JKS, QTHR. Project YEAR Co-ordinator – Phil Mayer, G0KKL, QTHR.

The Society has a large number of volunteer experts available to help and advise members on a wide variety of subjects. Each month we will be focussing on a different section of the volunteer workforce, whilst still giving brief details of the main office-holders. See also the Information Directory section of the *RSGB Call Book*.

RSGB Liaison Officers

Part 2: Counties H – Z

HIGHLAND (Zone G) - Elaine Shread, GM7TZT, 15 Hardie Court, Aberchirde, Huntly, Aberdeenshire AB54 5TG. Tel 01466 780739.

HUMBERSIDE (North Humberside: Zone A, South Humberside: Zone B): North: Clive Reynolds, G8EQZ, 49 Westborough Way, Anlaby Common, Hull, N Humberside HU4 7SW. South: (also for Lincs) Ray Degg, G0JOD, 42 Hawthorn Road, Cherry Willingham, Lincoln LN3 4JR. Tel 01522 750316.

ISLE OF MAN (Zone A) - Mr C G Baillie-Searle, GD4EIP, 2 Marguerite Place, Foxdale, Isle of Man IM4 3HE. Tel 01624 801353.

ISLE OF WIGHT (Zone D) - Doug Byrne, G3KPO, 'Lynwood', 52 West Hill Road, Ryde, Isle of Wight PO33 1LN. Tel 01983 67665.

JERSEY (Zone D) - Syd Smith, GJ0JSY, 31 Jardin-A-Pommiers, Patier Road, St Saviour, Jersey. Tel 01534 38996.

KENT (Zone C) - Fred Stewart, G0CSF, Shingles, Ingleborough Lane, St Mary's Platt, Sevenoaks, Kent TN15 8JU. Tel 01732 780721.

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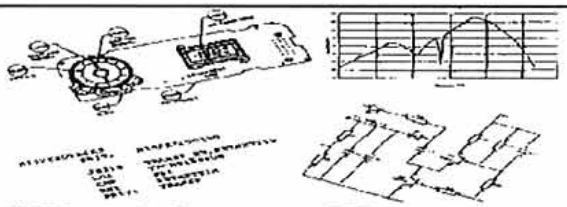

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