Volume 71 No 12 December 1995

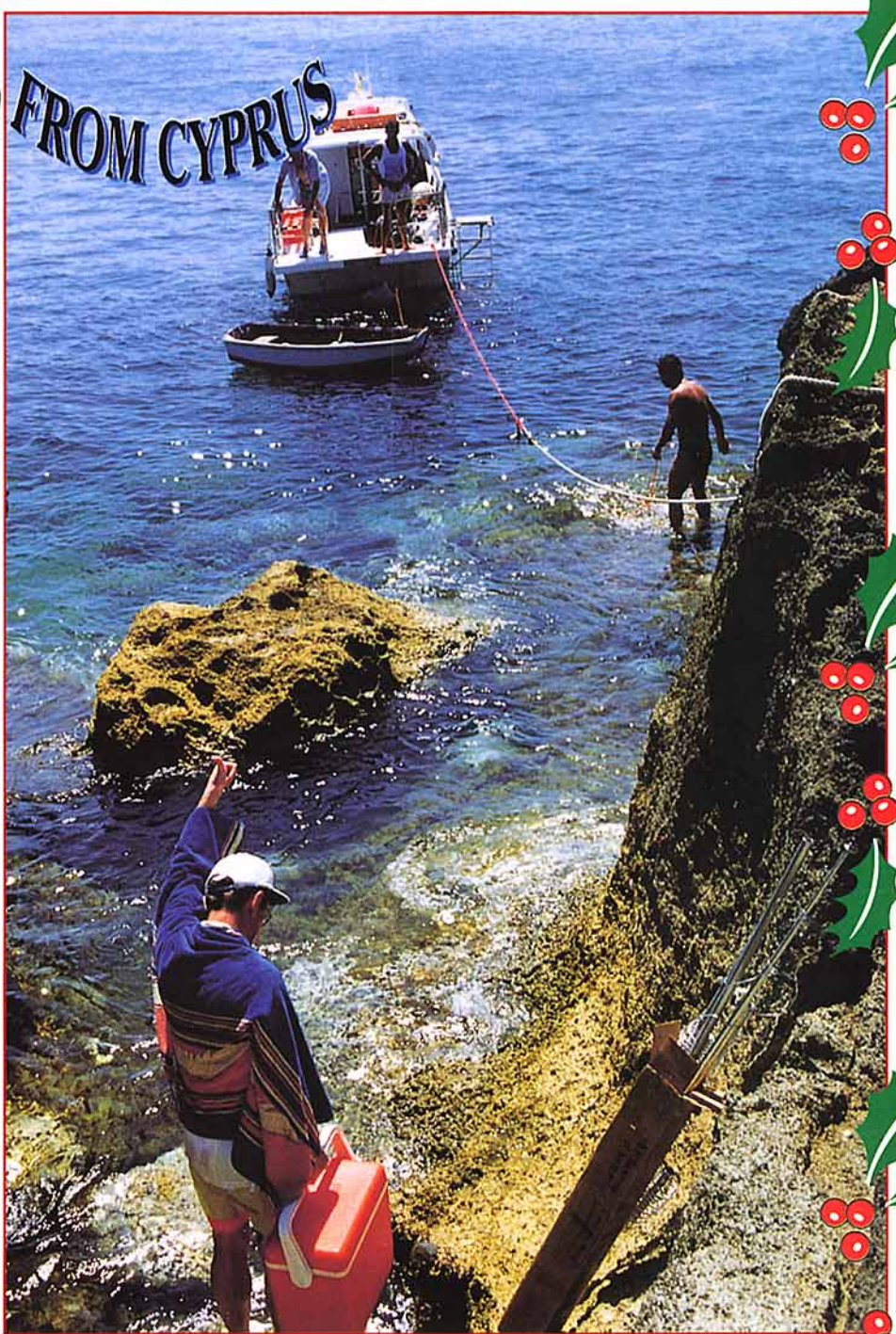
RadCom

Radio Communication

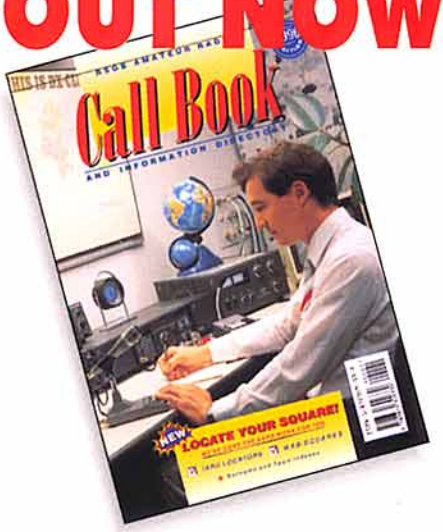
The Journal of the Radio Society of Great Britain

THE VOICE OF AMATEUR RADIO FOR 82 YEARS

IOTA OPERATIONS FROM CYPRUS



OUT NOW



1996 CALLBOOK

100 YEARS OF RADIO 1995

IARU Region 2 Conference Report 1995

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:
Loading the boat after a successful IOTA operation from AS-120. Read the report by Don Beattie, G3OZF, on page 17.

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**

Icom IC-775 DSP

Without doubt this is a thorough bred amongst H.F. transceivers - and it's an Icom! Interested? Then call Mike (G0ABB) for the best p/x deal in the country.

Yaesu FT1000 MP

The very latest HF radio from Yaesu. Nevada can offer the very best deals and after sales service, call Mick 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

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

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

Wire Antennas

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

Lloyd Arrow. . . From the Keyboard - With all these different digital modes now available but where do you start? Firstly don't be put off by all the jargon - Data comms is not all that difficult to get going! Already have a computer then all you need is the data box! Interested, then give me a call & I can get you started with TNC's, leads & software

Lloyd's monthly special - For those of you who don't want to go to all the fuss of using a computer then the ERA Microreader is a great choice - It decodes RTTY/AMTOR/CW/SITOR/FEC and has a CW tutor built-in.

Complete unit ..... Save £20 ... **Special £189**

Lloyd Arrow joined Nevada just few month's ago & is one of the countries leading data experts, for impartial advice, recommendations & a good deal - call Lloyd! - **Mike G3SED**

Multiband Vertical

New Trident VIII

At last a British made vertical that can out perform the competition - and withstand the British weather. Built with the very best materials, easy to assemble, no "lossy" traps to adjust just put it up and your ready to go!

- HF coverage 10, 12, 15, 20, 40, 80mtrs
- VHF coverage - 2, 6mtrs
- Elevated feed - To reduce most earth losses & interference problems
- Linear resonators - No "lossy" traps coils or transformers
- Wideband - Because it uses linear resonators the Trident VIII has wider bandwidth than trap antennas
- Height - Approx 36 feet
- No tune - The Trident VII is factory pre set so you just assemble and use it - easy!
- Full 80 mtr coverage - Supplied with capacitors for the top & bottom of the band - you choose the centre frequency.
- British manufacture - We have used top grade materials to give long life & reliability.

Send an SAE for full details of this new high quality multiband vertical available from mid-December

Price ..... £239 p&p £10

Military Standard 35ft Telescopic Mast

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

Microwave Modules

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

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

Transverters

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

Alinco

DR130E 2m mobile
- 50 Watts
- CTCSS fitted
- 20 memories - "One off" price £299

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

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!

AKD 2001	2mtr 25/5W FM	£193
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	£59.95
AKD Rings	F/Rings (pair)	£3.50
AKD BB1	Braid Breaker Filter	£8.50

Antenna Switches

2 Way

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

4 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

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Icom 707

f 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 FRG 100

Special Deal - FRG 100 plus:-
Free Short wave antenna ..... worth £59.95
Free 240V AC mains adaptor worth £12.95
Price **£549.95**

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!

Kenwood Main Dealer

Kenwood Rigs

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

Kenwood Chargers

KSC14	Dual rapid/trickle	£105
KSC8	Drop in charger	£21.36
BC15A	Rapid charger	£94.95

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 Filters

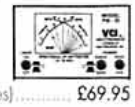
YK88SN-1	1.8 kHz SSB	£61.95
YK88CN-1	270 Hz CW	£61.95
YK88A-1	6 kHz AM	£61.95
YG455CN-1	270 Hz CW (455 IF)	£159.95
YG455C-1	500 Hz CW (455 IF)	£138.95
MC85	Comp/Preamp desks mic	£139
MC60A	Dual Input desk mic	£117

Vectronics

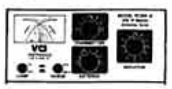
A range of high quality accessories imported by us direct from the USA.

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

Yaesu Master Dealer

Yaesu Rigs

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

Yaesu Chargers

NC37	1hour desk charger	£102
NC50	Intelligent charger	£91
PA10A	Mobile power/charger	£48

Yaesu NiCads

FNB31	4.8v/600mA	£44
FNB38	9.6v/600mA	£66
FNB14	7.2v/1000mA	£64
FNB10	7.2v/600mA	£44

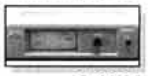
Yaesu Rotators

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

AEA Data Products

PK-12
1200 bps VHF, Packet TNC unit. Features include GPS Firmware, IBK 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

Software

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

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All Safety Tested & Guaranteed For 3 Months

Amateur

Alinco DJ100	2m handie	£100
Alinco DJ160	2m handie	£125
Alinco DJ580	Twinband	£299
Alinco DR112	2m mobile	£225
Drake TR4/RV4	Seperates	£395
Icom 720A	HF Trans. PSU	£695
Icom IC4iE	70cm mini handie	£219
Icom IC240	Basic 2m mobile	£145
Icom IC505	6m port-a-pack (c/w FM)	£375
Kenwood TH78E	Dual band h.	£325
Kenwood TH28E	2m handie 70 rx	£225
Kenwood TM451E	70cm ex-demo	£375
Kenwood TM721/E	Twin band mobile	£375
Kenwood TS120S		£395
Kenwood TS430	Mobile HF filters	£535
Kenwood TS440	HF/ATU/Filters	£795
Kenwood TS530SP	HF Base	£595
Kenwood TS680S	HF + 6m	£795
Kenwood TS830S	Classic HF	£595
Rexon RL102	2m H/Held	£165
Standard C500	Choice of 2	£225
Standard C528	Twinband	£325
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 FP800	PSU as new!	£250
Yaesu FT101ZD	Choice of 2	£495
Yaesu FT102	Base HF	£595
Yaesu FT202	2m handie	£65
Yaesu FT290 mk2	2m m/mode	£325
Yaesu FT690 mk2	6m m/m + amp	£425
Yaesu FT707	HF mobile	£425
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Yaesu FT726	2/70/6m mods	£995
Yaesu FT727R	D/band handie	£295
Yaesu FT757	Mobile HF	£595
Yaesu FT790R mk1	70cms portable	£345
Yaesu FT900 HF	Only 6wks old	£1095
Yaesu FT901 DM	Line up	£629

Scanning Receivers

Alinco DJX1D	W/B Handie	£225
AOR AR1500	Handie	£249
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

Scanning Receivers (continued)

Nevada MS1000	Scanner	£210
Nevada MS1000	Base Scanner	£195
Realistic Pro 2005	Base Scanner	£185
Yupiteru MVT3100	Scanner	£195

Shortwave Receivers

Drake MS8	Matching R8E spkr	£49
Drake R8E	Top quality rx	£699
Drake R8E	Fitted VHF conv	£795
Icom R71E	Receiver	£595
Kenwood R1000	Digital S/wave	£325
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

Accessories

Datong FL2	Audio filter	£45
Drake MN7	ATU	£195
ERA RS 232	Large opt display	£150
Global	2 way ant switch	£10
Kenwood AT230	ATU	£175
MM 70cm	Transvertor	£145
MM144/40	2m 40W amp	£70
SSC RTTY/CW	Decode software	£25
SEM	Multifilter	£35
Spectrum Comms.	6m Amp	£49
Vectronics VC300DLP	ATU	£99
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 FTV700	T/verter fitted 2m	£165
Zetagi HP10S	Bench PSU with meters	£95

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Your good quality used Amateur & Shortwave equipment
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THE BANDIT

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For the benefit of new readers who may not know us, it would be appropriate in these days of superlative advertising claims to give you a little of our background. Lowe Electronics was founded by Bill Lowe in the 1960's. He acquired the nickname of "The Bandit" as a result of his no nonsense straightforward advertising. In our time, we have been sole UK distributors for Icom, Yaesu and Kenwood amongst many other brands. We have built our reputation on solid support and backup and an honest hype free sales policy. We will never knowingly sell you something inappropriate for your needs, neither will we make exaggerated claims for products we sell. We will not always be the cheapest, or even offer to match the cheapest, but when you buy from Lowe you can have complete confidence in the knowledge that we will not let you down.

Vårgårda Radio AB

Call us on (01629) 580800 and we will send you full details of the top quality v.h.f. antennas from Vargarda of Sweden.

VHF SWR METER

125-525MHz. 5/20/200W

£69.95

Average and PEP reading

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! *Call or write to us for a copy of an independent review.*

only **£189**

THE NEW KENWOOD TS870S

is now in stock

- Fully DSP at IF stage • Built in RS232 control
- Auto ATU as standard • Built in K1 LogiKeyer
- Successor to the famous TS850

Phone for best price

ADI 2m and 70cm hand-helds **IN STOCK NOW**

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NEEDLESS TO SAY, ALL ITEMS ARE SOLD WITH THE FULL WARRANTY AND FAMOUS LOWE BACKUP. ALL PRICES INC VAT. NEXT DAY DELIVERY £10 EXTRA. VISA/MASTERCARD WELCOME. CASH EVEN WELCOMER! CHEQUES AS WELL.

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GPS EQUIPMENT

MAGELLAN GPS 2000 GARMIN GPS 45

- Smaller then a a 2m hand-held
- Tracks up to 12 satellites
- 15 metre accuracy
- 17 hour battery life
- Lat Long or Nat Grid

only **£199**

- Stores 250 way points
- Zoom-in map of your track
- Up/download route from PC
- Remote mountable antenna
- Ideal for in-car use
- Use with your packet TNC

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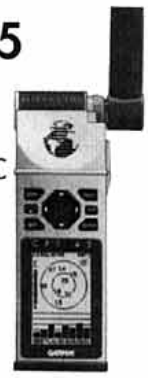

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Look at our WWW site (address below) for our super clearance list of bits and pieces

LOOKING FOR AN HF ANTENNA BEFORE WINTER?

WE STOCK A LARGE RANGE:-
Chelcom Verticals. Chelcom wire antennas. Cushcraft Verticals. Hygain Beams. Hygain Verticals. Butternut Verticals. Hygain rotators. Emoto rotators. Yaesu rotators.

Ask for our HF antenna pack

USED EQUIPMENT

As we have 8 shops across the country, we have a constant flow of trade-ins coming in. Every used item we sell is backed by our 3 month warranty. Here is a small sample of rigs currently available.

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Kenwood TS-940AT	**£1275**
Kenwood TS-830S	**£495**
Kenwood TH-78E	**£295**
Yaesu FT-747GX	**£495**
Yaesu FT-208R	**£110**
Icom IC-R71E	**£695**

Call us for our complete list

Got a 2M hand-held? Want more power? Using it mobile? You need our new linear amp with pre-amp.

WS-1090H

- Up to 5W in • 80W out
- GaS FET pre-amp • SSB or FM *only* **£139**

NEW! Hygain DX77

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

only **£275**

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Saturday December 9th is

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Member society of the International Amateur Radio Union

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Membership is open to all those with an active interest in radio experimentation and communication as a hobby. Applications for membership should be made to the Membership Services Department from which full details of Society services may also be obtained.

Headquarters and registered office:
Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE
Telephone: 01707 659015 - Members Hotline and book orders
Fax: 01707 645105.

General Manager: Peter Kirby, MIMgt, MISM, G0TWW
Company Secretary: John C Hall, OBE, G3KVA

COUNCIL OF THE SOCIETY
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EXECUTIVE VICE PRESIDENT: T I Lundegard, G3GJW
IMMEDIATE PAST PRESIDENT: I D Suart, GM4AUP
PRESIDENT ELECT: P R Sheppard, G4EJP
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Home Corporate: **£34.00.** ***Overseas Corporate*** (airmail): **£34.00**
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Corporate after 50 years membership: **50% discount.**
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Affiliated Societies (UK or Overseas): **£17.00** (including *Radio Communication*).
Junior (HamClub) under 18*: **£10.00**
*HamClub members receive *D-i-Y Radio* instead of *Radio Communication*.

(Subscriptions include VAT where applicable.)

Special arrangements exist for blind and disabled persons. Details are available from RSGB HQ.

Membership application forms are available from RSGB HQ.

RSGB Main Switchboard:
01707-659015

The RadCom Leader

Season's Greetings

FROM THE PRESIDENT

IT SEEMS ODD TO be writing this message at the beginning of November. However, after further thought, I realise that the end of 1995 is just seven short weeks away. Where has the year gone? It only seems like last week that the presidential dinner took place, but here we are nearly at the end of my term as your President.

Despite all the hard work, and long hours sitting in a train, or driving along the M4, it has been the most memorable year of my life. I have met, and talked to, so many amateurs (members and non-members) this year, and the prominent feature has been the friendship and courtesy accorded to me. I believe these are the foundations of amateur radio.

During 1995 there have been the usual ups and downs within the amateur radio scene, but nothing so earth-shattering that cannot be overcome by the foundations mentioned above.

I have been asked "was it worth all the effort?" and the answer can only be a resounding "yes". However, I must not forget the effort put in by the staff at HQ or the many volunteers - far too many to thank individually - and the support of my long-suffering wife, who have all contributed to making this year so successful for me.

It has been a privilege and honour to represent you as President for 1995.

In conclusion, on behalf of my colleagues on Council, and myself, may I wish you all a very enjoyable Christmas, and a prosperous New Year.

Clive N Trotman, GW4YKL, President

AND THE GENERAL MANAGER

CHRISTMAS IS ALWAYS a time of reflection. With this, my fourth Christmas message as General Manager, I have come to realise just how quickly the time passes. The last three and a half years have been extremely busy but very rewarding. There have been some enormous changes at RSGB Headquarters; in the administration, the material condition of the building and amongst the staff.

1995 seems to have flown by. As usual, it has been a varied year with a number of key issues tackled. Without doubt, the major achievement has been the commissioning of the new IT system at HQ which has taken a huge amount of staff time and effort to bring on-line. The rewards of these labours are there for all to see. The administration and related costs of running the Society are now on a much more professional footing.

I am sure you will be looking forward to the Christmas holidays. So, it only remains for me to thank you all for the support and courtesy you have shown to the staff throughout the year, and to wish you all a happy and peaceful Christmas and all good luck for 1996.

Peter A Kirby, G0TWW, General Manager

● THE INTELLIGENCE Corps Comrades Association East Coast Branches are conducting a recruitment drive. If you are a serving or past member of the Corps, or had wartime attachment to it and wish to continue associations in the hope of meeting past comrades, please write to J Hackett, 12 St Mary's Grove, Tudhoe Village, Spennymore, Co Durham DL16 6LR for details of branch meeting places and dates.

● IN THE *RSGB Annual Report 1994 - 95* (page 13) we stated that the oldest candidate for the 12WPM Morse test during the year was 77. Not true! - Charles Trippett, G0VKO, informs us that when he passed the Morse test in October 1994 he was over 80.

● THE LATEST callsigns issued by SSL as of 1 November were in the G*0WO*, G*7VW*, 2*0AM* and 2*1EO* series.

RSGB AGM

THE SOCIETY'S Annual General meeting will be held at the Royal Society of Chemistry, New Burlington Place, London on Saturday 2 December 1995 at 2.00pm.

For further details please see page viii of the *Annual Report* which was sent to all members with the November *RadCom*.

Jeff Stanton, G6XYU (left), of Waters & Stanton Electronics, presenting Bob Marley, G0VFV, with an MFJ-1798 HF vertical antenna. Waters & Stanton kindly donated the antenna, which was reviewed by Peter Hart in the September *RadCom*, as a competition prize and Bob was our lucky winner. The presentation was made at the RSGB stand at the Leicester Show in October. Ten runners-up have received Microset pens and Alinco keyrings.

Society's Initiative to Support Education

RSGB Bursary Awarded at King's College London

GERALD CLEWS, G7PRF, of the Electrical and Electronic Engineering Faculty at King's College, London, was presented with a cheque for £500 from the RSGB Legacy Fund during the college's annual prize-giving day on 19 October.

RSGB Council agreed earlier this year to use some of the RSGB Legacy Fund, which had lain dormant for some years, to award a £500 per year bursary to a university. A number of institutions were approached and it was decided to make the bursary available to King's College, London. The sum is used to help a student who is taking a degree course in radio communication or electronics, and Gerald was chosen by the college as being the most deserving student. Having taken a two-year foundation course at Stafford, he is now studying for a Bachelor of Engineering degree in Radio and Telecoms at King's College. Gerald has shown great promise and the donation will enable him to progress further on his chosen course.

Gerald Clews, G7PRF, being presented with his cheque for £500 by Ron Broadbent, G3AAJ.

The cheque was presented to Gerald by Ron Broadbent, MBE, G3AAJ, in his role as an RSGB Vice-President (President Clive Trotman, GW4YKL, unfortunately being indisposed). The choice of the recipient of the funds is made entirely by the university and Ron writes that it was only at the reception following the awards ceremony that he learned that Gerald was already licensed as G7PRF and had been a member of the RSGB for a number of years!

1996 Presidential Installation

THE SOCIETY's 1996 President, Mr P R Sheppard, G4EJP, will be installed at an evening reception and dinner on Saturday 13 January 1996 (7.30 for 8.00pm). The venue is the Forte Crest Hull, Kingston-upon-Hull, North Humberside HU1 2BX.

Tickets for this prestigious event are £20.50 per head. Members wishing to attend should apply to Fay Huxley at RSGB HQ.

Please mention any special dietary requirements when applying.

Overnight accomadation can also be arranged. If this is required, please request details from Mrs Huxley when applying for tickets.

Morse Decision Deferred

THE RSGB Licensing Advisory Committee reports that the World Radio Conference 1995 discussed the proposal to delete RR2735 (the international regulation requiring national administrations to test for proficiency in Morse code before permitting amateurs to operate on the HF bands). It was agreed that this matter will be on the agenda for a future WRC - possibly WRC 1999 - which will give sufficient time to obtain a considered opinion from all radio amateurs within Regions 1, 2 and 3.

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THIS MONTH'S LEADING FEATURE

IARU Region Two General Assembly

by Tim Hughes, G3GVV* and Malcolm Appleby, G3ZNU**

THE TWELFTH General Assembly of IARU Region 2 took place at Niagara Falls during the last week of September 1995. Region 2 comprises North, Central and South America, together with the islands of the Caribbean area. Societies vary in size from the American Radio League (ARRL), with its 155,000 members, to several with fewer than a hundred members. However, as in the International Telecommunication Union (ITU), each society has only one vote. Because of diversities of language, both English and Spanish were used, with simultaneous translation facilities. The host society was the Radio Amateurs of Canada (RAC).

Delegates

DELEGATES FROM 20 countries were present, including for the first time Barbados and Turks and Caicos. Representatives from Region 1 included Lou van de Nadort, PA0LOU, and John Allaway, G3FKM (Chairman and Secretary of the Executive Committee), and from RSGB Tim Hughes, G3GVV, and Malcolm Appleby, G3ZNU (Chairman and Vice Chairman of the IARU Committee). From Region 3 were Fred Johnson, ZL2AMJ (Chairman); Sangat Singh, 9M2SS (Member of Board of Directors); Keigo Komuro, JA1KAB (Secretary); and Shozo Hara, JA1AN (President JARL).

At the Opening Plenary, Alberto Shaio, HK3DEU, the President of Region 2, greeted the distinguished visitors, who included Noel Eaton, VE3CJ (President Emeritus); Richard Baldwin, W1RU (IARU President); Mr Blois (Executive Secretary, Inter American Telecommunication Commission - CITEL - of the Organisation of American States, OAS) and Robert Jones (Director of the ITU Radiocommunication Bureau, Geneva), all of whom addressed the meeting. The inaugural speech was made by Michael Binder (Spectrum Information Technologies and Telecommunications Sector, Industry Canada, Ottawa).

The Conference functioned in three main working groups, dealing with administration; technical and operational matters; and VHF / UHF, microwave and digimodes, delegates choosing which of these they wished to attend.

* 10 Farm Lane, Tonbridge, Kent TN10 3DG.
** 6 Manderville Rd, Prestwood, Gt Missenden, Bucks HP16 9DS.

7MHz Band

IN REGION 2, the 7MHz band extends from 7000 to 7300kHz. It is the long-term aim of IARU to secure, for all Regions, a 300kHz band in the vicinity of 7MHz.

Meanwhile, the problem exists of compatibility between Region 2 and Regions 1 and 3. Extended discussion took place on this problem, the ultimate decision being:

- to encourage the use of frequencies between 7100 and 7300kHz for communication within Region 2, particularly by digimodes from 7100 to 7120kHz
- to reduce the dependency of the use of frequencies between 7050 and 7100kHz by digimode stations and by SSB stations for communication within Region 2
- to discourage the use of frequencies below 7050kHz by SSB stations
- to discourage the use of frequencies between 7035 and 7050kHz by digimode stations except for communication with other Regions.

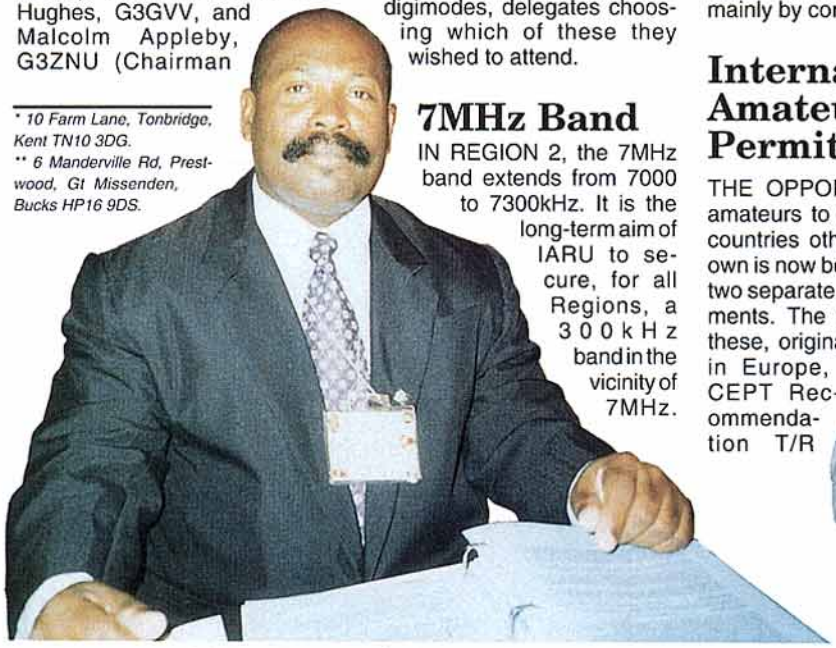
Attention was drawn to the disparity between these proposals and the existing Region 1 bandplan. In order that regular band planning consultation can take place, it was decided that an HF band plan committee should be set up in Region 2, to work mainly by correspondence.

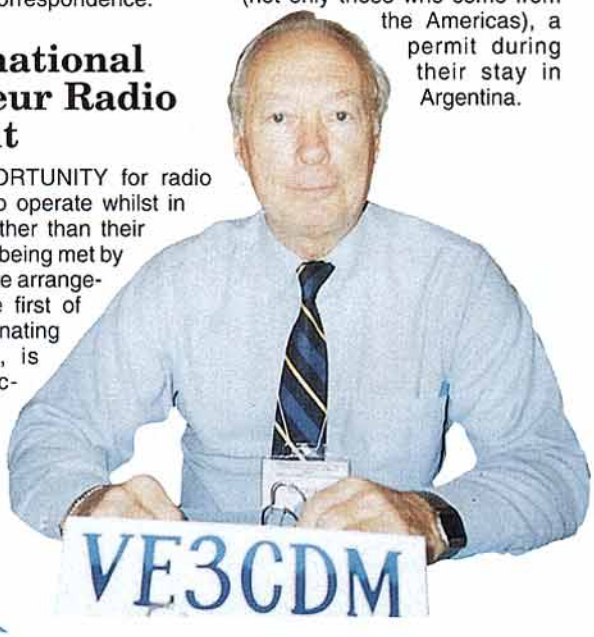
International Amateur Radio Permit

THE OPPORTUNITY for radio amateurs to operate whilst in countries other than their own is now being met by two separate arrangements. The first of these, originating in Europe, is CEPT Recommendation T/R 61-01, which is accepted by more than thirty countries in CEPT, as well as by New Zealand, Israel and Peru.

On 8 June of this year at their meeting in Haiti, the Organisation of American States (OAS) adopted the International Amateur Radio Permit (IARP), which can be likened to the International Driving Licence. USA and Uruguay acceded to it on that day, and Argentina is awaiting admission. At the Region 2 Assembly Dr Bruce Gracie (of Industry Canada) announced that Canada had just acceded to the IARP treaty, and handed over the first permits granted by Canada to the RAC President Farrell Hopwood, VE7RD, and to IARU Region 2 Vice President Tom Atkins, VE3CDM. The IARP is currently limited to members of the OAS, and is consequently not available to British, French and Dutch islands in the Caribbean.

Meanwhile, a paper from the Radio Club Argentino mentions that their licensing authority will continue to issue, to all foreign amateurs who hold a valid licence (not only those who come from the Americas), a permit during their stay in Argentina.





Left: The Turks and Caicos Amateur Radio Society, attending for the first time at an IARU Region 2 General Assembly, was respresented by Frederick Braithwaite, VP5FEB. Right: Newly elected President of IARU Region 2, Tom Atkins, VE3CDM.

Mr Robert Jones, Director of the ITU Radiocommunication Bureau, at the opening ceremony.

Morse Requirement

THE TOPIC OF the Morse requirement for operation on frequencies below 30MHz produced protracted discussion. First, the Assembly endorsed the resolution at last year's Region 3 Conference and at the subsequent meeting of the IARU Administrative Council for its retention, and not to seek a change in this regulation. However, it appeared that several licensing administrations were beginning to question the relevance of Morse as a qualification to operate on the HF bands. The issue is further complicated by the need for standardisation of technical and operational qualifications to facilitate the portability of amateur licences between countries. The matter has been referred to the IARU Administrative Council, who will prepare a report for consideration at each of the three Regional Conferences.

IARU Monitoring System

A PAPER FROM RSGB described the organisation, reporting, requirements and communication of our Monitoring System. Particular interest was shown in the results obtained, as detailed in a recent issue of *Radio Communication*. Malcolm Hamon, VE3KXH, outlined the problems he had encountered since taking over as co-ordinator for Region 2: all the observers are in the northern hemisphere, whilst the intruders are broadcasters and illicit transmissions located in the south. During the course of a presentation, he played a number of recordings of the type of interference being received; Bob Knowles, ZL1BAD, introducing the topic, spoke of the essential need of this service to protect our amateur bands.

Emergency Communications

IN AN AREA WHERE natural disasters are a frequent occurrence, many societies (particularly those in the Caribbean) are actively involved in providing emergency communications. Cuba reported that "on many occasions at great risk to themselves, our operators have participated with the people and the authorities in search operations and transmission of information related to these events". VERONA, the radio society of the Netherlands Antilles, maintains a fully-equipped operational radio amateur station with HF and VHF equipment in the Red Cross building. El Salvador's society, CRAS, participates in the National Emergency Committee, has taken initiatives with respect to emergency communications, and is part of the Emergency Net of the Federation of Radio Amateur Clubs in Central America and Panama. Turks and Caicos takes part in a regular net to obtain information on the direction of weather fronts, and to check that its stations are in working order. Aruba is in a constant state of readiness for the hurricanes which are regular visitors to the island; in the very recent past it had been involved in providing essential communications; the Minister of Telecommunications is now enquiring about becoming a radio amateur himself. The Radio Society of Bermuda is an integral part of the local Emergency Measures Organisation, and is on standby at all times. This summary has only mentioned a few of the countries involved; needless to say, many of the large societies have emergency systems too.

Amateur Radio and the Internet

THERE WAS MUCH discussion about the development of the Internet, the effect that it will have on amateur radio, and how we as radio amateurs can make use of it. Several societies have set up home pages on the World Wide Web, with more planning to do so in the near future. Many more are using E-mail to speed up communications between their members, and to help in society organisation. The Assembly agreed that societies should be encouraged to use both E-mail and the Web to improve communications and organisation. Whilst some thought the Internet could pose a threat to amateur radio, with enthusiasts switching their time and energy to the new communications techniques opened up, generally Internet was recognised as a valuable tool that should be used by amateurs.

Many countries in Region 2 have licence conditions permitting third party traffic, and consequently phone patch into repeaters is common. Amateurs are now experimenting with similar interconnection between packet networks and the Internet, and examples were described by Venezuala and Trinidad. Some concern was expressed about possible mis-use of Internet connections to amateur radio, and it was

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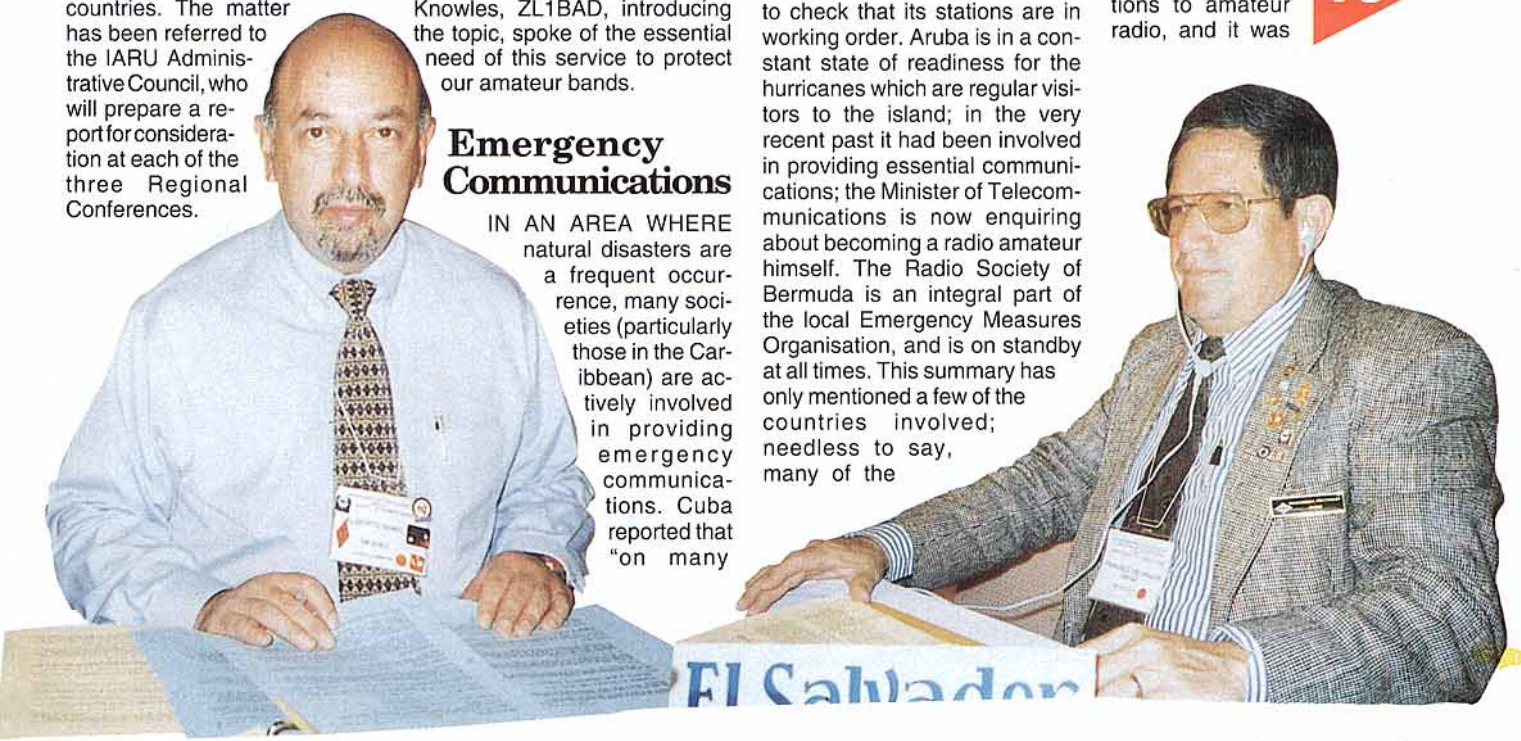


Left: Tributes were paid to Alberto Shaio, HK3DEU, who has served as President of IARU Region 2 for 19 years. Right: A delegate from El Salvador, Francisco Fischnaler, YS1FAF, using the simultaneous translation service.

Senior Novice Instructors

PRESSURE OF WORK or ill health has unfortunately caused the resignations of Senior Novice Instructors in Cheshire, Somerset and Wiltshire. Luckily, volunteers have been found to replace them. They are:

Cheshire: Gordon Adams, G3LEQ, 2 Ash Grove, Knutsford, Cheshire WA16 8BB, tel: 01565 634040.

Somerset: George Davis, G3ICO, Broadview, East Lanes, Mudford, Yeovil, Somerset BA21 5SP, tel: 01935 25669.

Wiltshire: Noel Woolrych, G4TIX, 20 Meadow Drive, Devizes, Wiltshire SN10 3BJ, tel: 01380 724533.

More instructors are required in all three counties. Anyone who has been licensed for a year or more (either with a full or Novice licence) and would like to help introduce newcomers to amateur radio should get in touch with one of the above.

Ad-Man Victor Brand, G3JNB, Retires

A GLANCE AT the Society's Accounts will show that more than half of the £0.5M annual cost of producing and posting *RadCom* is paid for out of advertising revenue, ie not out of subscriptions. For the last seven years, this substantial income has been generated for the Society by an agency, Victor Brand Associates. VBA's success in selling advertising space has been due to the professional experience of Victor Brand, G3JNB, and his boundless enthusiasm for amateur radio and the RSGB. This month, Victor retires, aged 62, having handed over the advertising reins to a new agency.

Victor Brand, G3JNB, using his Drake TR7 on CW. In the background, some of his home-built QRP equipment.
Below: partners in VBA and in life - Victor and Audrey Brand.

The Professional

VICTOR HAS SPENT a lifetime in publications and advertising, starting at Iliffe (IPC) and eventually running his own advertising business with a staff of 20. In 1988, having taken a break from the business, he was asked to look at maximising the RSGB's advertising revenue and in 1989 was appointed Advertising Agent. Ably assisted by his wife, Audrey, Victor succeeded in increasing the Society's income and in maintaining it through the recession. He is pleased to have assisted many new companies by advising on how to produce effective advertisements.

The Amateur

HAVING BUILT A crystal set from *Boy's Own Paper* in his early teens, Victor was hooked and, though he didn't work on *Wireless World* whilst at Iliffe, was frequently to be found in their offices. As with many members, this was the start of a lifetime's interest.

Licensed in 1953 as G3JNB, Victor joined the Kingston and District ARS and has been an active member of various clubs ever since. He is currently a member of the Norfolk ARC and is very active on phone and CW, mostly on the HF bands using Drake equipment and a 285ft centre-fed wire. A keen member of the G-QRP Club, he has recently built QRP transmitters and DC receivers and intends using some of his new-found spare time developing this interest. He is also an active member of the World Association of Christian Radio Amateurs and Listeners.

The Member

VICTOR HAS BEEN an RSGB member for 42 years and has contributed far more than just his professional services. He was very involved with the setting up of Project YEAR, the Society's ongoing youth recruitment programme, in 1988. He drafted a script for the video *Amateur Radio for Beginners* which is still widely used to introduce amateur radio to the public. Victor also wrote a book with the same title, and which is still selling well today.

Over the years, he has offered many constructive suggestions on how best to promote amateur radio and the RSGB, and will continue to support the Society in this way.

New Agency

THE ADVERTISING WORK is now being dealt with by Malcolm Taylor Associates. We are fortunate to have, once again, an active radio amateur (Malcolm is G0UCX) with considerable professional experience to fill this vital role.

Celebrating JOTA in Taunton with Baden Powell's Daughter

MRS BETTY CLAY, daughter of Lord Baden Powell, the founder of the Scouting movement, was a welcome visitor to the Jamboree on the Air station operated by members of the Taunton and District Amateur Radio Club. Mrs Clay sent a greetings message from GB2TWH, which was set up at the Huish Woods campsite on behalf of the Taunton and District Scouts. She said that although Scouts and Guides abroad may be different to ourselves, through Scouting there are many similarities. All Scouts share the same aim - to improve their talents and skills so that they can help other people to lead a happier life.

The club was unsure whether a CW station would be worthwhile, but to their surprise a lady Scout commissioner asked if she could don headphones to listen to the Morse. She began writing it down and on enquiry it transpired that she had been trained as a marine radio operator, but had never actually gone to sea. The club persuaded her to display her skills on the key and she worked a station in the USA - another budding amateur perhaps?

Peter Robinson, G0EYR, who was looking after the station's organisation, was also interviewed on both Somerset Sound and BBC Radio Bristol about the philosophy of JOTA, gaining good publicity for the club and amateur radio.

Mrs Betty Clay delivering her greetings message to Scouts from GB2TWH. Seated, left to right: Tom Turner, G0PSE; Gill Sendall, G0WAU; Mrs Betty Clay; Bernard Ballam, G0WDH. Standing: Vic Sendall, G0WAV and Scout commissioner Geoff Pinney.

RLO Correction

THE CORRECT address for the RLO for Somerset is 14 Holway Road, Taunton, Somerset TA1 2EY, and not as printed in *RSGB - At Your Service* on page 96 of the November *RadCom*. Apologies to all concerned.

The Morse Requirement

An Open Letter from the President

FOLLOWING THE interchange of letters between the Society and the Radiocommunications Agency on the subject of the Morse requirement, I was deluged with letters from members and non-members, some 1300 of them. Most of you will appreciate that answering all that correspondence presented me with an impossible task, therefore I am taking the easy way out via *RadCom*.

Firstly may I thank you all for taking the trouble to write to me, the debate was both interesting and informative, but again the result was still inconclusive, there were some paradoxes among the letters, for example, a good portion of B licensees were for retaining the requirements, whilst were there many A class who advocated its removal. However, the result was still around 'fifty-fifty'.

The major reason for the exchange of letters was a simple one really: this major change in direction on licensing should not take place until there has been discussion between the administration and the amateur radio fraternity, and should not be 'rubber stamped' without this consultation. Questions that immediately spring to mind include "what are we going to replace it with?" and "are we going to replace it?", both of which give rise to a whole new set of questions.

It is acknowledged that because of the CEPT T/R 61-01 no administration could act unilaterally. The letters between the Society and the RA had the desired effect, there has been consultation, and administrations have heeded the need for time to consider the effects of such a major change on and international scale.

The decision has been postponed until 1999, now we must work in collaboration with other societies and administrations to achieve a feasible, and workable system that will be acceptable across the whole amateur radio fraternity. Nobody must be complacent about the amount of work that will be required to achieve this, and just as important, we must not just sit on our hands, we must start to make moves to find a solution immediately, four years is but a short time.

73 de Clive.

Clive N Trotman, GW4YKL

RSGB President

Discovering the Friendly Face of SSL

SUBSCRIPTION SERVICES Ltd in Bristol recently held an 'amateur radio open day' to which representatives of the RSGB and *Practical Wireless* were invited. We were given a guided tour, not only of the Radio Licensing Centre at SSL, but also of the massive TV Licensing Customer Service Centre and the Distribution and Processing Centre. The scale of this operation is impressive indeed: with over 20 million customers, a database of 24 million households and 35 million documents processed each year, the centre is run by a staff of nearly a thousand people in two multi-storey office blocks in the centre of Bristol.

SSL was awarded the first amateur radio licensing contract by the RA in April 1992 and successfully tendered for a second three-year contract in April this year. Today, SSL's Radio Licensing Centre (RLC) handles over 63,000 amateur licences and 50,000 CB licences, with a dedicated staff of just 10. Aware that there had been a number of complaints about the level of service in the early days of SSL's first contract, RLC Manager Les Mountford explained that changing to a bespoke computer system has helped to reduce the quantity of complaints considerably and that these problems are now behind them.

Jo Davis, a Customer Services Assistant in the Radio Licensing Centre at SSL, processing a new licence application.

SSL and the Radio Licensing Centre are trying hard to improve their image with radio amateurs and, for example, have issued a Code of Practice which lays out their commitments to you, the customer. The Code of Practice was sent to all licence holders with their Validation Documents. As a further way of showing the friendly face behind SSL, they are now looking at the possibility of attending a number of amateur radio rallies next year. SSL has entered into a number of Service Level Agreements (SLAs) with the RA which ensure that, for example, a new licence application is processed within five working days of receipt. These SLAs are monitored very closely and Quality Assurance is an important part of RLC's work (they expect to obtain ISO9000 accreditation very soon).

Those of us invited to SSL were struck by their professionalism, dedication to the job and willingness to help. Anyone who does have any difficulties with licence issuing or renewal is invited to call 0117 925 8333, the direct line to the RLC. We were assured that any problems which do occur are now dealt with quickly and efficiently.

Patagonian Visitor

CYNHALIWYD CYFARFOD unigriw Dydd LLun 24 ain Gorffenaf 1995 yn Y Bedol, Bethel, Gwynedd pan gyfarfyddodd rhai o aelodau Y Rhwyd Gymraeg gyda Ffred Green, LU5WS, o'r Wladfa ym Mhatagonia, De America. Er I lawer o aelodau Y Rhwyd gael y cyfleu i siarad gyda Ffred dros y donfeddau dyma'r cyfleu cyntaf I gyfarfod ac ef 'llygaid yn lygaid'. Gan fod Ffred yn rhugl yn y Gymraeg hawdd iawn oedd nesu ato a mwynhau ei gwmpeini.

Yn ystod y bwyd cafwyd yr hanes diddorol gan Ffred am yr amser cynnar pan fu yr amser cynnar pan fu yr Ymsefydlwyr cyntaf yn chwilo am aur a phorfa bras. Dywedodd hefyd fod yno yn awr ail ennyn diddordeb yn yr heniaith a Chymru.

(For those unfamiliar with the Welsh language, see page 65!)

PHOTO: HYWEL, GW4CNM

Welsh Net meeting with Fred Green, LU5WS. From left to right: Wmffra, GW3GFS; Raymond, GW4OMB (front); Elfed, GW7UYF; Nye, GW2HFR; a young visitor; Fred, LU5WS; Ron, GW0BZE.

Stolen Equipment

YAESU FT-990 transceiver S / N IN100039, FT-726 transceiver SK260274, FRG-7700 receiver S / N SK260274, FRT-7700 tuner S / N 29100541, PK-232 TNC M01277, PK-232 TNC M35712, SWR Meter 106240366, SWR Meter 203248502, Tiny 486DX26 computer 0316436217, JV FAX decoder, Epson flat bed scanner, MFJ 12 / 24hr clock, 20A 12V PSU. Any information to DC Clatworthy, Liskeard CID, tel: 01579 342351.

Stolen in Redditch, Worcestershire, on 1 September: Yaesu FT-4700RH, S / N 9K240212. Any information to PC Hicks at Redditch police station, tel: 01527 584888.

Stolen from a car in Birmingham on 27 October: Kenwood TH-48E, S / N 41101371 with cigarette lighter power lead, but minus aerial and mains charger. Any information to G4RBR QTHR.

MORE NEWS ON PAGE 65

British delegates Malcolm Appleby, G3ZNU, and Tim Hughes, G3GVV, (standing) representing the RSGB, and John Allaway, G3FKM (seated), representing IARU Region 1.

11 agreed that the existing packet guidelines should be adopted to help users as they develop these new techniques. It was also agreed that the Region 2 EC will produce a policy document on the use of the Internet, and on its connection to amateur radio.

Band Plans - VHF and Up

MOST (IF NOT ALL) of the countries in Region 2 have 50, 144 and 432MHz allocations, but many have been denied access to the higher bands, or had allocations removed by their licensing authorities. RSGB presented a paper on the work of the CEPT European Radiocommunication Office (ERO), and the DSI proposals that have caused so much recent discussion on the future of UK and European VHF / UHF / SHF frequency allocations. The dangers to frequency allocations in Region 2 were all too apparent, and the need for amateurs worldwide to work towards common allocations was firmly agreed. Region 2 decided to start defensive moves, and as a first step agreed to appoint a frequency co-ordinator to record the allocations in each of the member societies' countries, and to liaise with Region 1 on common allocations.

The needs for VHF band planning in Region 2 are very different from those of Region 1. Region 2 countries are, in the main, large, and the requirement for cross border co-ordination is limited. As a result, band plans have tended to be drawn up by individual societies, with some direct interaction of countries bordering one another to achieve co-ordinated band usage. It was agreed to place this on a more formal footing, and outline bandplans showing the desired levels of compatibility were drawn up at the Assembly for both 50 and 144MHz.

Satellites

HANS VAN DE Groenendaal, ZS5AKV, the IARU Satellite Advisor, attended the General Assembly and made an interesting presentation about the past and future of satellites, and their relationship with the IARU. In the working groups, Hans discussed frequencies for SAREX (Shuttle Amateur Radio Experiments) and the problems of co-ordination between the bandplans of the three regions. It has been agreed that SAREX will use 145.850 / 145.250MHz (downlink / uplink) in Region 2, but in Region 1 will use 145.800 / 145.200MHz.

The Phase 3D satellite will make use of the 2.4GHz band, but many countries in South America do not have this allocation at present. It has been recognised that the satellite's launch will represent an ideal opportunity to lobby for an allocation, and it was agreed that societies should seek such an allocation, stressing the world-wide nature of amateur radio in general and satellites in particular.

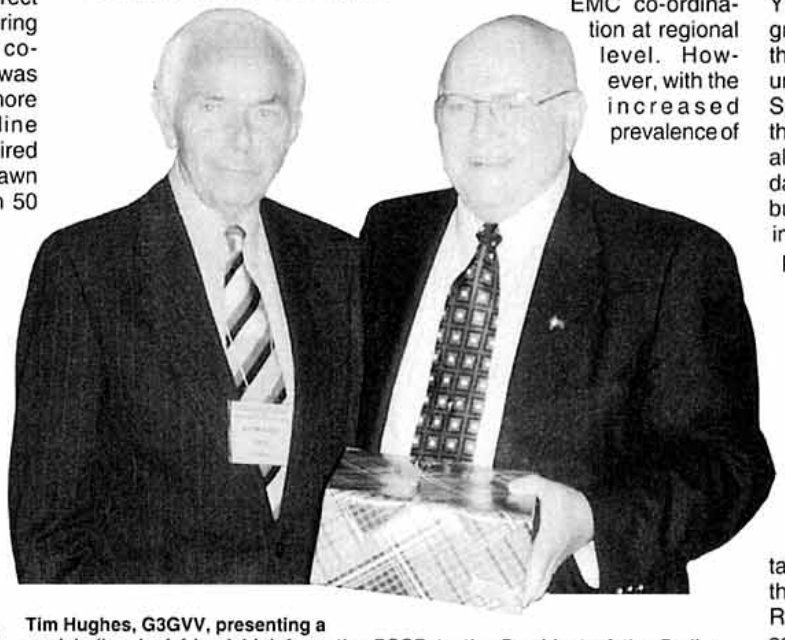
Beacons

REGION 2 IS THE home of the International Beacon Project (IBP), whose aim is to establish a world-wide chain of timesharing beacons on five HF bands. The pioneer of the work and its chief co-ordinator, Jack Troster, W6ISQ, was at the Assembly, and lectured on the project with a demonstration of the new five-band beacon destined for Venezuela. Thanks to the availability of small bus-controlled transceivers, and GPS receivers to provide an accurate and reliable timing reference, the complete beacons are now both compact and easy to operate. The problems of interference to the 14MHz beacons from digimode transmissions was discussed, and there is a proposal to move these beacons closer to the band edge. However, this will take some time as it will require changes to the licences in each of the countries where beacons operate.

Beacons on the VHF bands are not co-ordinated across Region 2 and it was agreed to appoint a co-ordinator to work with member societies, and with the other two regions, to ensure that the beacon systems across the world are compatible.

EMC

IN REGION 1 the EuropeanUnion directive on EMC will, in time, have a profound effect on amateur radio through the imposition of standards on both emissions and interference susceptibility. In Region 2 no such similar standards or regulations exist, and interference and EMC matters are handled by the authorities in a piecemeal fashion, in extreme cases with recourse to the courts. Consequently amateur societies have not established any form of EMC co-ordination at regional level. However, with the increased prevalence of interference, it is recognised that the amateur community in Region 2 needs a co-ordinated voice to lobby the rule-makers, and it was therefore agreed to establish an EMC Working Group.



Tim Hughes, G3GVV, presenting a quaich (bowl of friendship) from the RSGB to the President of the Radio Amateurs of Canada, Farrell Hopwood, VE7RD.

Conclusion

AT THE CONCLUSION of the Assembly, Tom Atkins, VE3CDM, was elected as IARU Region 2 President; Ron Szama, LU2AH, Vice President; whilst Pedro Seidemann, YV5BPG, and Steven Dunkerley, VP9IM, continue to serve as Secretary and Treasurer respectively. Tributes were paid to Alberto Shaio, HK3DEU, who, for nineteen years had served as President.

That the Conference ran so smoothly was due to the preparations made by VE3CDM and YV5BPG. With them must be grouped the many helpers from the Radio Amateurs of Canada; under the leadership of George Spencer, VE3AOS, more than thirty pairs of willing hands were always available to assist in the day-to-day routine. An unsung, but essential, task was transporting delegates from Toronto airport to and from the Conference venue at Niagara Falls, a round trip of more than 200km; and other delegates were met on arrival at Buffalo. To all of these, who remained cheerful and of great assistance, we express our real gratitude.

Why was it necessary for RSGB to be represented at a Conference outside its own region? Because decisions taken there affect radio amateurs throughout the world. The late Roy Stevens, G2BVN, used to say "radio waves do not stop at the English Channel". ♦

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RADCOM OPERATING FEATURE

Cyprus and the 'Other' Island

by Don Beattie, G3OZF*

OUR EFFORTS last year in the RSGB Islands on the Air contest as GJ3OZF from Les Minquiers reef (EU-099) gave Steve Telenius-Lowe, G4JVG, and myself second place in the 'islands' section of the contest. For 1995, we clearly needed to try to do better. We therefore considered a number of options for our effort this year.

The Challenge

THIS WAS TO find a location that met as closely as possible the sometimes conflicting requirements for a try for the top place in the contest. The criteria included:

- Reliable propagation to the UK and US
- Either a readily available station with beams, or a location within driving distance of the UK, so that we can take our own (it's not easy to take good antennas on a plane cheaply)
- Easy licensing
- If possible a 'rare' location
- Somewhere where we have access to 'local knowledge'
- Somewhere enjoyable!

Eventually we agreed on Cyprus. Enquiries showed that we could have the use of the ZC4EPI club station at Episkopi in the western British Sovereign Base Area of Cyprus. The callsign ZC4DX could be used from the station for contests. Beams for 10 - 40m were already in situ and transmitting equipment was available locally, courtesy of Alan Bramley, ZC4AB. We also had the offer of accommodation with Alf Wilson, 5B4AFB, a friend of Steve's from his days in Iran in the 1970s. Finally, there was also the possibility of activating one of Cyprus's Coastal Islands - wherever they were! - for the IOTA chasers.

The usual planning went into the trip, and eventually we were off, with all our luggage - including a complete station and Butternut vertical for the offshore island trip - being loaded on to the plane for Larnaca, and all within the 20kg per person baggage allowance.

Contest Preparation

WE ARRIVED IN Larnaca on the Thursday before the IOTA contest, with temperatures in the upper 30s Celcius. The Friday was spent getting the contest station organised and tested, and the Butternut installed in an adjacent field as a second receiver antenna, as far away from the other antennas as the 100m run of co-ax would allow.

A check on the VSWR on the existing beams at ZC4EPI (a Jaybeam TB3 for 10, 15 and 20m and a Cushcraft 40-2CD 2-element beam for 40m) showed that they both presented a very good match, as did the 80m dipole. The main transceiver was to be a Kenwood TS-850S, together with a TL-922 linear, both kindly loaned by ZC4AB. For the second receiver, we had my Yaesu FT-890AT, with a Dunestar switchable bandpass filter to keep the RF out of the front-end.

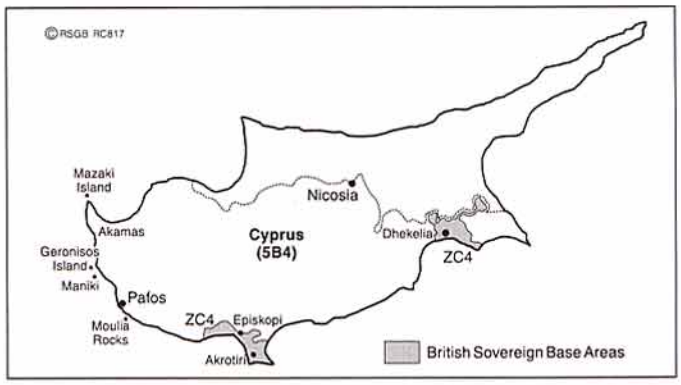
By 10.30am on the Friday the station was all set to go, and so we turned our thoughts to the rest of the week, after the contest.

AS-120

PHIL MARSH, G4WFZ, and more recently a group including Marios, 5B4WN, had activated AS-120 (Cyprus's Coastal Islands) briefly for the IOTA enthusiasts, but we had the feeling that many still needed this rare island group. So on the Friday before the contest, Steve and I set out to survey all the possible islands, in preparation for an assault on AS-120.

There are several islands that 'count' for AS-120:

Mazaki - to the north of the tip of the Akamas peninsular, at the north-west tip of Cyprus, and very difficult to reach. There is no road nearby, and the island is also reputed to be covered at high tide.



Geronissos - to the west of Agios Georgios, just off Cape Drepano. This was the island that G4WFZ activated. We had a good look at this, but dismissed it for two main reasons - it is very difficult to get on to the flat top - about 100ft above the sea, and also the Ministry of Antiquity had placed it 'off limits' since G4WFZ's operation, because of historical remains and archaeological excavations underway.

Moulia Rocks - a low-lying island group to the south-east of Paphos, and more than 1km offshore. These were the islands activated by 5B4WN and friends as C4MI shortly before our visit. Moulia Rocks are reported to be easy to land on, but are covered by the sea if there is a strong swell running. This problem cut short the C4MI operation. To optimise our efforts, and to avoid the worst of the heat, we intended to spend a night on the selected island. Moulia therefore did not appeal, with the prospect of being washed off in the dark.

The 'other' island. This is just south of Geronissos, and it took us some time to find anyone who could provide it with a name. The IOTA Director, Roger Balister, G3KMA, said it was 'Maniki' but no-one locally recognised that name. Eventually, the name 'Managin' was offered, which another local contact translated

The author working the pile-up as ZC4DX during the 1995 RSGB IOTA Contest.

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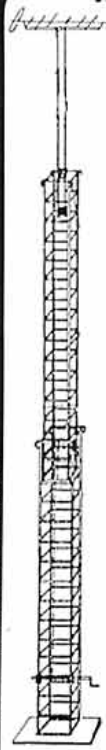

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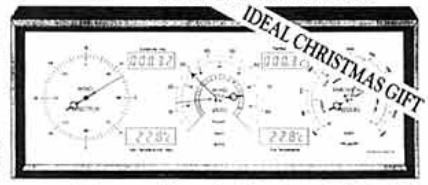

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The Butternut HF6VX vertical mounted at the highest point on Maniki island. The Cypriot mainland is in the background.

as meaning a 'sleeve' (the shape of the island) or 'Maniki' in Greek. Problem solved - at least we were talking about the same island!

Maniki Island

A CAREFUL SURVEY of Maniki from the mainland of Cyprus suggested that it was possible to land - although very rocky. The island looked about 15 metres high, long and thin, about 300 - 400m offshore, but a long way from any mainland habitation.

We started thinking about transport. Returning to Paphos, we asked the boatmen on the quay. Our first plan was to take the daily excursion boat, which travels up the west coast of Cyprus, and to land using the dinghy they have available on board. But before we were able to arrange this, we met Photis.

Photis is the same boatman that G4WFZ had used to get to Geronissos. After a five minute discussion with Photis about what we wanted to do, *he* was telling *us* about the IOTA island rules (200m offshore, 1:1,000,000 maps etc)! Phil must have trained him well. Photis assured us that it was easy to land on Maniki, giving the impression he had done it before (warning - don't jump to conclusions in these sorts of discussions). After some hard bargaining, we agreed a price for two round trips - one on the Monday, to drop us off, and the second on the following day, to collect us. We said we would arrange our own generator, preferring reliability to the convenience of leaving it to Photis. It was agreed that we would confirm the go / no-go decision on the Sunday evening when the weather forecast was known for the Monday and Tuesday.

Meantime, Alf had been busy. He had located a source of generators for hire (strangely, this is not an easy task in Cyprus), and we confirmed the suitability of the 2.2kVA unit the following day. All looked good for Maniki. We then concentrated on the contest for the next 24 hours.

IOTA Contest

LUCK WAS ON our side. The operating facilities at ZC4DX were ideal - a big shack, with sleeping accommodation and a kitchen just in the next room. We were lucky with the equipment, too. The only failure was the 40-2CD 40m beam (a suspected feeder fault), just as 40 metres was closing in the morning. Propagation conditions were not particularly good, but from our southerly location they appeared to be better than we had been expecting, based on experience from the UK.

However, although we made in excess of 2000 QSOs operating as ZC4DX, the multiplier score was not too good - Cyprus is just that bit too far from the heart of the IOTA contest (UK / West Europe / USA) and our contest position and particularly our multiplier tally this year will bear testament to this. But it was good fun, and gave a number of people the opportunity to work ZC4 for a new one.

Once the 24 hours of the contest were over, our thoughts turned back to Maniki.

Maniki is 'On'

A PHONE CALL to Photis confirmed the weather forecast was good, and we decided to go ahead with the trip. We had confirmed with the Cyprus Ministry of Tourism that no landing permission was needed on Maniki, and as Cyprus is now a signatory to CEPT, there was no problem with the licence.

Monday 31 July dawned hot and sunny. By noon we had met Photis, and made arrangements to have the boat loaded by 3.00pm, with a planned departure time from Paphos of 3.30pm. Starting with what was intended to be a light-weight operation, we seemed to be taking quite a lot. Antenna and feeder, transceiver and PSU, generator and fuel, tent, loads of drinking water, computer, spare clothes, cameras, table, chairs - it all mounted up.

Maniki is about 20km north-west of Paphos. Sea conditions were good, and the trip took just under an hour in Photis's fast boat. We then took 30 minutes to find a suitable landing spot. But Photis had been here before, hadn't he? Doubts were beginning to creep in. When it was decided that the only way to secure the boat to allow unloading was for someone to swim ashore with a rope, which would then be lashed to a suitable rock, I somehow found myself volunteered.

Eventually we had the boat secured between the rope to the island and the anchor, but the only way to get the equipment off was to form a human chain in waist-high water, and manhandle the equipment over seaweed-covered, sea urchin infested rocks. How we got it all ashore without something ending in the water, I do not know. As it later transpired, although there is little tidal fall in the Eastern Mediterranean, we had arrived at Maniki at exactly the right state of the tide to allow landing. Higher tide, and we could never have stood in the swell. Lower, and the boat would not have been able to get close enough to the island.

By 1630 Steve and I were ashore and began setting up the station. A hurriedly made shelter to protect from the sun, a Butternut stuck in the rocks, and we were ready.

AS-120 On The Air

AT 5.30pm (1430UTC) we started operations as 5B4/G3OZF/P and the pile-up was enormous. The first two hours were very hard going, and only with great difficulty did we separate out the stations calling. Then it settled down to a steady rate of 150 QSOs / hour. Propagation was excellent,

The cramped operating conditions at 5B4/G3OZF/P on Maniki. The whole island is made up of similar razor-sharp rocks, with no natural shade.

Left to right: Alan Bramley, ZC4AB; Don Beattie, G3OZF; and Alf Wilson, 5B4AFB at the ZC4DX station.

and the signal reports were good.

Early morning QSOs brought the West Coast of the US and Japan at great strength. Also a contact with Jim Smith, VK9NS, over a very difficult path, but we made it.

By 8.30am we had to make a decision on whether to extend the pre-arranged pick-up time of 11.00am. By then the temperature was already up to 40°C and there was not too much of a decision to make. Operating was getting very difficult, with sweat pouring off us, and barely enough shade. A phone call to Photis confirmed our departure plan (oh yes, they have phones on AS-120 - actually my GSM portable, which found an S9 base station signal into the island!) But by now, the sea was a little rougher and it was clear that we would not get the equipment off the way we had got on to the island. Photis suggested a small dinghy, and a long length of rope.

And so it was at 11.00am that we rigged up a loop of rope, and made a number of dinghy round trips to the launch, carrying all the necessary items for sustaining amateur radio life on this inhospitable little island. Again, amazingly, all the equipment came off without mishap, and before too long we were on our way back to Paphos, having made 1300 QSOs in the 12 hours or so of operation.

We could not have operated the contest, or from AS-120, without the help of our friends on Cyprus. Most of all Alf, 5B4AFB, and Doreen Wilson, and Alan Bramley, ZC4AB, who showed us immense kindness and hospitality - and of course tolerance. We are very grateful indeed. ♦

HF NEWS

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

FIRST OF ALL - a very happy Christmas season to all readers and sincere thanks for the support given to me in producing the column during 1995.

DX NEWS

THE LATEST ARRL DXCC news release said that documentation has now been received and approved from the following: 3A/I1RYL, 3A/IK1SLP, 3A/K4WMG, 3D2CT, 3D2CU, 3W5FM, 4H1TR, 4J0/IK2BHX, 4K1HX, 4S7FEG, 4S7ZAG, 5H1CK, 5H3CK, 5N3/SP5XAR, 5R8EI, 5R8EJ, 5R8EH, 5T0AS, 5T6E, 5X4A, 5X4B, 5X5THW, 6Y5/JR7QKH, 9A9JH, 9G1YR, 9M8BC, 9M8HN, 9N1WT, 9X/ON4WW, 9X/SM7KOJ, A71A/IV3TMM, C9/W6RJ, CE0Z, CN2AW, CN2SR, CN5I, CY9/WA4DAN, CY9/AA4VK, CY9/KW2P, CY9/W5IJU, CY9/K4TVE, D68QM, DU9/KG8QH, EA8/PA3GIO, ED8U SA, EY8/K4YT, H44/DJ9RB, LX/DL3FCP, LX/DL4FCH, P29VDI, S79NEO, SV5/PA3GIO, SV8/G3SWH, T5RM, TA/UA3AB, TG9/F5UKV, TI9JJP, TN7OT, TR8SF, TT8AB, TT8NU, TU2/KM4P, V2/G4DIY, VK9CJ, VK9XI, VP2MFM, XT/TU5BA, XU6WV, XT2CH, Z38/DL1SCQ, Z38/DL2SCQ, and ZL8/G4MFW. Quite a list!

A bulletin issued on 2 October said that that the number of unprocessed DXCC applications at the end of September was 991 (70,803 QSLs). 1,254 applications (82,230 QSLs) were for endorsements and new awards during the month. It is two years since this many applications and QSLs have been received in a single month. Applications being sent out at the end of the month were received less than two weeks earlier.

Austria will celebrate its millennium in 1996. The authorities have authorised the use of the special prefix OEM (M stands for the Latin word 'mille' which means 1000) for the whole year to be used on a voluntary basis.

I understand that plans are afoot for Ireland's first 28MHz beacon. EI4HQ is in charge of the project and the beacon will run 25W of A1A to a 5/8 vertical antenna controlled by a dedicated PC. Plans are set for this to be incorporated into the IARU beacon timesharing system in due course.

According to *DXPRESS*, PB0ALB is going to be in **East Malaysia** between 20 February and 2 April 1996. He will be using the callsign 9M8CC and hopes to take part in the *CQ* WPX SSB Contest. A71AN (DL9FCQ) will be in **Qatar** again from 29 December until 14 January. He should appear mostly on CW on all bands from 3.5 to 28MHz. A71BH is now on RTTY. *RSGB DX News Sheet* states that 4X4NJ will be on top band this season around 1.828MHz but in any case between 1.827 and 1.833MHz. He will listen from 300Hz to 1kHz up at his sunrise and two hours earlier on Fridays and Saturdays - mostly trying to complete his WAS (he needs NV, UT, ID, OR, and ND). The same source says that XZ1X was on the air from **Myanmar** on 28 and 29 September on 14, 18, 21, and 24MHz and 14MHz SSB and 21MHz CW. 1,000 contacts were made - mostly with Japan. The operators were OH2BH, OH0XX, and JA1BK and they operated from Government premises. The demonstration seems to have been very successful and the first Myanmar citizens may appear on the bands before the end of next year. Yaesu Musen Co donated the FT-900 used for the training of future local radio amateurs. It seems that there was no record of the XY0RR operation in official circles. The expedition to **DPR Korea** which was set to take place in late September has been postponed until 1996. A delegation from that country was supposed to be visiting Beijing to observe amateur radio at BY1PK. JH1AJT is said to be going there "before January". According to the same news source, 61 candidates sat the first radio amateur examinations held in **Iran** for 32 years on 20 September. K3UOC has returned to **Saudi Arabia** and will be active as 7Z5OO on CW, usually between 1200 and 1500UTC. Mike reminds those who contact him that QSLs sent to 7Z5OO "should be sensitive to basic Saudi cultural conventions and Islamic restrictions. Specifically no scantily clad women, no reference to beer or alcohol, no Christian or Jewish symbolism, and no pictures or reference to pigs, pork, or ham".

RSGB DX News Sheet quotes a report that KH6CC has heard G3PQA between 1600 and 1615UTC and worked ON4UN at 0523. His best time for Europe is 0530 and he is usually to be found between 1.825 and 1.832MHz using a 127ft vertical antenna and 1500W. HK100GM is a station in **Colombia** which is marking 100 years of radio communication. It will cease operation at the end of the year.

VA1S will be operated by the Marconi Amateur Wireless Society during December to mark the 93rd anniversary of Marconi's successful transmissions from Canada to England. This is the fifth consecutive year for the VA1S operation and the station will be on SSB and CW on all bands from 1.8 to 28MHz. Certificates for contacting the station will be provided by VE1AL at a cost of US$5.00 or 10 IRCs. However, those who make contact on five different bands in 1995 will receive the certificate free of charge.

S92VG says that he is the only CW station in **Sao Thome**. He says that he will be on 14 and 21MHz each night. It is reported that YT1AD will be in the country between 4 and 14 December. His callsign will be S92AD and he will be active during the ARRL 10m Contest. *Long Island DX Bulletin* reports that the intended 5A0A operation was cancelled due to lack of operating permission. It goes on to state that "the 5A1A operation was also apparently conducted without written permission . . ."

FB1LYF will be on **Kerguelen Is** until next November. His callsign was not known at the time of writing. Andy Chadwick, G4ZVJ, (ex ZD8VJ) and Ken Cheetham, G4RWD, (ex-ZD8WD) will sign as 8Q7VJ and 8Q7WD from Meerufenfushi Island, **Maldive Islands** from 21 November until 3 December 1995. The operation will be CW

1995 WARC BANDS TABLE

	10MHz	18MHz	24MHz	Total
G4YVV	78	117	72	267 (CW)
G3WGV	112	101	53	266 (CW)
G3ING	77	84	34	195
G0DEZ	83	62	38	183
GJ4GG	48	64	29	141
G4OBK	29	52	27	108
G4CMZ	21	18	29	68
G0SKW	33	26	7	66
G4FVK	17	36	10	63

The MOEM Award issued to celebrate Austria's millenium. To apply for the award, 1,000 OEM points are needed. The WOEM award, pictured in November's *RadCom*, requires European applicants to work 20 different OEM callsigns, of which at least three must be from OEM1 and two from OEM3.

only on the following frequencies: 1.827, 3.503, 7.003, 10.107, 14.027, 18.077, 24.897, and 28.027. The callsign 8Q7VJ will be used during the *CQ* WWDX Contest. Andy says that this will be a low-key operation with activity dependent on local generator power. Please note that G4ZVJ has a new address (see *QTH Corner*) and that in future all QSL cards for ZD8VJ, ZD7VJ, 3D2VJ, T20VJ, A35VJ, 5W1VJ, ZK2VJ, ZK2VJ, KH8/G4ZVJ, AH8F, HS0/G4ZVJ, DU3/AH8F, ZD8OV, ZD88V and GB5VJ should be sent to his new address. He has an E-mail address which is: andy@g4zvj.demon.co.uk and is also reported to have a supply of IRCs for sale at 45p each.

F2JD will be working in the **Malagassy Republic** for some months, and he will try to obtain a licence. Paul, 5X4F, is now said to have an antenna for 1.8MHz. He is to be found near 1.831MHz around 0300UTC.

BAND REPORTS

Many thanks to G2HKU, G3GVV, GU4GG, G0OTY, and the UK DX Packet Cluster (via G4PDQ) for the following loggings which took place between mid-September and mid-October. As usual callsigns given in italics were of stations using CW:

1.8MHz

0000	*A45ZZ, J28JJ, 9K2MU, 9N1SXW.*
0100	*R1MVI, TF3DX, 8Q7CW.*
0300	*CE0Z, CX4SS, SV8CS, XR0Y, ZS6UT.*
0500	*NW6N, OH0/OZ1FG, VP5/PA3BBP.*
0600	XQ8ABF, *ZL2SQ.*
2200	*UA9FQY, VK6VZ, 5N0MVE, 9M2AX.*
2300	*CY0TP, EW6CM, TY8G, 9H3WK.*

3.5MHz

0200	CE8EIO, *ET3KV, VP5/PA3BBP, 5R8DS.*
0500	*CE0Z, XR0Y,* ZL2JR.
0600	TG9NX, *ZL2AGY.*
1800	VK3DRD, *VK9NS,* ZL's 1CCR, IU, RS, 5N0MVT, *9N1SXW.*
1900	*JY5AQ, VK2OI, 8Q7CW.*
2000	A71DX, JA5AUE, JA0BYG, VK4SJP, *VK6DG, VK6HD.*
2200	CY0TP, VK6APZ, *TY8G, 9M2AX, 9X/ON4WW,* 9V1XQ.

7MHz

0100	*CE0Z, HC5AI, TY8G, XR0Y, XQ8ABF, 9N1SXW.*
0500	*HH2/N3SIV, KH6NO, KL7Y, R1MVI, TI9JJP, ZL2-4, ZS6P.*
0600	*FK8HG, KC4AAA, KH6XT, K0MVL/KL7, T32ZB,* VR6YL.
1800	*BY0AA, ET3KV, VK9XJ, ZL1MH, 3B8DZ,* 8Q7CW, *9N1SXW.*
2000	AP2NJ, *JA0BCO, OX/JA1OE ST2AA,* TT8BP, *R1FJZ/FJL,* 3V8BB.
2100	A71DX, CY0TP, JD1AMA, VP8CSA, *ZA1Z,* 4S7BRG, 9J2SZ.

AWARDS

GISBORNE 2000 AWARD

Available to all licensed amateurs and listeners. Only one contact per year may be made with one of the Gisborne stations using the callsign ZL2000. Any frequency/modes can be used and contacts may only be made during January of each year. The award starts at 1101UTC on 1 January 1996 and concludes at 1100UTC on 31 December each year until (and including) 2000. To achieve the award only one QSO is needed with ZL2000 and a complementary award will be given to those who contact the station in four of the possible years and one of these will receive a very special award in 2000. The cost of the award is US $10.00 and applications go to: Gisborne 2000 Award, PO Box 1017, Gisborne 3801, New Zealand. I can supply photocopies of the rules (SASE please).

WOEM - WORKED OEM

This award is sponsored by OVSV on the occasion of Austria's millennium and may be worked for by any amateur radio station or listener. European applicants need to work 20 different OEM callsigns, of which at least three must be from OEM1 and two from OEM3. Countries outside Europe need 10 including two OEM1 and one OEM3. All bands and modes are valid.

MOEM - WORKED 1,000 OEM POINTS

1,000 points needed. OEM4 - 7 and 9 stations count 20 points, OEM 1-2-3-5-6 stations count 10 points each and OEMX (club stations where first letter of the suffix is 'X') count 30. A minimum of five different call areas must be worked. Send applications for either award - certified list plus 10 IRCs, DM 15.00, or US$10.00 to: OVSV Diplommanager, Theresiengasse 11, A-1180 Vienna, Austria.

CONTESTS

ARRL 160M DX CONTEST

2200 3 December - 1600 5 December

CW only and only work W/VE stations. Give signal report - each QSO counts five points. Multipliers are ARRL/RAC sections plus VE8/VY1. Send entries within 30 days of the contest to: ARRL 160 Metre Contest, ARRL, 225 Main Street, Newington, CT 06111, USA. I can supply photocopies of the rules (SASE please).

ARRL 10 METRE CONTEST

0000 11 December - 2400 12 December

Three categories - QRP (up to 5W output), low power (up to 150W), and high power. Mixed mode, phone only, and CW only. Each phone QSO counts two points, each CW four. Send RS/T and serial number starting from 001. Multipliers are the 50 US states plus DC, and the Canadian call areas. Send entries no later than 30 days after the contest to: ARRL 10 Meter Contest c/o ARRL as above. I can also supply copies of the rules (SASE please).

RAC CANADA WINTER CONTEST

0000 - 2359 29 December

1.8 to 28MHz CW and Phone. Work anyone and QSOs with Canada count 10 points, with other countries two points. QSOs with VA2RAC, VA3RAC, VA7RAC, VE1RAC, VE4RAC, VE5RAC, VE6RAC, and VE8RAC count 20 points. Multipliers are Canadian provinces and territories (12 in all) and count on each band and mode. Single-operator multi-band, single band, multi-band QRP (less than 5W output), and multi-operator sections. Send logs to RAC, PO Box 356, Kingston, Ontario, K7L 4W2, Canada, by 31 January 1996. I have copies of the rules (SASE please).

Results of the **1994 *CQ* WW DX SSB Contest** appeared in September's *CQ*. In the **High Power** category results were as follows: (All band) **GW4BLE** 3,677,808, **GI0KOW** 2,302,140, **GM0ECO** 682,880, GM3BCL 258,509, and GI0OUM 17,765. (3.5MHz) **G3NLY** 164,372. (14MHz) **G0KXL** 230,879, **GM4FDM** 633,096, and

NINE BAND TABLE NO 16

CALL	1.8	3.5	7	10	14	18	21	24	28	TOTAL
G3KMA	191	279	320	275	326	306	326	293	320	2636
G4BWP	174	281	313	277	326	304	322	269	311	2577
G3XTT	195	252	297	240	323	282	317	250	294	2450
G4GIR	133	262	303	233	326	280	322	248	310	2417
G3GIQ	79	227	288	190	326	281	326	239	314	2270
G4OBK	136	184	240	199	307	263	282	222	252	2085
G3TXF	105	205	266	191	310	205	307	151	273	2013
G3NKC	139	175	233	213	258	235	244	201	238	1936
G3WGV	89	160	227	231	265	254	262	206	231	1925 CW
GW3JXN	107	190	245	188	285	243	254	174	206	1892
GM3PPE	68	175	222	232	281	243	256	185	223	1885
G3SXW	89	187	234	199	302	198	284	148	239	1880 CW
G3IGW	125	184	305	200	274	224	234	48	207	1801
G3VJP	72	163	237	119	321	170	303	68	262	1715
G3NOF	5	118	117	-	326	254	325	227	299	1671
G3NOH	43	98	175	203	268	240	257	169	211	1664 CW
G4ODV	88	184	307	167	254	123	244	69	200	1636
G4XRX	3	48	133	110	265	188	284	156	232	1419
G3IAR	72	106	132	136	247	168	220	124	150	1355
G4NXG/M	12	46	104	-	247	138	259	137	236	1179
G4CMZ	14	45	103	107	149	93	124	45	103	783
G4FVK	40	66	88	38	145	76	141	25	125	744
G0DEZ	30	53	90	88	98	64	78	44	66	611
AVERAGE	87	160	216	167	271	210	260	161	231	1763

Next deadline - scores to reach G3GIQ no later than **8 January.**
In future it will be possible to send in *two* scores - one for CW and one for mixed modes. (Prepared by G3GIQ).

28MHz COUNTRIES TABLE

G0AEV	123
G4OBK	111
G0DNV	90
G0MCT	55
G0DEZ	50
G0NQC	41
GJ4GG	37
G3XBM	32
G3ING	30
G2FQR	21
GM4CHX	20

QTH CORNER

CE0Z	R D Hamilton, 1042 Xenophone, Golden, CO 80401, USA.
S79NEO	DL3NEO, H Schmidt, Hans-Sachs-Str 24, D-91207 Lauf, Germany.
VE1ALA	R Leith, 846 George St, Sydney, B1P 1L9, N B, Canada.
8Q7VJ	via G4ZVJ, (New) Andy Chadwick, 5 Thorpe Chase, Ripon, N Yorks, HG4 1UA.
8Q7WD	via G4RWD, K Cheetham, 60 Holme Cl, Hatton, Derby, DE65 5EE.
9M8CCP	Borsboom, Madridwg 299, Valardingen, 3137 AN, Netherlands.

GD4GWQ 20,790. (21MHz) **GW0ARK** 318,400 and **G4WTD** 149,472.(28MHz) **G/OZ7SM** 84,100, and G4IUF 34,650. In the **Low Power** category: (All band) **G4KIV** 559,200, **GM0FET** 264,597, GM0TGE 135,946, G6QQ 114,856, **GW4BVJ/P** 111,830, G3YOG 44,548, G3JKY 42,968, G4NXG/M 31,590, GM4CUX 24,921, G3RSA 13,520, G0TTA 5,184, and G0MRH 3,724. (14MHz) **GI0UJG** 348,588, GI0SAP 214,428, G0ATG 17,340, and GM3CFS 13,038. (21MHz) **GI0SNA** 305,383, GM0SSO 1,178, G0OXT 285. (28MHz) G4OBK 864.

Results of the **1994 *CQ* WW DX CW Contest** appeared in October's *CQ* magazine. In the 1.8MHz low power section **GI0KOW** was world third with 41,580 points. In the single operator all-band high power category **G4BUO** was fourth in Europe with 3,032,424 points and **GB4RF** fourth on 21MHz with 324,960. In the low-power all band class **GD4UOL** was European sixth with 970,557 and **G4OBK** European third on 28MHz with 19,513. In the **High Power** category all bands **G4BUO** scored 3,032,424 **G0IVZ** 2,308,068, G3UFY 752,978, and G0LZL 180,810. On 28MHz **G0AEV** scored 26,829. On 21MHz **GB4RF** 324,960 and on 14MHz **G3KDB** 519,715, G4CNY 322,225, **GM3WOJ** 270,432, and G4ODV 192,717. On 7MHz **G3PJT** scored 222,575 and G3WVRR 10,945. On 1.8MHz **G3XTT** scored 68,388 and **GM3ITN** 36,812. In the **Low Power** class all bands **G3NKS** scored 469,778, **GW3JI** 356,070, **G0DEZ** 280,302, G4ZFE 273,828, G3ESF 265,038, G3RSD 124,410, G5MY 105,924, G3KKQ 90,870, **GM4HQF** 37,760, G0MRH 17,484, and GW4BVJ 14,884. On 28MHz **G4OBK** scored 19,513. On 14MHz **G3RXP** scored 113,460, G4WYG 73,062, and **GM3CFS** 33,408. On 1.8MHz **GI0KOW** scored 41,580 and G3MYC 5,016. In the **Assisted** category all-bands class G5LP scored 428,340 and G3YMC 5,016. Finally, in the **Multi-operator** class **GX0AAA** scored 6,279,640, **GW8GT** 5,183,882, **G3LNS** 5,162,808, **GB5DX** 4,697,360, GB5WW 2,534,592, **GU3HFN** 1,654,380, and **GM4TMS** 457,660. In the Multi-operator class **GW8GT** scored 3,881,250, **GB2AA** 2,800,657, **GM4DMZ** 2,369,400, GX0FUN 780,584, G3FJE 377,010, and GS0AEE/P 140,352.

No doubt, I have accidentally left out one or more scores - so apologies in advance!

THANKS

TO ALL WHO contributed to this month's column and also to the authors of the following publications for items extracted: *DXPRESS* (PA0FQA), *Lynx DX Bulletin* (EA2KL), the *Long Island DX Bulletin* (VP2ML), and *RSGB DX News Sheet* (G4BUE). Please send everything for the **February** issue to reach me no later than **10 December.** ♦

VHF/UHF NEWS

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

THERE WAS SOME more fine tropospheric propagation in October. Conditions in the UHF/SHF contests on the 7/8 October weekend were superb with Hungary worked from the UK on 23cm.

SPANISH EVENT

ANGEL PADIN, EA1QF, sent me details of the VHF National Congress to be held in Alicante, Spain, on 8 - 10 December. The venue is the Hotel Melia. The agenda is of primary interest to Spanish amateurs but there are discussions on digital communications, packet clusters, awards and contests and meteorological satellites. EA1QF is the congress director for the Spanish society (URE) whose address is Apartado postal 220, E-28080 Madrid, Spain.

PUBLICATIONS

THE LEICESTER Repeater Group's October newsletter *LENS* is mainly devoted to engineering news by Adam Moss, G0ORY, who is the LRG's engineering manager. The list of the features incorporated in GB3CF (R0) and GB3LE (RB4) is impressive. It includes a VoiceBox, automatic notching of toneburst and DTMF signals, automatic shutdown on signals being jammed by a toneburst for a certain period of time, alarms if switched to battery power and DTMF 'star services'.

G0ORY is working on repeater interlinking and on-site conferencing projects. GB3UM is a 6m repeater being built to similar specifications. A 23cm repeater has been acquired for a very modest sum and could be QRV next summer once a site has been located and clearance obtained. For details of LRG membership write to PO Box 180 Leicester.

The Kent Repeater Group's October *Newsletter* includes the minutes of the AGM held on 23 June and brief reports on GB3NK (RB4) and GB3KN (R4). The latter suffered lightning damage on 2 September which affected the logic and power supplies but service was restored after 45 minutes and the damage was totally repaired during the following week. The *Newsletter* is edited by Mr A J Young, G1AJY, and the KRG's secretary is Mr P N Clark, G0TBO, both QTHR.

Talkthrough is the newsletter of the UK FM Group (Western). The summer edition includes the callsigns of the 476 members and status reports on the 16 repeaters operated by the group. The membership secretary is Mrs Kath Wilson, 2E1CNY, who is QTHR. The PO Box 3600 address is now discontinued.

CQ Communications Inc, publisher of *CQ Magazine* since 1945, sent a press release about a new VHF magazine called *CQ VHF*, the first issue of which is due out on 14 December. Editor Richard Moseson, NW2L, commented: "*CQ VHF* will serve the specific needs and interests of hams whose operational and technical interests exist above 50MHz." The publisher's address is 76 N Broadway, Hicksville, NY 11801, USA.

REPEATERS

EVER SINCE repeaters came into service on the VHF/UHF bands they have been subject to occasional operational interference and sometimes physical vandalism. A press release from the Thames Valley Police, broadcast on the *GB2RS* news service on 15 October, referred to the discovery of a radio jamming device in the Brill area of Buckinghamshire on 19 September.

The jammer was attached to an anti-tamper explosive device. If detonated it could have caused serious injury.

The press release advised: "The public are warned not to tamper with any device which they may come across and immediately contact the police."

The RSGB Repeater Management Group (RMG) states that these jamming devices play various recorded abusive messages or tunes on a random basis at regular intervals. Details should be noted and passed to the appropriate beacon keeper. Anyone contemplating DFing these devices should contact the keeper so that efforts can be coordinated. If you locate one *do not approach or touch it but report it to the police immediately.*

The Nottingham TV repeater GB3NV (RT1-2) went QRT on 11 September; a new site is being sought. The Leicester ATV repeater GB3GV is QRV again on a new frequency with a new phase-locked exciter. The Bo'ness (W Lothian) UHF repeater GB3OH is QRV on RB4 and reception reports should go to John Wilson, GM6WQH, at QTHR or via packet at GB7EIY.

In the Hull area, VHF relay GB3HS (R2) and UHF repeater GB3HU (RB3) are both back on air following feeder cable repair due to vandalism. UHF voice repeater GB3LR (SXE) on RB11 is also QRV again after repair work. In Caernarfon GB3AR (R4) is operating with reduced sensitivity until further notice. UHF voice repeaters GB3DI (OFE) on RB6 commenced QRP service on 23 September while GB3RE (KNT) on RB11 recommenced operation from its new site on 5 October.

BEACON NEWS

FX5UHF IS A new beacon on 70cm operating continuously on 432.863MHz from IN93WC. The power is 128W ERP (variable) into two Yagis pointing north and northeast. Later on it will transmit its power and the atmospheric pressure.

METEOR SCATTER

DECEMBER SEES two good meteor showers, the first of which is the reliable Geminids. The OH5IY program predicts the peak at 1010UTC on 14 December. Last year's prediction was 0400 but the main radio peak occurred at 0000 on the 14th with a significant secondary one 6 - 7 hours later on the NW/SE path. Best UTC times for skeds are: NE/SW

LOCATOR SQUARES TABLE

STARTING DATE: 1-1-1979

Callsign	50MHz	70MHz	144MHz	430MHz	1.3GHz	Total
G3IMV	470	15	541	125	52	1203
G0CUZ	221	-	398	80	-	699
G4RGK	183	-	333	211	74	801
G4RRA	-	-	317	80	-	397
G4YTL	-	43	310	58	-	411
GW8JLY	-	-	288	36	-	324
G0EVT	286	14	285	75	9	669
GJ4ICD	648	1	264	121	79	1113
G6HKM	518	-	263	122	66	969
GW4LXO	527	37	261	109	48	982
G0FIG	200	-	253	79	33	565
G4IGO	621	-	250	-	-	871
GW4FRX	-	-	249	-	-	249
G3FPK	-	-	246	-	-	246
G3XDY	-	-	230	163	113	506
G0GMB	135	-	226	108	-	469
G4TIF	363	28	217	112	-	720
GW0PZT	-	-	207	-	-	207
G1SWH	302	39	206	74	21	642
G1HWY	-	-	202	90	48	340
G0EHV	-	38	199	87	-	324
G1AWF	69	-	190	20	-	279
G6RAF	134	19	184	119	16	472
G7LIJ	25	-	181	-	-	206
G4MUT	214	26	159	97	36	532
GW6VZW	416	-	143	6	-	565
G7CLY	112	-	139	2	-	253
G8XTJ	206	-	133	-	-	339
G8TOK	202	25	131	54	27	439
G1WPF	-	-	128	45	-	173
G1UGH	251	-	126	-	-	377
G7HUD	154	-	112	27	-	293
G6TTL	49	-	108	80	-	237
G4OUT	-	23	106	-	-	129
G8ESB	31	21	99	36	24	211
GW7SMV	167	-	92	-	-	259
G3FIJ	95	27	88	43	11	264
GI1CET	100	-	79	12	-	191
G0HIK	61	1	77	22	-	161
G0HVQ	339	-	71	-	-	410
G0HDZ	35	-	70	-	-	105
G3UOL	11	-	66	-	-	77
G4ZHI	-	-	65	24	-	89
G0JHC	576	-	48	-	-	624
GW7EVG	-	-	34	-	-	34
G0UPU	8	15	25	6	2	56
G3KIP	46	-	21	-	-	67
G6XRK	-	-	16	-	-	16
G3NKS	2	46	9	2	-	59
G4OBK	94	-	1	-	-	95
GM0WDD	138	-	-	-	-	138

No satellite, repeater or packet radio QSOs. If no updates received for a year entries will be deleted. Next deadline is 21 December. Band of the month 144MHz.

2100 - 0200 and 0500 - 0930; E/W 0030 - 0400; NW/SE 1900 - 2300 and 0230 - 0730 and N/S 1900 - 0100 and 0330 - 0900. The radiant rises around 1630 and sets at 1230.

The Ursids stream could peak around 2350 on 22 December. Its high declination of +75° means that the radiant never sets as far as the UK is concerned. Best times are: NE/SW 0900 - 2400, E/W all day, NW/SE 1700 - 0830 but N/S not so good.

MOONBOUNCE

THERE ARE THREE December weekends that could be useful for EME tests. On 2/3 the average declination +9.8°, the sun offset +135°, signal degradation - 1.22dB and 144/432MHz sky temperatures 340/20° K respectively. The next weekend is a night apogee one with corresponding parameters +17.0°, -148°, -1.85dB and 320/20° K. The 30/31 weekend is a day (pm) one and the data are +12.1°, +116°, -1.49dB and 411/24° K.

The October issue of Allen Katz's, K2UYH, *432 and above EME News* carries the usual news from contributors in many countries, net notes and a 'for sale' section. There is a piece by Dick Knadle, K2RIW, about correcting wind torque on antenna systems. The problem is that since there is usually more weight at the driven element end of a long Yagi - more elements and the feeder - the balance point is nearer the rear end. This causes the antenna to be 'forward wind heavy' and aim itself down wind.

Dick's solution is to fit a weather vane metal sheet parallel to the boom at the rear. When correctly sized the antenna will be 'wind neutral'. The plate size can be found experimentally but Dick prefers the more elegant calculated solution and describes how he tackles the problem. He concludes: "I cringe each time I hear someone say, 'well, the antenna was big enough, the wind destroyed it'. The exact wind speed and direction that will cause failure is calculable and correctable. It's silly to allow expensive antennas to destroy themselves."

On an esoteric note, Brian Wells, G0JEZ (HPH), met Christian Viellet, F5IDM, in Switzerland in August following a chance QSO through the Bern 2m repeater. F5IDM is normally in charge of the Observatoire de la Cote d'Azur, 20km north of Grasse, but was then overseeing the installation of a laser telescope in a small observatory at Zimmerwald, near Bern.

The French observatory is one of a very few lunar laser ranging stations sending light pulses onto retro-reflectors left on the Moon during past Apollo and Lunakhod missions. Measurement of the round-trip time of the pulses enables the Earth-Moon distance to be measured to within 2cm as well as determining the degree of 'wobble' of the Moon.

PROPAGATION

THE AUGUST ISSUE of *The Six and Ten Report* includes an analysis of the exceptional 50MHz opening to North America on 7 July. This is illustrated on a grid map of North America showing some of the squares worked from the UK by stations in IO72, 80, 87 and 94 and JO01.

Editor Professor Martin Harrison, G3USF, states: "The extreme example of GM4ILS (Elgin) to Minneapolis passes close to the southern tip of Greenland (lat 61° N). The low incidence of Es in these latitudes may account for the rarity of such an opening. Or could auroral-E have been involved? It would be interesting to know if any aurora was reported in North America."

There are numerous predictions about solar cycle 23. The August *Report* has three histograms of the projected optical flares, M and X flares and proton events, based on cycles 21 and 22, which each suggest a 1999 maximum. For subscription details to the Six and Ten Reporting Club, send an SASE to Dr S J Reed, G0AEV, who is QTHR.

50MHZ

CONTEST NEWS

David Whitaker, BRS25429, contest manager for the UK Six Metre Group, sent the classified results of the 1995 Summer Contest. The Single Operator section was won by Paul Baker, GW6VZW (GWT), whose 167 QSOs scored 501,552 points. Runner-up was G1IOV (163/393,624) with G3HBR (106/225,992) in third spot. There were 20 entries in this UK section. The Multi-op and Portable section attracted six entries and was won by GX1AYM/P (344/1,735,825). The Novice section had three entrants; 2E1AFN/P won it (88/129,150).

The Rest of the World section had six entrants and 5T6E came first (177/525,252). The Rest of Europe category attracted 41 entrants and was won by HV3SJ with a massive 877 QSOs worth 3,425,016pts. IK0OKY (353/

1,021,008) came second and 9H1BT (340/979,104) was third. The European Multi-op and Portable section winner was IA5/OE5D (782/2,665,656); there were seven entrants.

In summary, David writes that some 2,000 different callsigns were extracted from the logs. 88 entries from four continents were received. 55 countries were worked from Europe and 24 grids in the USA were worked. 858 British Isles operators were QRV of whom 202 were UKSMG members. With 16 hours of Es propagation recorded, this was a very successful event.

NEWS

Congratulations to Geoff Brown, GJ4ICD, who has received his 150 countries DXCC sticker. The QSL from FR/DJ3OS was disallowed as the ARRL said he had no landing permit. Ted Collins, G4UPS (DVN), writes that G4IFX (DHM) has commenced attended propagation test transmissions on 50.275MHz using 80W to a 5-over-5 Yagi array beaming south. At present the station is QRV from 1900UTC on Friday to 1900UTC on Sunday. Transmissions commence on the hour starting with '1900Z de G4IFX 1900Z de G4IFX AR'. Reception reports should be sent to Ray Cracknell, G2AHU (QTHR).

The monthly Scandinavian Activity Contest takes place every fourth Tuesday, 1700 - 2100UTC. Exchange full locator and score one point per kilometre. Each new square gives a 500pt bonus. Entries go to Bent Poulsen, OZ1EYN, at Lupinvej 15, DK-3650 Oelstykke, Denmark.

ACTIVITY

From G4UPS's report covering the 11 September to 17 October period, it seems there were only five days when any DX was noted. In the morning of 16 September Ted heard/worked SP4 and 8, YU1 and 7 and 9A and on the 30th EH4AV (IM88). In the extensive tropo lift period 11 - 13 October, he lists QSOs with EH1, 3 and 7, F, I2, 8 and 0, IS0, 9A and 9H with beacons CT0WW, ZB2VHF, S55ZRS and SV1SIX copied.

70MHZ

IAN CORNES, G4OUT (SFD), operated in the Trophy Contest on 24 September making 27 contacts. Best DX were GM4DSP/P (SCD), GM8XVJ/P (LTH) and G4ADV/P (CNL), all over 300km QRB. GJ4ZUK was heard and although at least two GIs were active, none were heard in IO92AT. Gerry Schoof, G1SWH's successes in this event included GM4DHF/P, GM4DSP/P, GM4FVQ/P, GM8XVJ/P, GW3MHW, G3VGG/P, G4PIQ and G8TIC/P.

During a visit to Rome in October, Neil Carr, G0JHC, enjoyed an evening in the company of several UKSMG members and friends. From left: IW0BET, IK0FTA, G0JHC, IK0OKY, IW0CFV, IW0AKP, I0AMU, I0XGR (and their XYLs).

144MHZ

ALEC TRUSLER, G0FIG (SXW), found the band a little disappointing in IO90UU in the October lifts, considering what the east coast operators were working. Best DX on the 8th were OK1FNX/P (JN79), DG8NCO (JO50) and OK1KF (JO60). On the 12th he worked DG1WG (JN49) and LX1DB (JN39) and on the 14th OE9BBH (JN47) was a new country for the 1995 table.

Due to local planning problems Matthew Cabban, G1WPF (HFD), operates from his car parked in the driveway with the antenna 16ft AGL on a mast sticking out of the sunroof. The station is mains powered and runs 250W to a single 9-ele Yagi. The evening of 13 October produced excellent DX, mostly DLs, but including seven OKs, F, ON and OE. He stayed up till 0300 on the 14th but conditions had begun to fade by then.

430MHZ

THE CONTEST

Conditions in the 432MHz - 24GHz Contest weekend on 7/8 October were excellent. G0FIG worked many Fs and DLs. Alec's best DX were DK8VRA/A and DK0BN/P (JN39), DA1ITU, OT5D and DL0WX (JO30), DF0RB (JO51), DG3FK/P (JO40), OK2KKW and OK1OKL (JO60). G1SWH added GJ4ZUK/P for a new one.

G1WPF used his 'car station' running 20W and two 19-ele Yagis. Matthew completed 69 contacts giving him 13 new squares. Best DX included OE5XDL (JN78) and OK2KKW. On the evening of the 8th, after the contest, the east coast stations were heard working lots of DX but it did not penetrate very far inland.

John Quarmby, G3XDY (SFK), confirms this phenomenon by listing 61 continentals in DL, F, OE and OK worked from 2337 on the 7th till the end of the contest.

Mark Turner, G4PCS, is a member of the G4LIP team which operated /P from the Kent coast near Dover (JO01QD). They ran 400W to four 21-ele Yagis. There was a high pressure system to the southeast and the weather was warm and clear with a southerly wind. An inversion was visible through 360°, especially on the 8th. The lift started around 1600UTC on the 7th, peaking at 0700 next morning and lasting beyond the end of the event. Best DX was HG6V (KN07) at 1,390km. Other Hungarians worked were HG7B/P, HG5FMV, HA5BDJ/7, HA6VV/P and HG6Z all in JN97. Other long DX included SP9FG (JN99), OM5CM/P (JN98) and OE3JPC (JN88)

Derek, G8TOK (KNT), only got one new square in the contest, DK0BN/P. GJ4ICD found the band packed from 432.150 to 432.400MHz. Geoff's best DX were OK1KNF (JN69) and OK1OKL with dozens of DLs in JO50/60 worked.

MORE DX

There was more good tropo a few days after the contest. On the 12th, G0FIG contacted OK1VMS/P (JO70) and LX1DB. G1WPF spent a couple of hours in the Cumulative session on the 11th making 24 contacts. F6OKW (JN18) and GJ4ZUK (IN89) were new squares for Matthew. The 13th was the best day, his DX including OE3EFS/3 (JN78), OK1KPA (JN79) and DK0OG (JN68) who was louder on 70cm than on 2m. In the 12/13 period G3XDY lists 10 QSOs with DL, OE and OK stations plus SP6MLK/P (JO80).

A warm welcome to Andrew Hutley, G6SPS (ESX), who runs an IC490E at 10W into half of a 21-ele Yagi! At 2105 on the 13th he worked SP6MLK/P, a QRB of 1,135km.

1.3GHZ

IN THE CONTEST, G3XDY lists 50 QSOs including HG7B/P at 0838 and HG5FMV at 0952 on the 8th. John asks if Hungary has been worked from G before on 23cm? His fine list includes DL, F, HB9, OE and OK contacts. In the opening on 12/13, he lists a further 21 QSOs from 1828 with DL, HB9, OE and OK stations, plus SP6MLK/P.

G4LIP/P ran 400W to 16 x 23-ele Yagis in the contest. The best QSOs were with HA5BDJ/7, HG7B/P, HG5FMV, OK2KDJ/P (JN99) and OE3EFS/3. G8TOK was disappointed with the propagation from the Kent/London border in the contest. Derek spent most of the time listening to the east coast stations rattling off the continentals. GJ4ICD worked OK1OKL/P on the 8th.

G6SPS uses an IC-202S, Microwave Modules transverter and PA running 18W to two 23-ele Yagis. Andrew's best contest DX was HG7B/P (1,366km) who called him. On the 13th he worked DLs and PE,OE5VRL/P, OE3EFS/3 but failed with SP6MLK/P. This column covers the 6m through 23cm bands, OM.

DEADLINES

THAT'S IT for another month. The **February** deadline is 21 December and the March date is **18 January** when I will need your final 1995 table scores. The first appearance of the 1996 Annual Table will be in the May issue.

My telephone answering/fax machine is on 0181 7639457. The CompuServe ID is 70630,603 and the Internet address is 70630.603@compuserve.com. The BT Gold mailbox number is 87:CQQ083. Have a super Christmas and let's all try to have a go in the mini contests in the 26 - 29 December period - see page 82 in the August *RadCom*. ♦

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CF-30H	HF Low Pass Filter 2kW PEP	£69.00
CF-30S	HF Low Pass Filter 150W PEP	£25.00
CF-50S	6M Low Pass Filter 150W PEP	£25.00
CF-BPF2	2M Band Pass Filter 150W PEP	£49.95
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Z4	2m/70CM M. whip w/locking collar	£35.00
B-10	2M/70CM Mobile Whip	£21.50
B-22M	2m/70CM Mobile Whip	£44.95
CHL21J	2M/70CM Mobile Whip	£19.00
CA-258	2m/6m Mobile Whip	£29.00
CA-350dB	6M/10M Base Colinear	£149.00
ABC23	3 x ⅝ Base Colinear	£55.00
GP9N	2M/70CM Base Colinear	£135.00
GP15	6M/2M/70CM Base Colinear	£115.00
GP95	2M/70CM/23CM Base Colinear	£119.00

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AX	FT-902DM	Yaesu	Fair	HF trasceiver valve PA £450
AX	La-120	Ham	V. Good	HF 100w amp £125
AX	FT-102	Yaesu	Fair	HF transceiver PA-3 x 641B's £475
AX	FT-747GX	Yaesu	Good	HF 12v transceiver £499
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AX	IC-725	Icom	V. Good	HF transceiver, boxed £624
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AX	TS-430S	Kenwood	Mint	HF Tx/Rx FM, CW filter £650
AX	FT-890T	Yaesu	Mint	HF transceiver with ATU £1,199
BX	FT-901DE	Yaesu	Good	HF transceiver £449
LX	FT-1010B	Yaesu	Good	HF transceiver £275
LX	FT-7B	Yaesu	Good	HF transceiver £275
LX	FT-101E	Yaesu	Good	HF transceiver 6 band £325
LX	FL-700	Yaesu	As new	HF linear, boxed £1,650
LX	FT-890T	Yaesu	As new	HF transceiver, boxed £1,250
LX	FT-757GX	Yaesu	Good	HF transceiver £575
LX	IC-726	Icom	V. Good	HF + 6m transceiver £665
LX	FT-747	Yaesu	Good	HF transceiver £475
LX	TS-820S	Kenw	Good	HF trans, no WARC bands £400
LX	TS-140S	Kenwood	Good	HF transceiver £595
LX	FT-767GX	Yaesu	V. Good	HF transceiver £1,450
LX	TS-850SAT	Kenwood	Excellent	HF Tx/Rx with internal ATU £1,350
LX	FT-757GX	Yaesu	Good	HF transceiver Gen Cov Rx £575
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PX	AT-50S	Kenwood	Excellent	Auto ATU matching TS-50 £225
PX	IC-728	Icom	Unused	HF 100W Gen Cov Rx £899
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PX	FT-1000	Yaesu	Unused	HF trans + additional Sub Rx £2,595
PX	FT-757GX11	Yaesu	Good	HF Tx/Rx Gen Cov Rx £675
PX	TS-130S	Kenwood	Fair	HF 100W with Ext VFO £395
PX	FTONE	Yaesu	Good	HF transceiver Gen Cov Rx £750
PX	FT-980	Yaesu	Good cond	HF 100W gen Rx/Tx ham s/h £925
PX	HT-180	Tokyo	Good	HF 10W 80mtr mobile SSB/CW s/h £289
RX	IC-720A	Icom	Poor	HF transceiver £350
RX	FT-990	Yaesu	Good	HF Tx/Rx £1,495
RX	IC-768	Icom	Fair	HF transceiver £1,778
RX	FT-7B	Yaesu	Good	Mobile HF transceiver 50W £225
RX	TS-530	Kenwood	Good	HF transceiver £395
RX	FT-1000	Yaesu	Fair	HF transceiver 200W dual Rx £1,950
RX	TS-450SAT	Kenwood	Good	HF transceiver with auto ATU £1,025
RX	30L-1	Collin	good	HF lin amp £425
RX	IC-735	Icom	V. good	HF Tx/Rx £695
RX	FT-101Z	Yaesu		HF transceiver £425
RX	FT-277	Yaesu	Fair	HF transceiver £250
RX	SB-104			Transceiver £225
RX	JST-100	JRC	Good	HF Tx/Rx £595

VHF/UHF TRANSCEIVERS

AX	£DR-90E	Alinco	Fair	Dual band £375
AX	FT-5200	Yaesu	V. Good	Dual band mobile £499
AX	FT-530	Yaesu	V. Good	Dual band hand-held £369
AX	DJ-180	Alinco	Good	2m hand-held £169
AX	C-500	Standard	Good	Dual band hand-held £225
AX	IC-2ZE	Icom	Good	2m hand-held £179
AX	IC-W21ET	Icom	V. Good	Dual band hand-held £299
AX	IC-2GE	Icom	Fair	2m hand-held £165
AX	FT-530	Yaesu	Good	Dual band hand-held £399
AX	FT-470	Yaesu	V. Good	2m/70cm handie + charger + mic £285
AX	C844	Stand	Fair	Hand-held £50
AX	IC-02E	Icom	V. Good	2m hand-held + bits £150
AX	FT-728	Yaesu	V. Good	Transceiver £299
AX	M40FM	HRC	Good	Transceiver £45
AX	TEMPO		Good	2m hand-held £88.99
BX	FT-270RH	Yaesu	Good	2m FM mobile £199
BX	TS-700	Trio	Good	2m all mode base Tx/Rx £289
LX	DJ-580	Alinco	Mint	VHF/UHF h/held + mic, DC, mount £380
LX	TH-21	Kenwood	Fair	2m hand-held £145

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HF F-LAYER PROPAGATION PREDICTIONS FOR DECEMBER 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 000001111122 024680246802	3.5MHz 000001111122 024680246802
* * EUROPE								
MOSCOW	.....1......	.....22.....	....2652....	....5885....	....88882...	32.476677..1	985644457668	++532..24+++
MALTA	....	.....221....	....3554....	....67772...	....88886...	4535766778322	998743347888	+++4....4+++
GIBRALTAR	....	.....1......	....333.....	....16662...	....68887...	232186668311	898764345887	++++3...2+++
ICELAND	....	....	.....21.....	....1144....	.....5884...	....477782..	552.755577753	++++42224+++
** ASIA								
OSAKA	....	....	....	....1......	....5......	....62121...	1..142124233	.........25+2
HONGKONG	....	....	....32......	....54......	....663.....	...144431...	2...111243 54	.........25+4
BANGKOK	.....2......	.....24.....	....471.....	....684.....	...15761....	2...24444..1	3....1125466	.........25+5
SINGAPORE	....121.....	.....242....	....5762....	....6874....	...14667....	2...14454.12	2....1125476	.........25+3
NEW DELHI	....11......	.....221....	....553.....	....676.....	...25662....	42.12344 2.13	731..1125578	5........25++
TEHERAN	....121.....	.....343....	....6662....	...17775....	...45567 1...	542322455124	8841..125678	++.......25++
COLOMBO	....121.....	.....3431...	....5663....	...15776....	...23567 1...	12...2456124	52....125678	3........25++
BAHRAIN	....211.....	....433.....	....6562....	...26675....	1..43467 1...	632311355124	973...125678	+5.......25++
CYPRUS	....2321....	....5553....	....7876....	...28888 2...	22.676786..1	88564446 8456	9973112368 99	++4.....3+++
ADEN	....2211....	....4332....	....5565....	...25567 1...	1..422575...	7.22..257345	952....25788	+4.......25++
** OCEANIA								
SUVA/S	....	....	....	.....1......	.....243....	....14453...	....321251..	.........2...
SUVA/L	....1.....	....21.....	....642.....	....86421...	111.86654 31.	..2364346 52.	....2311142..	.........2...
WELLINGTON/S	....	....	....	.....12.....	....1552....	....5445 1...	....42124....	.........2...
WELLINGTON/L	....	....	....11......	....421..1..	.11.753224 11	..1164346421	...1311141..	.........2...
SYDNEY/S	....1......	....131.....	....364.....	....6762....	...17765....	....154452...	....2112521.	.........23..
SYDNEY/L	....	....	.....2......	.....52..1..	....365314..	....5434 5731	....2111441.	.........2..
PERTH	....121.....	....3431....	....6763....	...16875....	...24667 1...	1...1445 6112	....112566 2	.........254.
HONOLULU	....	....	....	....	....	.....2142..	.11.311252..	..242...2...
** AFRICA								
SEYCHELLES	.....111....	....1332....	....3565....	...145771...	...222575...	5.1...257345	811....25788	+........25++
MAURITIUS	....2211....	....4333....	....6566....	...155782...	21.222576...	741...257455	73.....25789	4........24++
NAIROBI	....2222....	....4444....	....65661...	...155673...	2..322367...	8222...37566	863....14788	+4.......24++
HARARE	....122.....	....2345....	....4567 3...	....55575...	23.332357111	8822...26677	973.....3789	+4.......4++
CAPETOWN	.....133....	....13552...	....35675...	....45577...	31.132346222	8622...14688	873.....1489	+4.........5+
LAGOS	....14441...	....3556 3...	....6667 6...	....75567...	34.153236432	8934 2...3788	8873....1588	5+5.....2++
ASCENSION Is	.....3322...	....15544...	....3766 6...	....56556 1..	243.63234422	898341..1478	8885 1....269	+++2.....3+
DAKAR	.....3332...	.....5554...	....2766 6...	....47557 1..	234.752254 22	789352..2578	8897 2....279	+5+4.....4+
LAS PALMAS	....2321....	.....4542...	....2777 6...	....58888...	133.876674 21	7885754 45777	9998521125 89	++++2....2++
** S. AMERICA								
Sth SHETLAND	.....11....	.....1233...	....24556...	....46666...	133.765432 11	4662532 11123	234321.....1	....
FALKLAND Is	.....21....	.....1243...	....14465...	....36555...	134.664322 11	5783631..123	467531.....1	.442......
R DE JANEIRO	.....1.....	.....2112...	.....5324...	....7444...	124.463222 11	7893631..135	8897 41.....15	+++5.....2
BUENOS AIRES	.....1.....	.....1113...	.....4335...	....26545...	123.664222..	6783641...23	6897 41.....2	3++5......
LIMA	.....111....	.....332....	.....664....	.....7651..	..1...6431..	3361.231...11	5886221.....1	2++5......
BOGOTA	.....11.....	.....232....	.....554....	.....7641..	....116422..	2241543 1..11	7786421.....2	4++5......
** N. AMERICA								
BARBADOS	.....111....	.....332....	....1654....	....37541..	....66322..	3361443...122	88864 2....15	++55.....2
JAMAICA	.....1.....	.....131....	.....364....	.....5751..	.....6532..	113.4342...11	6675421.....2	5++5......
BERMUDA	.....1.....	.....31.....	.....364....	.....5751..	....26543..	1.2.2442 1231	7674421....25	++++2.....3
NEW YORK	.....1.....	.....21.....	....153.....	.....2751..	.....5653..	..1.1244332.	6572421 1...24	++++2.....2
MEXICO	.....1.....	.....21.....	.....53.....	.....75....	.....1741...	..1.2234 1...	3572421 2....	.++52.....
MONTREAL	.....1.....	.....21.....	.....43.....	.....2751..	.....5763..	....1244333.	6562421 21124	++++2.....3
DENVER	.....1.....	.....1......	.....2......	.....14....	.....462..	....1..5421.	355.41121..1	2++52.....
LOS ANGELES	.....1.....	.....1......	.....1......	.....4....	.....162..	....1.4421.	255.32121...	.4+52.....
VANCOUVER	.....1.....	.....1......	.....1......	.....1....	.....31..	.....1641.	353.311232 11	.4+52.....
FAIRBANKS	.....1.....	.....1......	.....1......	.....1....	.....1....	....21132..	341.321254 32	.344....22..

The provisional mean sunspot number for October 1995 issued by the Sunspot Data Centre, Brussels was 21.7. The maximum daily sunspot number was 58 on 13 October and the minimum was 0 on 1, 2, 3, 4, 5, October. The predicted smoothed sunspot numbers for December, January and February, are respectively: (classical method) 13, 12, 11 (±3); (SIDC adjusted values) 11, 10, 9 (±2). September 95 SESC: Smoothed solar flux 72.1 Ap13. Smoothed March solar flux 79.9 Ap 13.5.

QSL

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

AFTER CW, my second love is the QSL Bureau and the people who make it tick. So in writing about it, I hope there are some who see this column as a light and readable diversion. Others find it an island in a sea of otherwise totally incomprehensible technology! I must confess I learnt what little theory I know in an age when there were valves (yes - they did call them that). When soldering irons glowed in the dark, and soldered joints were big enough to qualify for IOTA. I guess I must have been out somewhere when microchip technology hit the streets. The only thing I know about a microwave is that it is invaluable for heating up a mug of coffee gone cold while trying to work G3SXW on one of his DX 'jollies'. With that in mind I trust the scribblings I produce are not always regarded quite as seriously as other parts of *RadCom* are intended to be.

VINTAGE QSLS

ROBIN ADDIE, G8LT, who has been an RSGB member for 58 years, wrote in about the W4DLH card featured recently. Robin tells me he worked the call on 15 February 1937 but no longer has the QSL card. Robin suffered ill health on reaching retirement and gave all his pre-war QSL cards away, a decision he now bitterly regrets as there were some real rarities among them. Like the one from VK4KC which was the first contact between the United Kingdom and Papua New Guinea (it came under VK in those early days). In addition, lots of XU8 and J calls. Robin used a home-made Tx / Rx. The former was a type 59 tritet CO with home ground crystals. The PA was a type 46 feeding two half-wave dipoles in line and in phase. No coax feeders - a bit of lamp flex did the job! It must have done because, using that gear, Robin worked all continents in 15 minutes flat. Robin says despite having spent all his working life in the electronics industry he is terrified by the 'black box'. If it goes wrong he has to let someone else do what he used to do himself. Amen to that.

RSGB QSL Bureau, P O Box 1773, Potters Bar, Herts EN6 3EP, England.

SUB MANAGERS

PETER CHADWICK, G3RZP, tells me that one of the worst things a QSL Sub Manager has to do is throw away cards from rare call areas. Invariably, this has to be done because no envelopes for the destination call are lodged with the Sub Manager. Peter currently has cards from such exotic locations as ZK2 (Niue), VU7 (Andaman Islands), and KH5K (Kingman Reef) just waiting to be picked up by a well-known G4B— call who hasn't bothered to replenish his envelope supply. Sadly, if none materialise the cards will contribute to Peter's compost heap.

Peter also says that the GB call situation is a bit silly. He has hundreds of cards for multiple contacts with GB stations. These not only take time to sort, but a good 50% are not even collected. Not in the gold medal class for his diplomatic approach to problem solving, Peter says it would be more productive if such GB stations wrote out cards for all the QSOs they made then tore up half of them before despatching them!

Had a query from a 3 series call the other week to the effect that he hadn't had any cards via the Bureau for two or three years despite, he said, being active on HF and VHF and having envelopes lodged with his Sub Manager. So I gave the relevant Sub Manager a ring to see what was up. Fortunately he kept meticulous records of his transactions and was able to tell me that the customer had sent in five envelopes in February 1987! He (the Sub Manager) had despatched envelopes containing cards to the customer in September 1987, October 1989 and February 1990. He had two envelopes left (presumably bearing penny black stamps!) Whilst there were a few cards for the punter, they had not yet reached the required postal weight for despatch. I suppose 'active' is relative but to only use three envelopes in eight years doesn't seem to indicate frenetic band activity to me!

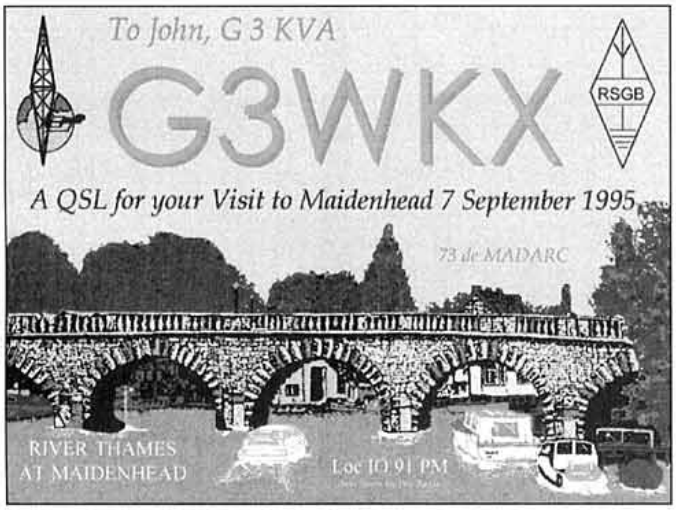
SPECIAL QSLS

DAVID HORTON, G3RZF, uses a QSL card (pictured above) with some interesting details about William Herschel who, although born in Hanover, moved to England and settled in Slough in 1786. Herschel discovered the planet Uranus and was honoured by King George III for that achievement. In so doing, Herschel doubled the size of the known solar system.

OVERSEAS BUREAUX

WE HAVE HAD A letter from the Secretary of the Bulgarian Federation of Radio Amateurs, Zdravxa, LZ1ZQ, who says the parcels of QSL cards for the former Yugoslavia have arrived safely. You will remember the BFRA kindly offered to route them for us because of the difficulties out there in YU-land [see *QSL* in September *RadCom* - Ed]. The RSGB is most grateful to the Bulgarian society for their assistance.

Dirk J de Jong, VP2VF, tells us that the British Virgin Islands QSL Bureau will handle cards for VP2V stations only. Those for VP2E (Anguilla) and VP2M (Montserrat) cannot be handled by the VP2V Bureau.



Hand-coloured QSL card presented to John Hall, G3KVA, by the Maidenhead and District Amateur Radio Club on the occasion of his visit to the club.

David Horton's, G3RZF, QSL card bearing details of William Herschel who moved to Slough in 1786.

QSL BUREAU NEWS

I WENT TO the Maidenhead and District Amateur Radio Club in September to give a talk on the QSL Bureau and its history. Nice people - nice club. At the end of the talk they very kindly presented me with a unique, hand-coloured, QSL card, bearing the Club callsign, to commemorate the event. It is reproduced below. It was done by one of the club member's sons and is mounted ready for framing.

Paul Guilbert, G0DXX (nice call!) tells me that he finds the Bureau much quicker these days. He says that he returned to DX chasing in November after an absence in the 'packet wilderness'. He worked eight new countries for his DXCC and has already had six confirmed via the Bureau. Paul says it's amazing how many more people QSL when they are chasing a rarer call. He worked as GU0DXXand maintained a separate log book. Nearly every single contact he made has been confirmed. Fancy that!

Duncan Peters, VP8CEH / G0NWY, is not a happy ham. His VP8 call is being pirated and we are shipping the cards to him along with the genuine ones. He asks what we can do about it? 'Not a lot' is the answer. Pirates are the sort of people who cheat at solitaire but we at the Bureau have no way of knowing which cards are for genuine contacts. If we get the duff cards back from him all we do is stamp them 'pirated call' and return them to the sender. At least that breaks the loop.

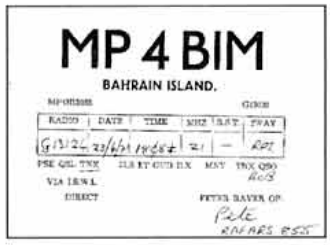
Owen Kemp, G4TLK, wrote about a QSL card he sent to PA0HWL in November 1988. Owen got it back the other day, via the Bureau, and stamped 'not interested'. Seven years seems a long time for one to make up one's mind!

May I thank the girls in the Bureau and all the hard working QSL Sub Managers for their efforts over the year. The letters I get from members indicate that the service is performing well. I therefore wish everyone who contributes to that service, customers and workers alike, a very happy Christmas and a peaceful New Year. ♦

SWL NEWS

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

The impressive SWL shack of Pete Rayer, ex MP4BIM, in Bournemouth, Dorset. Pete is now an ISWL Council Member and member of various other organisations. Looking through my QSL card collection, I found a QSL card (right) from Pete, MP4BIM, on Bahrain Island for an SWL report on his 21MHz signals in 1971! (in the days when I was a member of the ISWL).


MP 4 BIM
BAHRAIN ISLAND.

NOW THAT winter is upon us, the time is right to whet the SWL appetite for DXing on the LF Bands. With the shorter days and the state of the solar cycle, conditions on 40, 80 and 160 metres should be well worth losing a few hours sleep for if you are interested in adding countries to your All Time List.

For those new to LF listening, all three bands can, and do, provide mouth-watering DX. Looking at 7MHz SSB first, at Christmas-time, the band can be open for DX from 1400UTC in the afternoon through to 1000UTC the next morning. Stations in the East can be heard from 1400. Countries such as UA9, JA, YB, DU, etc can be heard then. Stations from VK and ZL, Africa and the East follow. Last season I heard my first VE7 Long Path on 7MHz at around 1615. If conditions are favourable, stations from the West - VE, PY and the Caribbean - can be heard as early as 1930. It is during evening hours where almost anything is possible, with Heard All Continents possible in a very short space of time available to dedicated SWLs who have a decent antenna for the band (something like a half wave sloping dipole) and run the receiver with the Pre-Amplifier in the 'Off' position (to reduce the noise level and increase the readability of some weaker signals). Worthwhile frequencies to monitor can be between 7.040 to 7.045 and 7.085, but as 7MHz is such a narrow band, the DX can appear almost anywhere. Another point to remember is that Ws can only operate SSB above 7.150.

3.5MHz has long been my favourite band. DXing is something of a challenge here because often the 'whistles and QRM' from the Europeans has to be heard to be believed. Beneath the bedlam, you will find some good DX. Again, the band is at its best at 'Grey Line', the period 45 minutes before and after sunrise and sunset when the best DX will be heard. In the mornings that will be VK, ZL, the mid West and West Coast of W, South America and, if conditions are particularly favourable, JA and the Pacific Islands. In the evenings, West Coast Long Path is, probably, the best DX at our sunset (with the best time the last few days of the year, through till about 6 January). Other DX can be heard from the Far East and Japan and VK and ZL. Again, listen during evening hours when various DX contacts will be heard. Best frequencies to listen on are 3.775 - 3.799 (the 'DX portion' of the band). VKs cannot operate below 3.794, while JAs can stray a little way above 3.800 - legally.

Moving to 1.8MHz, this is where you need real dedication and a TV that does not give you 5 x 9 timebase all over the band! The band is becoming ever more popular for DXing although the main DX mode is CW. However, DX does appear on SSB. You need a bit of luck and good conditions to 'bag a new one'. The main time for DX is after 2000UTC and up to and just after sunrise. Some of the most interesting stations, however, can be found after midnight. 9K2MU is often on the band and SU2MT has promised an appearance this winter. I managed 10 new ones on 1.8MHz last winter, mainly from the Caribbean, but also TU and VK - the 9K2 was bagged the year before! The frequencies to listen for SSB DX are between 1.840 and 1.845MHz.

I hope the above details have increased your knowledge of where to listen on LF and at what times. If you are trying LF seriously for the first time, or if you are an avid LF DXer, let me know how you fare. You will need a modicum of luck because the DX game (if you haven't got access to a DX Cluster) is all about being in the right place at the right time!

WHITE ROSE CLUB LF CONTEST RULES

FOR THOSE WHO have entered the White Rose LF Bands Contest in the past, it is important to read the very changed rules. The old multiplier scoring system has been abandoned. Instead, there is a system of bonus points. *Please read the rules carefully.*

1 From 1200UTC 13 January 1996 to 1200UTC 14 January 1996.
2 Open to *all* SWLs throughout the world. Both Phone and CW sections.
3 *Only* the 1.8, 3.5 and 7MHz bands can be used.
4 Object is to log a maximum of five stations on each band from as many countries as possible. Scores shall be compiled as follows:
a) 3.5 and 7MHz - Countries outside your own continent score 5 points for each station heard plus a bonus of 10 points for each new country.
b) 1.8MHz - Countries outside your own continent score 10 points for each station plus a bonus of 20 points for each new country. All other countries score 5 points for each station heard plus a bonus of 20 points for each new country.
5 The call areas of Canada, Japan, Australia and New Zealand will all count as separate countries, ie - VO1, VO2, VY1, VY2, VE1-9, JA1-0, VK1-8, ZL1-4. All other countries will be determined by the ARRL Countries List.
6 No CQ, QRZ or similar call will be allowed to count for points. /AM and /MM stations do not count for points.
7 Logs should show: Date, Time (UTC), Station Heard, Station being Worked, RS(T) at SWL's QTH. If both sides of a QSO are heard they may be claimed both for points, but both must be shown in the 'station heard' column. A seperate log is required for each band. A separate sheet listing all countries heard should also be included.
8 Entries should be sent to the Contest Manager, Mr D Whitaker, c/o WRARS, 57 Green Lane, Harrogate, North Yorkshire HG2 9LP. Entries *must* be postmarked no later than 13th February 1996.
9 A suitably engraved plaque will be presented to the overall winner. Certificates of Merit will be awarded at the discretion of the White Rose Amateur Radio Society and its decision will be final.
10 Please send a large SAE with suitable return postage if you want a copy of the results.

DX NEWS

SEVERAL REGULARS reported some interesting findings in the wake of the long, hot summer. The most worthy being these - GX0FDX transmitting from the 'Lost Village of Mardale' which is normally at the bottom of Hawes Water in the Lake District. Several special Swedish stations were heard, namely SI3GM, SI4GM and SI7GM, commemorating the first radio experiments in Sweden. VI50PEACE was reported. G3UXO/MM was heard from the liner QE2. Four listeners mentioned the Scandinavian Activity Contest, and Bill McConachie, BRS 88921, sent a copy of the log he had submitted. A few more mentioned logging M1OOG for a new prefix (who remembers when San Marino used this prefix?).

Several listeners referred to propagation conditions. September was a poor month with 21MHz disappointing and 24 and 28MHz just about devoid of stations. Conditions on LF improved, with Ws audible late evening and VK/ZL signals improving at sunrise. Since I penned the last column, a few major DXpeditions have taken place. This was unfortunate because several, including Robert Small, BRS8841, and myself were bemoaning the fact that they were not bagged on more bands. Both of us found XR0Y very elusive although the *RSGB DX News Sheet* mentioned them making 32,000 QSOs! Robert only heard them on 14 and 18MHz. I missed them on 18MHz! The other 'gotaway' was CY0TP operating from Sable Island. He was often heard on 7MHz SSB for a new one, but again was elusive on 18MHz! Other 'majors' in the period were TY8G (even reported on 24MHz!), OH2BU/MVI, CE0Z and 9M8PR. YS1ZV (via KB5IPQ) featured in several 18MHz logs. So many mention IOTA that I must mention EG9A, N7QXQ/HR7, IA5/IK2MRZ, OH1EH/OH0 and R9KWK.

FINALE

NEWS FOR THE **February 1996** column *must* be received no later than **13 December 1995**. Christmas Greetings to all readers, especially those who have provided news for the column during the past 12 months. ♦

NOVICE NEWS

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

FEWER CANDIDATES than ever before sat the June NRAE. The City and Guilds report was based on the papers of 131 candidates though the total number is a little higher. The papers from two centres are not included as they were not returned before the report was prepared.

For the most part, questions on receivers and receiving techniques were well answered. One question asked on which band lower sideband SSB would be used and then presumably, gave four ranges with a quarter answering 3.565 - 3.585 MHz. This section is not, of course, allocated for telephony working. With a licence schedule attached to the question paper, the answer could have been easily checked.

Components, applications and units gave no problems with the exception of a question on the construction of a dummy load where a quarter of the candidates chose to use a wirewound resistor instead of a carbon one. The type of feeder most suitable for a direct connection to a half wave dipole caused some difficulty in the next section as the dipole was not recognised as a balanced antenna for which the 75Ω twin feeder would be used.

Most questions in the transmitters and transmitting techniques section were well answered although two of them received a comment. There seems to be some confusion between a BFO and a VFO for use in a 3.560 - 3.585MHz transmitter. Also there was confusion over whether a high pass or a low pass filter should be connected in the aerial lead of a TV set.

Questions on abbreviations and the phonetic alphabet were well answered in the operating techniques section but almost a third wrongly thought it was unnecessary to enter the transmitter power in the log.

Station layout and construction questions were also well answered as were the safety questions although a disturbing 10% of candidates thought that the mains fuse was connected to the Green/Yellow wire and 6% to the Blue wire. As all students are required to wire a mains plug during their Novice course to the satisfaction of their Instructor, I can only assume that exam nerves were to blame!

The report states: "The overall performance of candidates was much higher than average, indicating that they were very well prepared for the examination."

Of the 131 candidates 109 were successful, giving the second highest percentage pass (83.2%) the highest being 83.3% in June last year.

Interestingly, the number of candidates taking the September exam has been consistently lower. No doubt holiday arrangements of both students and instructors affect the course leading up to this exam, but possibly examination centres too are busy getting into their new programme.

If any candidates do fail the exam and wish to retake it, there is not a great deal of time to make the decision before the enrolment date for the next exam. If it lies within your power, please ensure that the exam papers are returned to City and Guilds promptly.

A MEMORY AID

ONCE AGAIN, THE City and Guilds report reveals that some students lose marks answering the question on wiring a mains plug. Perhaps we can eradicate even the 10% who answer wrongly with an idea which came from Tony Lifton, G0PEH.

He drew a rectangle and marked it LEFT, RIGHT and EARTH. Then he wrote in the colours, highlighting the second letter. bLue goes to the Left, bRown goes to the Right and yEllow/green goes to the Earth (centre pin).

DF KIT TRIAL

JOHN BADGER, G4YZO, has - in conjunction with Ernie Bailey, G4LUE - added a direction finder (phase detector) to his range of kits. I was given one to assess how easy it was to assemble. I was asked to view the kit and instructions from the point of view of a, possibly young, Novice who was newly licensed and working without the guiding hand of a seasoned amateur.

The instruction sheet is excellent. To the more experienced constructor it could seem that there is too much help, but I would disagree, having run Novice classes where the students had no previous knowledge of construction, reading circuit diagrams or with components.

Besides a large, clear circuit diagram, there is an equally large clear drawing of the printed circuit board - four times the size of the PCB itself.

Components are clearly listed and described. The tools needed are also listed but are quite basic and there are hints to enable the constructor to make a neat, professional job of it. If the suggested order of building is followed, the board should be finished in an hour. Allow a little longer to check soldering and to ensure that your piece of equipment is as neat as you can make it.

There is also a description of how the direction finder works and how to use it. As the range covered is between 50 and 450MHz, a small group of youngsters could have a great deal of fun provided there was a licensed operator playing 'fox' to the DF user's 'hound'.

For more details write to: Badger Boards, 80 Clarence Road, Erdington, Birmingham B23 6AR. The cost of the kit is £17.50

CONTESTING

SCOUTS FROM THE Stourport and District Scout Amateur Radio Group took part in the six metre trophy contest in June, operating G0SSR/P. Kidderminster and District ARC loaned the equipment and also helped to set up and dismantle the station, but all the operating, logging and check logging was done by the Scouts.

Although not among the highest scoring teams, it was good experience for youngsters new to contesting and could lead to greater involvement in the future.

Many thanks to Geoff Dellbridge, G0PMF, for sending the information and photograph.

NEVER TOO LATE

I HAVE RECEIVED two interesting accounts in response to my request for stories of how Novices became involved in amateur radio.

Some 50 years ago, Peter Godfrey, 2E0ALQ, was serving as a Radio Officer in the Merchant Navy and he still remembers some of the callsigns he heard.

Radio Officers had other duties, too some being trained as wireless operator gunners and pilots of Swordfish aircraft (attached to the Fleet Air Arm). There were RAF pilots and crews on board the catapult armed merchant ships and they had different radio procedures from other ships - which must have caused some confusion on changing ship.

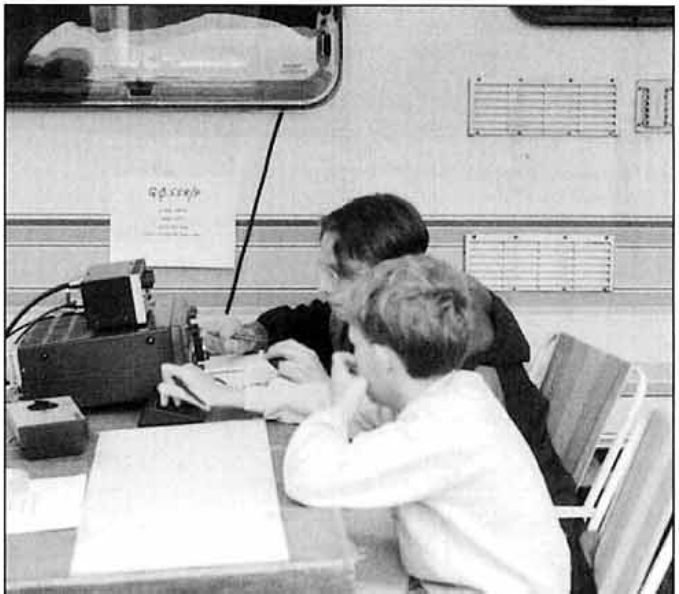
In his early '70s, Peter enrolled on a Novice course with Instructor David Berry, G4DDW, and pays tribute to David's teaching skills. He also expresses his gratitude to the members of Rugby ARS for their help.

Another mature radio amateur is Harold Jeffrey, G0VJZ. His father (now silent key) was licensed as G3JIB and was involved in Jamboree on the Air. As Harold was Group Scout Leader of the local Church group, he also became involved but during his working life, due to irregular working times and places, could not study for his own licence.

On retirement, Harold's wife suggested that he should take up radio as a hobby now that he had time. A Novice course was suggested and he went on to become 2E1APV.

Eager for more, Harold joined the Manchester and District ARS and joined the RAEcourse taught by Barrie Langfield , G3IOA. Following success in the May '93 exam, he became G7REN.

Last November Harold reached his final goal, gaining the callsign G0VJZ. ♦



Scouts from the Stourport and District Scout Amateur Radio Group operate G0SSR/P during a six metre trophy contest in June.

Contest Exchange

ANDY COOK, G4PIQ
Fishers Farm, Colchester Road, Tendring, Essex, CO16 9AA.
G4PIQ @ GB7MXM.#36.GBR.EU

THE TEAM selection process for the World Radiosport Team Championship in San Francisco on 13/14 July has now been announced. There will be a total of 52 teams competing in this event selected from more than 27 countries. The number of teams allocated to a country was based on the number of entries to the major international events in the past two years, and the UK has been allocated one team. Most countries have one or two teams - only Japan (4) and the USA (10) have more. There are also six wild-card teams for people either not resident in one of the invited countries, or who were not selected to represent their country. Teams consist of two people, and in the UK the RSGB HF Contests Committee has the responsibility of choosing the team leader. The leader can then select a partner from the UK.

Dave Lawley, G4BUO, is coordinating the selection process, so if you feel that you are suitably qualified to represent the UK then contact Dave on 01892 870400. Those interested should act quickly as the RSGB has to notify the WRTC committee of the team leader by **15 December** and of the partner by 15 January or the UK will lose its invited country status.

To quote from the WRTC-96 committee's press release: "We're looking for team members who have won major contests at the world, continent, country or zone level. They will be up against many of the best contesters in the world and should be capable of competing on both CW and SSB at that level."

If selected, you will have to make your own travel arrangements. Once in San Francisco, the WRTC-96 committee will provide housing, meals, local transportation and access to station locations. For more details about wild-card teams, contact Dave.

Next year's championship marks the follow-up to the first WRTC which took place in Seattle, USA in July 1990. It involved two-man teams from around the world, operating under contest conditions with identical rigs and similar antennas. The UK team of G4BUO and G3YDV achieved a creditable seventh place out of 22. An account of the first WRTC was published in the March 1991 edition of *RadCom*.

LOGS ON DISK

THERE HAS BEEN a lot of emphasis in the last couple of years, both in this column and in other communications from the contests committees, on submitting logs on computer disk. Unfortunately, it seems that some people have misinterpreted this and are worried they won't be able to enter contests unless they can submit logs in the correct electronic format. This is very definitely *not* the case. What we are trying to do is to encourage those people who do produce their logs on an IBM compatible PC to submit them in electronic form, because it is simpler for both us and for you. However, we are equally happy to receive ordinary, traditional paper logs if that's all you can do, or even, if you use a computer with some incompatible platform like a Commodore C-64. Nonetheless, I make no apologies for continuing to encourage more people to try computer logging. This is simply because I've found that for most of those who try it there is absolutely no desire to go back to paper logging.

Don't forget that you don't have to go through all the stress of trying to use a computer 'live' during the contest the first time if you don't want to. A good way to learn to use some of this software is to use it in post-contest mode, so after the heat of the event is over you can translate your paper and pencil scribblings onto the computer and find out how to drive the software like that. After a while you will hopefully feel confident enough to have a go actually during an event.

USING LOW POWER PCs

A little while back, Harry Wignall, GM0TFO, wrote and asked me if there was any logging package available which would run on an old relatively low power PC - in particular what would run on an Amstrad 1640 with only 5.25 inch 360k floppy drives. It's all very well for those of us who seem to spend far too much of our lives sitting in front of a computer and who therefore make sure that we have a reasonably quick machine, to assume that everyone else is using at least a 386 or better but this often isn't the case.

The latest versions of the most sophisticated packages such as CT by K1EA and LOG by N6TR do need at least a 386 to run on, but happily this is not the case for some of the other pieces of software. In particular, talking to Paul O-Kane, EI5DI, I'm told that his Super Duper software will run on a computer without a hard disk and it is possible to trim the file set down so it can all fit on a 360k floppy. The only slight problem is that Paul can only supply the software on 3.5 inch floppies so you would need to find someone with a computer with both formats of drive to move the files across for you. LOG by G3WGV will also run on a computer without a hard disk, but John recommends a hard disk for optimal performance and the files would need to be fairly carefully trimmed down to run on a 360k floppy.

SUPER DUPER UPDATED

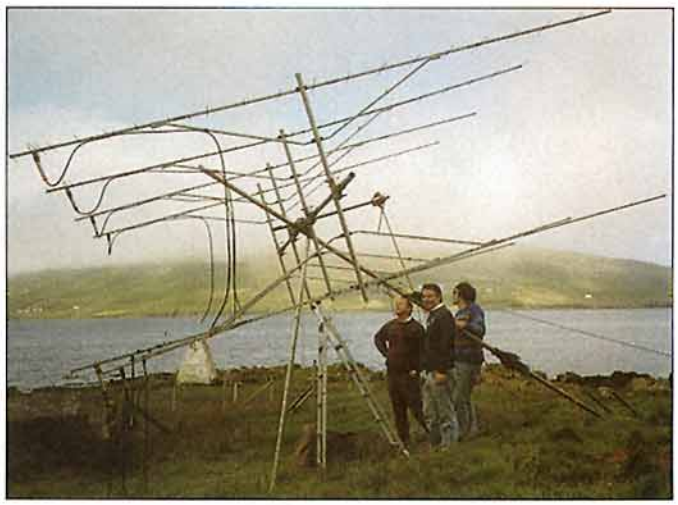
It is now a little over a year since I took a close look at what the various software packages are offering the contester. Since then, most have just had the odd feature added and the odd bug removed (and sometimes the odd one put in as well!). However, EI5DI's Super Duper has undergone a significant amount of development, and as I write the latest release sits at V8.02.

When I last looked at Super Duper a year ago, I thought that it had a nice user interface, but it was somewhat different from the 'standard' of CT/NA/LOG. Paul has done a lot to bring some of this into line with the spacebar and TAB keys behaving in conventional ways and the option to use the function keys for CW keying. All the work that's involved after the contest (tidying up the things you couldn't quite get your fingers quick enough to sort out during the event) have been simplified. Previously, post-contest editing required you to dive into the log file with a DOS text editor; always a recipe for managing to break the carefully controlled format of the file. This is now simplified with a post contest editor within the package which tries to stop you doing anything too stupid. In the post contest area, various facilities have been added to generate multiplier checklists, dupe sheets and so on. The VHF variant now has display of bearing and distance calculated from the locator - this is a great boon with sharp antennas.

Perhaps the biggest change, however, is in the means of distribution. Paul has released V7.08 as 'shareware' which means that you are welcome to take as long as you wish to evaluate the software. However, as soon as you find it useful - ie, you use it to generate the logs for a contest which you enter - you have to pay the registration fee. This shareware means of distribution is very widely used in the software industry and it won't be long until the software is available from the various amateur radio shareware suppliers. The software was originally launched as a disk with the November 1995 issue of *Ham Radio Today* and is also available by FTP on the Internet.

Super Duper now has a great deal to recommend itself to the UK contester. The interface is straightforward, it provides all the important basic features, and it supports all the UK contests well. There are still further functions which I would like to see implemented, but it now stacks up favourably against the competition. CT and N6TR's LOG undoubtedly sit in a different league in terms of their functionality, but they do not support UK contests in the same efficient way. ♦

TURN TO PAGE 81 FOR CONTEST RESULTS



Three contesters, (from left) David Johnson, G4DHF; Richard Gardner, G4WKN; and Keith Tatnall, G4ODA, set about the task of raising a 70cm EME system of 8 x 21 elements during an expedition to OY.

IARU

JOHN ALLAWAY, G3FKM
and
TIM HUGHES, G3GVV

STRAIGHT AFTER the Region 2 Conference - fully reported this month by G3GVV and G3ZNU, starting on page 10 - there was the usual meeting of the IARU Administrative Council. PA0LOU, ZS5AKV, and G3FKM represented Region 1. Also present were W1RU (president), VK3KI (vice-president), W4RA (secretary), VE3CDM, HK3DEU, and LU2AH (from Region 2), and ZL2AMJ, JA1KAB, and 9M2SS (from Region 3). K1ZZ was the minute taker.

As usual, the meeting covered a wide range of subjects and a news release was issued. A detailed Summary Record will be sent to all societies later.

- The ITU meetings at which IARU representation will be required were listed and the representatives decided.
- The Council agreed on instructions to be given to the IARU delegation to WRC-95 (which will be over by the time this appears in print).
- The budget for 1996-1998 was adopted (this includes a provision for the three regional organisations to share some of the cost incurred by the International Secretariat - at present the ARRL - beyond its 'constitutional obligation'). The contribution made by the American Radio Relay League in support of amateur radio is vast and is rarely recognised.
- A report was received from the 7MHz Strategy Committee and an action plan adopted to keep Member Societies fully informed and seek their help to persuade their administrations to support the IARU position. (This item refers to the hoped for extension to the 7MHz band).
- The International Secretariat has prepared a 'Strategic Plan for the Development of Amateur Radio' and all societies will be sent a copy of this by 31 October 1995.
- An *ad hoc* Communications Planning Committee was created which will support the Strategic Plan and publicise IARU activities to *all* amateurs.
- The terms of reference of the IARU Satellite Adviser were modified to make it possible for him to appoint assistants, and the terms of reference of the IARU Satellite Frequency Co-ordinator were deleted.
- In the field of EMC a new post of 'EMC Adviser' was created and Chris Verholt, OZ8CY, was appointed. Chris is, of course, well known in Region 1 as the Chairman of the IARU Region 1 EMC Working Group.
- The AC urged the regions to take steps to monitor the VHF/UHF/SHF bands and to take appropriate monitoring steps.
- A further *ad hoc* Committee was formed - this time to consider 'Roaming Licence Qualifications'. The ultimate objective of this body is to form a consensus of the three regional organisations regarding the technical and operating qualifications appropriate for the amateur services. We have already mentioned success within Region 2 with the Amateur Radio Permit, available to all states which are a member of the OAS (Organisation of American States) and at the time of the meeting Uruguay, the USA, and Canada had signed the agreement.
- Themes for World Amateur Radio Day were adopted. In 1996 the theme will be 'Amateur Radio - A National Resource' and in 1997 '35 Years of Amateur Radio In Space'.
- The very interesting question of the relationship between Internet and amateur radio was discussed and the Secretary (W4RA) was asked to keep the AC updated in all matters relating to it.
- Last, but not least, the 1996 World Radiosport Team Championship (which will take place at the same time as the IARU HF Championship) was endorsed. This is an event which is actually an HF contest and not as it may appear to some to be a direction finding event.

Sangat Singh, 9M2SS, a member of the IARU Region 3 Board of Directors, seen here during a visit to RSGB Headquarters. From left: Peter Kirby, G0TWW; John Allaway, G3FKM; 9M2SS and Tim Hughes, G3GVV.

SLOVAKIAN ARDF

THE TENTH IARU European ARDF Championships took place in Slovakia between 12 and 17 September. They were held near Bratislava and the organising society was the Slovak Amateur Radio Association (SARA). The organisation was excellent and 19 societies took part - including FRRM (Moldova) which is not yet a member of IARU. The 15th Plenary Meeting of the IARU Region 1 ARDF Working Group took place during the event and it will be proposed that the 1996 Region 1 Conference consider a new category of 'veterans' who are over 55 years of age!

Agnes Tobbe-Klaase Bos, PA3ADR, president of VERON, the national society of the Netherlands, wearing the chain of office which was a gift from the RSGB.

A GLOBAL VIEW

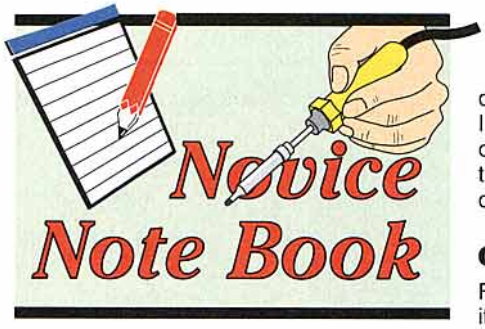
DAVE SUMNER, K1ZZ, has supplied some very interesting statistics on the amateur population in a number of countries. Japan has 1,325,527 amateurs, the USA has 679,504, Germany 74,625, the UK 63,033, Indonesia 60,000, Spain 47,233, Canada 44,000, Russia 38,000, Italy 30,000, Brazil 26,955, and Argentina 24,450. It came as a surprise that the UK has the fourth largest amateur population in the world.

VISIT BY 9M2SS

SANGAT SINGH, 9M2SS, is a well known figure in Region 3, having represented the Malaysian Amateur Transmitter's Society (MARTS) at conferences in Auckland, Seoul, Bandoeng, and Singapore. At the 1994 Conference he was elected a member of the IARU Region 3 Board of Directors; in that capacity he attended the recent Region 2 Conference at Niagara Falls. We recently met him again when he was in London. During his stay he visited RSGB Headquarters in Potters Bar, Herts. General Manager Peter Kirby, G0TWW, arranged a comprehensive tour of HQ, followed by a discussion on the work of our Society. 9M2SS gave a detailed account of the progress which is being made in Malaysia in introducing young people to amateur radio.

VERON IS 50

VERON, THE AMATEUR radio society of the Netherlands, has recently celebrated its 50th Anniversary, coinciding with its annual Day for the Amateur. The RSGB was represented by President Clive Trotman, GW4YKL, and by G3GVV (IARU liaison officer) while G3FKM attended as Secretary of IARU Region 1. We wish VERON well for its continuing success in the future. ♦



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

A BATTERY DISCHARGER / CHARGER

A BATTERY DISCHARGER! No, you did not misread this, this month's column is all about a battery discharger! A circuit that discharges batteries does seem a little strange. The reason for using one is that the best way to keep your nicads in top condition is to discharge them prior to recharging.

Unfortunately it is not good enough to leave the set switched on until all signs of life have been extinguished as this can cause further problems within the cells. The ideal is to discharge them to about 1.1 volts per cell and then recharge.

It would be fairly simple to design a circuit, using operational amplifiers, to discharge to 1.1 volts per cell accurately, but that degree of accuracy is not required. Our simple little circuit uses all passive components and uses the battery under discharge as the power supply.

The circuit works because a relay will 'pull in' at a design voltage but will remain energised as the voltage is decreased to a level considerably lower. A typical small 5 volt relay will remain energised to about 1.5 volts and then 'drop out'. All relays are different and it is necessary to check the drop out voltage and design the circuit to suit, but that is a simple enough thing to do.

I wanted to maintain the 6 volt batteries in a couple of TH42 handhelds in good condition. The batteries comprise five nicad cells in series. I wanted an indicator to show when the cells were discharging as well as indication when charging. As the current is flowing out of the cells on discharge and into the cells on charging a two wire dual colour LED could be used to indicate the direction of flow. These LEDs will glow red with the current flowing one way, but green if flowing the other way. They develop about 2 volts across their terminals when operating but will 'fuse' or have a short life if more than 50mA is allowed to flow through them. To overcome this problem we can pass the current through three diodes and these will develop the required 2 volts. This is because when a current flows through a silicon diode junction 0.6 volts (approx) is developed across the junction, this remains fairly constant whatever the magnitude of the current, see **Fig 1**. The voltage produced by three junctions can be used to power the LED. A further three diodes in the opposite direction are required to cater for the reverse direction of current flow.

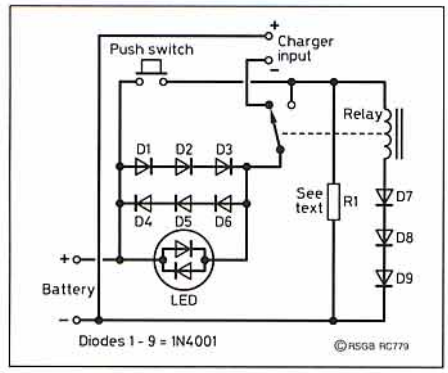


Fig 2: Circuit diagram of battery charger

The discharged battery containing five cells should be discharged to about 5.5 volts. If a relay with a drop out voltage of 1.5 volts is used, there will be an additional 2 volts across the three diodes so an additional 2 volt drop is required to satisfy the discharge requirements; this is accomplished by another three diodes in series with the relay coil. Resistor R1 is included to increase the discharge rate. In my unit I use a 25Ω 1 watt resistor which discharges the cell at about 200mA. It is a simple matter of using a calculator andOhm's law to work out a suitable value of resistance for different batteries.

OPERATION

THE OPERATION of the circuit, see **Fig 2**, is relatively simple. When a battery is inserted into the unit nothing will happen unless a charger unit is connected to the charger input socket.

In this case the LED will light green showing that charging is taking place. If we need to discharge the battery first, the push switch is pressed and the LED will change to red, showing that the cell is discharging.

At the completion of discharge the relay will de-energise and the battery will start to charge. I make the assumption that the cell will take one hour to discharge and so leave the charger turned on for 15 hours if it charges at about one tenth of the cells' capacity.

CONSTRUCTION

FOR SINGLE BATTERIES this circuit lends itself for construction on a piece of Vero board or even 'Ugly' construction. My first was ugly, but on the rebuild which has been made to accept four batteries I have made printed circuit boards and used the push switches for mounting the boards. To hold the batteries I cut up single sided PCB material and soldered them together to make a box. A hole was then filed in the side of the box to gain access to the batteries' terminals. Old relay terminals were then bent and fixed with Araldite to the box side to make contact with the battery terminals. This makes a very neat unit and easy to use.

The other interesting part to this discharger is the construction of the battery box. The construction shown in **Fig 3** is for TH42 batteries and you may have to modify the box for your batteries. Nevertheless, the construction method will be as described. With a little care the finished item can look very professional, if not commercial! Single sided fibreglass PCB material is used for the construction and is fixed together using solder and superglue. A word of warning: do not try and solder the whole box up, but just 'tack' together every 10 to 15 millimetres, this will remove any chance of distortion due to the heat of soldering. When this is done carefully run superglue along the joints and allow to set fully prior to finishing and painting. A hole must be cut and shaped to allow access to the battery contacts, then old relay contacts can be bent to make suitable contacts and these fixed to the box using Araldite.

I am currently in the process of designing an automatic timer so that the charger is turned off after 14 hours of charging. As handhelds are used extensively by Novice operators this may well be the subject of a future 'Novice Note Book'. ♦

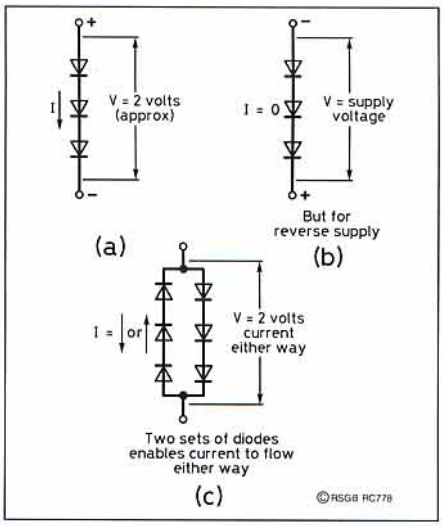
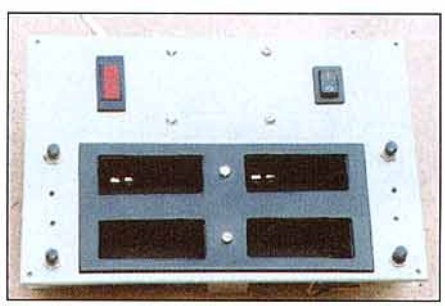


Fig 1: Voltage drop across three diodes.



Battery discharger/charger, front panel.

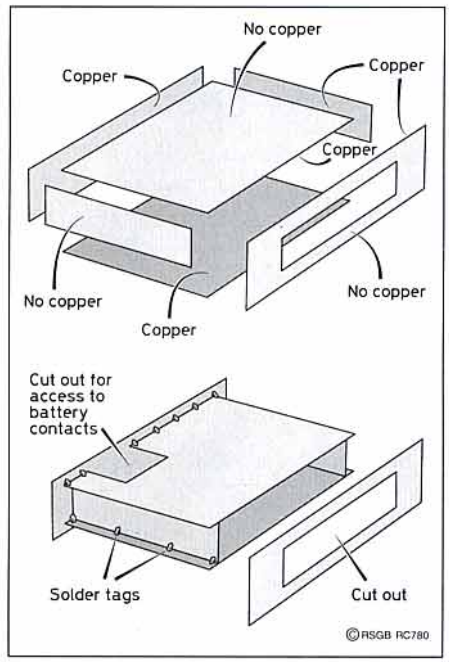


Fig 3: Construction of battery charger box.

IDEAS FROM ABROAD

TRANSLATED AND EDITED BY ERWIN DAVID, G4LQI

Early detection of approaching thunderstorms permits timely disconnection of radios and earthing of antennas. Last month's ***Eurotek*** covered the electronics of an early warning system by **Pierre Poilbarbe, F1FBH**. Here are the construction and adjustment details. From ***Radio-REF*** 5/95. Note that Figs 1, 2 and 3 appeared last month.

THE SENSOR

A FERRITE ROD, 160mm long and 8mm diameter, is to be wound with 2200 turns of 0.3mm enamelled copper wire. Having laid the end of the wire from the reel along the rod, wrap it with a layer of paper well saturated with paper hangers' paste.

Once dry, this paper will protect the ferrite and facilitate winding.

Place the rod in the chuck of a hand drill. Close-wind five layers of 440 turns each and fix the two wire ends with glue. Solder the two wire ends to the centre pin and barrel of a PL259 coax plug.

Epoxy the end of the rod into the barrel of the plug. Cover the rod and part of the plug with adhesive-lined heat shrink tubing.

THE SOLAR CHARGER

THE TRANSFORMER for the DC-DC converter is wound on a pot core, eg *Siemens* B655xx or any other one at hand.

The original circuit used a *Cofelec* 903-458 core; any similar pot core would be suitable. The primary consists of 2 x 21 bifilar turns of 0.2mm enamelled copper wire; watch the polarization of the windings, which is indicated by dots in Fig 2.

The secondary is wound with 110 turns of 0.1mm wire.

COMPONENT LAYOUT

THE LAYOUT of the components is not at all critical. The layouts shown in **Figs 4** and **5** are those used in my prototype.

The meter can be mounted on the front panel of the circuit board enclosure rather than as shown on Fig 4. The battery can be attached to the PSU board with double-sided tape or a battery clip.

ADJUSTMENT

THE SENSOR MUST be tuned to the 'receiving' frequency. Connect a solenoid with 5000 - 20,000 turns, for example a 230VAC relay coil, to an audio oscillator set to 10kHz.

Connect the probe of a oscilloscope across the sensor and position the solenoid a few centimetres from the sensor, increasing the distance as tuning progresses.

Connect various fixed capacitors of different values across the sensor until maximum oscilloscope deflection occurs between 9.9 and 10.1kHz. Then install the optimum capacitor value as C1 on the PCB. The optimum value used in the prototype was with 470pF.

- Connect the sensor to the PCB and apply power. Connect the 'scope to the AUDIO output. Without touching the oscillator setting, adjust RV1 for maximum output with the spacing between solenoid and sensor as wide as is consistent with a good 'scope deflection.

  With an oscillator output of 0dB, and my solenoid placed co-axially with the sensor at a distance of 70 centimetres, I measured 1V peak-to-peak signal at the AUDIO output.
- To adjust the solar battery charger, place a milliammeter in series with one of the battery leads. Under constant light, adjust RV2 and RV3 for maximum current. I measured an efficiency of 55% at an output of 50mW.
- If average light is not sufficient to keep the battery fully charged, two solar cells in series can be used. If the use of two cells results in a maximum charge (in full sun light) of over 10mA, a (single-transistor or IC) current regulator must be used to protect the battery from overcharging. ♦

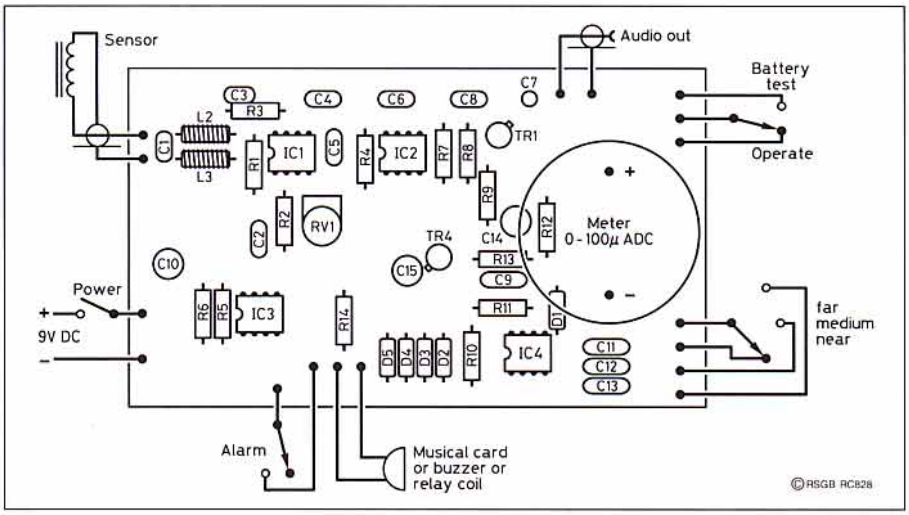


Fig 4: Component placement and external connections, main PCB.

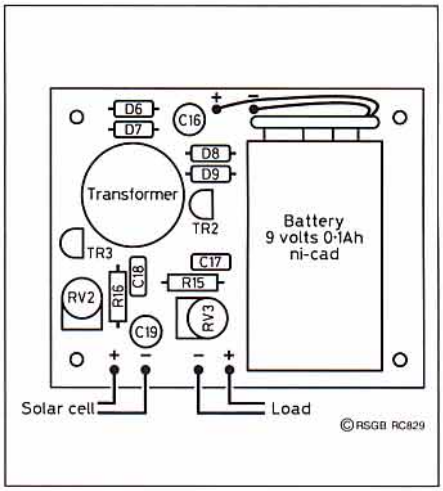


Fig 5: Component placement and external connections, battery charger.

RADCOM NEWS FEATURE

DJ2BW, the Man Behind Samson Keyers

by Frank H. Watts, G5BM*

HERMANN Samson, DJ2BW, is the man behind the successful Samson Keyers company. He designed his first ETM electronic keyer in 1966. His wife Margot, DL2DK, was in the clock-making business, and she was of the opinion that the point pivot and cup bearing used in small clocks and watches for the balance wheel would be an ideal very low friction bearing for keyer paddles. Hermann adopted these for use in his single paddle ETM-2 keyer, which was battery operated. Further development followed and the ETM-3 twin-paddle model, which was mains operated, was produced. This had reed-relay keying output. Later models were provided with CMOS circuitry. Then followed memory keyers and the ETM-SQ twin-paddle key, using the steel pivot and cup bearings as in the ETM keyers.

The current memory keyers are the ETM-9C and ETM-9COG, which have the same specification as the CMOS Super Keyer Mk 2 described in the 1992 ARRL *Handbook*, also known as the Logikey. Samson Keyers are in use in 120 countries, and have been widely used in ships, coast stations and embassies.

Margot Samson, DL2DK, is the owner of the company and Hermann is the Technical Director. A woman's intuition 29 years ago resulted in a successful business!

DJ2BW Home Station

NOT ONLY DOES DJ2BW make the keyers, but he also uses them to great effect. First licensed in 1953, he works exclusively on the HF bands, apart from packet operation on 430MHz. He is an active member of FOC (the First-Class CW Operator's Club) and has worked every country in the world (DXCC Honor Roll No 1) on CW, Mixed and SSB. His favourite band is 7MHz, with 329 countries worked, of which 90% were on CW. A start was made on RTTY in 1988, and 309 countries have been worked on that mode.

Hermann and Margot live in the small village of Osburg, near Trier. The present DJ2BW station includes a Yaesu FT-1000 transceiver, Centurion linear amplifier, Kantronics KAM modem, 486 Personal Computer, ETM-9C memory keyer, and 430MHz gear for Packet radio operation. Antennas include a 3 / 4 / 4-element Yagi for 7 / 14 / 21MHz, together with a 3-element monoband beam for 28MHz. These antennas are mounted on a 20m high Versatower. For the WARC bands, a 4-element trap Yagi is used on 18 and 24MHz, while a sloper antenna, supported from the Versatower, is used on the 3.5 and 10.1MHz bands.

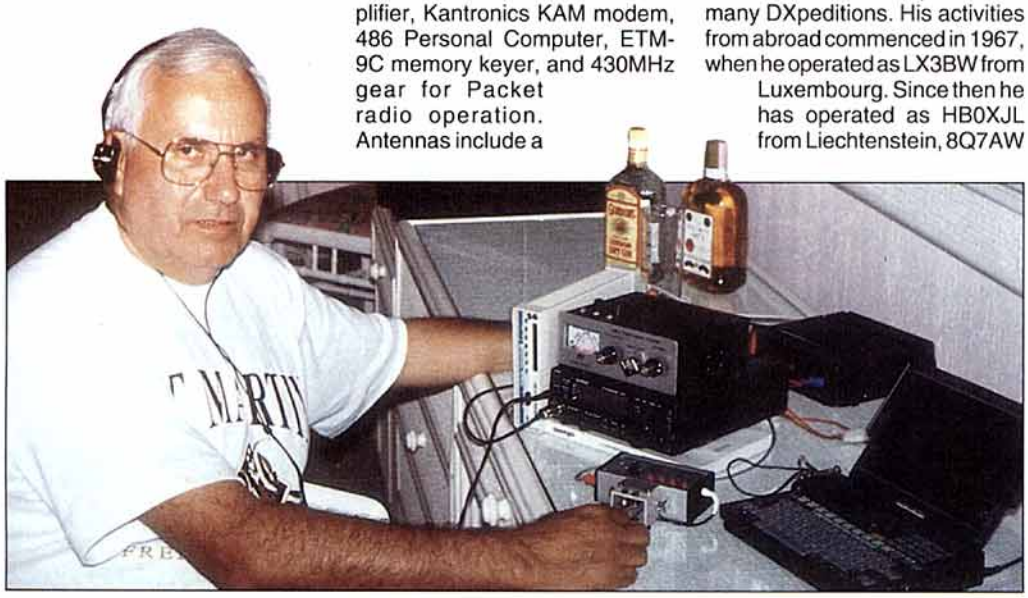
The beachside location for the Mayotte DXpedition.

DJ2BW DXpeditions

HERMANN has also operated on many DXpeditions. His activities from abroad commenced in 1967, when he operated as LX3BW from Luxembourg. Since then he has operated as HB0XJL from Liechtenstein, 8Q7AW (the Maldives), TY9ER and TZ8DC (Benin and Mali, in West Africa), CT3/DJ2BW (Madeira), VK2FOC (Sydney) and W6/DJ2BW (California). Last year, Hermann participated in two DXpeditions. The first was from the Indian Ocean island of Mayotte from 29 February to 9 March. Mayotte is located approximately 240 miles north of the Malagasy Republic (Madagascar). This DXpedition was a team effort and Hermann's companions were DK2BI, DJ7HH and DF9PG.

A very pleasant small holiday resort with 220V mains supply in 22 bungalows on a sandy beach provided their operating location. The antennas were erected on the beach and often the radials of the verticals were covered in salt water from the Indian Ocean. A trapped vertical ground plane was used for 3.5 and 7MHz, and separate verticals for the WARC bands. A 2-element trapped Yagi beam, with elements only 16ft above the ground, was used for 28, 21 and 14MHz.

Propagation was excellent, and a total of 12,500 QSOs were made on the various bands, of which more than 1000 were on 3.5MHz, and over 3000 on 7MHz. Approximately 500 of the QSOs were on RTTY. The equipment on this



FS/DJ2BW in action from French St Martin [the lubrication is normally only needed on SSB DXpeditions - *Ed*]

*Woodland View, Birches Lane, Newent, Glos GL18 1DN

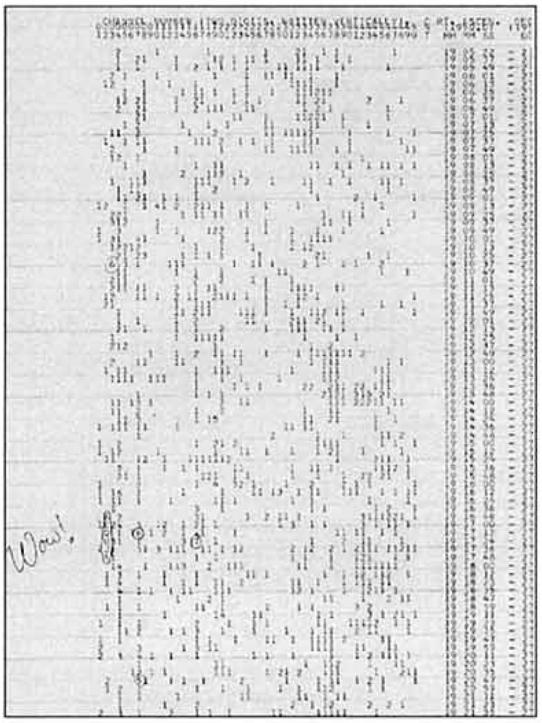


Fig 2: The Wow! was named for the note in the margin of the printout, scribbled by radioastronomer Jerry Ehman when he discovered it on 15 August, 1977. About 15dB above the background noise level, it represents the type of signal that amateur SETI receivers can hope to detect. Highly intermittent, the Wow! exhibited all the characteristics expected of a true alien signal but it was never repeated.

Our galaxy is but one of a hundred billion such star groups in the universe. Now there's no reason to expect the laws of physics, or chemistry, to be different in those other galaxies, from the ones we observe on Earth. Which leads us to imagine the existence of countless billions of Earth-like planets circling Sun-like stars. And remember, most of those planets are older than our homeland, and have had more time to spawn their particular versions of life.

THE EMERGENCE OF LIFE

PERHAPS THE MOST amazing aspect of our existence is that life evolved from non-living things! Not just any non-living things, mind you, but a specific group of complex organic molecules called amino acids. Recently, dozens of complex molecules, many of them organic, have been detected in the interstellar medium. We now know that interstellar space is anything but an empty void. It is a veritable chemistry set.

But can is spawn life? Nobel chemist and SETI pioneer Melvin Calvin believed so. At Berkely in 1951, he sparked a mixture of carbon dioxide, hydrogen and water with an energy burst from a cyclotron, and produced organic chemicals, some of which are known to be precursors of life. In 1955, Miller and Urey at the University of Chicago restructured the Calvin experiment with an even more startling result: using several of the precursors commonly found in space, they produced a wide variety of amino acids!

The chemicals of life may be found on countless planets. Necessary energy sources (lightening, volcanism, whatever) abound. Building amino acids appears relatively easy. In fact 'alien' amino acids have already been found in meteorite fragments, so we know they are commonplace in the cosmos. It's a long step from amino acids to living, thinking beings capable of harnessing electromagnetic communication (and hence detection by our radiotelescopes). On the other hand, the number of potential life sites in the universe is truly mind-boggling. There may be on the order of a thousand, million, million, million (10^{21}) 'good' suns among the galaxies. Should life not have evolved on planets orbiting a good many of those suns?

HOW TO SEARCH

WE CAN'T SAY THAT ALL species develop electromagnetic communication, but we're betting that some do. Photons are, after all, the fastest space ships we can imagine. Radio communication is cheap, quick and easy to learn. If we can figure it out, the assumption of mediocrity suggests, then so can anybody. Perhaps a technologically advanced civilisation adopted, and then abandoned, radio communication a billion years ago. No matter. If they are a billion light years distant, their photons are just now reaching us, and are falling silently on our heads even as we speak.

The greatest obstacle to interstellar communication is naturally occurring noise. Galactic, cosmic, quantum and synchrotron noise sources, span the spectrum, but they are not uniform. The quietest part of the sky, the 1 to 10GHz microwave window, is a logical starting point, and by no means geocentric. But we're talking an incredible bandwidth here. Can we narrow the search spectrum?

Most SETI scientists think we can. Towards the bottom of the microwave window are rather strong spectral radiation lines, emanating from hydrogen and hydroxyl, two of the most abundant substances in interstellar space. It has long been suggested that between these two markers falls a natural, universal communications band.

Significantly, hydrogen and hydroxyl are the disassociation products of water. Although we need not limit our search to water-based life, it's interesting to speculate that others might recognise a special significance to these two frequencies. Bernard M Oliver headed NASA's late SETI office. It was he who, in a 1971 study, first suggested scanning the cosmos between the hydrogen and hydroxyl lines. He coined the rather poetic term for this proposed communications band. "Where shall we seek out our kind?" Oliver asked. "At the water hole, where species have always gathered".

There are other interesting frequency regions to explore, but for now let's go with the majority opinion. The water hole extends from roughly 1420 to 1660MHz, a band-width of 240MHz. Monitoring it in 10-Hz steps means we have 24 million channels to scan!

Now you can understand why so much SETI research has been devoted to developing megachannel real-time spectrum analysers. This can be approached as a digital signal processing (DSP) problem, as an area in which radio amateurs are emerging as prime users. Given the appropriate software, it has been shown that DSP systems are capable of recognising very weak coherent signals.

Numerous targeted searches of interesting candidate stars have been conducted in the past 35 years. An all-sky survey, on the other hand, makes no *a priori* assumptions as to the most likely direction to explore. It attempts to sweep the entire sky as seen form a given location. No antenna tracking is required, since it is sky, rather than individual stars, that we

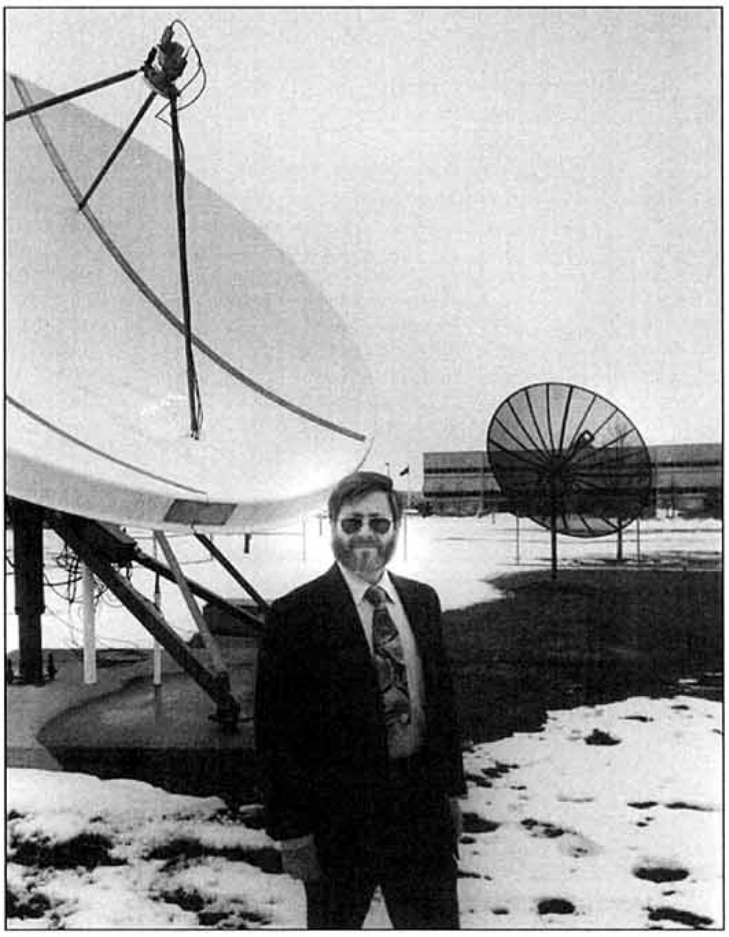


Fig 3: The author standing before the 5-metre (left) and 3-metre (right) satellite TV dishes. Both antennas have been refitted for amateur SETI. Five thousand such systems around the world can provide real-time all-sky coverage.

seek to survey. Therefore, we can deploy our antennas in a virtual transit mount mode, as Grote Reber did when he invented the radiotelescope, by aiming them due south, letting the Earth turn them, and varying only their elevation.

Because large antennas are quite narrow, the sky survey is better performed with dishes of moderate size. Smaller antennas of course have less gain, so to achieve reasonable sensitivities, they need to scan for extremely long periods of time. The sky survey approach, it would seem, is ideally suited to the community of radio amateurs and microwave experimenters. This is the area in which I feel radio amateurs can make their most significant SETI contributions.

WHAT CAN WE DO?

CONSIDER THAT THE AVERAGE moonbounce or TVRO dish has a beamwidth on the order of 3°. Let's put that dish on a transit mount, and let the Earth be our antenna rotator. Now the dish will be rotating at 15° per hour, which means any star will be within its beamwidth for about 12 minutes. Given existing amateur DSP technology, and employing a few tricks, 12 minutes is enough time to scan thoroughly about 14.4kHz of spectrum, at 10Hz resolution (which I consider consistent with the frequency stability of amateur microwave local oscillators).

But the water hole is 240MHz wide, which means to cover our assigned swath of sky at all water-hole frequencies, we need to be listening for only 16,667 days. That's a little over 46 years.

Well, perhaps a dedicated experimenter will be willing to devote 46 years of his life to studying the sky: Tycho Brahe did. But a 46-year search at a single antenna elevation will only survey a 3° swath of sky. To cover the range of declinations from the southern to northern horizon, we need to conduct 60 such surveys, which brings the time required for the effort up to about 2760 years! And that only covers the one hemisphere of sky we can see from our part of the world; a complete sky survey demands we spend as long searching from Earth's other hemisphere as well. So, a single dedicated amateur can complete one full sweep of the water hole in just under six millennia!

On the other hand, 5520 experimenters can do that same sky survey in just one year. This is why we need to make SETI a broad-based effort. And where but in the Amateur Radio Service are we likely to find several thousand dish-equipped experimenters, scattered around the globe, with the means to co-ordinate their efforts? The SETI search problem is tailor-made for us.

WHAT DO YOU NEED TO JOIN THE SEARCH?

- A 3 to 5-meter parabolic reflector, with surface smoothness adequate for TVRO, or 23cm moonbounce.
- A low-noise preamp that covers the 1.4 to 1.7GHz range.
- A downconverter (in the manner of the popular Rick Campbell/Jim Davey no-tune transverter boards) to shift the water hole down to a VHF IF.

- A VHF scanning receiver.
- A digital signal processor, spectrum analysis software, and home computer on which to run them.

All can be purchased at a cost on a par with the typical OSCAR satellite station. Several hundred stations are already so equipped. By the turn of the century, perhaps several thousand, and then - who knows?

Fig 3 shows 5-metre and 3-metre satellite TV dishes suitable for amateur SETI.

Some kind of co-ordination is required, and that's where the SETI League comes in. We stand prepared to assign participating amateurs specific specific search declinations to assure full sky coverage, and will act as a clearing house for information and results. Once a suspicious signal is detected, everybody will want to know where to point his or her dish to help confirm it!

A broad membership base will make it possible to put amateur SETI on track. We plan to publish and promote the best hardware and software schemes to come out of the radio amateur community, and will design, prototype and evaluate various detection and signal analysis technologies. To receive further information on joining the SETI League, write to the address on page 37, or e-mail to info@ setileague.org. In the immortal words of Rick Blaine at the end of *Casablanca*: "If that call comes, and you don't answer, you'll regret it. Maybe not today, maybe not tomorrow. But soon, and for the rest of your life".

NOTES

[1] Drake bases this estimate on his personal solution for the Drake Equation, an elegant tool for quantifying our ignorance, which he developed in 1961 as the agenda for the world's first SETI conference. Today the Drake Equation is a classic, to be found in nearly every astronomy textbook that addresses the question of alien life. See the sidebar, "The Drake Equation.

[2] Viewing a planet orbiting a star is a little like looking at a firefly perched on the rim of a searchlight.

[3] That study, part of a summer faculty fellowship program at Stanford University, brought together some of the leading minds in radio astronomy, to puzzle the problem of interstellar communication. The group's most tangible result, the Project Cyclops report, remains one of the most important SETI publications to date.

[4] Reber, an electrical engineer and radio amateur (W9GFZ), built the first true radiotelescope in his backyard in Wheaton, Illinois, in 1937. Although lacking in formal astronomical training, he is today recognised as the patriarch of a new discipline. his 10-meter-diameter dish (only a little larger than the size that I propose for amateur SETI), on a transit mount, generated the first radio map of the sky. Reber measured radiation levels millions of times in excess of what then-favoured theories predicted. His controversial measurements have subsequently been borne out repeatedly. Reber ultimately retired to Tasmania.

[5] If you don't want to dedicate your dish full-time to the SETI effort, no problem. A water-hole feed certainly doesn't preclude installing other feeds at the focal point as well. You can practice what's come to be known as parasitic SETI, letting your water-hole receiver scan while your dish goes about its daily business of EME, TV or whatever. ♦

THE DRAKE EQUATION

IS THERE A WAY TO estimate the number of technologically advanced civilisations that might exist in our galaxy? While working at the National Radio Astronomy Observatory in Green Bank, West Virginia, Dr Frank Drake conceived a means to mathematically estimate the number of worlds that might harbour beings with technology sufficient to communicate across the vast gulfs of interstellar space. The Drake Equation, as it came to be known, was formulated in 1961 and is generally accepted by the scientific community.

$$N = R.\, f_p\, n_e\, f_l\, f_i\, f_c\, L$$

where,

N= the number of communicative civilisations

R= the rate of formation suitable stars (stars such as our Sun)

f_p = the fraction of those stars with planets. (Current evidence indicates that planetary systems may be common for stars like the Sun).

n_e = the number of Earth-like worlds per planetary system.

f_l = the fraction of those Earth-like planets where life actually develops.

f_i = the fraction of life sites where intelligence develops.

f_c the fraction of communicative planets (those on which electromagnetic communications technology develops).

L = the "lifetime" of communicating civilisations.

Frank Drake's own current solution to the Drake Equation estimates 10,000 communicative civilisations in the Milky Way. Dr Drake, who serves on the SETI League's advisory board, has personally endorsed SETI's planned all-sky survey - *WB8IMY*.

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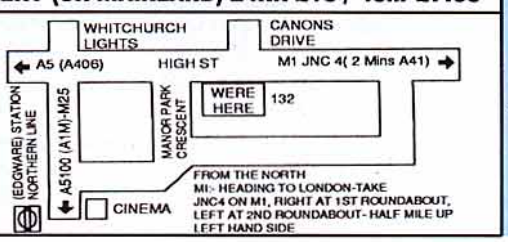

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CUTTING PC BOARD - AND ALSO ICS

THANKS TO EVERYONE who contributed further ideas following the item in October's *In Practice*. In particular, thanks to Terry Kirk, G3OMK, whose chapter on construction techniques in the *Radio Communication Handbook* I mentioned last time. He pointed out that after securing the PC board between the bending bars in the vice, it can be cut by scoring both sides and then snapping the board off.

Some other correspondents also suggested scoring the board, but using a hand-held steel ruler - a method which I do *not* recommend because it needs a lot of force and the blade or ruler can very easily skid out of control. The bending bars recommended by G3OMK allow you to score the board very deeply without any fingers or thumbs close by. Terry uses a heavy scoring 'knife' in the form of a wood chisel ground to a 40° point. A good commercial alternative is an X-acto knife, not the surgical scalpel variety but the modeller's knife with a stubby red handle that takes a short, stiff blade (**Fig 1**), or of course a Stanley knife.

However long or short the board may be, snap it by starting at one end and working along the break, rather than trying to break the whole length at once. The broken edge will be very ragged so you'll need to straighten and smooth it with a file. Do this while the board is still between the bending bars, clamped to the marked-out line. G3OMK points out that you need to be careful not to peel the copper foil away from the laminate. File single-sided board with the copper side facing you, and lift the file off for the return stroke; with double-sided board, file carefully along the length of the edge.

Tip: The X-acto knife is also very good for removing dead ICs from PC boards by shearing straight through the legs. Support the board firmly from the back and cut the legs one at a time, close to the package, pressing diagonally downwards as shown in Fig 1. Mind your fingers and also take care to avoid cutting any tracks on the top of the board. Don't try to cut the last leg on each side of the IC, because the knife may skid and damage the board. Change over to the soldering iron to remove these last two pins and the body of the IC, and then use the iron with tweezers and a solder-sucker to clean out the remaining holes.

The same X-acto knife will also take chisel-shaped blades and a range of fine-toothed disposable slitting saws which are very good for microwave metalwork (tnx G4PMK).

IN PRACTICE

IAN WHITE, G3SEK
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TWO-TRANSISTOR PA BIAS CIRCUIT

I SHOULD HAVE KNOWN that I couldn't get away with recommending the two-transistor 'Mullard' bias circuit in September's In Practice *on bipolar transistor power amplifiers without being asked to describe it. A few other points also came up in correspondence.*

RECALLING SEPTEMBER'S column, the problem is to provide an adjustable, precisely-regulated bias voltage to the base of the PA transistor. The voltage must remain constant in spite of the very large variations in base current caused by the RF drive. Note the difference between the RF and DC current paths in **Fig 2**: it is the RF drive waveform that turns-on the transistor and makes it draw both base current and collector current, but the DC return path for the base current is through the base bias supply. This means that the bias supply must be capable of delivering the full-drive base current, and not just the small current required to bias the transistor to its idling current of about 100mA. Another requirement for the base bias supply is a small negative temperature coefficient to help avoid thermal runaway caused by the decrease in base-emitter voltage drop of TR1 with increasing temperature.

The two-transistor bias circuit looks like **Fig 3**. To understand how this or any other voltage regulator circuit works, there's a standard technique to apply: imagine that the output voltage falls for some reason (eg, because more current is drawn by the load) and work out what happens to compensate for it. If the voltage V_B in Fig 3 falls, TR2 will draw less current. That will reduce the voltage drop across R1, making the voltage rise at the connection between the collector of TR2 and the base of TR3. TR3 is an emitter-follower which delivers the output voltage with a high current capability. As its base voltage rises, so too will its emitter voltage, compensating for the fall in output voltage that we imagined at the start of this paragraph. If the output voltage were to try and rise for some reason, it's equally easy to work out that TR3 would deliver less current and thus make the voltage tend to fall back to its original value.

Similar reasoning explains the negative temperature coefficient of this circuit. TR2 is the temperature-sensing transistor bolted to the heatsink close to the RF power transistor TR1. An increase in temperature will cause a decrease in the base-emitter voltage drop of TR2, and a corresponding increase in the collector current drawn. This will increase the voltage drop across R1 and lower the base voltage of TR3, whose emitter-follower action will lower the output voltage. Hence the response to the temperature increase is a reduction in bias voltage supplied to TR1.

To calculate the component values, estimate how much base current TR1 will need. How much collector current will TR1 draw at full RF output? Say you're designing for a 100W PA powered from 13.8V, which will be reduced to about 13.0V by the time it reaches the TR1 collector. Assuming an efficiency of 50% - it's best to err on the low side when making this estimate - the peak DC input will be (100W ÷ 50%) = 200W, which at 13.0V represents 15.4A. Assuming that the current gain of TR1 falls as low as 10 at maximum collector current, that's 1.54A of base current to be supplied to TR1 through TR3.

Now let's look at the voltages. The base voltage of TR1 must be about the standard silicon V_{BE} value of +0.7V. This is also the emitter voltage of TR3, and the base of TR3 must therefore be another V_{BE} higher than its emitter, ie about +1.4V. R2 limits the amount of base current this circuit can deliver when TR3 is turned fully on. Allowing about 1.0V from emitter to collector of TR3 in this condition, the collector voltage would be 1.7V and the voltage drop across R2 would be (13.8 – 1.7) = 12.1V. The estimated peak base current of 1.54A must flow through R2, so its resistance must be 7.86Ω and its wattage 18.63. For practical purposes, choose a lower-resistance component with a higher wattage, ie a 6.8Ω 20W resistor. At this point it's useful to note that unlike any of the 'passive' shunt regulators described in September's *In Practice*, which draw large currents all the time,

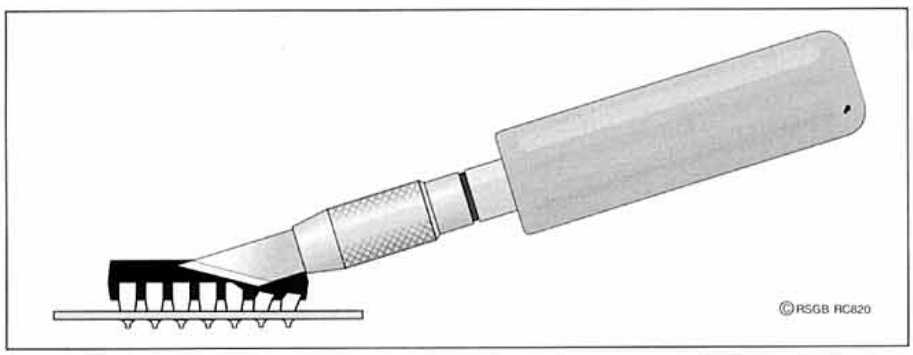

Fig 1: An X-acto modeller's knife is very good for scoring PC board clamped in bending bars as shown in October's *In Practice*. The short, stiff blade is also very good for cutting the legs off 'dead' ICs to remove them from a board.

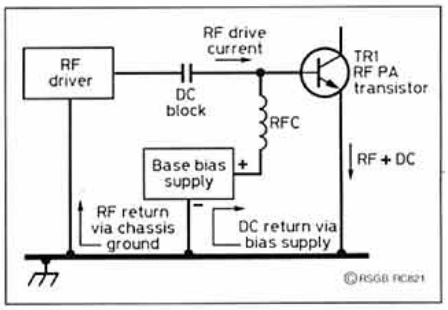

Fig 2: RF drive turns-on the TR1 and makes it draw both base current and collector current, but the DC return path for the base current is through the base bias supply. This means that the bias supply must be capable of delivering the full-drive base current.

REELING IN ANTENNAS

THERE HAS BEEN further feedback to the saga on reeling in wire antennas when you lower the tower . . .

I WAS PREMATURE in dismissing the use of enormously long springs passing on G3XAQ's request for ideas (*In Practice*, August 1995). John Cleeve, G3JVC, found exactly what he needed in the form of 8mm elastic 'shock cord'; in other words 'bungee cord', obtainable in long lengths from a yacht chandler and also in a 'domestic' grade from DIY stores. Each leg of his inverted-V goes out from the top of the tower to an insulated pulley mounted on a post, and is then attached via an insulator to the length of shock cord. The other end of that cord runs back beneath the antenna to the top of the fixed 20ft tower section. When the tower is cranked up, the cord stretches and lets out the inverted-V; when the tower is lowered, the cord pulls the antenna in again. G3JVC's system has worked reliably for many years, and is exactly what G3XAQ was asking for.

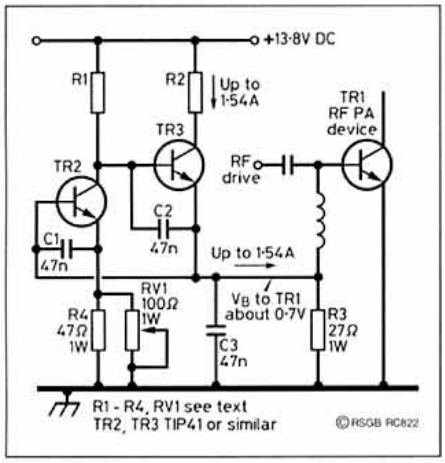

Fig 3: Circuit and design notes for the two-transistor base bias supply. RF circuitry not shown.

this circuit draws very little standby current from the DC supply; R2 and TR3 only handle significant current at high levels of RF drive to TR1.

TR3 gets its base current through R1, with relatively little going through TR2. At this point we have to decide what device to use for TR3, and TR2 can be the same. A good selection would be something like the TIP41A (cost about 50p). This has a flat TO220 package suitable for tucking under the PC board as the temperature sensor TR2 (see Fig 3, *In Practice*, September 1995) and also a 6A/65W rating which with heat-sinking will be ample to handle the power in the TR3 position. The TIP41A has a typical current gain of 50, so when the collector current is 1.54A the base current must be (1.54 ÷ 50)A = 30mA. This current flows through R1 across a potential difference of (13.8 – 1.4)V, so the value of R1 required is 413Ω - we'll call that 390Ω. The power dissipated in R1 is less than 0.5W - work it out.

R3 is chosen so that TR3 is always passing a minimum of, say, 25mA to keep the system stable at low currents. That's (0.7V ÷ 25mA) which is 27Ω to the nearest preferred value. You might imagine that this could be a low-wattage component, but if the bias supply fails (eg R2 goes open-circuit) the amplifier will revert to Class C and all the RF-driven base current to TR1 will go through R3, and if R3 then burns out you'll lose the expensive RF power transistor. For the sake of a few extra coppers, make R3 a 1W resistor. The final two resistors in this circuit are RV1 which will set the required bias current through TR1, and R4 which is a safety resistor in case RV1 fails open-circuit. To cut a long story short, make RV1 a 100Ω1W trimpot and R4 a 47Ω 1W fixed resistor. Garnish with 47nF capacitors to prevent the circuit being upset by stray RF, and the circuit is ready to test.

Do *not* test the bias circuit using TR1 as a guinea-pig - big RF power transistors are too expensive to risk mistakes! Initially, just check it without any load except R3, and confirm that RV1 will adjust the output voltage through the necessary 0.6 - 0.75V region. Next, hook up an NPN audio power transistor instead of TR1 and confirm that you can set the collector current to 100mA. Play a hot-air blower on the back of the heatsink where it will heat up TR2 by conduction but won't affect your test transistor, and confirm that the standing current falls as TR2 heats up. Now you can feel reasonably confident to connect TR1.

I hope this has given you the information you need to design and use this active bias circuit. Calculating the component values has required nothing more than RAE-level circuit theory. You only have to remember what you already know and use it. Thanks to G4SWX for his valuable comments and the detailed design information.

RG OR NOT RG?

I'VE CUT SOME COAX to quarter-wavelengths using the method you described in the July 1995 In Practice *but the physical lengths are all wrong. Here is a sample of the cable.*

THIS HAS HAPPENED twice in the last few months, and on each occasion the cable wasn't quite what it was supposed to be. The first sample was bought as 'RG58', and it even said 'RG58' all along the outer cover, but the dielectric between the inner and outer conductors was white foam instead of translucent solid polyethylene. This had several consequences. The velocity factor was significantly higher than the correct value of 0.66, which explained the incorrect resonant lengths. Also, the cable was slightly thinner overall than real RG58 - by which I mean a cable that conforms fully to the US MIL-C17D specification.

Sample number two, known as 'RG213/U - BX', once again isn't proper MIL-spec RG213. The dielectric does appear to be solid polyethylene, as it should be, but the outer braid and jacket are separated by a thin layer of transparent film and thus fit rather loosely. This looser fit increases the velocity factor to about 0.68 according to measurements by G4SWX, and the characteristic impedance appears to be nearer 55Ω than 50Ω. Most important of all, the outer diameter is only about 9mm instead of 10.3mm, so standard connectors designed for real MIL-spec RG213 don't grip the cable sheath properly. Another interesting observation is that when using high power at UHF, where RG213 might be expected to become slightly warm, the 'RG213/U - BX' cable gets quite hot - simply because it is smaller.

What both these 'substitute' cables have in common is that they are of cheaper construction than the real RG ones. They are actually quite good examples of 'value engineering', in the sense that they achieve loss figures similar to the full-specification cables, or even lower, and at a reduced manufacturing cost. But you can't change just one aspect of a coax cable without affecting something else as well. For example, if you use a foamed dielectric instead of solid polyethylene, then the impedance must change unless you make the inner conductor thicker or the outer conductor diameter smaller - and then you've got a different cable that no longer fits a normal plug. There are also some doubts about the wear and water resistance of the outer sheath in the cheaper cables, and if that sheath fails the cable is ruined.

The 'RG' cables are very tightly specified in MIL-C17D, and the 'UR' cables in BS2316. These are well-made quality products. However, the 'RG' and 'UR' designations are not trademarked and there appears to be little to prevent manufacturers from selling cables with identical or very similar markings. As soon as the old 52Ω RG8 cable was replaced by 50Ω RG213, the obsolete RG8 designation became devalued by a flood of less expensive so-called 'equivalents'. It now looks as if RG213 is going the same way, but prematurely. As we've seen, these new cables may be near-equivalents, and they may provide very similar electrical performance at a lower price than the real thing, but they cannot be the same in every respect. Increasingly, it's a case of 'buyer beware'. If you want the real thing, not only will you have to pay for the higher quality, but also you'll need to check very carefully what you're buying.

THANK YOU!

FINALLY, THANKS TO everybody who has sent in letters, packet messages and E-mail during the past year. Although it isn't possible to reply to everybody individually, a major purpose of this column is to pass on other people's practical experience as well as my own. This is a seasonal opportunity to say how grateful I am for all your questions, comments and brilliant ideas, and to wish everyone a happy Christmas and New Year. ♦

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.

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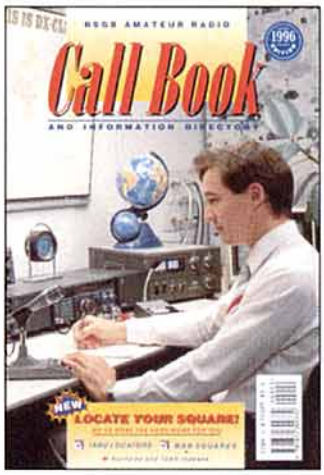

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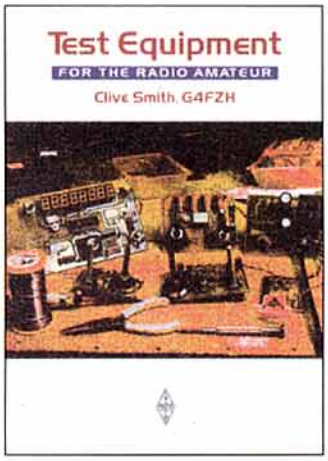

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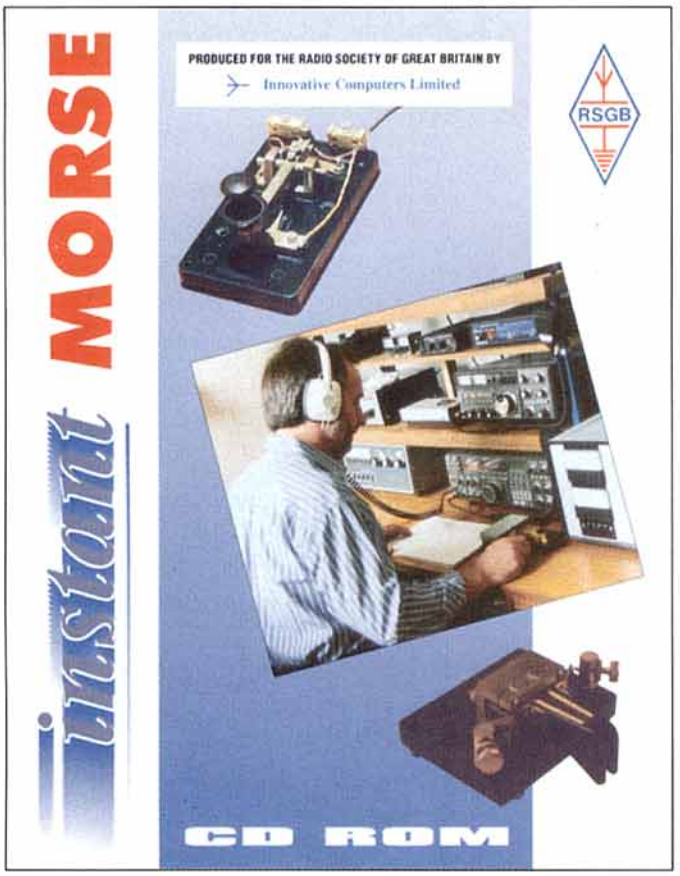

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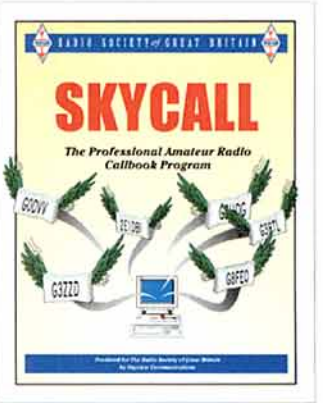

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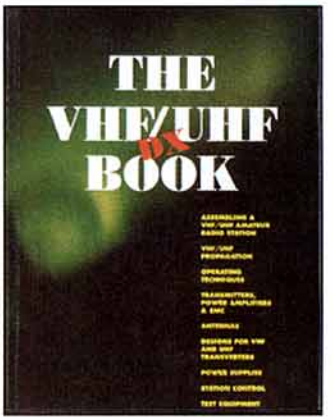

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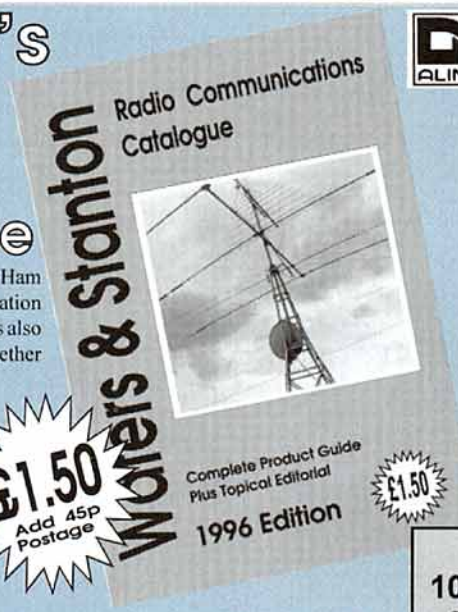

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RADCOM USER REVIEW

The MyDEL Multi-Trap Dipole

Reviewed by RSGB HQ Staff

A 10 - 80M WIRE antenna only 20m long? It sounded almost too good to be true, so it was with some interest that the MyDEL Multi-Trap multiband antenna was unpacked and examined.

The MyDEL Multi-Trap silhouetted against the dusk sky.

DESCRIPTION

THE FIRST THING to say about the MyDEL Multi-Trap is that it is *not* a single trap dipole antenna. Rather it is *two* trap dipoles, one for 80 / 40m, and the other for 10 / 15 / 20m. The two dipoles are connected in parallel and fed from the same feeder. The longer dipole is 20m long - only about a quarter-wavelength on the 80m band - while the shorter is about 6m long. It appears to be very well constructed, using high-quality materials. The wire is quite thick multistranded copper cable, covered in a thick transparant plastic insulation.

There are a total of four traps: a pair in the 10 / 15 / 20m elements, and a pair in the 40 / 80m elements, which clearly also provide a large degree of inductive loading in order to achieve resonance in the 80m band. The 10 / 15m traps are encased in aluminium tubes and it is not possible to adjust the resonant frequencies on those bands. Black plastic insulation covers the 40m coils, and the dipole centre piece is made of blue high-impact plastic, with the standard SO239 'UHF'-type socket to connect the co-ax. The four insulators are made of the same material.

The transparant insulation on the wires will allow you to see if the wire is becoming corroded, while at the same time actually help to prevent corrosion taking place.

INSTALLATION

THE INSTRUCTION leaflet supplied with the antenna says that the longest element, for 40 and 80m, should be installed in an inverted-Vee configuration, with an inclination of about 35°. The shorter element should be deployed at 90° to the first, 'if possible'. This may be difficult to achieve in some locations, particularly if the centre of the antenna is installed on the chimney of a house. A more convenient location would undoubtedly be on a pole or mast in the middle of the garden, providing the garden is 6m wide as well as 20m long. As with all dipole-type antennas, it is important to have the centre of the antenna as much 'in the clear' as possible.

The antenna comes complete with a bracket for mounting the centre insulator on a pole. However, at the review location, a 3m pole complete with halyard was already *in situ* on the chimney, so the bracket was not used and the centre insulator was hauled to the top of the pole by means of the rope halyard. The centre of the antenna was only about 8m above ground, but relatively in the clear of other objects.

The slope of the 40 / 80m elements was about 35°, as specified; the 10 / 15/ 20m elements somewhat steeper. The two sections of the antenna were spaced about 60° apart. The antenna was thus erected as closely as possible to the manufacturer's instructions, and the installation would certainly be typical of many at suburban or urban locations. Initially, no adjustments were made to the lengths of the elements.

SWR MEASUREMENTS

THE INSTRUCTION LEAFLET states 'VSWR (Max) 1.4:1'. This should read that the maximum VSWR *at resonance* is 1.4:1, since clearly the antenna will be quite 'sharp' on 80m, being only approximately 50% of full size. In practice, the SWR was indeed found to be 1.4:1 or better in each of the five bands. All SWR measurements were made using an ordinary Welz SP-200 1.8 - 160MHz SWR / power meter and the results are summarised in **Table 1**.

On 80m the resonant frequency was 3711kHz, and as expected this was quite a 'sharp' resonance, the 2:1 SWR points being only 27kHz apart. The antenna was much broader on 40m, although the point of minimum SWR was found to be above the top of the European amateur band (presumably the MyDEL is intended for export to the USA and other countries with a wider 40m band than we have in Region 1!) However, at 7100kHz the SWR was just 1.2:1 and at 7000kHz it had only risen to 1.8:1. On 20m, the SWR was 1.75:1 at the CW band edge, dipping to 1.35:1 at 14135kHz and rising to 2:1 at 14330kHz. At the higher band edge it was about 2.2:1. These measurements were made immediately after installing the antenna and before any adjustments were made to the resonant frequencies on 20, 40 or 80m.

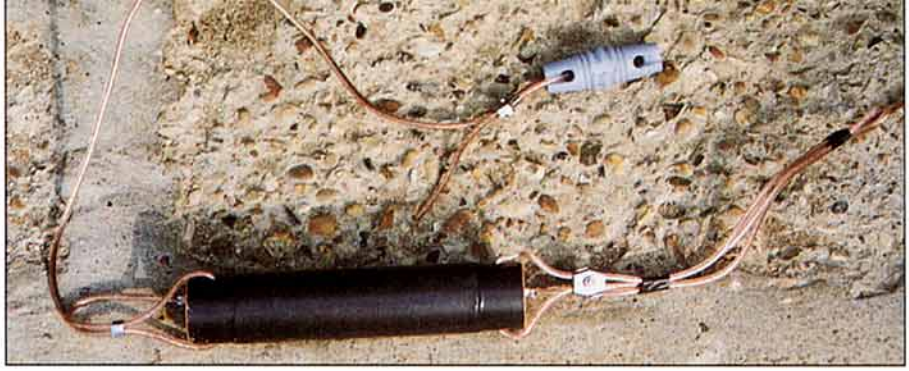
On 15m, the MyDEL appeared to have two distinct dips in SWR, at the low and high edges of the band. However, the highest SWR found on 15m was still only 1.9:1. This occurred around 21250kHz. The SWR was therefore perfectly acceptable over the whole 450kHz of the 15m band.

On 10m the minimum SWR was at 29065kHz (1.2:1). Although very broad on 10m, the SWR 2:1 points were at 28620 and 29540kHz. The most 'useful' part of the band (for the majority of users), 28000 - 28600kHz, had an SWR in excess of 2:1, and between 28000 - 28100kHz it was in excess of 3:1. This is unfortunate, as the resonance point is not adjustable on this band.

The manufacturers make no claims about the performance on other bands, other than to state that "this antenna may work on other bands, including the WARC bands, if used in conjunction with an antenna tuner". The SWR

Band	Min SWR	Resonant Frequency kHz	2:1 SWR Bandwidth
80m	1.4:1	3711	27kHz (3697 - 3724kHz)
40m	1:1	7145	Whole band
20m	1.35:1	14135	>330kHz (<14000 - 14330kHz)
15m	1.3:1	21450	Whole band
10m	1.2:1	29065	920kHz (28620 - 9540kHz)

Table 1: Measured SWR and bandwidth of MyDEL Multi-Trap antenna (see text).



Close-up of a 40m trap, showing the method of adjusting resonance on 40 and 80m.

was found to be very high - in the region of 7:1 or 8:1 - on 30, 17 and 12m. However, the built-in ATU in the Yaesu FT-890AT was able to match the antenna and so deliver the full 100W on all three WARC bands. Similarly, although the SWR was very high on 80m when well away from the resonant frequency (in the region of 10:1 at 3800kHz!), the FT-890AT's ATU was able to match the antenna over the whole band.

IN USE

INITIALLY, THE MyDEL Multi-Trap was compared on 80 and 40m with a Butternut HF2V vertical. This is a 32ft long vertical which is optimised for use on those bands only. The HF2 was ground mounted, with a dozen random-length radials lying on the ground, and about 100ft away from the centre of the MyDEL dipole.

Numerous 'A' / 'B' comparisons were made which can be summarised as follows. On 80m the dipole was about 10 to 12dB *better* than the vertical on almost all signals. The exceptions were DX signals: a JA was S7 on the HF2 but unreadable (below the S3 or S4 noise level) on the MyDEL. W6RJ was S8 on the HF2 but only S5 to S6 on the dipole. Several ZL stations on the morning long path were S8 on the vertical but only around S5 on the dipole. However, the vast majority of stations worked or heard were considerably stronger on the MyDEL than on the HF2. This included both G and near European stations during the day, and more distant European stations during the evening. The greatest difference noted was between a station some 35km away late one evening, who was 59+20dB on the MyDEL, but only just readable, at about 46, on the vertical! (It should be noted that he was also using a dipole and was probably close enough for ground wave cross polarisation to be an important factor.)

On 40m the difference between the MyDEL and the HF2 was not as marked as on 80m. Frequently, no difference could be noted between the two antennas (eg with several Russian stations). Where there was a difference, it seemed to be more a function of the dipole's radiation pattern: Italian stations in particular were frequently two S points stronger on the MyDEL than the vertical, but Finnish stations, for example, were usually about one S point stronger on the vertical.

As on 80m, more distant stations were stronger on the vertical: a JA4 was S6 on the MyDEL but S7 on the HF2, and the Iranian broadcast station on 7070kHz was S9+10 on the dipole but S9+20 on the vertical.

The most noticeable difference, as also noted on 80m, was with G stations: they were always stronger on the dipole, and sometimes by 15 or even 20dB.

It is encouraging, if perhaps a little surprising, that all of the above correlates very closely with how theory suggests the two antennas should compare: the low dipole with its high angle of radiation was better for 'local' working, whilst the vertical was better for DX work.

A few tests were made on 20m, comparing the MyDEL with a 'straight' 20m dipole. There appeared to be little or no difference between the two. The 17m band sounded very quiet in comparison with 20m, although it should be noted that the ATU in the FT-890AT is only in circuit on transmit, and not on receive. Propagation conditions during the review period meant that very few signals were heard on the higher frequency bands.

When using 100W, no TVI (or BCI) was noticed at all, despite being in a fringe area for TV reception. The traps in the MyDEL easily handled the power during brief tests made at 400W output, and they certainly look 'beefy' enough to handle the rated 1kW power level.

ADJUSTMENT

THE ONLY ADJUSTMENT really necessary is to increase or decrease the lengths of wire in the 40 / 80m element to set the 80m resonance to the desired part of the band. This is achieved by the very simple, but effective, method of folding a length of wire back on to itself and fastening it with two or three turns of insulating tape. The antenna comes supplied with an excess length of wire already folded back and fastened, but located *before* the 40m traps. This means that if you are primarily a CW operator and wish to *lower* the resonant frequency on 80m, you must make the 40m section longer, which has the effect of lowering the resonant frequency on both bands. If, on the other hand, you wish to move the 80m resonance closer to 3800kHz, you do not need to adjust the 40m section at all, just shorten the wire beyond the 40m traps, closest to the 80m insulators.

Although the 40m resonance was above 7100kHz, being a full-size dipole on that band the tuning is quite broad. It is therefore unnecessary to adjust the MyDEL at all on that band, unless you need to in order to lower the 80m frequency. There would also be little or nothing to gain by adjusting the 20m resonance, unless the user only ever wanted to operate in the top 20kHz or so of the band!

The feedpoint of the MyDEL Multi-Trap dipole antenna.

CONCLUSION

FOR THOSE WHOSE garden is not large enough to accommodate a full-size 80m dipole (or a G5RV), a multi-band vertical has often been the method of choice for getting on to 80m. Usually, results are disappointing: because the garden is small, the vertical is screened by the close proximity of houses, trees etc and so does not perform as an effective DX antenna. The vertical also does not put out the good high-angle signal required for 'local' working. Finally, lack of space for an effective ground system also contributes to the vertical's often poor performance from small garden plots.

Although the 'crossed double inverted-Vee formation' may be difficult to realise in many locations, for those where it is possible the MyDEL Multi-Trap offers a very attractive alternative solution to the problem of putting out a potent signal on the HF bands from a restricted space.

In the tests, the MyDEL worked very well indeed. On 80m in particular performance was excellent, albeit over quite a narrow section of the band. The narrow bandwidth on 80m is only to be expected given the short length of the antenna with respect to the wavelength.

Using an ATU it was possible to get a match over the whole of all of the eight bands from 10 - 80m. Even without an ATU, the whole of the 40 and 15m bands could be used, very nearly the whole of 20m, and nearly 1MHz of 10m, albeit not in the most useful part of the band.

While the manufacturers make no claims about the performance of the MyDEL on the WARC bands, its use on those bands can be considered as something of a bonus for users with a built-in ATU or out-board ASTU.

For DX work (particularly on 80 or 40 metres) the MyDEL - in common with all horizontally-polarised dipole-type antennas - should be mounted as high as possible, probably at least 50 or 60ft, in order to compare with the performance of a good vertical. But for general working around the UK on the lower-frequency bands, or for working around Europe on any band, the MyDEL should outperform almost any vertical, even when only mounted at roof height. Although capable of handling 1kW, the MyDEL should not be overlooked by the QRP operator either: the one to two S points advantage over a vertical on most European signals is an important plus if signals are weak.

The MyDEL Multi-Trap antenna is available for £69.95, plus £7.50 postage and packing, from Martin Lynch, who is thanked for the review model supplied. ♦

SPECIFICATIONS

(Source: MyDEL specification sheet)

Impedance	52 Ω
Power rating	1kW
Weight	2.5kg
Trap type	Multiband
Overall length	20m
Slope of elements	35 degrees
VSWR (Max)	1.4:1
Adjustments	Three bands only

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SPECIFICATIONS
Impedeance: 52 Ohm
Overall length: 20m
Power Handling: 1kW
Max SWR: 1:5:1
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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.

CQ COMMUNICATIONS Inc is launching a new magazine called ***CQ Contest*** next month. Edited by the *CQ* World Wide contest director, Bob Cox, K3EST, each issue will include contesting articles from around the world, as well as columns by world-class contesters. Parent magazine *CQ* will continue to cover contesting itself. *CQ Contest* will appear 10 times per year and a subscription will cost US$40, including airmail delivery to the UK.

CQ Communications Inc, 76 North Broadway, Hicksville, NY 11801, USA, tel: 00 1 516 681 2022, fax: 00 1 516 681 2926.

MUCH MORE THAN just a listing of their products, the **Waters & Stanton 1996 *Radio Communications Catalogue*** is now out. With 128 A4 pages, the catalogue contains dozens of full-page articles on MFJ's factory, the Yaesu FT-1000MP transceiver, QRP transceivers, the Treshnish Islands DXpedition, PacTOR, DSP filters and plenty more, in addition to the full listing and prices of Waters & Stanton's wares. The catalogue costs £1.50.

The new **Optoelectronics Cub MiniCounter** (above) is a 1MHz to 2.8GHz frequency counter which replaces their successful 3300 model. The new model has improved input sensitivity, a digital filter to virtually eliminate unwanted random counts, and 'Auto Capture', so that each frequency displayed will stay displayed for as long as you want. Waters & Stanton supply it complete with nicad batteries, a charger and telescopic antenna. The price is £159 - £10 less than the recommended retail price of the 3300.

The popular **Watson / Calvin** range of budget-priced **power supply units** (below left) has now been extended to include 3A, 5A and 10A models. The prices are just £22.95, £29.95 and £49.95 respectively. Other models available include the very popular 20A and 30A models at £89 and £119, and a 10A model with variable volts and meter at £59.95.

Also from **Watson** is the new **2090H 2m linear amplifier** (below right). It is ideal for using with a hand-held transceiver as a base or mobile station. It will accept power input levels from 0.7W to 5W and will produce up to 80W from a transceiver running 5W output. The 2090H operates on FM and SSB, includes RF sensing Tx / Rx switching and a GaAsFET receive pre-amp. Owners of the new multiband Icom IC-706 (which includes 2m) may be interested to boost their power on that band by using a Watson 2090H.

Waters & Stanton Electronics, Spa House, 22 Main Road, Hockley, Essex SS5 4QS, tel: 01702 206835, fax: 01702 205843.

AOR (UK) LTD has recently released two new receivers. The **AR7030** is a **British-designed shortwave receiver** built at **AOR Manufacturing Ltd's** new site at Belper in Derbyshire. Unveiled at the Leicester show at the end of October, the AR7030 covers 0 - 32MHz and sets new standards of strong signal handling performance, with a dynamic range in excess of 105dB (on SSB with 2.2kHz filter) and IP3 greater than +35dBm. Add to this 'razor sharp' selectivity, and the performance of the AR7030 exceeds that of many receivers even at considerably higher prices. Stocks should be available by Christmas and the target price has been set at the £800 - £1000 mark.

The **AR5000** caused a real stir when displayed for the first time at the Tokyo HamFair in August. It is an **all-mode, wide-band base station** set, in the **professional communications receiver** category. It covers 10kHz to 2.6GHz, features automatic electronic front-end pre-selection, excellent strong signal handling, multiple IF bandwidths, 1000 memory channels and much more. The price will be in the £1500 - £2000 region, and first stocks should start shipping before Christmas.

AOR (UK) Ltd has now relocated to be under the same roof as AOR Munufacturing Ltd. The new address, phone and fax numbers are:

AOR (UK) Ltd, 4E East Mill, Bridgefoot, Belper, Derbyshire DE56 2UA, tel: 01773 880788, fax: 01773 880780.

SURF THE 'Net' with Siskin! Siskin Electronics have announced a **14,400 baud Internet modem**, for those who like to build their own equipment, based on the Rockwell RC144/AT data pump. The **RC144** consists of a half-size PC slot card, Rockwell RC144/AT single chip modem IC, EPROM and user manual. All other components (line jack, resistors, capacitors etc) are off the shelf items from the usual component suppliers. Using the Rockwell single chip modem allows data throughput equivalent to 57 kbits/s using on-board data advanced data compression and error correction facilities. The kit costs £58.75 plus £1.50 P&P.

Siskin Electronics, Unit 1A, Hampton Lane, Blackfield, Southampton SO45 1WE, tel: 01703 243400, fax: 01703 243500, E-mail: siskin@zipmail.co.uk.

FOR A TRIAL period of one year; **G4ZPY Paddle Keys International** are making their customers an offer too good to refuse. With the exception of keys sold in 'kit form', they will accept '**pump keys**' purchased from them within the previous 12 months in part exchange for a **paddle key**. Subject to inspection, up to 40% of the purchase price paid for the pump key will be allowed as part exchange.

They hope that the offer will allow them to offer refurbished pump keys at lower prices. This will help young Novices to purchase a good key to learn on and provide an incentive to continue with Morse code.

G4ZPY Paddle Keys International, 41 Mill Dam Lane, Burscough, Ormskirk, Lancs L40 7TG, tel/fax: 01704 894299.

SGC HAVE RECENTLY released their 150W PEP output **SG-2000 HF SSB transceiver** with 'PowerTalk' remotable control head. It incorporates ADSP (adaptive digital signal processing) and SNS (spectral noise subtraction) to provide powerful interference reduction capabilities. With 644 pre-programmed channels, the SG-2000 is particularly appropriate for the amateur who also requires HF radiotelephone capability, eg for marine use. The price is £1799 and trade enquiries are welcomed.

Photo Acoustics Ltd, Communications Centre, 58 High Street, Newport Pagnell, Bucks MK16 8AQ, tel: 01908 610625, fax: 01908 216373.

RADCOM NEWS FEATURE

One Man's Visit to the Leicester Show

by Colin Dollery, G3GAF*

IT IS NOON on Saturday 20 October, the car is cruising quietly along the A14 and we are off to the amateur radio show at the Granby Halls in Leicester. I switch the rig to S22, the talk-in frequency of GB2GH at the show. My wife winces at the crashes and bangs from the radio. Is he really that weak or has the antenna which I cut into the roof of the car six years ago corroded so much that I have no ground plane connection any more?

I give him a call after he has finished with another mobile who, coming from the south, seems to be lost in the M1 contraflow to the north of Leicester. GB2GH can hear me clearly, so that suggests that he really is weak and I wonder why. Rule one for a control station is to have a big signal.

Still, no matter, I get some directions and tell the nice man at GB2GH that we are off to get some lunch first. Why the lunch booking, you may ask? It is because this is the basis on which my wife will permit the side trip to Leicester, en route to an old friend's 70th birthday party. I should explain that she is entirely beyond price, being willing to stand at the bottom of a ladder (and occasionally climb it to hand up supplies) on a mast which is swaying in a gale on the eve of the *CQ* WW SSB contest while spanners, amalgamating tape and imprecations rain down from her husband above. She has found a restaurant in the *Good Food Guide* in Leicester and that is where we are going for lunch. In fact it is a pretty good lunch, and we arrive at the show about 2.30pm feeling distinctly cheerful.

After circling the Granby Halls twice in the one way system, we eventually park in the grounds of the Leicester Royal Infirmary. The sole advantage of our late arrival is that the parking attendant has gone off duty so that parking is free. We also survive the crossing of the ring road between the hospital car park and the Granby Halls, which must be a nice little earner for the hospital's A&E department. We pay our reduced entry fee, my wife having announced brightly (and truthfully) that she is an old age pensioner. At this stage I produce the list.

The List

THERE ARE SEVERAL dangers of going to an amateur radio show. Roughly in order they are as follows:

1) You will forget what you came intending to buy,
2) You will buy something that you never intended to buy, and
3) You will spend much more than you planned.

Hence the list. The first two entries on the list are solder tags and heat shrink tubing. Solder tags and heat shrink tubing appear to be scarce commodities. I very nearly buy a large packet of pretty coloured, but very large diameter, heat shrink tubing but reflect, just in time, that the smallest is about half an inch in diameter which is a size I use about once every three years. Then a stroke of luck as I find a packet of multi-coloured silicon rubber tubing offcuts for £1.

My wife has disappeared to patronise a toy stand in order to acquire Christmas presents for nieces, nephews and a forthcoming grandchild.

Eureka! Solder tags. A plastic envelope bulging with plastic packets. There must be hundreds of solder tags in it. Much later when I get home I find that each packet within the envelope contains another packet and in that packet there is another packet and that packet contains one solder tag! Does anyone know why a solder tag, which cannot cost more than a hundredth of a penny to make is worth packaging in that way? The packing must have cost 50 times the cost of the tag.

Another error: I buy a smart-looking pointer knob for my antenna switch for £1, but when I get it home I find that it has no grub screw in the shaft. Caveat emptor!

Next a Cannon plug and socket. If the list had been reliable I should have only bought the plug but I forgot to note whether the socket I have at home is male or female.

By now my wife is flagging so I park her in the cafeteria and return to the fray. I need some N plugs and line sockets and fortunately Henry Westlake is here so I can get reliable Greenpar components with 10% off because I need more than 10. Seven half AA size nicads from Strike-a-Light follow to replace the dead ones in my BP3 battery pack for the old Icom IC-2E. Much cheaper than a new BP3. A cheapish 15W soldering iron follows. Things are going better. It is time to look at the junk.

On Buying Junk

JUNK LIES NEAR the heart of amateur radio. My first RF power amplifier was made out of bits culled from RAF and USAF equipment bought with an impecunious schoolboy's pocket money in 1948 / 49. It included a pair of 813s in class C: we were all young once! Sadly there is

How many callsigns can you recognise? Leicester '95 [Please don't write in - *Ed*].

* *101 Corringham Road, London NW11 7DL.*

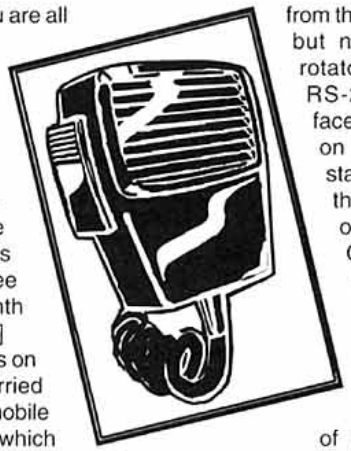
not much junk at Leicester and most of it is expensive. Junk ought to be cheap to give the young hams a flying start.

Unfortunately current junk is full of printed circuit boards which are not much good for anything unless you enjoy salvaging quarter Watt resistors and diodes. After twiddling the knobs on various pieces of test gear which look as though they retired from active service about 25 years ago, I focus on a 50W line terminator (dummy load). It is about the size of a hand grenade and looks as though it might have a low SWR at UHF, which my existing dummy loads do not. Also it is quite cheap at £17.50, probably because it has a 'C' fitting, not an 'N'.

A quick visit to my wife in the cafeteria (who has spun out one mug of tea for an hour) and it is time for the black boxes.

The Black Boxes

EVERY NOW AND again we seem to have a generation change, rather than just a facelift, on the main HF rigs. For the first time I begin to wonder whether it is time to replace my excellent, but ageing, TS-940. Icom, Kenwood and Yaesu are all at Leicester with enticing packages. The FT-1000MP looks particularly impressive but what does digital signal processing (DSP) at the IF stage, as well as AF, really offer? [See *RadCom* next month for the answer - *Ed*]



The main offerings on the stands are serried rows of VHF / UHF mobile rigs and handhelds which get ever more versatile, and complicated. Does anyone use all those crossband duplex, dual in-band reception, 50+ non-volatile memories and countless other functions? Yet judging by the ads in *RadCom* and the prominence of the displays on the stands, handhelds (and packet) are now the main ham markets.

The manufacturers are here, too, in their own right and not just represented by dealers. I have just acquired the latest update of K1EA's contest logging software package CT (version 9.23) which makes provision for driving rotators directly from the computer, but none of my rotators has an RS-232 interface. The man on the Yaesu stand tells me that an add-on for my G-1000DSX rotator, a GS-23 board, will do nicely, but for a list price of £289. Seeing my shaken look he hastens to say that the price is just indicative and the dealers are bound to have it for much less. I should think so too, as that is nearly two-thirds the price I paid for the whole rotator! I decide I can do without the board for the time being.

My last port of call is the Strumech stand to talk about winches. I should love to fit a motorised winch to my 60ft mobile Versatower contest mast, but at around £750 plus VAT it is just too expensive. But one of my hand-powered winches is badly corroded and needs replacing. David Taylor, on the stand, helpfully suggests an ex-demonstrator self-braked handwinch he has back at the plant and we promise to get in touch with one another on Monday.

By this time the Tannoys are announcing the show closes in 15 minutes. A quick visit to the loo to find it flooded and I think some uncharitable thoughts about the hygiene standards of the city fathers of Leicester. The stands are breaking up but there do not seem to be any of those last minute bargains that sometimes appear at shows.

And so back to the cafeteria. My wife is the only customer left, her cup of tea has now lasted nearly two hours and the atmosphere is rather frosty.

However, back in the car she soon cheers up and I reflect on my purchases. I have spent just under £70. One or two mistakes but nothing serious (and in the end I even got some heat shrink tubing). And it was fun, not too crowded, but busy and the stall holders seemed to be doing a fair amount of trade. I shall be back next year, but will it be for a Yaesu FT-1000MP, a Kenwood TS-870S or what? We shall see.

● Leicester 96 is on 18/19 October. ♦

RADCOM TECHNICAL FEATURE

More on G3FDW Log Periodic Yagis

By Mike Gibbings, G3FDW*

THIS article describes two Log Periodic Yagi designs developed to overcome the problems of antenna survival in the severe weather at this northern QTH. Long boom Yagis tended to shed elements or even break up due to metal fatigue. Both of these LPY antennas are shown in the photograph.

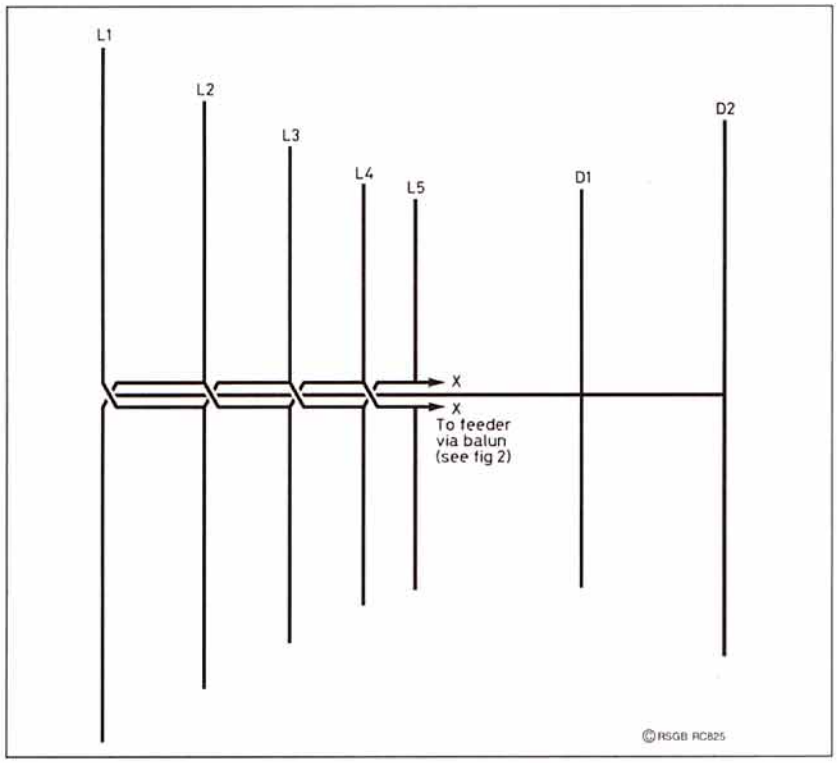


Fig 1: The Multiband Log Periodic Yagi.

VHF MULTI-BAND LOG PERIODIC YAGI

THE SEVERE weather survival strategy employed here is to lower the mast during predicted winds speeds in excess of Force 8 (severe gale, 45MPH with gusts to 60MPH). As you can guess from my call sign this solution was becoming more hazardous by the day. Weather conditions are much worse in the winter and the mast was down more often than it was up. In an effort to reduce the wind loading on my 23ft mast I took to using a single antenna at a time but this was, to say the least, very restrictive.

The mast wear and tear was increased to an unacceptable level for a contest man working on four bands.

A single 'winter' antenna was needed, even if this meant restricting the number of bands that I could work.

I decided to try a wideband log periodic cell that would give moderate gain on 6 and 4 metres, and to use parasitic directors to give increased gain on these two bands. The aim was a gain similar to that produced by a good three or four element yagi with a good match to 50Ω coax on a six foot indestructible one inch square boom.

CONSTRUCTION

Several weeks, half a tree and two calculator batteries later a design was produced, and with only minor adjustments of the feed cell open wire feeder spacing, worked right off the drawing board.

As part of the experiment it was hoped to try out the 'log periodic' theory devised by K4EWG[1]. This, put simply, means that if a log periodic is made to cover two bands then by making two of the component dipoles resonate on the two required frequencies, the other parameters such as feed impedance would come out equal in value. Sounded good, so it was hoped it would work in practice.

The final design, **Fig 1,** uses five elements in the log periodic cell and I consoled myself during the construction that the symmetrical layout looked like two 3-element beams in series. A single director is used for each band.

Once the feed cell was constructed it was tested by measuring the feed impedance over the design bandwidth of 50 to 70MHz. Over this frequency range the feed impedance was substantially flat with a value of 90 ± 25Ω. The cell showed a typical bandpass characteristic with large changes in feed impedance outside the band.

Two directors were then fitted. The SWR was then measured with the beam supported on the pole a short distance from the ground and beamed vertically. The SWR improved and was then optimised by adjusting the spacing of the feeders. The feeder spacing between L1 - L2 and L2 - L3 effects the 6 metre feed impedance while the feeder spacing L3 - L4 and L5 - L6 determines the 4 metre feed impedance. The SWR measurements are tabulated in **Table 1.**

Frequency	50.1	50.3	50.5	51	52
SWR	1.2:1	1.2:1	1.2:1	1.5:1	1.3:1
Frequency	7.1	70.5	70.45		
SWR	1.2:1	1.3:1	1.5:1		
Frequency	144.0	144.5	145.0	145.5	146.0
SWR	1.4:1	1.4:1	1.25:1	1.15:1	1.1:1

Table 1: SWR measurements of the multiband VHF LPY.

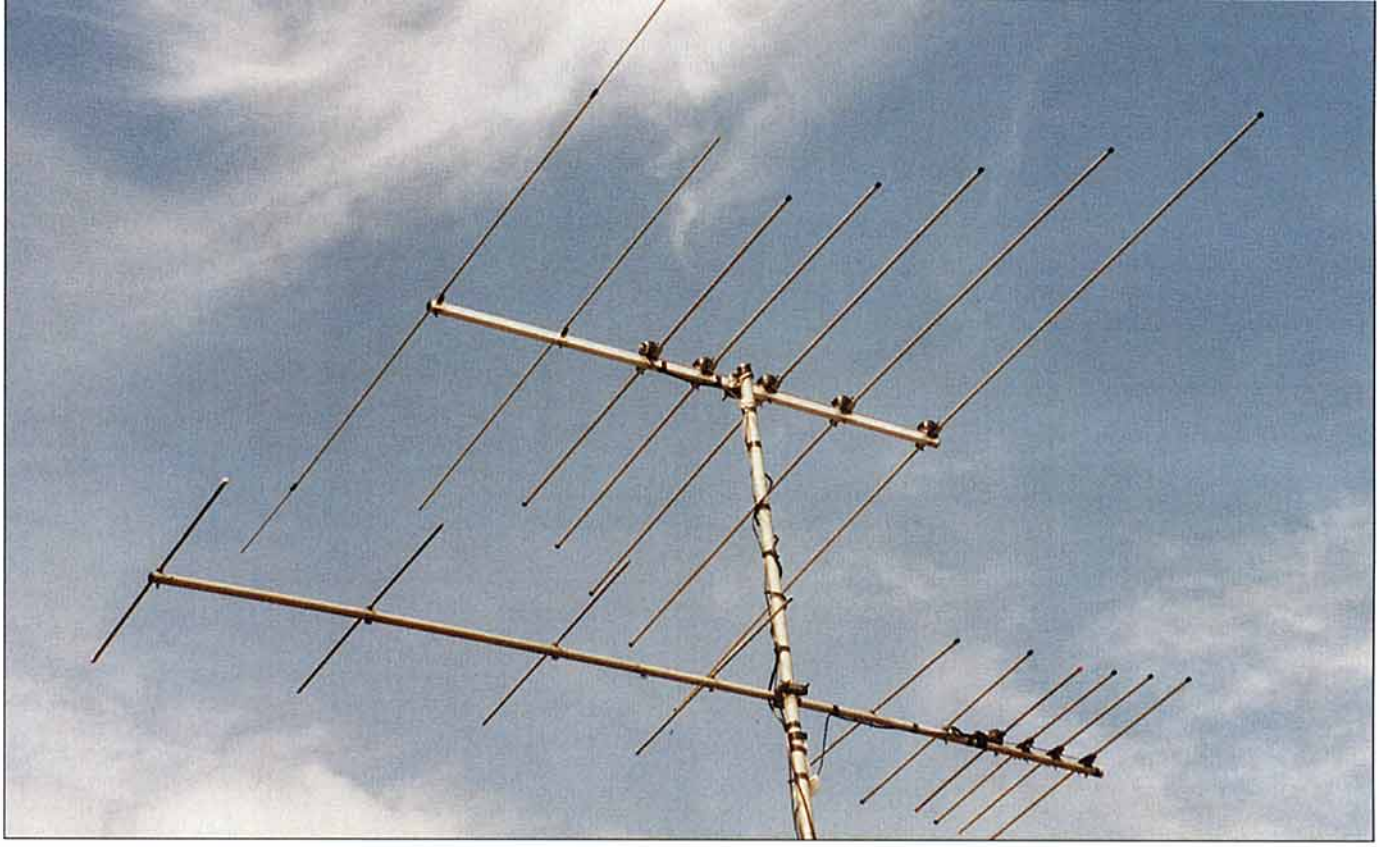
OPERATION ON 144 - 146MHz

I was surprised to find that the antenna is usable between 144 and 146MHz with a low SWR across the band, see Table 1. This is because the ½in diameter six metre elements of the cell are three half-wavelengths long, and present a low impedance when fed in the centre.

Unfortunately this arrangement produces two narrow forward lobes at an angle of approximately 40° either side of the centre line of the boom. The beam splitting could be corrected by angling the log cell elements to align the two lobes to produce a single main lobe. This would give an additional 3dB gain compared with a log cell with halfwavelength elements. Such an arrangement can be considered as a series of V-beams fed out of phase. Work by W4EWG[2] would indicate a gain for this array to be in the region of 10dB.

Although I did much experimental work

* 5 Meadowbank Lane, Grange Over Sands, Cumbria, LA11 6AT.



Showing both the multi-band G3FDW beam and the 10 element LPY.

with angled elements I did not use them in the final design. The main reason is that such a configuration is mechanically weak and would need bracing. This would defeat the original objective of a strong multi-band 'winter' beam.

If you can live with a 2-metre antenna whose two main lobes are 40° out of alignment with the rotator setting then the best way to regard it is as a 'free' 2-metre antenna with useful gain. I have had many QSOs at distances of over 100 miles using only 2.5 watts from an IC202.

The construction of the beam is the same as described in [3]. The design data and dimensions are given in **Table 2**.

Note: that for ½in diameter elements, L2 and L4 are resonant at 50.2MHz and 70.2MHz respectively.

It should be stressed that this is not a high gain DX antenna but was designed to provide a dual band device that would stand up to severe weather conditions. To date it has weathered wind gusts of up to 70MPH on no less than three occasions in the winter of 1994-5. With a performance as good as most 4-element beams on two bands it turns in a good dB per dollar. Additionally it only requires one length of low-loss coax and the antenna can be placed at the top of the mast.

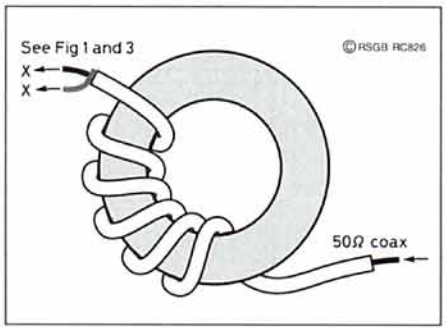


Fig 2: Coaxial balun.

RESULTS

In the first few months of use on six metres since Dec 1994, 30 countries have been worked, the best DX being CN8 and EH8. On four metres QSOs in excess of 200km have been made on several occasions. From observations on 4 metres this antenna is judged to be 1½ 'S' points down on the 8 element LPY described in [3].

BALUN

This consists of seven turns of UR43, 50Ω coax wound on an RSGB ferrite ring (see **Fig 2**).

TEN ELEMENT LPY FOR TWO METRES

WHEN THE SMALL 7-element two-metre LPY antenna was first used by the Westmorland VHF group it was greeted with much comment, and observation that it was too small to be taken seriously. Nonetheless, it has helped us to win the low power section of VHF NFD. This proved the LPY's performance by the well known 'proof of the

CONTINUED ON PAGE 59

Boom	=	72in (1in square)
L1	=	133.49in
L2	=	111.73in
L3	=	93.53in
L4	=	78.27in
L5	=	65.51in
d1-2	=	13.35in
d2-3	=	11.17in
d3-4	=	9.35in
d4-4	=	7.83in
D1	=	77in
D2	=	109.25in
s1	=	12.25in
s2	=	16.25in

$\tau = 0.873$, $\sigma = 0.5$. Bandwidth of log cell = 50-70MHz. The gain of the array on 6 and 4 metres is estimated to be 7-8dBd. Back to front ratio is observed to be between 10 and 12dB.

Table 2: Multiband log periodic yagi design parameters and dimensions.

MATERIALS

MULTIBAND LOG PERIODIC YAGI

Boom	1in square section 6ft
L1 to 5	½in seamless tube
5 insulated dipole fittings	½in to 1in square
D1, D2	3/8in seamless tube
2 mounting clips	3/8in to 1in square
1.6mm enamelled wire	as required

10 ELEMENT LOG YAGI

Boom	1in diameter aluminium tube, overall length 10ft 6in
Elements	all 3/8in diameter seamless tube
4 Dipole fittings	
Metal element fittings	3/8in to 1in diameter required

Note. Director length corrections need to be applied if the fittings are different from the those specified.

All parts are available from Sandpiper Communications, telephone: 01685 870425.

RADCOM NEWS FEATURE

DJ2BW, the Man Behind Samson Keyers

by Frank H. Watts, G5BM*

HERMANN Samson, DJ2BW, is the man behind the successful Samson Keyers company. He designed his first ETM electronic keyer in 1966. His wife Margot, DL2DK, was in the clock-making business, and she was of the opinion that the point pivot and cup bearing used in small clocks and watches for the balance wheel would be an ideal very low friction bearing for keyer paddles. Hermann adopted these for use in his single paddle ETM-2 keyer, which was battery operated. Further development followed and the ETM-3 twin-paddle model, which was mains operated, was produced. This had reed-relay keying output. Later models were provided with CMOS circuitry. Then followed memory keyers and the ETM-SQ twin-paddle key, using the steel pivot and cup bearings as in the ETM keyers.

The current memory keyers are the ETM-9C and ETM-9COG, which have the same specification as the CMOS Super Keyer Mk 2 described in the 1992 ARRL *Handbook*, also known as the Logikey. Samson Keyers are in use in 120 countries, and have been widely used in ships, coast stations and embassies.

Margot Samson, DL2DK, is the owner of the company and Hermann is the Technical Director. A woman's intuition 29 years ago resulted in a successful business!

DJ2BW Home Station

NOT ONLY DOES DJ2BW make the keyers, but he also uses them to great effect. First licensed in 1953, he works exclusively on the HF bands, apart from packet operation on 430MHz. He is an active member of FOC (the First-Class CW Operator's Club) and has worked every country in the world (DXCC Honor Roll No 1) on CW, Mixed and SSB. His favourite band is 7MHz, with 329 countries worked, of which 90% were on CW. A start was made on RTTY in 1988, and 309 countries have been worked on that mode.

Hermann and Margot live in the small village of Osburg, near Trier. The present DJ2BW station includes a Yaesu FT-1000 transceiver, Centurion linear amplifier, Kantronics KAM modem, 486 Personal Computer, ETM-9C memory keyer, and 430MHz gear for Packet radio operation. Antennas include a 3 / 4 / 4-element Yagi for 7 / 14 / 21MHz, together with a 3-element monoband beam for 28MHz. These antennas are mounted on a 20m high Versatower. For the WARC bands, a 4-element trap Yagi is used on 18 and 24MHz, while a sloper antenna, supported from the Versatower, is used on the 3.5 and 10.1MHz bands.

The beachside location for the Mayotte DXpedition.

DJ2BW DXpeditions

HERMANN has also operated on many DXpeditions. His activities from abroad commenced in 1967, when he operated as LX3BW from Luxembourg. Since then he has operated as HB0XJL from Liechtenstein, 8Q7AW (the Maldives), TY9ER and TZ8DC (Benin and Mali, in West Africa), CT3/DJ2BW (Madeira), VK2FOC (Sydney) and W6/DJ2BW (California). Last year, Hermann participated in two DXpeditions. The first was from the Indian Ocean island of Mayotte from 29 February to 9 March. Mayotte is located approximately 240 miles north of the Malagasy Republic (Madagascar). This DXpedition was a team effort and Hermann's companions were DK2BI, DJ7HH and DF9PG.

A very pleasant small holiday resort with 220V mains supply in 22 bungalows on a sandy beach provided their operating location. The antennas were erected on the beach and often the radials of the verticals were covered in salt water from the Indian Ocean. A trapped vertical ground plane was used for 3.5 and 7MHz, and separate verticals for the WARC bands. A 2-element trapped Yagi beam, with elements only 16ft above the ground, was used for 28, 21 and 14MHz.

Propagation was excellent, and a total of 12,500 QSOs were made on the various bands, of which more than 1000 were on 3.5MHz, and over 3000 on 7MHz. Approximately 500 of the QSOs were on RTTY. The equipment on this

FS/DJ2BW in action from French St Martin [the lubrication is normally only needed on SSB DXpeditions - *Ed*]

*Woodland View, Birches Lane, Newent, Glos GL18 1DN

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MFJ-949 - same as above but with 300W dummy load built-in **Order Ref: MFJ-949 £159**

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This unit will make signals leap out of the noise and get rid of all that annoying QRM from adjacent channels. Makes copy so much easier. And if you use data modes you'll be amazed at the improvement it gives. Just connect to the audio output of your transceiver - built in 4 Watt amplifier for speaker use. Has 16 programmable memories.

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This pocket tutor works like nothing else before it. Now you also get random QSO's - just like the Morse Test. You als get traditional letter groups and the latest Farnsworth mode for rapid learning. Self contained, it is the ideal way for learning or brushing up on your code. 5 - 50 WPM

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Covers 1.8 - 30MHz and reads 0-30/0-300 Watts. Great value.

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*** 1.8 - 30MHz * Cross Needle Avge & PEP**
*** VSWR Readings * Large Inductor**
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MF-962 - 3kW ATU using differential capacitor tuning and roller inductor for rapid tuning of system. Ideal for use with linears. **£339.95**

QRP CW HF Rigs

These 4 Watts rigs can be adjusted down to any power level. Completely self contained with 500Hz xtal filter. Theire's models for 40m, 30m, 20m and 15m. Please specify band when odering

Order Ref: MFJ-90/band £209.95

MFJ-941 Budget ATU

This represents amazing value. Covers 160m to 10m and will match long wires, coaxial cable and balanced feeder. Includes cross needle VSWR and power readings. plus aerial selector switch.

Order Ref: MFJ-941 £119

Artificial Earth Plus ATU

If you operate from the first floor or can't get a decent earth, this unit will provide the answer. At the same time it tunes your aerial - coax, wire or balanced - and ensures that your rig is not live to rf. 1.8 - 30MHz

Order Ref: MFJ-934 £189

MFJ-931 - Similar to above but comprising Artificial Earth only

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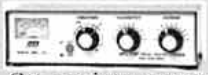
Amazing value. Just plug in a paddle like MFJ-564 opposite for effortless keying.

Ref: MFJ-401C £59.95

MFJ-921-2m ATU



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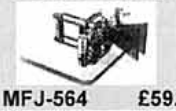

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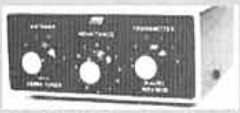

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CONTINUED FROM P56

pudding is in the eating' theorem beloved by all true amateurs.

I decided to try an increased boom length and additional director elements. I hoped to be able to increase the gain without running into the problems of 'plan view of a hedgehog' polar diagrams and low feed impedances that can happen with yagis which employ more than a couple of directors.

Starting with the original seven element LPY [3] as the basis for the new design I doubled the length of the boom and added three additional directors.

Unfortunately, no combination of director spacings allowed the antenna, using the 4 to 1 balun in the original design, to be matched to a 50Ω coaxial cable. In order to measure the feed impedance of the new beam the balun was disconnected, and to my surprise the measurement showed 45Ω with very little reactive component. A small repositioning of director 3 (D3) produced the required 50Ω impedance. The overall dimensions of the antenna are shown in **Fig 3**. When the antenna was connected to the feeder with an untuned balun, as shown in Fig 2, a very good match was achieved with no sign of polar diagram distortion or squint, over the DX portion of the 2-metre band.

The first tests were carried out at about 10ft above the ground and were done to measure the relative currents in the 10 individual elements. The current is measured by placing a loop current detector near to the elements. This test is always carried out as it seems to be a good indication that each of the elements is working. The results are shown in **Table 3**.

Element	L1	L2	L3	L4	D1	D2	D3	D4	D5	D6
Relative current	1	3	3	3.5	6	10	6	10	6	9.5

Table 3: 10 element log yagi currents.

The antenna was installed on a mast at 23ft. Tests with other stations who were able to give some estimation of the polar diagram. Data collected over a period of time suggests a front-to-back-ratio of around 15 to 20dB with all minor lobes better than 25dB down.

REFERENCES

[1] 'The K4EWG Log Periodic Array', Peter D Rhodes, *The ARRL Antenna Compenduim*, Vol 3, P118.

[2] 'Log Periodic-Yagi Arrays', *ARRL Antenna Handbook, 1988 Edition,* P10-20.

[3] 'The VHF Log Periodic Yagi', Mike Gibbings, G3FDW, *Radio Communication*, July 1994. ♦

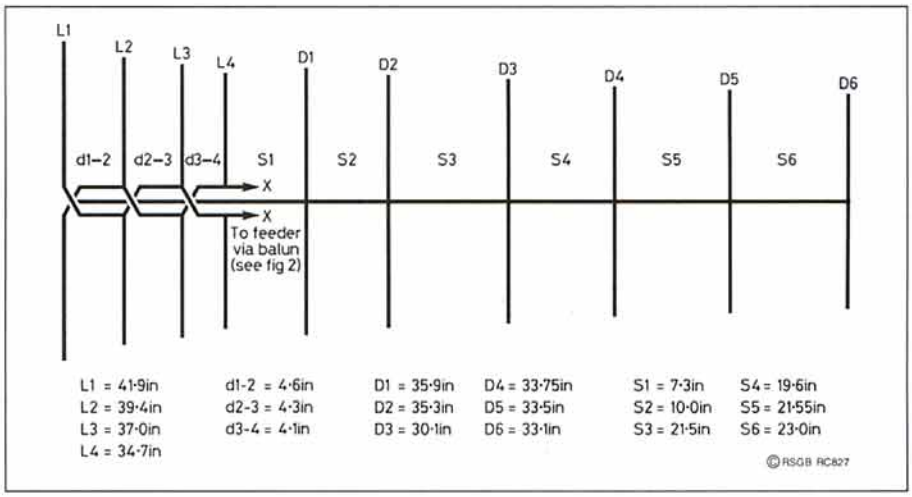

Fig 3 : 10 element 2 metre log periodic yagi.

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57 DXpedition consisted of two Kenwood TS-50 transceivers, KAM interfaces, laptop computers and ETM-9COG memory keyers. Operation on two bands at once could thus take place.

Hermann and the team really enjoyed their stay on this beautiful island abounding with palm trees and tropical vegetation, sandy beaches and small villages. They were fascinated by the great number of large crabs crawling over the beaches and the colourful birds.

St Martin

HERMANN'S MOST RECENT DXpedition was his trip to the Caribbean island of St Martin. Hermann, his wife Margot, DL2DK, and daughter Sabine arrived there on 29 October 1994 for a two-week stay. Approximately half of the island is French, and the other half Dutch, so that gave Hermann the unusual advantage of being able to use two callsigns - FS/DJ2BW and PJ7/DJ2BW - by operating from two locations.

The FS/DJ2BW shack was located in a pleasant modern bungalow, with 220V mains electricity supply, on the edge of a harbour backed by rolling hills. During the first week, operation took place from this location, resulting in 3100 QSOs. Activity was from the Dutch side of the island during the second week, when 1500 stations were worked as PJ7/DJ2BK. The bands used were 28, 24, 21, 18, 14, 10.1 and 7MHz. Operation on 3.5MHz was unfortunately not possible due to antenna limitations. Of the total of 4600 contacts for the two locations, 4300 were on CW, 100 on SSB and 200 on RTTY.

The FS/DJ2BW location on St Martin.

The equipment used consisted of a Kenwood TS-50 mobile transceiver, a KAM interface, a laptop computer, a small ASTU and an ETM-9COG memory keyer. The only antenna used was a fibreglass fishing rod 9m long, with a quarter-wave wire attached to it appropriate to the band in use.

To operate in PJ7, or elsewhere in the Netherlands Antilles, it is first necessary to obtain a reciprocal licence from the local authorities, supported by one's home licence. In French St Martin, in common with other French overseas territories, the home licence is sufficient, as France is a signatory to the CEPT T/R 61-01 recommendation permitting temporary operation abroad.

[Frank Watts, G5BM, is the UK agent for Samson electronic keyers - *Ed*] ♦

TURN TO PAGE 89 FOR NEWS OF OUR INSTANT MORSE CD-ROM

RADCOM NEWS FEATURE

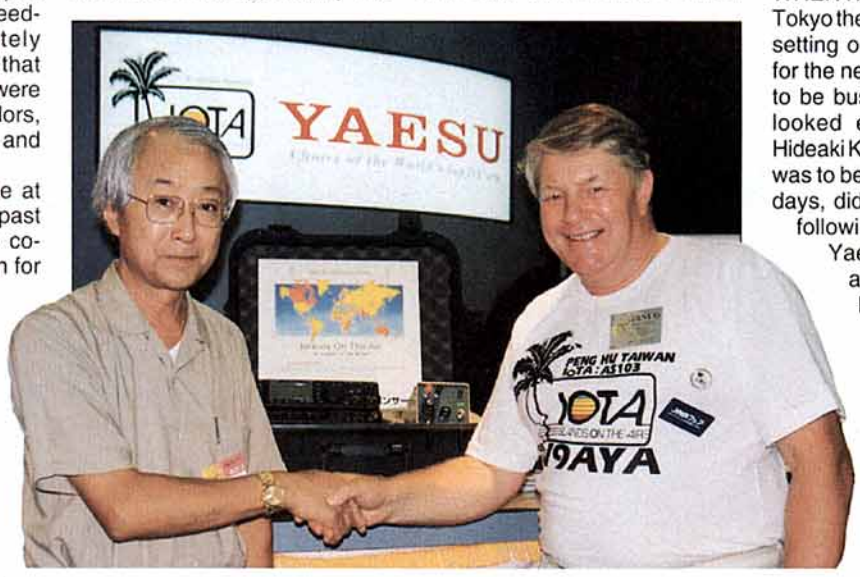
The Tokyo HamFair August 1995

by Neville Cheadle, G3NUG*

A general view of the uncrowded aisles at the Tokyo HamFair - despite the 53,000 visitors!

THE TOKYO HAM Fair must be the most popular amateur radio exhibition or convention in the amateur radio world. But despite the 53,000 visitors, well exceeding Dayton (approximately 40,000), it did not seem that crowded. The two large halls were well laid out with wide corridors, all very different to the push and bustle of some UK events!

So, how did I come to be at theTokyo HamFair? In the past year or so I had started to coordinate relations with Japan for the RSGB IOTA awards committee. We saw a huge potential market amongst Japanese DXers, but as yet we had relatively few JAs applying for IOTA awards. Our sponsorship agreement with Yaesu was working well, and the Japanese *CQ ham radio* magazine was actively marketing the IOTA publications. JARL was also very supportive of IOTA, and agreed to provide a slot in the lecture programme at the HamFair during the Saturday afternoon. So, the opportunity was there and the timing seemed right to promote the IOTA programme in Japan. The visit would also provide the opportunity to develop relationships further with *CQ ham radio* and Yaesu, both of whom had already done a great deal to promote IOTA in Japan.



Top Japanese DXer Kan Mizoguchi, JA1BK, a recent convert to the RSGB IOTA awards programme.

Yaesu Visit

WHEN I ARRIVED at the hotel in Tokyo there was a fax from Yaesu setting out a tentative schedule for the next six days: I was going to be busy, but the programme looked extremely interesting. Hideaki Kakinuma, JR1NUO, who was to be my host for the next six days, did a marvellous job. The following morning I visited the Yaesu Musen head office and met Jun Hasegawa, President of Yaesu, and some of the senior managers. All the research, development and testing work is done here and I was taken on a tour by Jun. I have never before seen so many CAD / CAM units with 20in monitors and so much test equipment - and I have toured quite a few electron-

* Further Felden, Longcroft Lane, Felden, Hemel Hempstead, Herts HP3 0BN.

ics companies in the past few years. The enthusiasm amongst the engineering teams for their products was infectious. At the end of the tour I had a real surprise when I was shown the new Yaesu FT-1000MP HF transceiver which was to be launched the following day at the HamFair. I could tell after using the rig for an hour or so, with its impressive array of noise-reduction and interference-rejection filters, that the FT-1000MP was going to be a winner.

Neville Cheadle, G3NUG, with 'IOTA's great supporters' in Japan: left Tomo Tanaka, JA1EFT, of *CQ ham radio* magazine, and right Jun Hasegawa, President of Yaesu.

Tokyo HamFair

AFTER LUNCH WE visited the Harumi HamFair site where the stands were being built. There was the IOTA booth in the middle of the huge Yaesu stand with a very large brightly-lit IOTA logo.

We arrived early the next day to set up the portable IOTA rig and the IOTA flag. Ten thousand copies of the Japanese version of the IOTA brochure had arrived, together with a large number of car window stickers showing the combined IOTA / Yaesu logo. The fair was opened by the President of JARL and by the President of JAIA, the manufacturers' trade association. These two organisations work very closely together.

Two delightful young ladies were on the stand to distribute literature and I asked them to make sure that anyone showing interest in HF equipment received an IOTA brochure and car sticker. The numbers of visitors increased rapidly (Friday 16,000, Saturday 22,000, Sunday 15,000) - I have never seen literature disappear so quickly. Taizo Arakawa, GW0RTA, had mentioned my presence at the HamFair in his column in *CQ ham radio* magazine. He had said where I could be found and suggested that if anyone approached me and said "Hello Neville-san" they might receive a small gift. About 30 did so and received IOTA badges.

There was also a great deal of interest in the IOTA portable rig with its Yaesu FT-900AT transceiver and lightweight switched-mode power supply. I was able to discuss how this station worked under DXpedition conditions, as I had activated two fairly rare Malaysian IOTA island groups (AS-046 and AS-073) as 9M2/G3NUG on the way to Tokyo.

There were a number of functions held during the HamFair - a luncheon get together, an evening 'eye-ball QSO party', and a dinner for overseas DXers, all of which were great fun.

On the Saturday afternoon I gave my lecture 'IOTA - The World's Hottest Award Programme'. This was translated sentence by sentence into Japanese and seemed to be well understood, judging by the quality of the questions. Dealing with the questions was quite difficult, as I wanted to make sure that the whole audience understood the questions that I was answering. We followed a set procedure: question in Japanese, translation into English, I repeat the question in English, question translated into Japanese, my answer in English, my answer translated into Japanese. This seemed to work!

CQ ham radio had created an IOTA booth on their stand for the IOTA publications, including the new Japanese language version of the *IOTA Directory*, translated by Taizo Arakawa, GW0RTA. Over 150 directories were sold at the HamFair and in addition, there were around 150 mail orders, a good start as the *Directory* had only been released a few days earlier. JARL provided space for RSGB publications and accepted orders on behalf of the Society, a useful facility.

I had the opportunity to walk around the HamFair from time to time. The ground floor was devoted to the large manufacturers, JARL and to some QSL printing companies. The big three manufacturers were all showing their new DSP rigs and it is going to be interesting to see some comparative reports [Peter Hart is working on a comparative review of two of these rigs now and we hope to bring you his results next month - *Ed*]. The first floor of the exhibition hall was allocated to smaller companies, clubs and to a flea market area similar to Dayton, but with only around 200 stands in total. I noticed that a *CQ ham radio* supplement for the HamFair contained a list of second-hand prices for all the most popular pieces of equipment - a very useful guide.

After the Fair

THE FAIR CLOSED later on Sunday afternoon. Everyone seemed to think it was a great success. Certainly from the point of view of IOTA, I answered a great number of questions and I am certain that in years to come the number of active participants in Japan will exceed those in any other country.

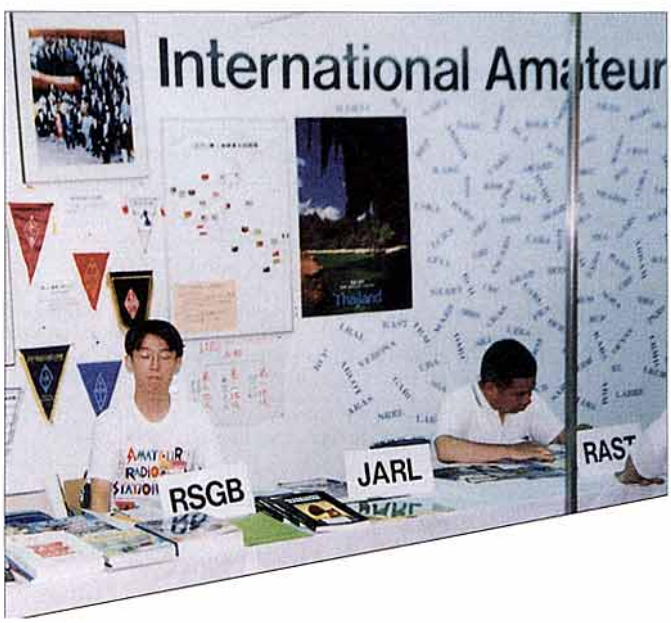
On the Monday morning I visited the ultra-modern JARL offices and was taken on a tour. The satellite station on the top floor was particularly interesting, as was the museum which had the first receiver I ever used as an SWL in 1950 - the BC-342.

The author and his two assistants at the IOTA booth on the Yaesu stand.

I also had a discussion with the JARL awards team about setting up an IOTA checkpoint in Japan. We plan to do this by 1 January 1997 and this will be a great incentive for more JAs to join the programme.

The *CQ ham radio* team entertained me to lunch that day. Sitting crossed legged Japanese-style was not the easist for my 17 stones, but the food and company were excellent. After lunch we visited Akihabara, the radio and electronics area in downtown Tokyo. It was fascinating but hot, 38°C and with 90% humidity!

A coach tour of Tokyo brought my visit to an end. It was a wonderful trip and my thanks again to Yaesu, *CQ ham radio*, JARL and to the IOTA Committee for their support. ♦



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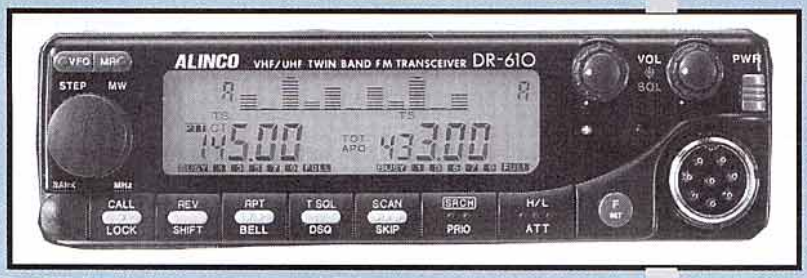

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RADCOM NEWS CONTINUED FROM PAGE 13

COUNCIL ATTENDANCE

1 January to 31 December 1995

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J Bazley	G3HCT		83%
EP Essery	GW3KFE		83%
D A Evans	G3OUF		67%
J N Gannaway	G3YGF		100%
J E Greenwell	G3AEZ		83%
R Horton	G3XWH		83%
I J Kyle	GI8AYZ		83%
N Lasher	G6HIU		100%
T I Lundegard	G3GJW	Executive Vice President	100%
N Roberts	G4IJF		83%
P R Sheppard	G4EJP		100%
M G Shread	GM6TAN		83%
I D Suart	GM4AUP	Immediate Past President	100%
D Whalley	G4EIX	(From 1 April 1995)	80%
R P Horton	G4AOJ	Honorary Treasurer	67%
J C Hall	G3KVA	Company Secretary	83%

*Absences mainly caused by attendance at IARU meetings.

The following retire from Council on 31 December, and are thanked for their services to the Society: J Bazley, G3HCT; T I Lundegard, G3GJW; I D Suart, GM4AUP.

Patagonian Visitor

FRED GREEN, LU5WS, is a descendent of early Welsh settlers who searched for gold and fertile lands in Patagonia, Argentina. He recently visited Bethel in Gwynedd and met members of the Welsh Language Net, many of whom had spoken to Fred over the air. Thanks to Dewi Roberts, GW0ABL, for sending in the story and photograph on page 13.

New Committee Chairmen

IAN SUART, GM4AUP, is now Chairman of the **Licensing Advisory Committee** and Ian Kyle, GI8AYZ, becomes Chairman of the **Membership Liaison Committee** from 1 January 1996. This corrects the information printed on page 14 of November's *RadCom*. The new chairman of the **Amateur Radio Direction Finding Committee** is Geoffrey Foster, G8UKT.

RSGB HF Awards

THREE OF THE more difficult awards, and one 'first-ever' award, have been claimed recently. The Supreme Commonwealth Century Club award is probably the most difficult of all the RSGB awards, requiring confirmed contacts with every call area of the British Commonwealth. Only the third of these ever to be issued was claimed by Henry Lewis, G3GIQ. The amount of dedication required to achieve this award is reflected in the collection of QSL cards, spanning over 40 years of HF operating, which Henry submitted.

Two awards were claimed by the Siaulai Radio Club from Lithuania, LY2ZZ. The club members claimed the 5-Band Supreme Commonwealth Century Club and a Supreme Worked ITU Zones awards. The first WARC band endorsement for the 5-Band Worked ITU Zones award was claimed by John Eaton, G3EZZ, who uses a modest station with wire antennas. Extensive use of CW was John's secret! John also claimed the first WARC endorsement for the 5-Band CCC earlier in the year.

Finally, congratulations to Alan Birch, G4NXG/M, who confirmed contacts with all of the IARU Region I member countries from his mobile 'shack' and claimed the Class 1 award. This was only the second time this award has been issued for mobile contacts.

The following awards have been issued up to 30 September 1995. All awards are mixed modes unless otherwise noted.

IARU Region One Award

Class 1 (for all countries on current list): JA1JI (CW), G4XRV, SP5PB, GW0DFY, G4NXG/M (SSB Mobile).

Class 2 (for 45 countries from the list): G4OBE (SSB); G0SWG, JA8XDM (SSB), HC4L (SSB), W6RQQ (SSB), BV2FI (SSB), G0GKH (CW), GI0PCU, KB2PFP, HS1NGR (SSB), SV1CIF (14MHz SSB), GM4AUP (SSB), JR3CVJ (21 MHz SSB).

Class 3 (for 30 countries from the list): BV7GC (CW), BV7FC (14MHz CW), BV7II (7MHz CW), YF0NA (21 MHz SSB), YB0DBZ (21MHz CW), SV1CIF (SSB), BV3BW, GI0NNK, BV5CN (SSB), G0TUV (SSB), DL9RCF (28MHz *and* SSB), BV4OQ (SSB), G4IFM (CW), BV7FN (CW), BV4JB (14MHz CW), JF7QUE (CW), IK0NOF (CW), JH1OGT (21MHz CW), JA8DGO (21MHz SSB), GW3LHK, GI0PCU (CW), JH8UGL, JR3ADB, BV7GA (14MHz SSB), HS1NGR (SSB), YB2PBX (SSB), SV1DHU (SSB).

Commonwealth Century Club

Supreme (*all* call areas): G3GIQ.
Standard (100 call areas): G3TBK, G4IUF.

5-Band Supreme (500 call areas): LY2ZZ.

5-Band Class 2 (400 call areas): G3TBK.

5-Band Class 4 (200 call areas): G3SWH (CW).

5-Band WARC Endorsement Class 4 (150 call areas): G3SWH (CW).

DXLCA (SWL DXCC)

100 country award: F-10652, F-10064, DE4ASS, UA9-130-1305.
Country stickers: *125* UA9-130-1305; *125, 150, 175, 200* F-10064; *200* BRS 94436.

Worked ITU Zones

Supreme (*all* zones): LY2ZZ.
Standard (70 zones): YU7FW.
5-Band Class 4: G3EZZ (CW).
5-Band WARC Endorsement Class 4 (first award): G3EZZ (CW).

Reaching New Heights

AMATEUR RADIO in the south west of England was given a boost when the Norman Lockyer Observatory on Salcombe Hill at Sidmouth in Devon was re-opened on 29 September by Dr Patrick Moore. The site received a £125,000 grant for new extensions which was financed by the East Devon District Council. The extensions include two new radio rooms, a planetarium seating 60 people, and a large entrance hall with display areas.

The observatory was set up by Sir Norman Lockyer on his retirement in 1913, and radio has been used there ever since. Some time later Marconi himself visited to give advice. During the last six years the site has been managed jointly by trustees of the Sidmouth Astronomical Society and the Sidmouth Amateur Radio Society on an annual licence basis, during which time the operation has been a great success. The two societies have now merged to form the Norman Lockyer Observatory Society Ltd and have negotiated a long term lease on the site. The former Sidmouth Amateur Radio Society has now become the Norman Lockyer Observatory Amateur Radio Group. The new group has benefited greatly from the new premises and membership has gone up accordingly. The aim of the new society is to promote, develop and encourage public interest and awareness in the study of science, engineering and telecommunications.

The two new radio rooms are fully equipped with demonstration amateur radio stations for VHF and all the HF bands, and operate with the permanent special event callsign GB2NLO. The VHF room is also equipped with packet radio, NLO node, remote imaging of weather satellites and weather fax. Patrick Moore toured the radio rooms, where he met club members G3AQM and G6SNY, and later paid tribute to the work being done at the site.

Members of the public are welcome to visit the Norman Lockyer Observatory on open days and on certain nights throughout the year. Arrangements for parties to visit can be made by contacting the Secretary on 01395 568591.

Turn to page 37 for more about astronomy and amateur radio.

Patrick Moore meets F J Gregory, G3AQM, in the new HF room at GB2NLO.

INDEX OF EQUIPMENT & SOFTWARE REVIEWS IN *RADCOM* - 1985 TO 1994

WE OFTEN RECEIVE enquiries from both members and non-members looking to discover whether a certain piece of equipment or software has been reviewed in *RadCom*. Listed below, in alphabetical order, is an index of reviews from 1985 to 1994 (volumes 61 to 70). A full index of *RadCom* 1995 (volume 71) will appear in the January 1996 edition.

Note: Prior to 1989 *RadCom* pagination ran sequentially through the year.

MEET THE RSGB AT A VENUE NEAR YOU

THERE WILL BE an RSGB bookstall at the Royal Society of Chemistry, New Burlington Place, **London**, the venue for the Society's Annual General Meeting on **Saturday 2 December**. Doors open at 12 noon, and a buffet will be available. The AGM itself starts at 2.00pm. Full details, including a map, are given on page VIII of the *Annual Report*, which was sent to all members with the November *RadCom*.

The following day, **Sunday 3 December**, the RSGB bookstall and a membership information stand will be at the Amateur Radio and Computing Rally at the Maryhill Community Central Halls, Maryhill Road, **Glasgow**. There will be two lecture streams with a large RSGB presence, including members of Council, General Manager Peter Kirby, G0TWW, and representatives of the VHF Committee, HF Contests Committee and Data Communications Committee.

RSGB Headquarters at Potters Bar will be open as usual on the third Saturday of the month, ie this month on **Saturday 16 December**, from 10.00am to 4.00pm. The bookshop, museum, library and GB3RS shack will be available to visitors. Morse tests will be available on demand between 11.00am and 12.30pm; don't forget to bring two passport-size photographs and the appropriate fee with you.

Finally, the **RSGB HQ** bookshop, museum, library and shack will also be open over the **Christmas holiday period** on **Wednesday 27, Thursday 28 and Friday 29 December**. Headquarters will be closed on Christmas Day, Boxing Day and New Year's Day.

RADCOM TECHNICAL FEATURE

Three-Band QRP Transceiver for CW

The concluding part by Bernie Pallett, G3VML

THE DRIVER / POWER Amplifier is shown in **Fig 7**. The input carrier signal, derived from the Band Pass Filter Module, is first amplified by buffer amplifier IC1 (SL1610), and then additionally amplified by a further two broad-band amplifier stages, transistors TR1 and TR2. These stages will only amplify during periods when the keyed +12V, from the Control Circuit, is present. The output signal from the final driver stage is coupled to the base of the Class C Power Amplifier TR3, via matching transformer T2. The output transformer T3, is a 4:1 impedance step down bifilar wound device, which serves to match the output collector impedance of transistor TR3 to 50Ω. The value of resistor R2 affects the overall gain of the circuit, the actual value chosen should give maximum circuit gain consistent with low output distortion. For optimum performance a 3.5MHz carrier input, at a level of 450mV, should deliver about four watts into an external 50Ω load at the transceiver antenna connector.

LOW PASS FILTER MODULE

THIS CIRCUIT, see **Fig 8**, consists of three Low Pass Filters, any one of which can be chosen by energising a pair of relays. Because relays are more electrically rugged than switching diodes, they were chosen for this circuit despite the extra expense. Past experience has shown that switching diodes tend to break down under high VSWR conditions when interfacing Power Amplifier Stages to external loads.

TRANSCEIVER CONTROL CIRCUIT

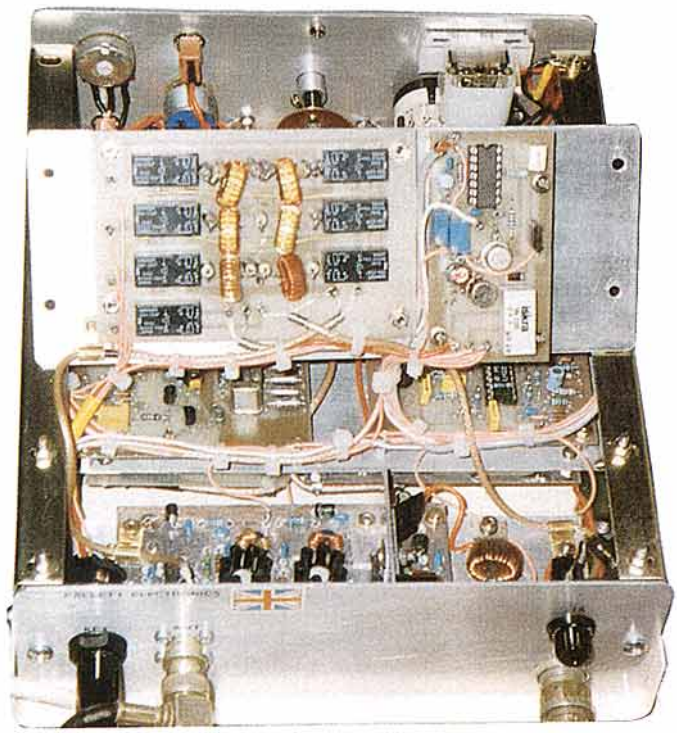
THIS CIRCUIT, shown in **Fig 9**, can be divided into two halves, the first comprises transistors TR2 and TR3, which control the energising circuit for relay RLA/1. The contacts of this relay switch the +12V supply alternatively between the receive and transmit supply rails.

When the Key input is grounded transistor TR2 becomes fully forward biased, which permits capacitor C6 to charge from the +12V supply rail, via TR2 and D2. The voltage across C6 increases with charge, switching on TR3, thereby completing the energising circuit for relay RLA/1. Series emitter diodes D4 and D5, ensure that transistor switch TR5 will not react to circuit noise.

When the Key Input goes high, transistor TR2 ceases to conduct, therefore capacitor C6 begins to discharge through resistors R10 and RV11. At or near full discharge, the voltage across capacitor C6 becomes sufficiently low that transistor TR3 will cease to conduct, at which point Relay RLA/1 becomes de-energised.

The rate that C6 discharges is proportional to the combined resistance value of R10 and RV11. By adjustment of trimpot RV11, the discharge time of C6 can vary from approximately 200 milliseconds to about 1.5 seconds. This controls the release time of Relay RLA/1 and the time for the transceiver circuits to return to receive mode at the end of each transmission.

The second half of the Control Circuit comprises a nominal 750Hz tone generator, and also transistor TR1 which controls the switching of a +12V supply to the Driver Power Amplifier Module; both are activated by the same Key input. The output level of the side tone is determined by adjustment of trimpot RV1.



OPTIONAL REJECT FILTER

THE PURPOSE of this optional reject filter circuit, (see **Fig 10**) is both to attenuate the unwanted broadcast station breakthrough, whilst not impeding the 14MHz signal input to the receiver. By adjustment of L1, in series

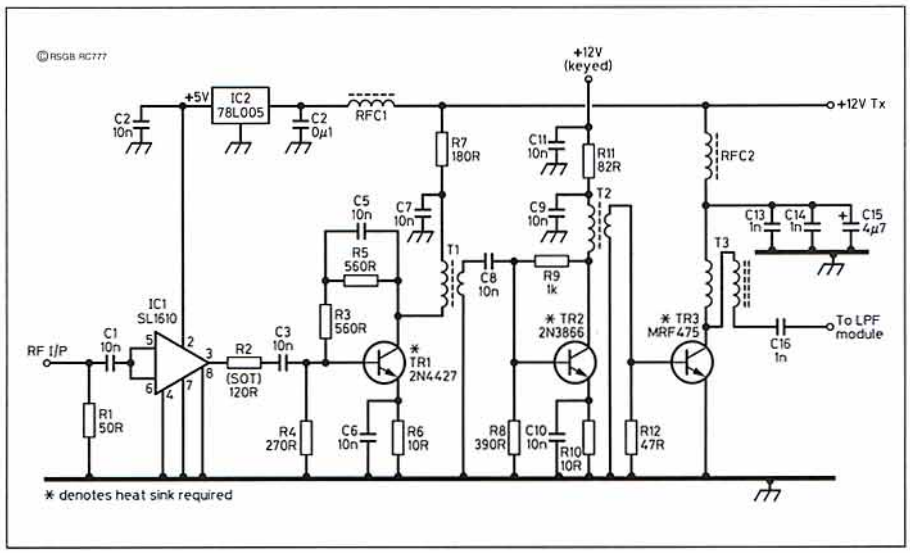


Fig 7: Transmitter driver and power amplifier, circuit diagram.

with C1, the circuit can be tuned to reject signals that originate from the 31 metre broadcast band. The series tuned circuit, L2 and C2 is a 14MHz acceptor network.

CONSTRUCTION AND TESTING

THIS IS A FAIRLY ADVANCED project, and should only be attempted by, or under the guidance, of someone with some prior construction experience.

The most necessary item of test equipment is of course the multimeter. Testing the transceiver will be easier if you have other equipment such as an HF signal generator, a frequency counter and, if possible, an oscilloscope.

As an alternative to the HF signal generator and frequency counter, an HF transceiver may be used. It can function as a signal source (into a dummy load), a frequency counter (particularly if it has a digital readout) and as a signal level indicator.

From experience gained so far, apart from the usual constructional errors, most faults were caused by the failure of the odd switching diode. For example this can cause a local oscillator to resonate on two crystal frequencies, or for two filters to be selected at once. It is important not to over-drive the final RF power amplifier, to do so could cause spurious radiation. Housing and positioning of the various finished modules is not critical, but there should be sufficient room within the metal project cabinet to permit good ventilation. Inter-module RF signal connections are made via miniature 50Ω coaxial connectors. The cabinet screen bulk heads and external panels should be well bonded to both chassis and earth. All the printed circuit boards are single sided track, however the Driver/PA is constructed from double sided copper laminated glass fibre board, the top layer is utilised as a ground plane.

The main tuning capacitor should be electrically isolated from the chassis. One method is to use a piece of unlaminated glass fibre board for this purpose. The spindle of the tuning capacitor should be coupled to the dial mechanism via a nylon shaft, a length of shaft cut from a volume control should suffice for this requirement. It is advisable to take anti-static precautions whilst installing the integrated circuits on to the assembled printed circuit boards. Apart from the Driver/PA board, it is desirable to fit dual in line sockets to house the integrated circuits wherever possible, as this will aid any future servicing, or fault finding that might be required.

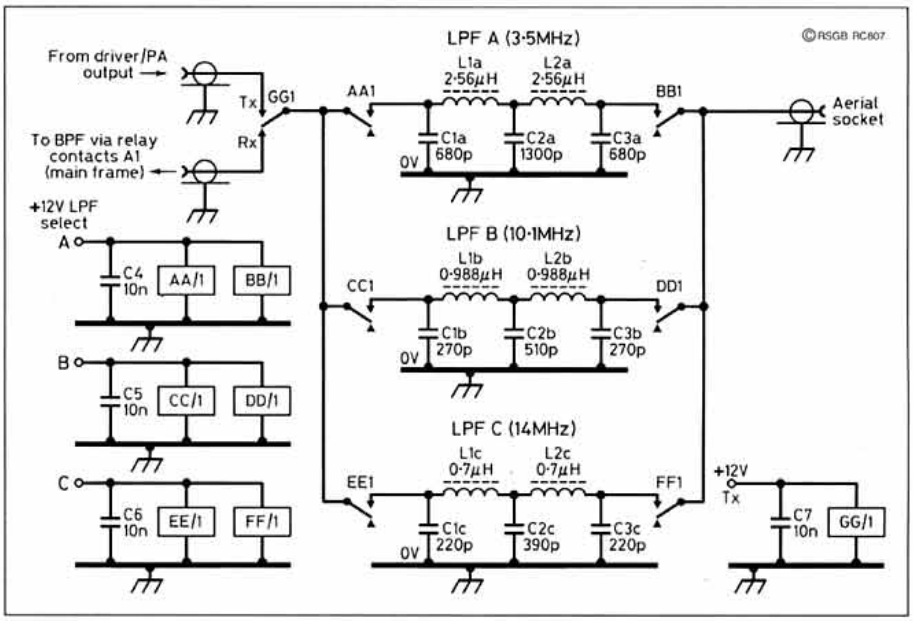


Fig 8: Low pass filters, circuit diagram.

CONCLUSION

AFTER COMPLETING the construction of this project, both G3MJX and myself have air tested this transceiver over a period of three months. After ironing out remaining design and performance glitches, we both found the transceiver to perform well on all three bands, which included making some transatlantic contacts on 20 metres. It estimated that the cost of construction, excluding hardware and also assuming that you have to buy every single component, to be about £150 at current prices. However by shopping around for the best deals, and using reclaimed components, there is plenty of scope to reduce this estimated construction cost considerably. All the components are readily available from most of the main electronic component distributors.

Finally I wish to take this opportunity to thank my good QRP operator friend, Tony Bird, G3MJX, for his enthusiastic help and encouragement associated with this project.

FURTHER READING

ADDITIONAL MATERIAL on the design and construction of HF transceivers is given below:

- *Radio Communication Handbook* (RSGB), chapter 7, pages 7.41 to 7.59
- '5W 20m VFO Tuned Transceiver', Gary Breed, KGAY, *QST* December 1990.
- 'A modular multiband transceiver' Mike Grierson, G3TSO, *Radio Communication* October / November 1988.

NOTE

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

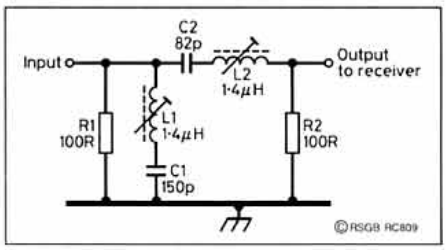


Fig 10: Optional broadcast station rejection filter.

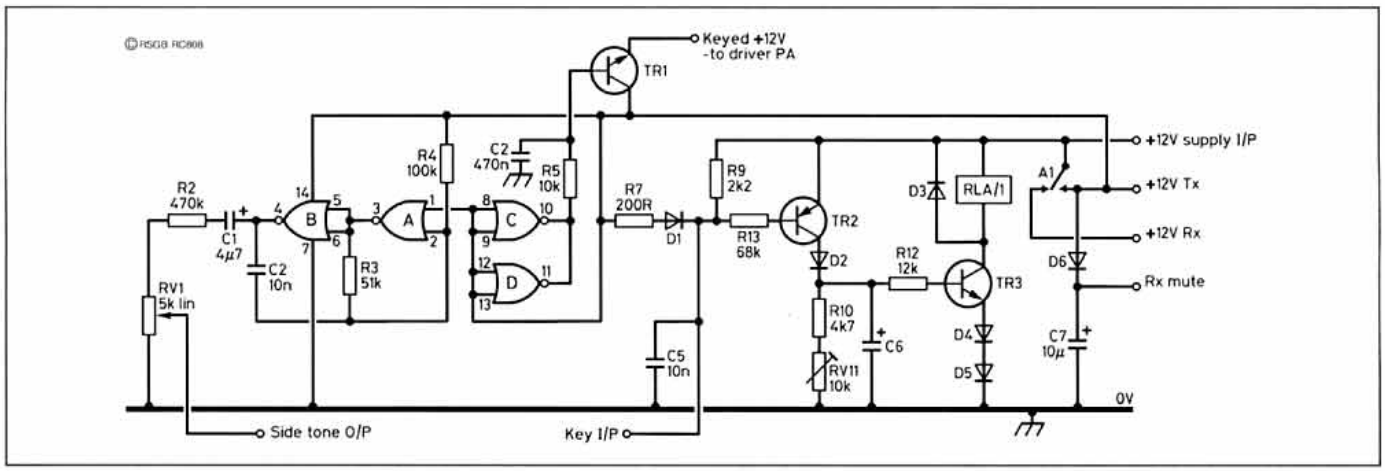


Fig 9: Control module, circuit diagram.

Pat Hawker's Technical Topics

PAT HAWKER, G3VA
London 37/SE22 8SS

100 YEARS OF RADIO

THE RECENT IEE three-day conference succeeded in holding the interest of the nearly 200 delegates from the first day - largely devoted to the beginnings of radio with emphasis on the work of Hertz, Lodge, Marconi, Fessenden and the early application of radio to maritime and even military (Boer War) communications - to the third day with its reviews of the current use of space satellites, cellular radio, spread spectrum techniques, and the start of digital radio broadcasting.

In between, we were treated to a description and a special demonstration of the oldest working transmitter in the world - the 200kW Alexanderson alternator transmitter, SAQ, at Grimeton, near Varberg, Sweden, which can still put out a potent signal on 17.2kHz. This was received at the BBC monitoring station at Caversham with the signals sent along digital landline to Savoy Place. We also had reminiscences of the home-construction era of broadcast receivers; a review of developments in Germany 1920 - 45 by Dutch amateur Arthur Bauer, PA0AOB; radio propagation research; the pioneering FM work of Howard Armstrong; pulse-code-modulation (PCM) devised by Alec Reeves.

Antennas and propagation - from ELF to microwaves - were also well covered, with R C Kirby, formerly of the ITU Radio Bureau (and incidentally an amateur of 1938 vintage), considering the history and trends in spectrum regulation.

It was interesting to note how, after 94 years, the 'reception' of those three-dot signals by Marconi at Signal Hill, Newfoundland - the world's first attempt at long-distance radio - can still spark off controversy and continued study and experimentation. Canadian Dr John Belrose, VE2CV, is among those who retain doubts that signals from the spark transmitter tuned only by the fan antenna (**Fig 1**) at Poldu could have reached Newfoundland strong enough to be detected. J C B MacKeand, WA3ZKZ, (an Englishman living in the USA) believes from his studies that the signals made it, though not necessarily on the fundamental frequency imposed by the fan antenna.

The very first 'DX-pedition'. Marconi (centre) with G S Kemp and P Paget at Signal Hill, New Foundland in December 1901. In the background is the kite used to carry the receiving antenna. The basket on which they are sitting contained the balloons which they had intended using but which were blown away when they attempted to fly them. Scientists and engineers still argue whether the dots heard by Marconi and his assistants were really signals transmitted from Poldhu.

Amateur radio was not forgotten; a considerable proportion of the 'professional' delegates including many of those delivering papers and five members of the organising committee hold, or had held, amateur licences. A paper 'Amateur Radio: past, present and future' written by Joe Kasser, K3/G3ZCZ, was presented by Richard Lambear, G3RWL. The paper on 'Developing digital radio communications using small satellites - the UoSAT programme' describing work at the University of Surrey gave full credit to its origins in the AMSAT programme.

My personal regret, although in the circumstances inevitable, was that there were relatively few delegates at the threshold of their careers in radio communication. The rewarding 250-page IEE Conference Publication (No 411) is priced (at almost £50) well beyond student and amateur budgets. I hope that many will seek it out in the university and other libraries that hold IEE conference publications.

A 'poster presentation' by Dr Peter Excell and D. Excell of the University of Bradford explored 'What use is the history of radio?' This stressed that radio is a particularly impressive achievement of human, scientific and technological investigations which have made it a major force in the shaping of the modern way of life. This makes its history of use in education, technological forecasting. Museums with radio artefacts should be encouraged and should seek to establish and show the historical context of radio relics.

Examples of some of the subjects covered at the conference are as follows:

"Quartz crystals have been used in oscillators continuously since 1923, and are likely to remain the major form of stable low-noise frequency sources for many years to come" - Professor Mike Underhill, G3LHZ, conference. (I hope to refer to this excellent paper on another occasion - *G3VA*)

"Noise has been described as 'The ubiquitous, unwanted, insistent, unwelcome gatecrasher of electronic systems'. Whatever the description, noise adversely affects a radio system's performance. It can be naturally occurring or man-made and sometimes intentionally introduced as jamming. Good engineering practice based on 100 years of research and development can reduce noise and its effects to manageable levels, but there are some fundamental limits. 'Know your enemy' has always been a good maxim . . ." - David Evans, consultant.

"There does not, at present, seem to be any alternative to electromagnetic radiation for communication between places not connected by wire or fibres. Neither do there seem to be any major propagation modes which are not known at present, at least in general outline. Thus propagation research will continue to be devoted to more precise characterisation and modelling of the medium. This should yield better prediction methods, with less statistical uncertainty, which may be applied to give greater utilisation of the spectrum... There is no doubt that the small community of propagation researchers throughout the world will have the important work to do for many years to come". - Professor Les Barclay, OBE, G3HTF.

"Already (communications receivers) are available which digitise the signal at some point and perform, for example, filtering in software.... The approach is to retain a substantial degree of analogue filtering, digitise the baseband signal and use the digital signal processor to perform tasks which are more efficiently done in the digital rather than the analogue domain. Squelch, noise reduction, speech compression, audio AGC and data demodulation are typical examples. Efforts are being made by receiver manufacturers to digitise the signal as near to the antenna as possible, thus eliminating analogue circuitry. The ultimate goal is the antenna signal directly feeding an analogue-to-digital converter with all signal processing and conversion to baseband being performed in software. All that then remains is too digitise the operator!" - R T Sutton, Eddystone Radio.

"Early antennas were designed empirically and any theoretical explanation was produced after a working antenna had been developed. This was largely the case up to the mid - 1920s. From that time onwards electromagnetic theory was used to aid the development and design process. Design methods can be divided into 'before' and 'after' computers were developed" - Professor A D Olver.

The associated exhibition was similarly well balanced in covering many aspects of

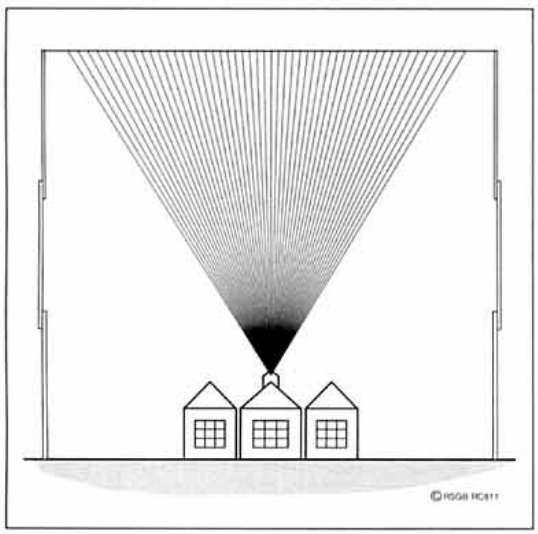


Fig 1: The emergency fan antenna used at Poldhu, Cornwall in December 1901 after the original, more complex and higher antenna had been destroyed by gales. Two wooden masts, 170ft high, were hastily erected and the fanwise antenna consisting of 60 bare copper 7/22 wires was strung from a triactic stretched between them. The aerial was not excited by an induction coil, but by a 25kW, 45Hz alternator charging high voltage capacitors through a transformer.

pioneering and current equipment and components, and clearly interested delegates between sessions.

MORE ON COAXIAL ANTENNAS

COMMENTS HAVE CONTINUED to come in about August's *TT* item 'Coaxial travelling wave antenna?' (see also November's *TT*). Stan Brown, G4LU, writes: "I would suggest that the so-called 'coaxial travelling wave antenna' is anything but that. It seems to me to be just a coaxial stub almost in parallel with the feed point of a vertical antenna, *viz* the outer surface of the tube. I say 'almost in parallel' because the coaxial stub is connected across the whole of the transformer secondary winding whereas the vertical antenna is connected between one end and the secondary's virtual earth point. Taking the simplest form of Fig 6(a) (August), the reactance of the short-circuited coaxial stub will be its characteristic impedance times the tangent of its electrical length expressed as an angle. The reactance of the vertical antenna will be opposite in sign and its magnitude will be its characteristic impedance divided by the tangent of the same angle. The stub characteristic impedance will be, due to its larger diameter, somewhat lower than that of a wire of the same length. When referred to the primary of the transformer there will be a cancellation of reactances which in effect will enhance the bandwidth of the antenna over that obtained from a simple vertical.

"However, the tangent of an angle and its inverse have a 'see-saw' relationship. When one is infinite, the other is zero and vice-versa; but in mid-range, when the angle is about 45° (or its odd multiples) they are about equal. Thus cancellation of the reactances will take place only over a small range of angles of mid-value; but at the extremes, when the angle is a multiple of 90°, the reactances will diverge considerably in magnitude. Hence the statement that the antenna will not work if it is resonant (nor anti-resonant). At these latter points the SWR will go haywire so one has to trade off the inferior performance of a short vertical antenna against the improved bandwidth over what one would normally obtain."

G4LU continues: "The radiation resistance of the antenna will be that of a short vertical and lower than one could expect with a longer wire antenna. Consequently, the transformer must be designed to suit the lower value or alternatively designed to be compatible with the ATU in use.

"It is interesting to note, from the dimensions quoted, that the tangent of the angle corresponding with the electrical length is between 0.5 and 1.6 for the 1.8, 3.5, 14 and 28MHz bands; whereas it is above 4.5 at 7MHz, which probably explains the quoted performance difference on that band. The other variants in Fig 6 (August) are modified versions of the stub and provide different values of reactance at its input, but the same analysis will apply.

"Since the antenna is essentially a vertical antenna, albeit with reactance compensation at its feed point (which adds nothing to its radiation properties), I cannot see why its performance should not be enhanced if it were mounted above an earth plane (ie earth mat or radials)."

HIGH PERFORMANCE, HIGH GAIN IF AMPLIFIER

AN ITEM, 'Low Noise AGC Controlled IF Amplifier' in *TT*, May 1995, p61 emphasised that modern approaches to receivers with super-linear front-ends and with DSP at the 'rear-end' require new thinking in most sections of the receiver. In May's *RadCom* a 9MHz IF amplifier design by Colin Horrabin, G3SBI was described, intended for use after

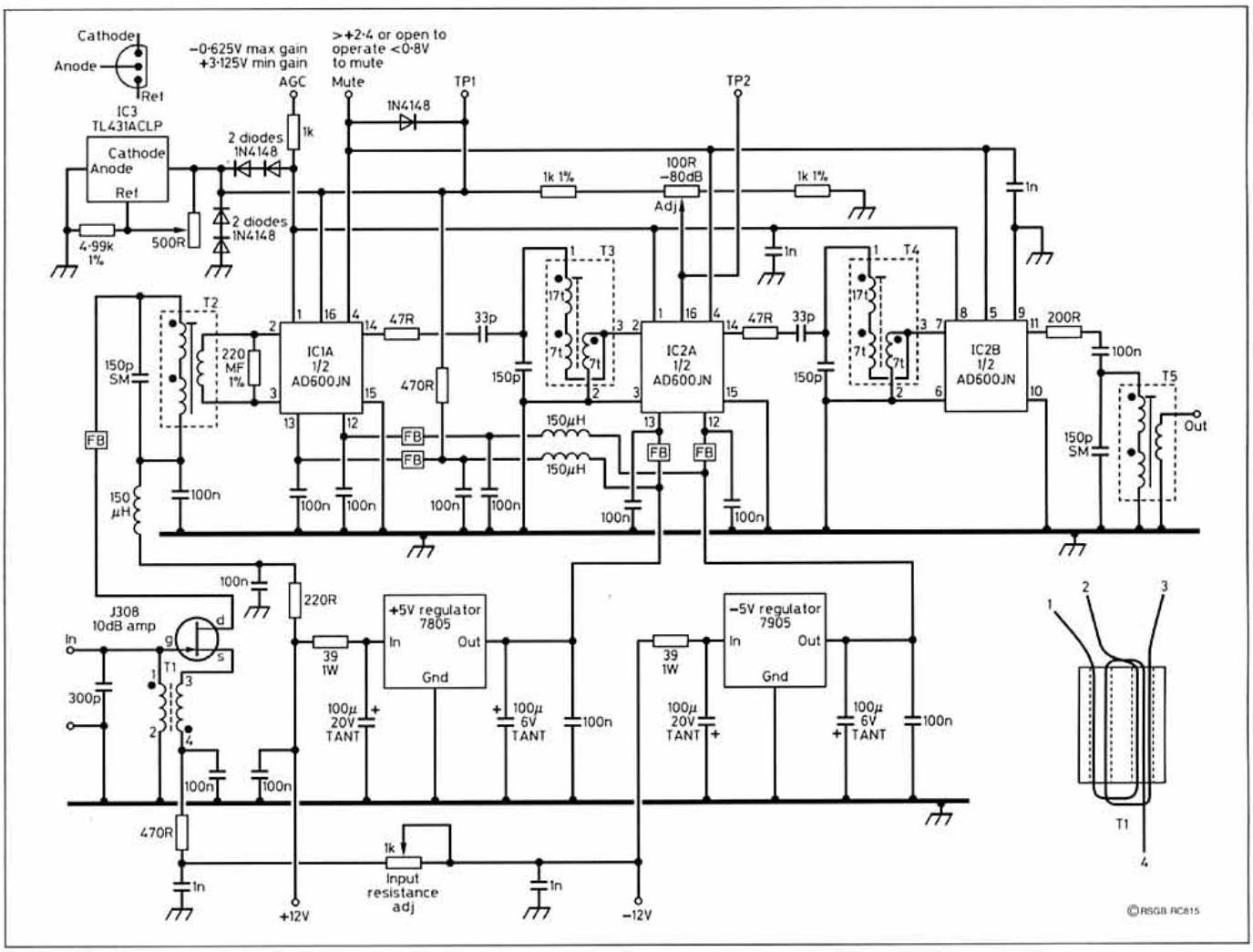


Fig 2: The high-gain, low-noise, AGC-controlled state-of-the-art 4.434MHz IF amplifier as developed by Bill Carver, K6DLG/7. Input and output impedance 50-Ω. Gain 95dB. AGC range 120dB. Max input 0dBm. Max output - 25dBm. Noise figure 1dB. Power: +12V and -12V DC at 100mA. Transformers: T1, T2, (see sketch) 1-2, 4t Nr 28. 3-4 3.5t Nr 28. Core Amidon BN-61-202. T2, T5, 15t trifilar Nr 30, slug tuned form Amidon L43-6, primary 6-9.5µH (set at 7.2µH). IC1B not used. Ground pin 6, 7, 8, 9, 10 with pin 11 not connected. Test point 1. Set to 2.596V with '-40dB pot' and refine for smooth gain/voltage around 40dB gain-reduction point (AGC +1.875V. Test Point 2. Set to 1.298V with '-80dB pot'. Refine for smooth gain/voltage around 80dB gain-reduction point. (AGC 0.625V).

his state-of-the-art H-mode mixer as presented in *TT* in October 1993 (correction November 1993) and in the current edition of *Radio Communication Handbook*.

The H-mode mixer is currently arousing considerable interest in the USA and one result has been that Bill Carver, K6DLG/7, has developed an alternative low-noise IF amplifier with exceptional characteristics including a 1dB noise figure, gain of 100dB, maximum input of 0dBM, maximum output of -20dBm and an AGC range of 120dB. K6DLG has sent details of his design (**Fig 2 and 3**) to G3SBI together with permission for its publication in *TT*.

G3SBI writes: "This IF amplifier intended for use with an H-mode mixer front-end is based around the Analog Devices AD600 devices; although the interstage networks are centred at 4.4MHz it would be useful with modified transformers for any IF up to about 21MHz.

"I expressed some concern to K6DLG that with so much gain at a single frequency, there could be a problem from BFO leakage to the front-end. In my case I may convert from say 9MHz to 6MHz for final detection, alternatively a final IF of 100kHz could be used but if this were done it might be better to use 2-pole crystal ladder filters as the interstage coupling network. Otherwise there might still be a BFO leakage problem.

"Bill is a gifted radio engineer although he now teaches mathematics. He has produced a most attractive IF amplifier which has already been successfully duplicated by some of his radio friends. It should be most useful to constructors of advanced receivers."

Subsequently, Bill Carver, K6DLG/7 sent me additional notes on this state-of-the-art IF amplifier. He is planning later to publish a fairly detailed article describing the complete 'back end' of a receiver, including this IF amplifier, in *Communications Quarterly*.

He writes: "First some philosophical issues - *Broadband Noise*: This amplifier has high gain so even though the noise figure is low due to the JFET with gate-source feedback, the broadband output noise is considerable. When it operates a product detector that noise is translated to audio, folded over around the BFO frequency (there goes 3dB!), but band limited. The result is acceptable, a minimum detectable signal (MDS) in the region of 0.02μV.

"However, an AGC detector is *not* a linear translation. Band limiting the output of a DC rectifier does no good. I find the broadband noise is about 100mV RMS and this is far too large. Therefore, if AGC is used, a post-amplifier bandpass filter is mandatory. It also offers the opportunity of preventing the loss of 3dB when the noise spectrum is folded at the BFO frequency.

"I successfully patched in the 2-pole 'roofing' crystal ladder filter that I have following the H-mode mixer. It is 3kHz wide at -3dB, with the holder capacitance 'neutralised' to maintain RMS, but I would like it lower, so I could reduce the AGC threshold. I have no interest in increased time delay through any filter, the bane of AGC stability, but intend to experiment 'soon' with a 3-pole filter.

"*Gain, output level etc*: We usually have only a general idea of what the final gain of an IF amplifier will be. Furthermore, we have even less idea of how that gain is distributed or which stage will overload first.

"The AD600 changes that. The gain and gain distribution depend only upon the accuracy of the coupling networks. In this amplifier the J308 delivers 10dB of gain from the input to pin 2 of IC1A. IC1A delivers 0-40dB of gain to T3. T3 has 10dB of loss to the input on IC2A. Similarly T4 has 10dB of loss, IC2B has 0 - 40dB of gain and T5, with the 200Ω resistor, has 12dB of loss.

"When a finished 3-stage plus JFET amplifier delivers only 95dB of gain we have extra loss in the interstage networks. If we are to avoid overload at 0dBm input, the output must be limited to (120-gain) dBm. In the event of say 95dB gain, the nominal output level should be limited to -25dBm if distortion is to be avoided over the whole 120dB gain range of the AD600.

"Where the overall gain differs from 100dB, I've found the culprit is usually a 33pF capacitor on the low side of its tolerance or (once) out of tolerance. A few pF in parallel will bring the gain up.

"The earliest amplifier had no separate reference voltage for the AGC section of the AD600. It used divided-down supply voltage. Since this determines the point at which each chip's gain-control section operates this proved far too casual an approach. I've added

IMPROVED STOPBAND OF CRYSTAL LADDER FILTERS

STEIN TORP, LA7MI, has found a relatively simple way to increase greatly the stopband attenuation. One result would be to provide an effective roofing filter in a double-conversion receiver, but the technique could also be applied to narrow-band filters using three or more crystals.

LA7MI writes: "My experiments were carried out with fifth harmonic 92.8611MHz (HC18/U) crystals. At their fundamental frequency (18.556MHz) they were free of spurious responses and I first constructed a simple ladder filter at that frequency: **Fig 4**. The stop-band attenuation was 35dB, which is about usual for such a filter.

"To build a better filter (**Fig 5**) I first modified the matching network. L1 was replaced by a 51pF polystyrene capacitor; C1 was replaced by an inductance wound on an Amidon T37-2 toroid. By using a bifiliar winding and a 2-4pF ceramic trimmer the internal capacitance of the crystal (approximately 3.8pF) can be neutralised. After careful screening, the stopband attenuation is now close to 90dB which is the limit of measurement with the HP8505A Network Analyser.

"The passband is more symmetrical compared to the original unneutralised filter. Insertion loss is only 1.5dB."

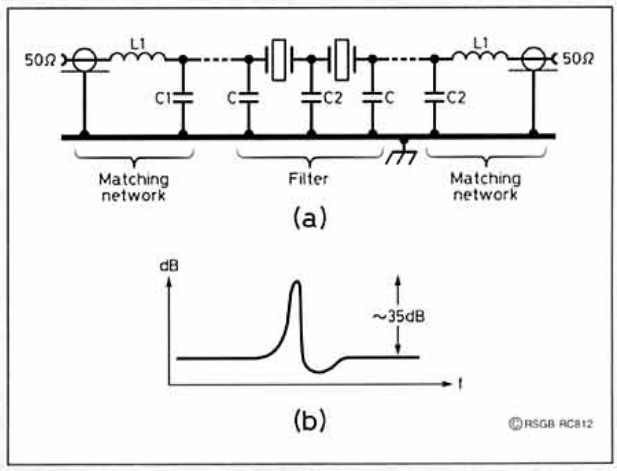


Fig 4: (a) LA7MI's prototype two-crystal ladder filter. (b) Approximate shape of the response curve showing a stopband attenuation of about 35dB.

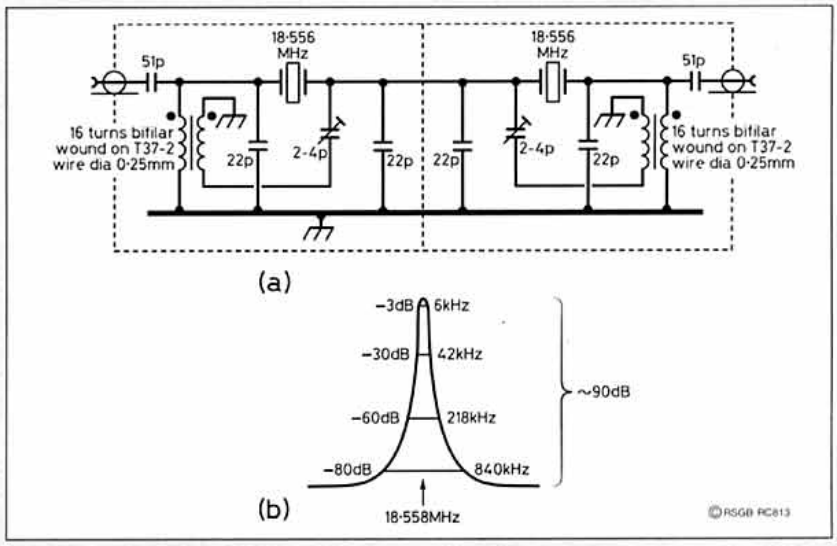


Fig 5: (a) LA7MI's improved two-crystal 18.5MHz crystal with the crystal capacitance neutralised. (b) Response curve showing a stop-band attenuation of almost 90dB. Such a filter would make an excellent low-cost roofing filter.

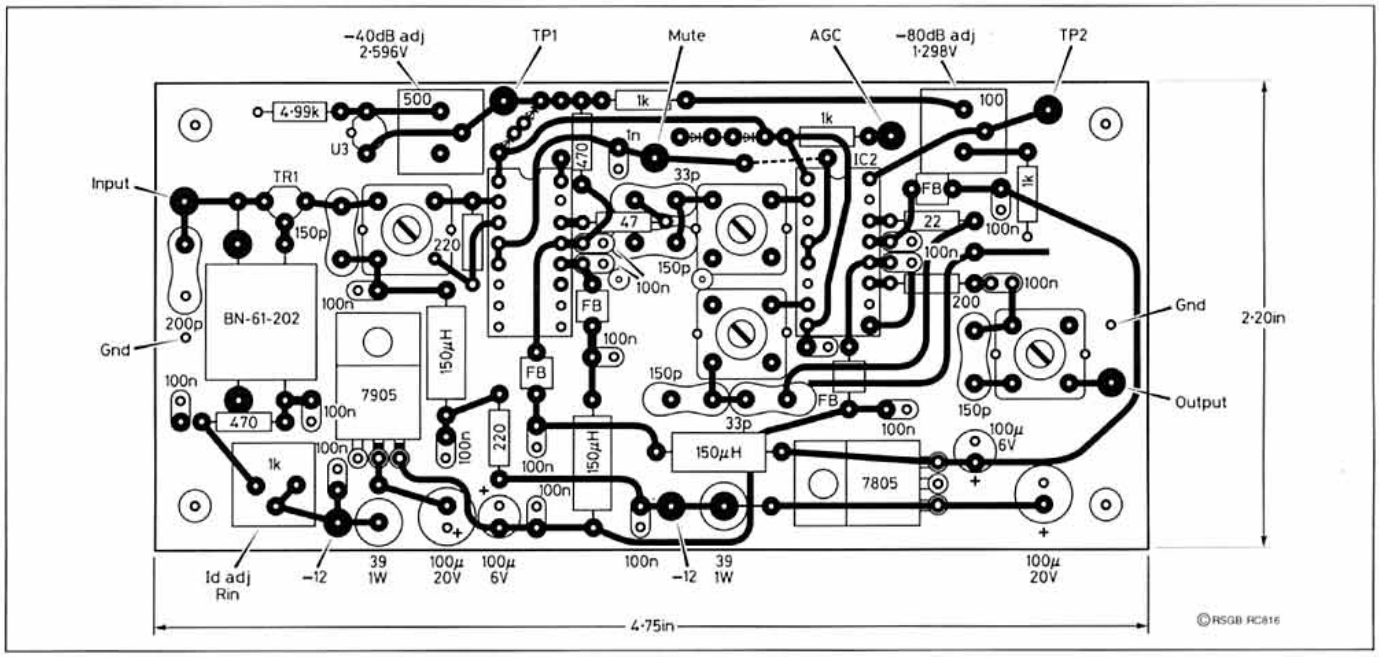


Fig 3: Printed circuit board details for K6DLG's IF amplifier.

the TL341 to provide a nominal 2.6V reference which is divided to 1.3V for the second 40dB stage.

"The TI431 is a *shunt* regulator which works very well to clamp, through signal diodes, the AGC and mute pins, as follows: The AGC pins of the AD600 must be limited to the +/- 5V supplies. Two 1N4148 diodes from the AGC pin to ground limit negative excursions to about -1.4V, and two more from the AGC pin to the TL431's +2.5V reference limit positive excursions to about 3.9V. If used, the *mute* pin needs protection. It is hoped to incorporate this in a future design. G3SBI's concern with IMD led me to block the DC path from pin 11 of IC2B in order to prevent the possibility of a few mA of DC being bled to ground through T5.

"*Transformers*: T1, for those not familiar with dot convention, Fig 2 shows the direction of windings. The transformer is resonated with a 300pF capacitor, but the value depends upon the precise permeability of the core and the IF frequency, but it is very low Q. A return loss bridge could be used to find experimentally the capacitance required for any particular situation.

"T3, T4: W4ZCB has pointed out that the caption notes on the windings of T3 and T4 may be unclear. I used one length of Nr 28 gauge wire. A short bit is folded back on itself and twisted to form a bifilar pair hanging on the end of the single Nr 28 strand. The loose, short wire where the twisted pair turns back into a single wire is the dot end of the secondary and is soldered to pin 3. The seven turns are wound on the former, the extra length of bifilar wire trimmed off, and an ohmmeter used to find which one is the other end of the pin 3 wire. This other end is soldered to pin 2. The remaining wire of the bifilar pair is soldered to pin 3. Then the remaining long single wire is wound for 17 more turns, continuing the same direction as the first seven turns are going from pin 2. This is soldered to pin 1. Note that although the winding are the same, for board layout reasons the windings of T3 and T4 are not wired the same way to the header.

"*ACG adjustments*: Adjustment of thresholds to align the gain 'handoff' between stages seems to be uncritical. However, in the interests of taking every possible measure a simple test generator is being built to optimise the exceptional AGC performance. The AD600 is so well defined that it is possible to design the circuits and write a procedure for such an adjustment, but this will wait until the test circuits are built and the procedure verified."

SWITCHING DIODES: DJ2LR/ KA2WEU'S REPLY

THE ITEM 'RF Switching Diodes Controversy' *TT*, July 1995, included G4HRY's criticism of the advice given by Dr Ulrich Rohde, DJ2LR/KA2WEU/4, in his excellent articles in *QST* that the second order IMD performance of several popular amateur HF transceivers could be improved by judicious substitution of PIN diodes, such as the Hewlett Packard HP5082-3081, specifically intended as RF switching diodes. I pointed out that the criticisms were based solely on RF losses and that G4HRY had not made any IMD measurements. I added that I was sure that Dr Rohde could provide a convincing reply. However, in view of his experiences with G4KPT's Omni VI I felt it would be right to include G4HRY's view that it was unwise to put unquestioning faith in published articles, including even those in *QST* and *RadCom*.

The detailed measurements provided by G3SBI (*TT*, November) and those published by DB1NV in *VHF Communications* showed clearly that there is a wide difference between different diodes used for RF switching both in insertion loss and in IMD performance and that IMD is significantly affected both by the forward current through the diode and by frequency.

As a result of an unfortunate delay, the November item was written before I received a fax sent by Dr Rohde on July 18th. This, in a slightly abridged form, reads: "I feel really concerned and sorry about G4KPT and the results of his experiments. As a matter of record, I would like to point out that intentionally I had not changed any of the diodes myself, but had the authorised service departments of AES, Milwaukee replace the diodes in the Yaesu FT890; ICOM changed the diodes in two IC765s; and Kenwood made the same changes in a TS50. The itemised ICOM repair bill shows 0.12uV for 12dB SINAD. I also had the other companies involved validate that following the diode changes, the receivers were within specifications.

"This validates my statement that this was a repeatable effort and the changes were not done at the expense of performance in any respect. It is also a matter of record that the HP5082-3081 diodes were used in the production of the Collins KWM380, one of which I still own and whose noise figure is on target with 0.3µV without a pre-amplifier and whose 2nd order IMD is superior to other diode applications. This should remove any doubts as to the correctness of my *QST* article.

"I have had no experience in modifying an Omni VI nor did I do any measurements or modifications with it. The ARRL edited in the Omni VI because it is a popular US-made transceiver and there had been some discussion as to whether or not the European version had different diodes or relays. Before fingers are pointed at specific diodes, I would like to examine the circuit diagram because there can be no need to change all 40 diodes. As an experiment, I may want to supply one set of more modern diodes.

"Everyone who has contacted me as the result of the *QST* articles had been advised not to use the HP 3081 (for reasons of cost and availability) but rather to use a Siemens BAR17 diode or MI204 diode, which is available through ICOM dealers/repair centres. Those diodes are much less expensive and more readily available.

"To the best of my knowledge, the companies who changed the diodes in the equipments involved did not change the diode bias. It is questionable why any one should wish to change diodes in the IF section; similarly diodes in the transmit/receive switches should not be touched.

"Finally, there is no question that relays provide the best of all worlds as far as IMD characteristics are concerned, but not necessarily the best solution in terms of space and costs. I have just tested a soon-to-be-re-

leased transceiver which uses PIN-type diodes and exhibits superb IMD characteristics while maintaining a good noise figure.

"As to multi-tone functionality, once 2nd and 3rd order IMD tests have been done, one can predict the higher-order IMD effects, especially since they are based on diode characteristics and this type of test is a legitimate test to evaluate receivers.

"Hopefully, your readers will not deduce from this experiment that *QST* or other reputable magazines publish articles which are technically incorrect."

In a subsequent letter, dated September 19, 1995, Dr Rohde confirms that he has run into a lot of people who have modified their RF switching diodes and have been extremely happy with the results. Further, after refining his test set-up he finds the improvement is now slightly more dramatic than outlined in his *QST* article.

In regard to Dr Rohde's endorsement of the technical accuracy of articles, I would enter a caveat. While most writers strive for complete accuracy, the mechanics and Murphy's Law of publication make it difficult to avoid some errors, particularly in columns produced to a tight deadline. Many years ago, I stressed that I regard *Technical Topics* as a forum for new ideas, not all of which are likely to prove repeatable or even strictly accurate. No guarantees can be given on experimental ideas still under development! I welcome comments from sceptical readers or those spotting printing errors etc. Fortunately, there is good evidence that the vast majority of *TT* items do work as intended, and often provide useful additions to amateur lore!

TIPS AND TOPICS

MAC MCMULLIN, W6DSY, in the 'Hints & Kinks' section of *QST* (September 1995, p49) writes: "Rather than threading a 100ft or so of reluctant antenna wire through holes in 30 or 40 spreaders (two holes in each) and repeating the process on the other side of the ladder, I prefer to take a couple of inches of scrap wire, push it through a hole in the spreader, and twist the ends around the antenna wire as shown in **Fig 6**. But then I'm lazy."

Bruce Carter, GW8AAG, offers the following tips: (1) While flicking through some old electronics catalogues before scrapping them I noticed several pages showing full-size illustrations of meter scales. I kept these as they may later be used to paste over existing meter dials when these are being amended.

(2) Many amateurs store small components in screw-top glass jars (even through breakage can prove disastrous). While the labels on the jars can be floated off when immersed in hot, soapy water, small areas of heat-sensitive adhesive remains. This will spread but not dissolve. Complete removal of the adhesive can be achieved by placing the dry jar in the freezer or freezing compartment of a refrigerator and leaving it there for three or four hours, then taking it out of doors and shaving off the adhesive with a knife using a 'pencil sharpening' motion. The adhesive will shatter and drop off. Afterwards, the jar should be left for an hour or two to regain ambient temperature. If the jar is washed out too soon, even cold water is likely to shatter the glass.

Mike Whitaker, G3IGW, as GM3IGW, has for many years chased 1.8MHz DX during the 'CQ contests' from a coastal site in south-west Scotland. Initially, he used hydrogen-filled ex-WD meteorology balloons but later kites. He writes: "Until we knew better we just let out as much wire as we dare! Later we understood better that the lowest angle of radiation is from base-fed wires of from five-eights to three-quarter wavelengths; anything longer reduces the amount of low-angle radiation. Optimum vertical heights mid-band are 176ft +/- 16ft on 3.5MHz 338ft +/- 30ft on 1.8MHz. Remember that long vertical wires pick up a lot of static! Wear gloves and arrange a static-leakage path (note the regulations for heights above 60m - *TT*, August 1995, pp64-65 - *G3VA).*

Lightning is a particularly severe problem in South Africa. 'What is lightning?' compiled by J C Greenway, ZS5JER, part 3, *Radio-ZS* March 1995 provides an exhaustive list of some 15 'safety rules', of which the following seem most applicable to amateurs operating in the great outdoors during thunderstorms: Don't work on fences, telephone or power lines, pipe lines or structural steel fabrication. Don't use metal objects like fishing rods, golf clubs (or metal antenna supports). Golfers wearing cleated shoes form particularly good lightning rods. Don't handle flammable materials in open containers. Get out of the water or off small boats. Stay in your car which offers excellent lightning protection. Seek shelter in buildings. If no buildings or cars are available your best protection is a cave, ditch, canyon, or under head-high clumps of trees in open forest glades. Where there is no shelter, avoid the highest object in your area. If only isolated trees are nearby, your best protection is to crouch in the open, twice as far away from isolated trees as the trees are high. Avoid hilltops, open spaces, wire fences, (metal) clothes lines, exposed sheds and any electrically conductive elevated objects.

HERE & THERE

"IF YOU HAVEN'T SPUN the Sperry PW epicyclic dial of an HRO receiver then you haven't lived" - ZS4NP/VE3NPK in *Radio ZS*. It is clear that there are still a significant number of amateurs, old timers and newcomers, using valve transceivers produced in the 1960s and 1970s. By modern standards, most suffer from a significant degree of frequency drift, up to about 2 - 3kHz over a couple of hours. For those who find this unacceptable, one solution is to add 'huff and puff' frequency stabilisation as devised many years ago by PAOKSB and described on several occasions in *TT*. Following his WARC-bands modifications for the KW2000-series of transceivers, Steve Dyke, G3ROZ, produced a detailed article on adding a huff and puff stabiliser. While this was specifically concerned with a KW2000, the circuit board could be adapted for other models of that period. The typescript runs to 10 sheets plus 8 sheets of diagrams and tables. Providing I am not swamped with requests, photocopies (including postage) will be supplied to members seriously interested for £1.50p (G3VA QTHR). G3ROX estimated the total cost of constructing the stabiliser as just under £70 (£20 if you have a good junk box).

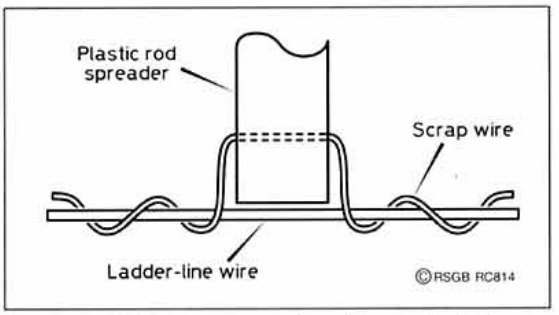


Fig 6: How W6DSY overcomes the tedious task of stringing open-wire feeders on spreaders. He uses twisted pieces of scrap wire holding the feeder wire in place. He recommends soldering the holding wires to the feeder wires if you encounter difficulty with 'rusty joint' noise or harmonics.

TT, November 1994 in 'Here & There' noted that G30UC had drawn attention to the development by Trevor Baylis of a radio receiver powered from a clockwork motor, giving about 20 minutes operation from a single winding. It was seen as of value in countries where the cost of batteries and absence of mains supplies limits the value of radio broadcasting. G30UC felt that here was a challenge for the amateur making the first "clockwork-driven" QSO.

I have not heard of anyone yet taking up the challenge, but Alan McCulloch, G4HTL/ZS6KU, who works for the Liberty Life Association of Africa Ltd, forwards an article 'Wind Up the Radio' from a recent issue of a South African financial journal indicating that South Africa is "rushing ahead with the clockwork invention that could change the direction of wars" with the International Red Cross interested in using the radio in Chechneya and in similar situations where effective communication may greatly assist humanitarian effects. Liberty Life provided the funds for this development as a UK university project. It indicates that a three-band radio covering short wave, medium wave and FM can be wound up in 40 seconds and then plays for 45 minutes. G4HTL/ZS3KU comments: "One wonders when the day will be reached when this idea could be applied to at least amateur-radio receivers, but I fear it will be a long time before the HF transmitters could use it."

Nature (11th May 1995) notes that 'superconducting superwires' seem possible with the development at the Los Alamos National Laboratory of thick films of Y-123 material deposited on flexible metal tapes 5cm long by 2cm wide, an embodiment that could in principle be scaled up to kilometre lengths. The tapes are capable of carrying 100A when cooled to 77K (ie by liquid nitrogen) a major improvement on the current-carrying capacity of earlier 'high temperature superconductors'. The development could open the way for the use of superconductors in the practical distribution of electricity.

Scientific America (July 1995) has a long article entitled 'Plastics Get Wired' which suggests that by tailoring the electrical properties of conducting polymers, researchers hope to render electronics a bit more organic. It is admitted, however, that so far copper conducts 100,000 times as much current as the most suitable polymer - polyaniline - and costs half as much. Early applications may be for LEDs or even entirely plastic transistors (though again so far much slower than silicon). ♦

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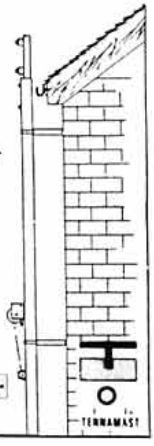

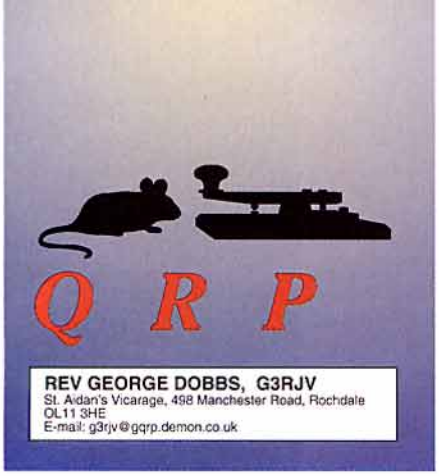

REV GEORGE DOBBS, G3RJV
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THE LAST WEEK in August brought an interesting new QRP event: the International QRP Week in Dublin. It took place at the Marino Institute of Education on the edge of Dublin and was attended by visitors from England, the USA and Ireland. The venue was excellent, the proceedings instructive and enjoyable and most of us also took the chance to explore the delights of Dublin and other parts of Ireland. The week included lectures, laboratory and workshop sessions and a special event station EI3RJV.

The final evening was marked by the formation of the QRP Club of Ireland. I was honoured to give the inaugural speech to launch the club and further delighted by being enrolled as the first member. The club began with some 50 members and appointed Bill Ryan, EI8BC, as its first chairman. Further details about the QRP Club of Ireland can be obtained by writing to Bill Ryan, EI8BC, Marino Institute of Education, Griffith Avenue, Dublin 9, Ireland.

QRP IN SLOVAKIA

IN THE APRIL *QRP* column I announced an invitation to anyone from the UK to attend a QRP Convention in Slovakia. Unknown to me, Fred Garratt, G4HOM, answered that invitation. Below are excerpts from Fred's report of his encounter with the QRP operators of Slovakia.

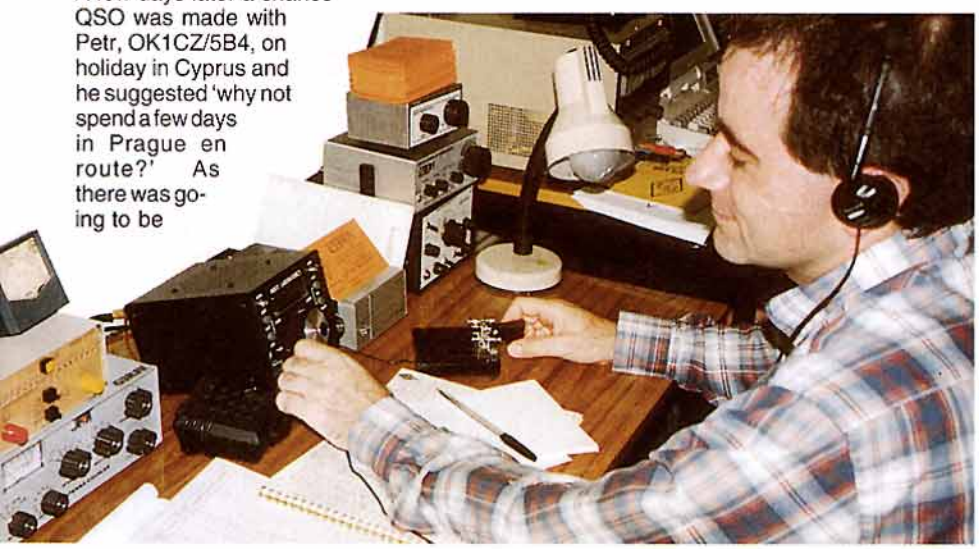
"I saw a notice from Alex, G4FDC, in *SPRAT* for a QRP Convention in Vrutky Slovakia and as I was going to be in Europe anyway, I made a phone call to Alex and with a month's vacation at my disposal, the trip was possible. A few days later a chance QSO was made with Petr, OK1CZ/5B4, on holiday in Cyprus and he suggested 'why not spend a few days in Prague en route?' As there was going to be a home brew equipment exhibition, I hastily completed my latest 40 metre transceiver literally the day before I left.

"Arriving in Prague by train from Hamburg I met Petr, OK1CZ, for an overnight stop before proceeding by train to Slovakia the next day, promising to return for a few days after the convention. On arriving in Vrutky after an eight hour train journey I was met by the smiling faces of Alex and his XYL Luba, Slovak nationals whose efforts with the local Klub OM3KFV are considerable.

"Visitors were accommodated at the rather unsportingly titled 'Zelenznicne Ulciliste' - The Railway College! Home for the convention, delegates came from G, PA, OK2 and LZ. Presentations on QRP construction and design were eagerly received and many of us had the opportunity to give presentations of our own and share our ideas on QRP. Some of the home-brew equipment on display was stunning as regards the resourcefulness of the local amateurs whose access to the components, which we take for granted, is very limited. In particular, the equipment built by OM6TN on his kitchen table would leave our professional engineers gasping.

"All too soon the convention came to a close and addresses were swapped, skeds arranged and endless photos snapped and everyone went home .... All except me; I was staying for Field Day. The town sits in the splendour of the Malo Fatra mountains and being there was like stepping back 40 years in time, with an unhurried way of life. The charm and hospitality of the locals is a secret I would have liked to have kept to myself. I spent the rest of the week exploring the region punctuated with QRP operation from the local Klub and homes of various amateurs and yes, they really do hang antennas from the tower blocks.

"NFD weekend also coincided with a local VHF contest. So with the local Klub and their old ex-army truck we all piled in with VHF equipment, Alex's Argosy and my QRP rig and headed up the mountain to Klacianska Magura with the special event call OM9MV (MV=Malo Velkon = Low Power). We arrived at the ski lodge at dusk and after a hastily improvised barbecue we groped around in the dark trying to throw a wire over a tree. We fired up the Argosy, called CQ and LW2DFM in Buenos Aires obliged. The following day a top band doublet for all bands was erected and we got down to NFD, operating being shared between Alex, myself and Jirka, OK2MJ. The rest of the club was busy in the back of the truck on VHF. We made about 250 contacts on HF, not a too serious attempt given the distractions of the scenery but a very satisfactory QRP effort and a great deal of fun. Real amateur radio and QRP operating is alive and well in Eastern Europe. I plan to return as soon as possible."



Bob Ross, WA2MFI, operates EI3RJV during the International QRP Week in Dublin. The transceiver in use is the Index QRP PLUS. To the right are a selection of American QRP transceivers. From the top of the pile: The NN1G 40-40, the NorCal Sierra and the Oak Hills Explorer.

Jirka, OK2MJ, operates the OM9MV/P station in a ski lodge at Klacianska Magura. The Ten Tec Argosy below the station sign is surrounded by home built equipment.

WINTER SPORTS 'PARTY'

HAILED AS THE most popular QRP event on the air, the G QRP Club Winter Sports give the opportunity for any radio amateur to try out low power operating. The event - it is a 'QSO Party' rather than a contest - takes place from 26 December to 1 January. There are no fixed bands and times. Many operators choose the highest frequency band open at the time. Most of the operating takes place on or around the International QRP Frequencies: 1843, 3560, 7030, 10106, 14060, 1060, 28060kHz on CW and 3690, 7090, 14285, 21285, 28360kHz on SSB. The only rules are to use a power output of 5 watts CW or 10 watts PEP SSB, or less, call 'CQ QRP' and enjoy working as many other QRP stations as possible. Logs and comments are very welcome and should be sent to the G QRP Club Communications Manager: Gerald Stancey, G3MCK, 14 Cherry Orchard, Staines, Middx TW18 2DF. The G4DHF Trophy is awarded to the person thought to have contributed most to the overall event. ♦

TOTALLY HOME BUILT!

DIETER ALBIN, DL2AYI (ex Y25FI), has sent me a photograph of his impressive home built QRP station. Everything in the station, even the clock, is homebuilt! The photograph shows, from left to right, desk microphone with processor, Power Supply with speaker and clock, 9 band (160-10m) SSB/CW 5 watt Transceiver, Antenna Tuner and Memory Keyer. Above the multiband transceiver is an 80m SSB/CW 5 watt transceiver. A homebuilt station to rival any I have seen. Can anyone offer better?

Dieter Albin's, DL2AYI, remarkable home built QRP station.

EMC

HILARY CLAYTONSMITH, G4JKS
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DUE TO THE RAPIDLY expanding use of electronics in cars and in particular, problems with 433.92MHz vehicle radio keys, most of this month's column is devoted to vehicle EMC.

AUTOMOTIVE EMC

As mentioned in *EMC,* June 94, the RSGB EMC Committee is a member of the MIRA (Motor Industry Research Association) EMC Club. At the MIRA EMC Club meeting on 4 October '95, EMC Committee member Dave Lauder, G0SNO, gave a presentation on 'The Radio Amateur and Automotive EMC'. The main topics were mobile operation of amateur transmitters, immunity of vehicle electronics and emissions from vehicle electronics. It was also a timely opportunity to voice concerns about EMC problems with vehicle security systems. The presentation created considerable interest and we received an enquiry about repeating it at a meeting of the Society of Motor Manufacturers and Traders (SMMT).

The European Commission Directive 72/245/EEC was originally issued in 1972 and related to interference from ignition systems. It has now become the Automotive EMC Directive which covers RFI from other sources such as engine management systems. It also covers RF immunity of vehicle electronic systems. New types of vehicles need to comply with the amended 72/245/EEC from 1 January 1996 but types which are already approved under the old 72/245/EEC are exempt until October 2002.

To pass the RF immunity tests for the Automotive Directive, a vehicle must be immune to 30V/m on various spot frequencies but no tests are performed below 20MHz. The immunity levels specified are intended to ensure that the driver's control of the vehicle is not affected by RF sources outside the vehicle. They are not intended to ensure immunity to transmitters installed in the vehicle. We understand that some motor manufacturers are testing their vehicles at field strengths of up to 200V/m due to possible product liability implications.

Owners' handbooks for some new cars contain prominent warnings about installing mobile transmitters without seeking the manufacturer's advice. Some members who have asked for such advice have been told that they can install an amateur transmitter and others have been told that they should not. Before buying a car, any radio amateur who intends to operate a mobile transmitter would be well advised to study the owners' handbook for any warnings about installing transmitters. It is also worth avoiding models with lots of electronic gadgets.

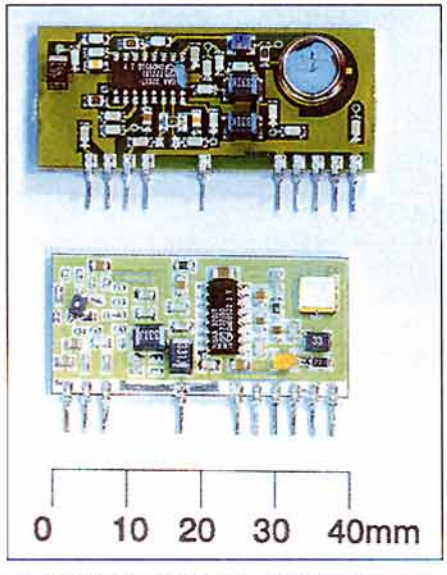
REMOTE KEYLESS ENTRY

REMOTE CONTROL OF the central locking or alarm/immobiliser in a car is known in the trade as Remote Keyless Entry or RKE. This refers to an infra-red or UHF radio transmitter on a key ring which can be operated outside the vehicle at a distance of several metres or more. It is not related to a 'transponder key' where the key in the steering lock responds to a signal around 130kHz.

In the UK, UHF radio operated RKE systems for vehicles have operated within the 70cm amateur band on a harmonised European frequency of 433.92MHz since mid 1994. Some EMC problems with 433.92MHz RKE systems were reported in the *EMC,* February 95, but now that this frequency has been used in the UK for over a year, more EMC problems are occurring, both with emissions and immunity.

A radio controlled car central locking system or security system only responds to the correct digital code from its own key, so if the RKE receiver receives an amateur FM carrier, this should not cause it to arm or disarm and neither should it cause a false alarm. What can happen near an amateur 70cm repeater or near some other authorised non-amateur transmitter within the 70cm band is that the RKE receiver fails to respond to its 433.92MHz radio key. Some types may also be blocked by PMR transmitters above or below the 70cm band. In one case, new cars were taken by car transporter to a ferry port for export but they could not be driven onto the ferry because their immobilisers were blocked by a nearby transmitter!

Cases have been reported where a driver parks near a 70cm repeater or a UHF PMR transmitter and arms the car immobiliser using the radio key while the nearby transmitter is not transmitting. On returning, the unlucky motorist may find that the car cannot be started because the immobiliser cannot be disarmed while the nearby transmitter is on the air! Although some cars have a back up system which involves a special sequence of left and right turns of the door key, this assumes that the driver keeps a note of this code handy. So far, in cases known to the EMC Committee where this has involved amateur transmissions, it has occurred at 70cm repeater sites. Unless urgent action is taken by the motor industry, we anticipate future problems involving radio amateurs' 70cm home base stations.



The 433.92 MHz superhet receivers tested by the EMC Committee.

We have been informed that as little as a few hundred milliwatts on the 70cm FM Simplex channels using a WX1 colinear can block an RKE receiver in a car parked outside the house. It appears that 25W may prevent some types of vehicle security systems being armed or disarmed within a radius of 100m or so.

As mentioned in *EMC,* February 95, low power devices such as RKE are not protected from interference from other radio users and the Radiocommunications Agency has stated, "if manufacturers of low power devices wish to use this band then the onus is upon them to ensure that the receivers are properly designed". In a letter from the RA about the 430MHz band which was published in the March 1993 *RadCom* (Page 7), it was stated: "There was never any question of removing existing services from the band."

Some RKE receivers do not appear to have been designed to take account of the realities of existing services such as amateur radio.

RKE RECEIVER EMISSIONS

Some RKE receivers radiate spurious signals in the 70cm amateur band, but in the UK such receivers do not yet need type approval. Car alarm manufacturers seem to have gained the best of both worlds by being allowed to start using the new European 433.92MHz allocation before having to meet the European standard for receiver emissions.

Geoff Watts, G0EVW, who is Repeater Keeper for the Weymouth 70cm repeater, GB3SD, told us about a member of his repeater group, Les Barnes, G0FAJ, who had a Sigma SG20 car alarm/immobiliser installed. This ABI (Association of British Insurers) approved model had a super-regenerative receiver which generated broad band noise right across the 70cm band making all but the strongest signals unreadable on a mobile transceiver. Les contacted Sigma Technical who were most helpful and arranged for his receiver to be replaced by a new type which was a superhet. Its LO (Local Oscillator) was between 433.300 and 433.375MHz, drifting as the engine warmed up. It often sat on repeater output channel RB14, 433.350MHz so that Les couldn't receive the local GB3SD repeater. He also found that the system could not be armed or disarmed if he parked within about 100m of the GB3SD repeater which has an ERP of 25W. Sigma then arranged for a 418MHz receiver to be fitted, which solved the oscillator radiation problems.

Like many vehicle security manufacturers, Sigma buy in their 433.92MHz receivers as ready-built modules. They supplied the EMC Committee with some sample receivers for testing and they were interested in the selectivity curves which we obtained (see opposite). They are now investigating a new type of receiver, the RFM RX1000 from RF Monolithics Inc. This uses a novel technique called ASH or Amplifier Sequenced Hybrid and has no local oscillator.

The local oscillator radiation from some superhet RKE receivers can open the squelch of a 70cm mobile 50 - 100m away and Geoff,

G0EVW, considers that if these continue to proliferate, the higher repeater channels will become unusable and the GB3SD Repeater Group will have no option but to apply for a change of frequency.

Over several weeks, EMC Committee member Dave Lauder, G0SNO, did an extensive survey of UHF signals emitted by cars. He found that cars fitted with 433.92MHz RKE receivers are nearly all 'M' or 'N' registered and that four types of receiver are in use. The first is a SAW (Surface Acoustic Wave) stabilised super-regen used by some motor manufacturers. These are generally fairly quiet as they would have to meet ETS 300 220 in some European countries. The second type is a noisy 433.92MHz super-regen of which two were found, both with LaserLine stickers. The third type is a superhet with a 10.7MHz IF and the LO is at 423.22MHz, well outside the 70cm amateur band.

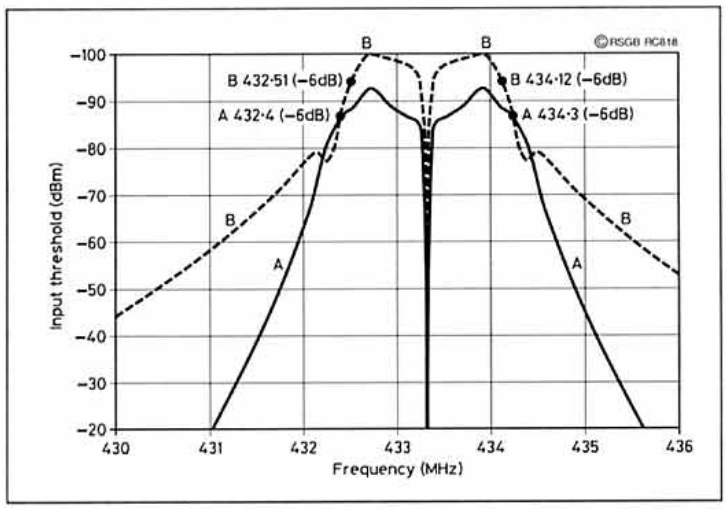


Fig 1: Response curves of two types of receivers for 433.92MHz vehicle Remote Keyless Entry systems.

The fourth type of receiver is a superhet which radiates a carrier around 433.280 - 433.475MHz. Dave found 43 of these of which three were in accessory alarms and 40 were in motor manufacturers' own security systems, all with window stickers.

One manufacturer, which has fitted passive immobilisers as standard to various models since December 1994, accounted for 32 out of the 40. The other eight were in another car manufacturer's system but all were on the same model. The EMC Committee is in contact with both of the motor manufacturers concerned.

Local oscillators in RKE receivers are stabilised by a SAW resonator. For those with a 500kHz IF, the LO is anywhere between 433.280 and 433.480MHz which includes channels RB11-SU19. Most of them seem to be around 433.300 - 433.350MHz and few are at 433.500 or above.

The ETSI (European Telecommunication Standards Institute) standard ETS 300 220, for short range devices, specifies that the limit for local oscillator radiation from the receiver with its aerial connected, is 2 nanowatts (two-thousandths of a microwatt) ERP. On some RKE receivers currently used in the UK, we have measured 5-6nW of local oscillator leakage out of the aerial input although the ERP which this produces would depend upon the aerial used.

Even 2nW is far from insignificant at UHF and can open the squelch in a UHF FM mobile receiver at a distance of 50m or more. This can be annoying to any mobile operator who monitors RB11-SU19. In some other European countries, where repeater *inputs* are on 433.000 - 433.375MHz, cars parked near repeaters could radiate carriers on the repeater input frequency. This local oscillator radiation problem is a matter of frequency planning (or the lack of it). All local oscillators radiate and frequency allocations normally take account of this. For example, with UHF TV broadcasting, channel allocations are planned so that the LO radiation from a TV normally falls within a channel which is not used in that particular area.

TWIN PEAKS

An RKE transmitter is also SAW stabilised and although its intended frequency is 433.92MHz, it may be up to ±100kHz off frequency due to SAW tolerances and temperature changes. To allow for the worst case where the receiver and transmitter are both 100kHz off frequency in opposite directions, the receiver bandwidth would need to be 400kHz but some are much wider than this. It could be made narrower, 200kHz or less, if both the transmitter and receiver SAW oscillators were brought nearer to their intended frequency.

G0SNO tested two types of 433.92MHz AM superhet RKE receiver. Selectivity was tested but strong signal handling characteristics such as blocking require further investigation. Both receivers use a UAA 3201 single chip AM data receiver with two coupled L-C tuned circuits as a simple IF filter. They cannot recover the data from their key unless the peak signal strength from the key is higher than any other continuous carrier which gets through the receiver's IF filter. The problem is that the receiver's pass band extends far outside the UK 433.92MHz low power device allocation.

Receiver 'A' uses a small PCB, 45 x 19 mm with nearly all components surface mounted. In **Fig 1**, curve 'A' shows this receiver's selectivity from 430 - 436MHz. The threshold level shown is the PEP signal required so that 100% AM data is just recoverable. The centre frequency of the IF filter is 500kHz and the bandwidth is 700kHz between the -6dB points. Using such a low IF in a UHF superhet receiver gives no image rejection at all unless an RF stage with a SAW filter is used. These receivers have no RF stages so the response has twin peaks with a total -6dB bandwidth of 1400kHz! Apart from a notch centred on the LO which was at 433.330MHz in the sample tested, the pass band extends from 432.4kHz to 434.3kHz. Outside this range the roll-off is not very steep and it is only below 432.0, above 434.7MHz or within 25kHz of the LO frequency that the response is even 30dB down.

Receiver 'B' uses a thick film construction technique on a 40 x 19mm ceramic substrate. Its characteristics are shown by curve 'B' in Fig 1. The sensitivity is higher and the IF response has been modified.

The total bandwidth is 1440kHz although the outer -6dB points have been pulled in slightly which makes the centre notch narrower. The roll-off outside the pass band is even less steep. Overall, there is no improvement in the rejection of the amateur signals over an important part of the band, as shown in **Fig 2**.

In the DSI Phase 2 (See *RadCom* June 1995, pp 30/31 and July 1995, pp 8/9), section 10.10.1 recommends phasing out the European 433.92MHz low power device allocation and opening up new low power device bands at 403 - 404.5MHz and 915 - 920MHz. Currently in the UK, 433.92MHz is only available for vehicle radio keys and according to a recent copy of *LPRA News*, which is published by the Low Power Radio Association, the RA has decided not to open it up for general low power device use in the UK. As the proposed 403 - 404.5MHz allocation seems unlikely to be available before 1997, the EMC Committee considers that there is an immediate need for major improvements in selectivity of some 433.92MHz RKE receivers and an end to the use of superhets with a 500kHz IF.

It should be possible to solve most of the current problems by using a higher IF with a proper IF filter, provided attention is paid to where the LO and image frequencies fall. Alternatively, it may be possible to use the type of direct conversion technique which is used in VHF and UHF radio paging receivers.

It appears unlikely however that 433.92MHz RKE receivers will be required to meet any standard for rejection of signals close to their 433.72 - 434.12MHz UK allocation. ♦

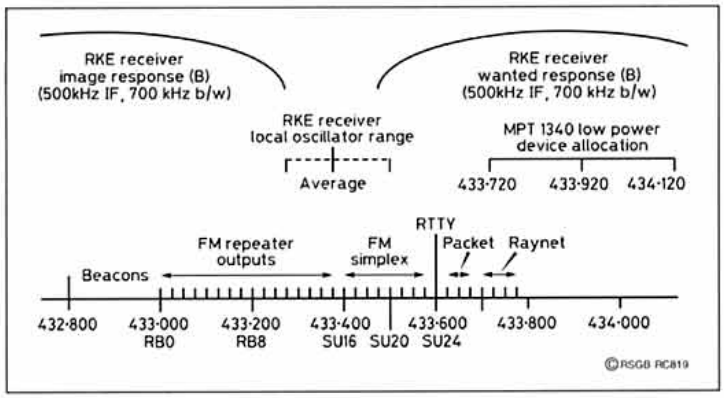


Fig 2: Part of the 70cm Band Plan in relation to the response of receiver 'B' in Fig 1.

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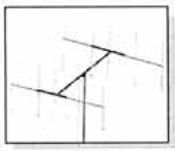

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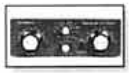

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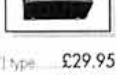

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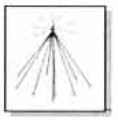

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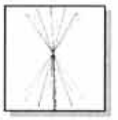

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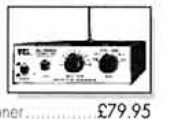

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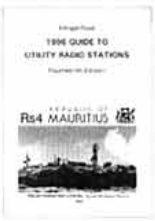

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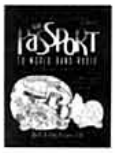

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RADCOM CONTEST FEATURE

RSGB VHF Field Day 1995

by Andy Cook, G4PIQ*, VHF Contests Committee

FOR THE LAST FEW years, the VHF Field Day entry has been steady in the low 70s. However, this year marks the first big increase for a long while, with a total of 83 entrants. It must also be a very long time since the VHFCC has slipped up this badly and organised VHF Field Day to coincide with excellent propagation two years in a row! Yet, this is exactly what happened for the 1994 and 1995 events. Even the weather was generally pleasant, although not quite up to the scorching 30° plus heights of 1994. Warrington Contest Group summed it all up by saying "Well, what a weekend. It started off reasonable, but it just kept getting better and better - further into DL, SP, OZ and OK. No sleep on all bands - needed a week to recover."

Propagation

IT IS NEVER in the nature of VHF Field Day to be entirely equitable across the country, and for once, it was the south of the country which missed out on much of the excellent tropo. The North Kent RS thought that propagation peaked 24 hours earlier than in 1994 - ie on Friday! The Flight Refuelling ARS operating from Dorset said that conditions were flat until it rained, when they became worse. And to cap it all, this was the first rain for two and a half months! It is difficult to draw an exact line where the conditions cut off, but those south of the Downs fared very much worse that the lucky majority further north. The contrast in conditions was very marked as you headed south of this imaginary line, with a good number of people who were feeling rather hard done by making some very disparaging comments about conditions and the weather - it was also only down here that we had any concentration of reports of rain. Clearly a weather front had taken up position in a rather unpopular place for the contest, and it was probably the extension of this front into Europe which restricted the good conditions to the northern part of Germany.

The majority of the good propagation for this year's contest was down to a tropo opening into Germany, the Czech Republic, Poland and Scandinavia. For many people the contest started off with relatively flat conditions. However, those on the more northerly part of the east coast did have some enhancement into the northern part of Germany. As the evening drew in, the ducts spread further inland, both in the UK and in the rest of Northern Europe. The propagation spread deeper into Germany and then beyond into SP, OK, and the southern parts of Scandinavia. This meant that overnight, there was plenty of DX about to keep awake those operators who normally draw the short-straw with the night shift; and conditions remained excellent throughout the traditional Sunday morning peak of activity from Europe, enabling people to rack up some superb QSO totals.

Murphy

THINGS RARELY GO absolutely smoothly in a contest, and VHF Field Day has all the ingredients necessary to encourage things to go wrong. A portable contest with four bands and gear which often hasn't seen the light of day since last year, makes an ideal playground for Murphy. However, ingenuity so often comes to the rescue - for example, CARSCOG Gearboxers had the shear pin fail on their generator, but managed to make do by using a mixture of nails and tent pegs! Aberdeen ARS had planned to put in a substantial effort but a variety of problems meant that some key parts of their equipment didn't turn up on site and so they had to make do with a single band entry on 2m with a substantially reduced antenna system even here. Nevertheless - they were in a superb location to take advantage of the good conditions and came very close to winning the band. That well known Scot, Allan Duncan, GM4ZUK, currently in Jersey, mounted an impressive single operator entry to the restricted section as GJ4ZUK/P, managing to put in a very creditable entry on all four bands. This was in spite of feeling that discretion was the better part of valour when a major thunderstorm happened along and Allan felt that sheltering in the car, 100 yards away from the antennas was a good plan!

G1NLU (front) and G1OCN (back) haul up the Noisy PARCers' 2m antenna.

Band Reports

70MHz

As is so often the way, the excellent conditions on the higher bands did nothing to help things on 4m, and the sporadic E meant that the MUF into Europe bubbled around and above 4m for quite a lot of the event. This enabled Radio Gdansk to raise frustration levels once again, although things were nowhere near as bad as in 1994. It was interesting to see that the unusual wire V-beam which has been used for the last two years by GM3TAL/P entering a check log has now been taken on by G4FRS/P into the main event. Once again 4m showed that the right location is the key to making a top score, rather than sheer brute force since, remarkably, the top score came from G3FDW/P in the Low Power Section. Congratulations should also go to G3GRS/P for winning the

*Fishers Farm, Colchester Road, Tendring, Essex CO16 9AA.

OPEN SECTION

Posn	Group Name	Loc	70	144	432	1296	Total
1	The Northern Lights	02QV	853	995	1000	637	3485
2	The Windbreakers and HADRABS	01PU	847	666	566	1000	3079
3	A1 CG	94WC	1000	1000	642	390	3032
4	De Montford Univ & Leicester ARS	02TG	827	841	413	446	2528
5	Flight Refuelling ARS	80UU	809	399	178	148	1534
6	Clifton ARS	01DH	653	393	169	247	1461
7	Hornsea ARC	93VW	645	325	118	168	1256
8	Chesham & Dist ARS	91PS	583	473	113	72	1241
9	Newquay ARS	70PP	944	138	38	0	1119
10	Bristol CG	81TJ	633	284	75	107	1098
11	Aberdeen ARS	86RW	0	961	0	0	961
12	Farnborough & Dist RS	91OF	540	143	159	0	842
13	11th Hour CG	91VG	524	106	60	70	761
14	Guildford & Dist RS	91TF	626	126	0	0	752
15	Fareham & Dist ARC	90MX	365	146	97	77	685
16	Noisy PARC(ers)	80SN	479	90	69	27	665
17	Kidderminster & Dist ARS	82RJ	169	249	157	88	663
18	TMC ARC	92IK	0	412	186	0	598
19	Highland CG	75DH	302	174	76	0	552
20	Victory CG	90JO	0	426	0	0	426
21	Reigate & Crawley	01OC	0	77	199	0	276
22	G0SEA	92VI	0	244	0	0	244
23	Sudbury and Dist RA	02JA	0	99	126	0	226
24	Dengie Hundred ARS	01LP	0	100	0	0	100
25	Bredhurst RATS	01GH	0	74	0	0	74
26	The Aracnids	91FH	0	66	0	0	66

RESTRICTED SECTION

Posn	Group Name	Loc	70	144	432	1296	Total
1	Telford & Dist ARS	82NN	889	1000	1000	1000	3889
2	Scunthorpe VHF CG	94SB	953	844	699	687	3182
3	Leicester RS	92MO	739	659	376	516	2291
4	Windmill CG	01LD	1000	387	291	303	1980
5	Goole R&ES	93PW	894	487	263	202	1845
6	Surrey RCC	91XH	788	391	347	223	1749
7	ESCOG	00EW	833	492	251	128	1703
8	Bracknell ARC	80ST	966	284	219	222	1692
9	Univ of Birmingham	82LB	769	559	147	0	1475
10	Queen's Univ Belfast RC	64XC	986	126	101	20	1233
11	Loughborough & Dist ARS	92IR	530	470	150	0	1150
12	HI CG	94HH	630	201	120	121	1072
13	Weston Super Mare ARS CG	81PH	582	276	147	0	1006
14	Mid Cheshire ARS	83PF	646	196	94	0	937
15	Allan Duncan	89WF	452	321	45	43	860
16	Melton Mowbray ARS	92LU	536	150	128	0	814
17	Splinters CG	91GI	0	457	307	0	764
18	Thornton Cleveleys ARS	83LU	628	107	0	0	735
19	Swale ARC CG	01JG	216	200	106	89	612
20	Reading & Dist ARC	91IH	0	292	82	232	605
21	Lowestoft Dist & Pye RC	02UL	0	182	98	230	509
22	Lagan Valley ARS	74AI	0	188	17	0	205
23	Dorking & Dist RS	91TG	0	122	83	0	204
24	Mid Glamorgan ARG	81EO	0	134	0	0	134
25	GM4VVX	78UB	0	73	0	0	73
26	Crowborough & Dist ARS	01BB	0	57	0	0	57

LOW POWER SECTION

Posn	Group Name	Loc	70	144	432	1296	Total
1	Warrington CG	93AD	605	1000	1000	1000	3605
2	Sutton & Cheam RS	93AC	704	560	869	453	2586
3	South Birmingham RS	82XJ	514	483	591	656	2244
4	Nunsfield House ARG	93BA	517	552	536	371	1977
5	Rochdale & Dist ARS	83VP	588	362	366	378	1695
6	The 3 Cs	84UR	1000	213	185	231	1629
7	Cockenzie & Port Seton ARC	85RU	775	309	236	198	1518
8	Salop ARS	82LQ	497	377	209	248	1331
9	S Yorks CG	93JK	387	150	222	430	1188
10	Wythall RC	92BJ	478	287	175	207	1147
11	Shefford & Dist ARS	92XA	598	155	144	189	1086
12	Basingstoke ARC	91KG	582	163	160	125	1030
13	Torbay ARS	80FP	703	142	112	68	1025
14	Maidenhead & Dist ARC	91OS	475	144	180	108	907
15	Great Lumley ARES	94ET	532	166	150	44	892
16	North Kent RS	01BH	448	78	101	75	701
17	Aylesbury Vale RS	91NV	0	199	213	212	625
18	Stevenage & Dist ARS	92WA	0	253	130	194	577
19	DARTS	91RR	311	103	92	43	550
20	Edgeware & Dist RS	91VO	385	50	49	0	483
21	CARSCOG Gearboxers	92GD	258	48	50	103	460
22	South Devon RC	80FJ	388	33	14	5	440
23	Cambridge & Dist ARC	02AD	301	0	0	0	301
24	GPT RC	93KA	0	117	147	0	264
25	Mid Sussex ARS	90WV	0	116	110	0	226
26	Kings Lynn ARC	02HR	0	209	0	0	209
27	Bishops Stortford ARS	01BX	0	104	98	0	202
28	I McCluskie	72QT	0	77	0	0	77
29	West Bromwich Central RC	92BN	0	17	0	0	0

SWL SECTION

Posn	Group Name	Loc	70	144	432	1296	Total
1	BRS 32525	01AL	1000	383	778	0	2162
2	BRS 25429	93FX	0	1000	1000	0	2000

70 MHZ OPEN SECTION

			Score			QSO					
Pos	Callsign/P	Loc	CW	SSB	Total Pts	CW	SSB	Pwr	Ant	Best DX	km
1	G4BVY	94WC	632	816	1448	61	83	160	2 x 7	GJ4ZUK/P	559
2	G4ADV	70PP	545	822	1367	52	70	50	2 x 7	GM4IKU/P	596
3	G4UJS	02QV	518	717	1235	56	73	160	10	GM3TAL/P	542
4	G0VHF	01PU	485	741	1226	56	81	150	10	GM3TAL/P	613
5	G3ORY	02TG	562	635	1197	58	69	160	8	GI4SJB/P	550
6	G3PFM	80UU	436	735	1171	59	97	150	2 x 12	GM3TAL/P	590
7	G3JKY	01DH	427	518	945	63	68	100	5	GM0FRG/P	597
8	G4IGY	93VW	446	488	934	46	57	40	-	G4ADV/P	475
9	G4AHG	81TJ	368	549	917	50	73	50	5	GM3TAL/P	532
10	G3PJX	91TF	397	509	906	53	70	10	8	GM3TAL/P	607
11	G0RDI	91PS	361	483	844	55	71	40	5 + Dipole	GM4IKU/P	470
12	G4FRS	91OF	360	422	782	50	58	25	84' Vee	GM4IKU/P	527
13	G3ZMF	91VG	273	486	759	41	64	80	5/5	GI4SJB/P	503
14	G0VOP	80SN	298	395	693	32	49	10	3	GI4SJB/P	463
15	G4ITF	90MX	281	247	528	47	39	10	HB9CV	G3FDW/P	426
16	GM0FRG	75DH	55	382	437	3	22	100	5	G3GRS/P	640
17	G0KRC	82RJ	0	245	245	0	41	100	5	G3ORY/P	283

70 MHZ RESTRICTED SECTION

			Score			QSO					
Pos	Callsign/P	Loc	CW	SSB	Total Pts	CW	SSB	Pwr	Ant	Best DX	km
1	G3GRS	01LD	549	701	1250	59	75	150	6	GM0FRT/P	641
2	GI4SJB	64XC	461	772	1233	36	54	10	12ZL	G3GRS/P	575
3	G4BRA	80ST	499	709	1208	60	79	75	6	GM3TAL/P	591
4	G3VIP	94SB	540	651	1191	61	73	150	6	G4ADV/P	477
5	G4DBN	93PW	473	645	1118	55	75	70	6	GJ3YHU	532
6	G3UKV	82NN	465	646	1111	60	90	100	8	GM3TAL/P	398
7	G4XBF	00EW	471	570	1041	55	66	50	5	GM3TAL/P	663
8	G4WAY	91XH	417	568	985	60	70	120	4	GM3TAL/P	590
9	G3NAQ	82LB	297	664	961	35	86	60	8	GM3TAL/P	447
10	G5UM	92MO	409	515	924	61	84	120	9	GM3TAL/P	458
11	G4ZTT	83PF	389	419	808	47	55	10	4	G3GRS/P	341
12	G1HIC	94HH	369	418	787	41	48	25	4	G4ADV/P	466
13	G4ATH	83LU	367	418	785	42	50	20	4	G3GRS/P	405
14	G4WSM	81PH	410	318	728	53	40	15	5	G4GBF/P	396
15	G4PZQ	92LU	301	369	670	48	59	25	5	GM3TAL/P	383
16	G3RAL	92IR	310	353	663	48	58	40	HB9CV	GM3TAL/P	433
17	GJ4ZUK	89WF	331	234	565	27	20	70	5	G4BVY/P	559
18	G6SRC	01JG	0	270	270	0	36	100	5	G3FDW/P	436

70 MHZ LOW POWER SECTION

			Score			QSO					
Pos	Callsign/P	Loc	CW	SSB	Total Pts	CW	SSB	Pwr	Ant	Best DX	km
1	G3FDW	84UR	692	838	1530	57	75	25	8LPY	G7FDC/P	490
2	GM4IKU	85RU	538	647	1185	38	46	20	8LPY	G4ADV/P	596
3	G2XP	93AC	502	575	1077	68	87	25	5	GJ3YHU	431
4	G3LHJ	80FP	557	519	1076	53	55	15	5	G3FDW/P	462
5	G4WDL	93AD	405	521	926	55	79	20	8	GJ4ZUK/P	435
6	G2DPQ	92XA	374	541	915	55	71	20	8	GM3TAL/P	548
7	G0ROC	83VP	411	489	900	49	69	20	6	G4ADV/P	375
8	G3ZOI	91KG	362	529	891	53	71	25	6	GM3TAL/P	578
9	G4GBF	94ET	327	487	814	31	45	10	5	G4ADV/P	507
10	G3EEO	93BA	335	456	791	51	73	10	6	GJ4ZUK/P	421
11	G4OHM	82XJ	351	436	787	56	74	15	6	GM3TAL/P	439
12	GW0ALV	82LQ	251	509	760	31	68	25	5	GM3TAL/P	381
13	G4WAC	92BJ	319	412	731	47	66	25	8	GM3TAL/P	444
14	G3TWG	91OS	290	437	727	51	68	20	4	GI4SJB/P	437
15	G4CW	01BH	346	339	685	48	51	20	6	GI4SJB/P	560
16	G7FDC	80FJ	150	444	594	14	46	25	9	G3FDW/P	489
17	G4RHY	93JK	278	314	592	40	48	20	3	G4ADV/P	392
18	G4IUZ	91VO	294	295	589	48	49	25	5Q	GI4SJB	480
19	G0TCD	91RR	275	201	476	45	35	25	HB9CV	GI4SJB/P	453
20	G2XV	02AD	198	263	461	34	43	25	5	G4ADV/P	369
21	G4DFN	92GD	330	65	395	52	9	10	Turnstile	GM4IKU/P	418

70 MHZ SWL SECTION

			Score			QSO				
Pos	Callsign/P	Loc	CW	SSB	Total Pts	CW	SSB	Ant	Best DX	km
1	BRS32525	01AL	0	100	100	0	24	Dipole	G3VIP/P	290

144 MHZ OPEN SECTION

Pos	Callsign/P	Loc	Score	QSO	Pwr	Ant	Best DX	km
1	G4ZAP	94WC	17078	1030	400	2 x 4 x 17	EA7DKD	1960
2	G0EMG	02QV	17001	998	400	4x15, 2x9	SP9ZDN/7	1341
3	GM3BSQ	86RW	16407	650	400	9	EA6IB	2004
4	G8TIC	02TG	14364	992	400	4 x 19, 2 x 9, 15	SP7NJV	1234
5	G0VHF	01PU	11379	741	400	2 x 15	HA9KLZ/P	1557
6	G3MDG	91PS	8071	576	400	2 x 17	SK6HD	1150
7	G8LNC	90JO	7269	531	400	4 x 19	OZ1HLB/P	1028
8	G4CAA	92IK	7035	513	400	18	SQ3BYC	1504
9	G4RFR	80UU	6810	550	400	2 x 19	IS0IER	1517
10	G3GHN	01DH	6708	548	400	2 x 18	SK6HD	1137
11	G4EKT	93VW	5553	383	200	2 x 17	EA5IFI	1564
12	G3TAD	81TJ	4847	409	200	2 x 15	EA6SA	1373
13	G4GXP	82RJ	4251	257	50	9	DF0TEC/P	1127
14	G0SEA	92VI	4161	361	150	2 x 9	SP3SUX	1120
15	GM0FRG	75DH	2975	198	200	17	EA6CN	1653
16	G3VEF	90MX	2493	303	80	2 x 13	OZ6EVA/P	1027
17	G1FRS	91OF	2450	262	200	9	OZ6EVA/P	999
18	G0HXO	70PP	2349	215	400	2 x 8/8	OZ7SKB/P	1127
19	G5RS	91TF	2156	267	200	4 x 17	OZ7AMG/P	980
20	G6CTU	91VG	1817	239	350	2 x 17	OZ1HLB	926
21	G0UTT	01LP	1704	172	70	8/8 Slot	LA2PHA	802
22	G7SRA	02JA	1696	168	350	2 x 14	DL7AKA	856
23	G0VOP	80SN	1545	177	400	10	IT9TVF	1851
24	G7RAT	01OC	1315	140	150	9	LA2PHA	852
25	G0BRC	01GH	1262	151	100	2 x 12 ZL	OZ4VV	834
26	G0ARC	91FH	1119	182	60	9	DF0NF	798

144 MHZ RESTRICTED SECTION

Pos	Callsign/P	Loc	Score	QSO	Pwr	Ant	Best DX	km
1	G3ZME	82NN	12427	631	400	18	SP9ZDN/7	1628
2	G4ERG	94SB	10488	525	400	15	EA7ZM	1935
3	G8FCQ	92MO	8189	505	300	17	SP9ZDN/7	1498
4	G8IUB	82LB	6946	421	100	16	SP1UJU/1	1369
5	G4RKV	00EW	6111	471	400	15	OZ9EVA/P	950
6	G0OLE	93PW	6047	362	300	17	EA3DXU	1397
7	G3RAL	92IR	5841	342	80	67'	EA3KU	1324
8	G3WOI	91GI	5674	490	400	19	EA3CR	1132
9	G6LX	91XH	4863	459	400	19	LA9YN	1012
10	G0FBB	01LD	4806	376	400	17	EB5IJA	1382
11	GJ4ZUK	89WF	3985	307	400	17	LA2PHA	1139
12	G0CCC	91IH	3625	353	100	19	OZ6EVA/P	1125
13	G4BRA	80ST	3533	362	400	17	OZ6EVA/P	1113
14	G4WSM	81PH	3432	325	170	17	OZ9EDR/P	1093
15	G8ESB	94HH	2499	195	150	8	EA6IB	1704
16	G6SRC	01JG	2491	227	100	11	OZ6EVA/P	924
17	G3ZTT	83PF	2436	232	25	17	EA6IB	1604
18	GI4GTY	74AI	2338	184	80	17	IS0YFG/P	1983
19	G3URM	02UL	2258	175	80	17	SP3SUX	910
20	G4FOX	92LU	1870	169	180	18	OZ6EVA/P	887
21	GW0VJS	81EO	1660	181	50	6	IW0BET	1636
22	GI8FOB	64XC	1563	122	100	12	LA2PHA	904
23	G3CZU	91TG	1510	197	100	9	DL0EO	762
24	G6GMW	83LU	1328	110	25	17	EA3DXU	1426
25	GM4VVX	78UB	907	43	150	17	DL0KI	1077
26	G0CRW	01BB	705	103	100	17	DF0NF	714

144 MHZ LOW POWER SECTION

Pos	Callsign/P	Loc	Score	QSO	Pwr	Ant	Best DX	km
1	G0CDA	93AD	13734	686	25	18	EA9ML	1989
2	G4FKA	93AC	7695	470	25	17	SP9ZDN/7	1566
3	G3ZBI	93BA	7585	440	25	16	SP7NJV	1469
4	G1OHM	82XJ	6630	402	22	17	SP7NJV	1483
5	GW3SRT	82LQ	5177	301	10	16	SP9ZDN/P	1636
6	G0ROC	83VP	4977	336	25	14	SP9SOI/P	1521
7	GM0CLN	85RU	4244	234	25	14	EA3CN	1646
8	G1WAC	92BJ	3941	268	25	17	EA3DBJ	1277
9	G8SAD	92WA	3468	199	25	19	SM7VTW	973
10	G3IZD	84UR	2928	194	25	10LPY	EA3AYK	1488
11	G1XYZ	02HR	2871	239	25	9	DL0WS/P	925
12	G4VRS	91NV	2737	221	25	10	OZ5BAL/P	991
13	G4EUZ	94ET	2281	160	25	17	DL2LSM/P	967
14	G3TCR	91KG	2235	280	25	17	OZ5BAL/P	934
15	G3FJE	92XA	2131	188	25	12	DG6JF/P	1050
16	G0ITW	93JK	2057	157	25	13	EA3ADW	1330
17	G3WKX	91OS	1979	228	25	16	EA3KU	1270
18	G3NJA	80FP	1950	188	25	17	EB5DYS	1115
19	G7LNV	93KA	1607	172	25	17	SP9KDA	1382
20	G3ZMS	90WV	1587	179	25	13	OZ6EVA/P	947
21	G5ZG	01BX	1430	126	10	13	OZ5BAL/P	818
22	G7RIH	91RR	1417	123	25	9	OZ7AMG/P	955
23	G3WMR	01BH	1071	137	10	17	OZ5BAL/P	862
24	GW0UVJ	72QT	1052	88	25	13	-	-
25	G3ASR	91VO	680	92	25	19	OZ9IT824	
26	G2ASF	92GD	660	72	25	14LPY	OZ9EDR/P	974
27	G4SSD	80FJ	451	62	25	12	GM3BSQ/P	???
28	G4WBC	92BN	233	37	10	HB9CV	GM3BSQ/P	489

144 MHZ SWL SECTION

Pos	Callsign	Loc	Score	QSO	Ant	Best DX	km
1	BRS25429	93FX	2280	137	8	OK1KIM	1086
2	BRS32525	01AL	874	92	9	OZ1ALS/P	765

432 MHZ OPEN SECTION

Pos	Callsign/P	Loc	Score	QSO	Pwr	Ant	Best DX	km
1	G4GCM	02QV	9007	549	400	4x28, 2x21	SP9GVT	1266
2	G6APZ	94WC	5781	339	400	2 x 4 x 21	SP9EWU	1373
3	G0VHF	01PU	5096	371	400	4 x 21	OK5VHF/P	1008
4	G3SDC	02TG	3724	260	400	8 x 17	SP3DRT	1135
5	G5LK	01OC	1793	163	120	21	LA1E	896
6	G4CAA	92IK	1673	142	80	18	DL3BWW	1072
7	G0FRR	80UU	1607	134	400	-	DJ9BV	886
8	G0NTP	01DH	1518	108	200	2 x 18	LA1E	896
9	G6FRS	91OF	1430	156	100	4 x 21	OZ1ALS/P	829
10	G6KRC	82RJ	1416	111	35	-	DL7AFB/P	1116
11	G7SRA	02JA	1137	109	100	2 x 19	DL3BWW	936
12	G4YTV	93VW	1065	99	400	4 x 21	OK1KIR/P	980
13	G1MDG	91PS	1019	131	200	4 x 19	OZ5EDR/P	947
14	G8KGI	90MX	870	128	85	2 x 19	DF0NF	782
15	GM0FRG	75DH	686	45	100	21	PA3BPC/P	745
16	G6YB	81TJ	673	77	100	2 x 21	OZ9EDR/P	1068
17	G0VOP	80SN	621	67	400	18	DF0NF	896
18	G3NAT	91VG	544	116	400	27QLY	OZ1ALS/P	792
19	G8XNH	70PP	341	27	25	88	DF0NF/P	1027

432 MHZ RESTRICTED SECTION

Pos	Callsign/P	Loc	Score	QSO	Pwr	Ant	Best DX	km
1	G6ZME	82NN	5434	293	250	24	SP9EWU	1539
2	G0JRB	94SB	3796	204	400	28	OK5VHF/P	1155
3	G3LRS	92MO	2045	161	100	21	DL3BWW	1048
4	G3ZPB	91XH	1885	119	400	21	OZ9EDR/P	931
5	G4UHF	91GI	1669	164	400	88	OZ9EDR/P	1014
6	G4FAM	01LD	1579	143	350	21	OZ7SKB/P	792
7	G8HSG	93PW	1428	107	70	48	OK5VHF/P	1168
8	G0MSA	00EW	1363	127	200	22	DF0NF	708
9	G4BRA	80ST	1191	137	400	21	DF0NF	881
10	G3RAL	92IR	813	85	60	19	DL7AFB	1025
11	G1KHX	81PH	800	94	120	17	OZ9EDR/P	1093
12	G3IUB	82LB	799	72	50	22	DL7AFB/P	1157
13	G7FOX	92LU	695	80	100	21	DC3XH	741
14	G6HIC	94HH	650	70	100	19	PI4GN	549
15	G6SRC	01JG	577	57	75	19	DF0NF	663
16	GI3LLQ	64XC	547	41	45	23	PA3BPC/P	719
17	G3JRM	02UL	530	51	10	19	OK5VHF/P	984
18	G8ZTT	83PF	512	62	10	21	PI50RCG	551
19	G7DOR	91TG	449	81	80	23	DF0NF	731
20	G0ULT	91IH	443	82	50	21	DF0NF	783
21	GJ4ZUK	89WF	246	24	100	17	G6APZ/P	559
22	GI4GTY	74AI	92	10	25	19	G8JYN/P	472

432 MHZ LOW POWER SECTION

Pos	Callsign/P	Loc	Score	QSO	Pwr	Ant	Best DX	km
1	G8XVJ	93AD	5228	302	22	30	SP3DRT	1372
2	G7SAC	93AC	4543	264	25	30	OK5VHF/P	1237
3	G8OHM	82XJ	3090	186	25	21	OK5VHF/P	1238
4	G0NHR	93BA	2804	164	25	88	OL7M 1297	
5	G0ROC	83VP	1914	120	12	18	OK5VHF/P	1260
6	GM6VIU	85RU	1236	74	25	24	OK1KIR/P	1194
7	G8JJR	93JK	1159	89	23	21	OK5VHF/P	1191
8	G7OLI	91NV	1116	118	20	21	DL3BWW	1051
9	GW0RVE	82LQ	1094	103	25	14	DK9OY/P	886
10	G4RCD	84UR	965	66	20	21	DL0OU/P	802
11	G1RDX	91OS	940	110	25	21	OZ9EDR/P	952
12	G4TVR	92BJ	917	78	25	21	DL7AFB/P	1072
13	G8JYN	91KG	836	121	25	21	OZ5BAL/P	934
14	G6GLR	94ET	784	52	15	22	OK1KIR/P	1096
15	G8IGQ	93KA	768	76	25	10	DL3BWW	1056
16	G1GSN	92XA	755	95	12	21	OZ5BAL/P	826
17	G8SAD	92WA	682	66	10	17	DL3BWW	999
18	G8NJA	80FP	583	66	25	23	ON5OF/P	676
19	G1ZMS	90WV	576	82	25	Slot	DF0NF	740
20	G8TNK	01BH	528	76	25	19	DF0NF	698
21	G0DQF	01BX	510	54	25	21	OZ9EDR/P	885
22	G0TIW	91RR	480	66	25	12	DL7AFB	1082
23	G7ASF	92GD	261	42	25	18	DL0OU/P	761
24	G4RMD	91VO	255	43	10	21	DF0NF	702
25	G0CDB	80FJ	74	17	25	10	G4CAA/P	276

432 MHZ SWL SECTION

Pos	Callsign	Loc	Score	QSO	Ant	Best DX	km
1	BRS25429	93FX	212	22	8Y (2m)	DL0OU/P	743
2	BRS32525	01AL	165	26	19	DF0NF	694

1296 MHZ OPEN SECTION

Pos	Callsign/P	Loc	Score	QSO	Pwr	Ant	Best DX	km
1	G0VHF	01PU	3940	233	250	4 x 55	OL6K/P	1158
2	G4IEV	02QV	2509	174	400	16x23	OL6M	1137
3	G4OQR	02TG	1759	139	80	1.8m	OK5VHF/P	992
4	G4NXO	94WC	1538	122	150	4 x 55	OK5VHF/P	1134
5	G0ALE	01DH	975	108	350	2m	DC4XH	706
6	G8EQZ	93VW	661	69	250	48	DC2OD	694
7	G6SFR	80UU	582	66	150	8x39	DG1KJG	660
8	G0CFM	81TJ	420	54	50	54	PI4GN	667
9	G0RJP	82RJ	345	32	3	18	DL8BDU	715
10	G8VOI	90MX	305	41	40	4 x 26	DF0NF	782
11	G1ONY	91PS	284	54	150	4 x 23	PI4GN	544
12	G4WGZ	91VG	276	50	60	65	DF0NF	720
13	G0VOP	80SN	106	14	40	23	F1DBE/P	513

1296 MHZ RESTRICTED SECTION

Pos	Callsign/P	Loc	Score	QSO	Pwr	Ant	Best DX	km
1	G4NKC	82NN	2069	123	180	39QLY	OK5VHF/P	1293
2	G4CCH	94SB	1421	109	400	47QLY	OK5VHF/P	1155
3	G3TQF	92MO	1068	94	100	2m	OK5VHF/P	1165
4	G0FDZ	01LD	626	70	120	5'	DF0NF	661
5	G3ULT	91IH	479	66	100	Dish	DF0NF	783
6	G3JRM	02UL	475	43	5	23	OK5VHF/P	984
7	G8TB	91XH	461	75	35	55	DF0HS/P	425
8	G4BRA	80ST	459	57	100	2m	PA0WMX	563
9	G0SWL	93PW	417	37	1.6	23	OK1KIR/P	1009
10	G0MSA	00EW	265	33	100	23	PI4GN	523
11	G6JQV	94HH	251	27	100	15	PE0MAR/P	449
12	G6SRC	01JG	184	22	10	23	PI4GN	478
13	GJ4ZUK	89WF	88	10	12	23	G4NKC/P	374
14	GI6ISQ	64XC	41	5	7	45	G0RUZ	312

1296 MHZ LOW POWER SECTION

Pos	Callsign/P	Loc	Score	QSO	Pwr	Ant	Best DX	km
1	G3CKR	93AD	2621	174	23	93	DF0TEC/P	1074
2	G3OHM	82XJ	1719	115	25	55	OK5VHF/P	1238
3	G4WGE	93AC	1188	89	25	49QLY	OK5VHF/P	1237
4	G4CYA	93JK	1127	100	25	2m	OK5VHF/P	1191
5	G0ROC	83VP	992	69	10	26	OK5VHF/P	1260
6	G8KGC	93BA	973	81	15	55	DF0RB	857
7	GW0EIY	82LQ	650	49	10	15/15 Slot	DL0MI	811
8	G3JYP	84UR	605	48	25	48QLY	DL0AAN	733
9	G8SPE	91NV	555	73	25	48QLY	DL0OU/P	729
10	G0EYO	92BJ	542	50	25	56	DL0OU/P	783
11	GM0USI	85RU	520	30	20	55	OK1KIR/P	1194
12	G8SAD	92WA	508	55	20	55QLY	OZ9EDR/P	883
13	G4LOO	92XA	495	71	22	55	DB8WK	565
14	G4BEZ	91KG	327	54	10	55	PI4GN	593
15	G6YLJ	91OS	284	44	10	21	PI4GN	550
16	G1ORG	92GD	271	34	10	1.36m	DL0OU/P	761
17	G8BHD	01BH	196	34	10	54	G6JQV/P	348
18	G0UWS	80FP	178	20	10	2m	PE0MAR/P	553
19	G1JDP	94ET	116	12	10	22	PI4GN	573
20	G6YLV	91RR	114	20	10	28	PI4GN	535
21	G6ZRM	80FJ	12	4	25	Corner	G6SFR/P	102

70MHz Restricted Section from Kent - normally a difficult task.

4m is often a band where equipment does not get a lot of testing throughout the year, since activity is not normally very high on SSB / CW outside of contests. This shows through in the number of people who were not on for the complete event, having suffered this or that blowing up. The Reading and District club, G0RSR/P, went one stage further and said that 4m completely failed to materialise - at least it makes it easy to adjudicate! There were a number of comments that activity seemed to be down a little yet again this year and there were a couple of requests to replace 4m with 6m or to incorporate both bands, but also a couple stressing the desire to keep the band. With this in mind, and following the comments received earlier this year, there are no plans to make any changes for the 1996 event.

144MHz

It is a very long time since the 1000 QSO barrier has been broken on 2m in VHF Field Day and it is testimony to the quality of this year's conditions that G4ZAP/P managed to do this and both G0EMG/P and G8TIC/P came frustratingly close. Between these stations and GM3BSQ/P, scores at the top of the 2m Open Section were very close and were given a great deal of careful attention with the computer-aided checking system. Congratulations should also go to G3CKR/P for a remarkable score in the low power section with just 25W.

In addition to the tropo opening there was also a good bout of sporadic E during the Saturday evening which gave many people their best DX into the eastern coast of Spain, or for some of the more westerly stations, into Sardinia or even Sicily and mainland Italy. There was an additional sporadic E opening on the Sunday morning which enabled G0VHF/P to work a couple of HA stations and which also enabled GM4VVX/P right up in the North of Scotland (IO78) to hear, but not complete with, some HB9 and Italian stations. Clive, GM4VVX/P, made some interesting comments on propagation from the opposite extreme of the country to most people. He was hearing DL, PA, ON, HB9 and F stations for a couple of hours before the contest started, but this all faded out around 1300 on the Saturday - typical! It was even more frustrating to hear GM3BSQ/P located 100 miles to the south-east working continentals like shelling peas. During the evening, Clive did hear some DL stations and also caught the sporadic E to Spain, but none of this resulted in any complete QSOs. However, using the site when the van was not up to its hub-caps in snow and having the opportunity to have a BBQ with 32oz steaks made up for it all!

PHOTOGRAPH: G4ODA

G4DSP/P, Five Bells and Spalding ARS Contest Group's 8 x 21-ele on 70cm.

PHOTOGRAPH: G4ODA

An interesting view of the G4DSP/P 8 x 9-ele on 2m.

432MHz

The G4GCM/P score at the top of the Open Section probably says it all really - 9000 points is the sort of score which people would normally be quite happy with from 2m. In terms of propagation, 70cm followed much the same pattern as 2m, but was rather more extreme in terms of the sizes of the dips and peaks in conditions. There was a particularly strong peak in propagation overnight, with the band leaders averaging 20 - 28 points per QSO around this time, but conditions dropped off very rapidly after mid morning. Mid Cheshire ARS, G3ZTT/P, bore this out, saying "Conditions best when I (G0LBO) was asleep - fortunately the operator, G8HAV, wasn't!" 70cm had its share of equipment problems too - Sudbury and District Radio Amateurs (SANDRA) had trouble getting the generator started, suffered a broken coax and the odd dropped antenna and then had to finish early due to a thunderstorm. However, when they did get on, they found the effort well worth while with the good conditions.

1296MHz

In spite of suffering from being too far south for 2m and 70cm, the Wind-breakers and HADRABS, G0VHF/P, managed to maintain their domination of 23cm with another excellent score in spite of a two and a half hour gap in their log on the Sunday morning. The Northern Lights, G4IEV/P, suffered very badly with enormously strong in-band radar QRM for several hours at the peak of the opening, particularly on Sunday morning. When this appeared there was nothing to do except go away and walk around the field until it went away - most frustrating! Warrington CG, G3CKR/P, also staged an excellent effort on this band in the Low Power Section which would have put them in second place had they been in the Open Section. The A1 CG station, G4NXO, think that they have a new definition of a portable contest. They put the station up before the start of the event and then found that the 23cm pre-amp was being completely blocked by the 70cm station. The only solution was to remove the 23cm station to the far corner of the field and start all over again. They also had a digital voice keyer which needed a thump on *every* call, but at least this kept the operator awake enough to work the OK station!

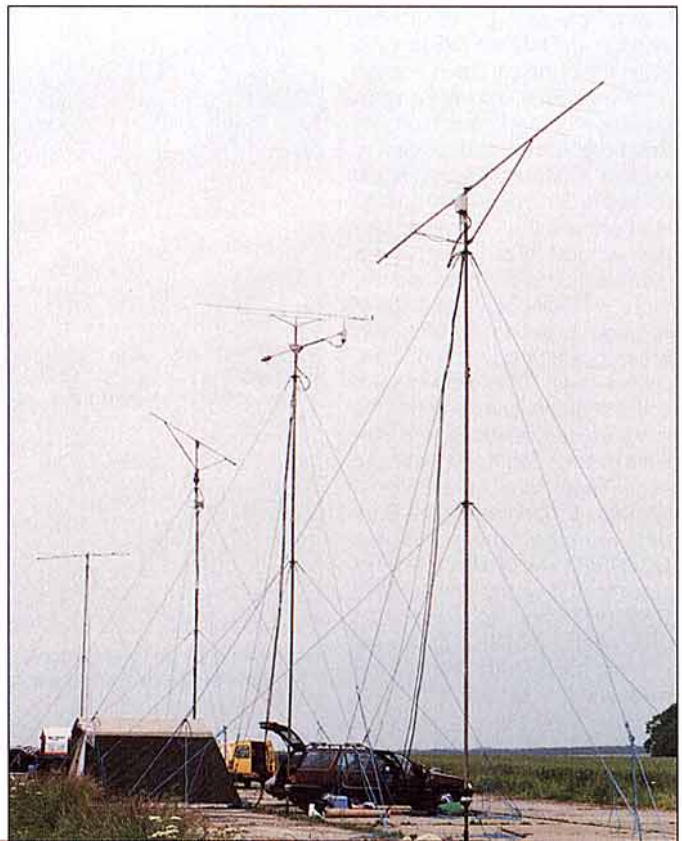
Just like the higher bands, not everyone had good conditions, and the Fareham and DARC station, G8VOI/P, struggled to just equal their worst total in 10 years! The Queen's University ARC, GI6ISQ/P, thought that 23cm received their award for most improved band over 1994, but weren't sure whether this was down to better equipment or the hard work and enthusiasm of three newly-licensed members. Maybe this last comment is a lesson to us all? There were a couple of interesting antennas - G3CKR used a 93-element quad loop which was described as a home brew F9FT antenna! I wonder how long till we see a single antenna break the 100-element mark! CARSCOG Gearboxers, G1ORG, lived up to their name with a 4ft dish mounted on top of a Ford Sierra Estate. The dish was made of fibreglass which was 'wall-papered' with aluminium kitchen foil and mounted on top of the car on a circular L-section track made out of an old road sign! The whole vehicle could travel to site (although not at over 45mph) with the dish stowed horizontally, and in this position they felt that the dish acted like a big spoiler helping to keep the car on the road and the dish on the car! Once at the site, the dish could be put into the normal vertical operating position within one minute - a lot quicker than putting a normal mast up!

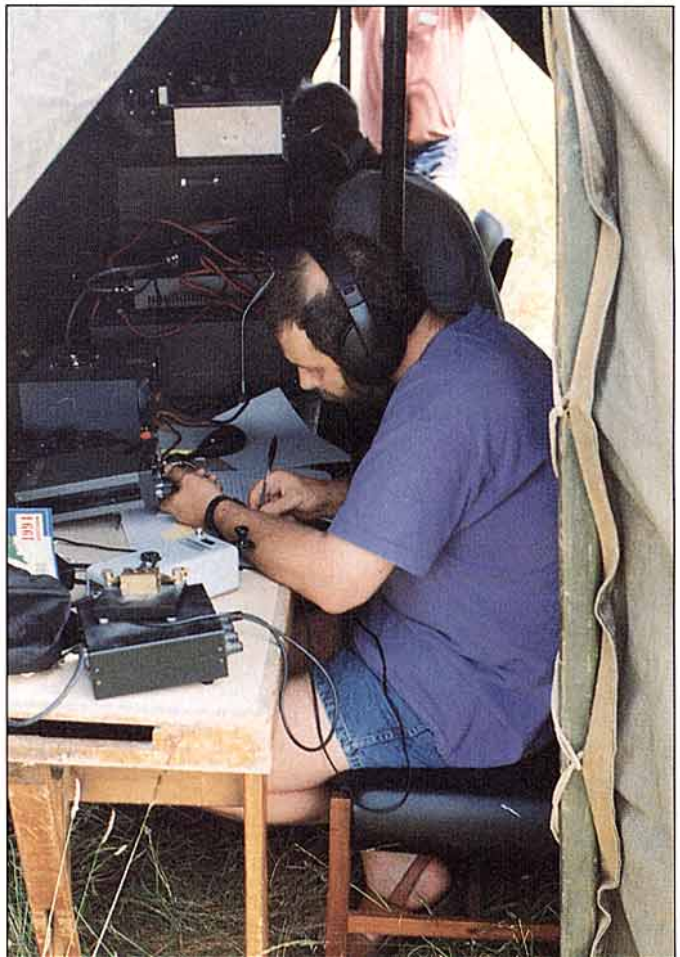
Finally, we had three requests this year to re-instate 13cm. Again, we have no plans to do this for 1996, but we'll continue to keep the situation under review and your comments are always welcome.

Adjudication

THIS WAS THE FIRST time that we were really able to make good use of computers to help us with the adjudication process. We had the vast majority of the leading logs available to us on disk, and this enabled us to cross-check the top logs very efficiently. Those few groups in leading positions who did not provide electronic versions of their logs had their logs typed up by the adjudicators so they could be checked in the same way. If you generate your logs on computer, please do submit a disk. This checking process proved a very interesting exercise with, even at the top of the tables, the number of points lost varying by a factor of five or more between different groups. Congratulations must go the Windbreakers and HADRABS in particular for some very accu-

Left: The Scunthorpe VHF CG antenna farm. Right: Noisy PARCers' 4m station (front) being operated by G4ZIY. The 2m station is in the background.





CONTEST CLASSIFIED

All rules should be read in conjunction with the General Rules published in *Contest Classified*

VHF RESULTS

50MHZ TROPHY 1995

For the second year running the Sporadic-E openings ended at the start of the contest and re-started around the time it ended! Perhaps the Trophy contest should run for 24 hours (the same length as the IARU 6m contest)? Your comments are invited on this point.

Only one serious complaint of poor signal quality was made. Please try and be as helpful as possible if you receive a poor signal complaint and please remember to record the complaint in the log! I realise that it takes time to conduct tests to determine if the problem is, for example, receiver overload or power amplifier instability. Unless tests are carried out, it is no good complaining after the contest as the 'damage' will have been done.

Congratulations to the Windbreakers and HADRABS Contest Group for winning the Multi-operator section. They will receive the Telford Trophy for this achievement. Also congratulations to GW4BVY/P for winning the Single Operator section (and hence the Six Metre Cup) for the second year running. Congratulations to all of the runners up in the various sections, you will receive certificates.

G0FCT

MULTI-OPERATOR SECTION

Pos	Group	Callsign	Loc	QSO	Mult	Points	Pwr
1 *	Windbreakers & HADRABS	G0VHF/P	IN79JX	131	52	169156	350
2 *	Flowerpot Men CG	GW0RDI/P	IO82JJ	258	64	129402	400
3	The Northern Lights	G4KUX	IO94BP	175	65	122655	400
4	Black Sheep CG	G6YIN/P	IO92JR	208	58	62928	100
5	Spalding & DRS	G4DSP/P	JO03CE	132	53	53689	400
6	Flight Refuelling ARS	G4RFR	IO90AS	156	48	45984	85
7	Fairham & District ARC	G3VEF/P	IO90MX	162	47	39621	90
8	A1 CG	G4ZAP/P	IO92QP	140	51	37026	150
9	11th Hour CG	G6AQP/P	IO91XG	155	49	33840	250
10	East Sussex CG	G0MSA/P	JO00EW	129	45	33075	50
11	Wythall CG	G1WAC	IO92BJ	96	38	18316	100
12	Dacorum AR & TS	G7RIH/P	IO91RR	64	34	9112	180
13	Stourport Scout Radio	G0SSR/P	IO82TU	57	29	8294	10
14	Colchester RA	G4CRA/P	JO01IT	35	20	3200	10
15	Lowestoft RC	G3JRM/P	JO02UM	20	16	3072	50
16	Guildford & District RS	G5RS/P	IO91TF	42	19	2660	10
17		G6YB/P	IO81UL	83	1	387	50

SINGLE OPERATOR SECTION

Pos	Callsign	Loc	QSO	Mult	Points	Pwr
1 *	GW4BVY/P	IO81NV	255	60	108420	200
2 *	G4PIQ	JO01MU	161	46	49266	400
3	G8APB	IO83WD	132	47	31490	
4	G0NYL	IO93QN	78	35	14105	200
5	G7KTE/P	IO80FI	64	25	10175	25
6	G6FQZ	IO91JR	59	33	9075	150
7	GJ4ZUK/P	IN89WF	27	27	7911	80
8	G0UVJ/P	IO83VC	56	30	6180	20
9	G8ZRE	IO83NE	35	26	4706	10
10	G0GZI	IO83RE	30	25	4000	20
11	G6TER	IO81UB	20	18	2592	10
12 *	PE1EWR/P	JO11RL	12	11	1232	10
13	G8IFU	IO90BT	11	11	649	5

SWL SECTION

Pos	Callsign	Loc	QSO	Mult	Points
1 *	BRS25429	IO93FX	33	25	4525
2 *	BRS32525	JO01AL	36	18	2628

HF RESULTS

SUMMER 1.8MHZ CONTEST 1995

Generally, this contest being run in the summer is fraught with problems such as high static levels and severe fading: a real test for any topband operator. This year was no exception, although it would also appear that conditions varied between different parts of the country. A few stations in the top ten worked into W2, VO, and 9H.

SUMMER 1.8MHZ CONTEST 1995

(continued from column 1)

There was a marked increase in G stations submitting logs, well up on last year's entry, which is most encouraging. This year top honours go to Fraser Robertson, G4BJM, with a very creditable score: his first Summer topband win. Second place goes to Clive Penna, GM3POI, followed by last year's winner Dave Lawley, G4BUO, and Dave Cree, G3TBK, for joint third spot. In the Overseas Section, honours go to Audrius Lucinskas, LY3NJM. Congratulations to all concerned. Checklogs are acknowledged with thanks from GM4DGT, GW0KZW and G3GMM.

The standard of logs was fairly accurate, the major pitfall being incorrect callsigns and County Code information. One operator submitted a log with four unmarked duplicates: he would have won the European section outright if he had not incurred the penalties. It really does make sense to check logs for 'dupes'! The station concerned has been informed of his loss of points and the reasons why.

Comments from logs: "No DX heard until 1 minute after contest" (G3KKQ); "last third of contest very slow going" (G4XHE/P); "good to work VE and Ws, near the end poor conditions to Europe, nothing went wrong for a change" (G3VYI); "put up a new antenna and reasonably satisfied with it" (GM4SID); "first time using SD on 1.8MHz, worked very well" (G4BJM); "conditions seemed to be very good at start but then deteriorated later" (GM3UM); "very slow going after 0100, QRN was very bad, how about extra points for DX QSOs!" (G3RZP); "very hard due to QRN" (YU1RA); "thanks for interesting contest, see you next year" (LY2OU).

G0ORH

UK SECTION

Posn	Call	QSOs	Bonus	Eqpt Code*	Score
1	G4BJM	133	66	4C17	726
2	GM3POI	132	64	4Q19	713
3=	G4BUO	131	66	4C17	710
3=	G3TBK	131	65	4C17	710
5	G3NKC	127	62	4C15	664
6	G4IFB	112	57	4C15	618
7	G4XHE/P	113	56	4W15	606 (Multi Op)
8	G0ORH	103	56	3C16	586
9=	G3RZP	100	52	4C17	548
9=	G3VYI	97	53	3W13	548
11	G4IUZ	91	51	3C15	517
12	G4OGB	94	50	2C13	502
13	G2HLU	86	48	3C12	495
14	G0LZL	88	48	3C13	493
15	G3UFY	83	45	4W1-	469
16	G3KKQ	76	46	3Q13	453
17	G3TCQ	80	44	3C15	441
18	G2AFV	72	44	3C15	436
19	G0LII	73	44	4W12	434
20	G4RCG	75	40	3C1-	417
21	G4CZB	71	41	3W13	415
22	G4RSC/P	63	44	3W12	396
23	G3GMS	58	41	3G12	379
24	G0JQN	56	39	3W12	360
25	G3AWR	56	37	3Q12	321
26=	GM4SID	50	34	3C12	295
26=	G3ZDD	46	34	3W2-	295
28	GM3UM	41	32	3W1-	283
29	G3VNG	41	29	3C1-	265
30	G3OKO	40	29	2G1-	257
31	G0VQR	37	27	2C1-	246
32	G3ZGC	21	17	2W12	148

* See RSGB Contesting Guide in Sep 95 *RadCom* for Equipment Coding System.

OVERSEAS SECTION

Posn	Call	QSOs	Bonus	Score
1	LY3NJM	50	30	297
2	LA2UA	48	31	293
3	UA2FT	42	27	226
4	OK1DRU	37	24	225
5	PA3ALP	35	23	217
6	OK1DNR	37	23	214
7	SP9KRT	32	23	199
8	DF1AL	68	30	174
9	LY2OU	26	15	153
10	DL5BWE/P	21	18	150
11	UR5UW	18	14	112
12	SP5ELA	12	11	91
13	YU1RA	12	10	77
14	UA9AR	9	7	62
15	WW2Y	6	6	48
16	YU1UA	5	5	40

VHF CONTESTS CALENDAR

27 Nov	432MHz Cumulative (June 95)
3 Dec	144AFS/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)
4 Feb	432MHz AFS/Fixed (Sep 95)
11 Feb	70MHz Cumulative (Sep 95)
25 Feb	70MHz Cumulative (Sep 95)

HF CONTESTS CALENDAR

25/26 Nov	*CQ WW DX CW*
3-5 Dec	*ARRL 160m CW (Dec 95, p21)*
11/12 Dec	*ARRL 10mCW/SSB(Dec95, p21)*
29 Dec	*RAC CW/SSB (Dec 95, p21)*
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)
2 Feb	LF Cumulative CW (Sep 95)
4 Feb	LF Cumulative CW (Sep 95)
5 Feb	LF Cumulative CW (Sep 95)
10/11 Feb	1.8MHz CW (Sep95)

All VHF and HF Contest Rules were published in the September *RadCom*

rate logging. This enabled them to put some extra distance between them and the A1 Contest Group in third place in the Open Section.

Overall, we had few problems with adjudication this year. The only real difficulty we experienced was that a number of groups wanted to change the section of their entry from that in which they registered. Unfortunately we have not felt able to allow this, since it negates the whole point of pre-registration. However, in the future, if you want to change section before the event - and it is possible to do so, even very close to the contest - you need to contact the adjudicator, but you must do it before the contest.

Trophies

IT'S PRETTY MUCH all change on the trophy front this year. After a break from the **Open Section** for a couple of years, the **Northern Lights** returned, this time from a new site in Norfolk, to take the **Surrey Trophy**. They beat the winners of the last two years, the Windbreakers and HADRABS, who were sited that bit further south and perhaps not so well located to take advantage of the conditions, into second place. There was quite a shake up in the **Restricted Section** with the **Martlesham Trophy** being awarded to the **Telford and District ARS**, with last year's winners, the Windmill CG, very much out of the propagation in Kent, being relegated to fourth place. After three years on the top of the **Low Power Section**, the Sutton and Cheam Radio Society were beaten by the returning **Warrington Contest Group**, who take the **Arthur Watts Trophy** having given a commanding performance on all bands. In Scotland, in spite of staging a single band entry at less than full strength, the **Aberdeen ARS** take the **Tartan Trophy**, and the **Cockenzie and Port Setton ARS** successfully cling on to the **Scottish Trophy**. It was good to see at least a little competition in the **SWL Section** this year, and congratulations to **Bob Treacher, BRS 32525** for winning this section. As always, we'll be sending certificates to the winners and runners-up in each section and on each band, and to the leading stations in each country. Congratulations to you all.

Many thanks to GM0GNT/M, G4IDF, G0ADH, G3NKS, G3BPM/P, GM3TAL/P and F6KBF for their most useful checklogs. ♦

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TS 50 S	TM 732	IC 9000 E
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BNOS 6 metre linear (CLP 50-3-50) six months old. Excellent condition. boxed. £115 01472 343430 office hours or 01472 840988 evenings. (Grimsby).

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BARGAINS. Moving house SB1000 amp £295 W9GR DSP2; £125. 3 ALI 20ft scaffold poles, collect £10 each. KEF Cadenza spkrs, light oak, perfect; £120. German course 1 video 1 tape, books £20. FL3 £80. 4-400 £20. G3RHM, QTHR. 0181 423 2329 (W London).

BETTER than lin amp Datong ASP7. Wired for FT707 ideal for mobile use. New price £86. wanted price £50 + P&P. ATU roller coaster VCT VC300 want £75 + P&P. Ring any time, all above with mans. 0181 949 4503 (new Malden, Surrey).

BIRD 43 throughline power meter with 9 elements complete in leather case as new condition £225 John G8BXH QTHR 01923 234924 (Watford).

BUTTERNUT HF5B 2-ele beam 10,15,20,12,17 bands as new, bxd; £160. Hy-Gain vertical 10.15.20 bands ex-cond; £30. After 6pm. 0151 734 0328 (Liverpool).

CABLE 6 pair screened, 100M £60. Also RG91 high grade lowloss CO-AX 35 metres £12. Buyer collect, G3MWO, QTHR. 01359 270218. (Bury St Edmunds).

CANNON A1 camera with 28mm 2.8, 50mm 1.8 lenses, Vivitar 35 105 zoom 400mm 5.6 telephoto lenses. Speedlight 199A flash, Sangamo weston light meter, data back, gadget bag, sundries. condition v.good £400. Record multi-plane no.405 23 steel gutters in own box. £185. G4OWM QTHR. 0181 395 6890 (Carshalton).

CLEARANCE IC751 fitted both CW filters and internal PS £875. IC735 with CW filter £600. IC290E 2M Multimode mobile £275. FL2100Z 9 band linear £475. NIR10 DSP filter £185. Buyer collects. 01705 463504 (Hayling Island).

DRAKE TR7 AUX7 NB7 PS7; £500. Diawa auto ATU CNA 1001 £50 ono. G3JXG, QTHR. 01482 842386 (Hull).

ELECTRIC car design program for PCs and compatibles under DOS. uses GW basic/Basica and wordstar. state 5 1/4 or 3 1/2 disc reqd. £7 each. Eric GM4BOA QTHR. 013552 24087. (East Kilbride).

EX-MOD Geiger counter £35, new Discone Tx/Rx aerial, heavy duty construction £45, 3 of 12V 100 AHR batteries, 9 of 12V 2.5 AHR batteries £5 ea. Several 150 amp 200 P.I.V new diodes £4 ea, pair new 6JS6C valves (NEC) £50, petrol generator 24V 500W £65, carriage extra. 0121 472 3688 (Birmingham).

FDK 2M multi 750E excellent condx, bxd with mic & instruction book; £200. 0181 550 2502 (Ilford, Essex).

FT 290MkI with MM30W linear case, new nicads, £240. Sony ICF2001D boxed £100. Racal manpack PRM 4031 1MHz - 30 MHz SSB AM CW Nicad pack, aerials offers. MSF radio clock, unused unwanted gift already have one £16. Straight key. Gratham Latham c1915 offers. G3YJD 01908 379250 (Bletchley).

FT 736R £950 TH28E £175 with mic. Kenwood TS950SDX £2100 FT 470 dual band handie £280 all boxed going QRT. 01202 896088 (Bournemouth).

FT708R case mic/speaker £100 70cm 5/8 mobile ant £20 CR100 mint condx £50 Olivetti PC/XT 20M.H.D VGA mono card but no monitor £120 Taxan RGB monitor £45 collect or carriage at cost G3RKH QTHR 01422 202551 (Halifax).

FT75 with VFO & DC power supply £100. Standard C58 multi mode 2M Tx/Rx £130. Sansui tuner/amp 25W per channel £75. 01661 872665 (Ponteland).

FT757 GX FB home mobile portable multi mode plus mobile mount handbood and tech supp inc with ERS MOD G3IZD QTHR £450 01229-828572 (Barrow).

FT767GX 2, 6mts 70cm modules SP767 matching spkr original box/pack. D/mike H/mike H/brew ATU 4-1Balun Daiwa CN101 1.8-105MHz CR/needle SWR meter. Multi trap dipole, Kent straight key, Kent single paddle, Kent double paddle. Rig hardly used since new, straight key double paddle key as new sell complete station no splits buyer collects; £1650 ono. G0FVC, QTHR. Must sell going QRT on HF. 0171 281 1464 (London).

FT790 MK1 Nicads £235 (no mic) FT290 MK1 £220 Alinco 70cms 30 watt linear £40. MM 2metre 100W linear £100 RN electronics 2M-6M transverter £100 24 ele and 48 ele 70 cms aerials £5 each mobile 70/z £10 need HF ATU. 0181 951 5948 (Edgware).

FT901 DM working order all extras; £275 ono. Buyer collects. 01732 465011 (Sevenoaks).

FT980 HFTX with 0-30 general coverage receiver all mode cat vgc £600 ovno would consider exchange with good spec TFT 486 Laptop (colour) phone Tom G4TDE QTHR. 01322-274070 (Dartford).

FT990DC with 250 Hz filter mint £1200 ono also Yaesu FT 736R plus 6M 23cm modules £1200 call 10am 12pm 5pm 6pm. 01226 754799 (Barnsley).

G3RUH 9 turn 70cm Helix £65 inc carriage. Vacuum capacitor. Jennings 7-1000PF 5KV mounted in heavy duty casting complete with insulators and mechanical gearing. £75. G0KTN QTHR 01225 703726 (Melksham, Wilts).

G400 £200 KR500 £175 10M 3 ele monoband £40 Versatower P40 all complete inc ground post and Emotator £150 buyer collects. IBM XT CGA 10mb HD £100 Yaesu Sommerkamp FLDX500 +FLDX400 pair 10 to 80m £250 Yaesu FT200 offers inc PSU/spkr 46 ele GP CD MBM £25 4 x 48 ele 70cm MBM'S with power splitter + stacking frame £120 pair JVC U-matics req attn. offers buyer collects G6DTW Alvin. 01372 277945 (Ashstead, Surrey).

GAP Eagle vertical for 10 12 15 17 20 & 40 metres height 21.5 feet no traps, coils or transformers. No tuning is required. SWR less than 2:1 Greater Manchester. Buyer to remove. 4 months old. £200 ono. Tel. 01204 398412 between 9am and 9pm anyday. (Bolton).

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ICOM IC735 all band tcvr mint condx, bxd £600 would part exchange for IC7000 rcvr contact Jim, 0191 416 8211 (Washington).

ICOM IC735 HF tcvr, CW filter. Original packing & man, mint; £500. HP4815A vector impedance meter, no probe; £75. HP2590B 3-15ghz frequency converter £50. EIMAC 4CX1000A new bxd, £250. 4CX250B new, bxd; £50. After 6pm or w/ends. Keith, 01268 751417 (Benfleet, Essex).

ICOM ICA72E HF Rx 99 memories, mint no FM £475. Purchaser pays delivery. 0191 2665775 (Newcastle/Tyne).

ICOM IX735 all band tcvr SSB/CW/AM/FM gen/cover receiver HDBK/WKSHP mans bxd as new 93 £600 ono. Eric, G3KQS. 01908 647076 (Milton Keynes).

KAM multimode TNC version 6 £175 BNOS LPM 432-10-100 £225. JT603 Icom / BBC interface with software & books £50. G3LDI QTHR 01598 570278 (Norwich).

KENWOOD / Icom service manuals. price including postage in brackets. Kenwood TR75IE (£12), TSI4OS/6805 (£15), TS 450SAT/TS690S (£30), TS850SAT (£30), TS 950 SD (£30) and Icom IC 575A/H (£12). G3JHP QTHR. 01293-774303 (Horley).

KENWOOD T5850SAT with 500Hz (455KHz) and 1.8kHz filters, C.A.T Interface. also PS52 PSU. £1150. Yaesu FT76 £145. MC60A Mic. £50. 01237 451065 (Bideford).

KENWOOD tcvr TS530S all HF bands G3WWG £350, carriage included in the UK. 01642 644061 (Stockton-on-Tees).

KENWOOD TS450SAT HF filters, ATU fitted bxd mans also G5RV full size both as new; £1000 ono. Tel after 6pm. 01332 600621 (Derby).

KENWOOD TS50 used twice hence lovely condx, complete with set of hustlers plus rear shock spring. G4MPQ, QTHR. 0150 324 0432 (Liskeard).

KENWOOD TS811E 70cm multi mode base station tcvr as new, bxd; £550. No offers. Yaesu FT101Z, bxd; £275. G4KIR, QTHR. 01287 642114 (Loftus).

KENWOOD TS830S CW/filt SSB/CW HF/rig immaculate; £575. TA33JNR HF/beam; £95. CDR rotator with cable £95. Osker SWR bridge; £20. BC221 £20. Silent key sale OBO widow G3CZS, apply Neil, G3RIR, QTHR (Leics). 01455 554522 (Lutterworth).

KENWOOD TS830S nice clean unit fitted 500Hz filter, buyer inspects, collects; £500. QTHR near Weston S Mare. G0CHJ 01934 843895 (Winscombe).

KENWOOD TS850S fitted with two 270Hz CW filters (8.8MHz & 455kHz) also SP31 spkr with switched filters & PT20 power supply; £950. Purchaser must collect, no haggling please. G3BDQ, QTHR. 01424 812262 (Hastings).

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LATTICE tower brand new complete with ground post and winch never used £185. 0282 924 9304. (Ilford).

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MFJ model 948 ATU as new; £80. Peter Jones pump key as new; £40. Tel eves or w/ends, postage extra. 01287 635708 (Guisborough).

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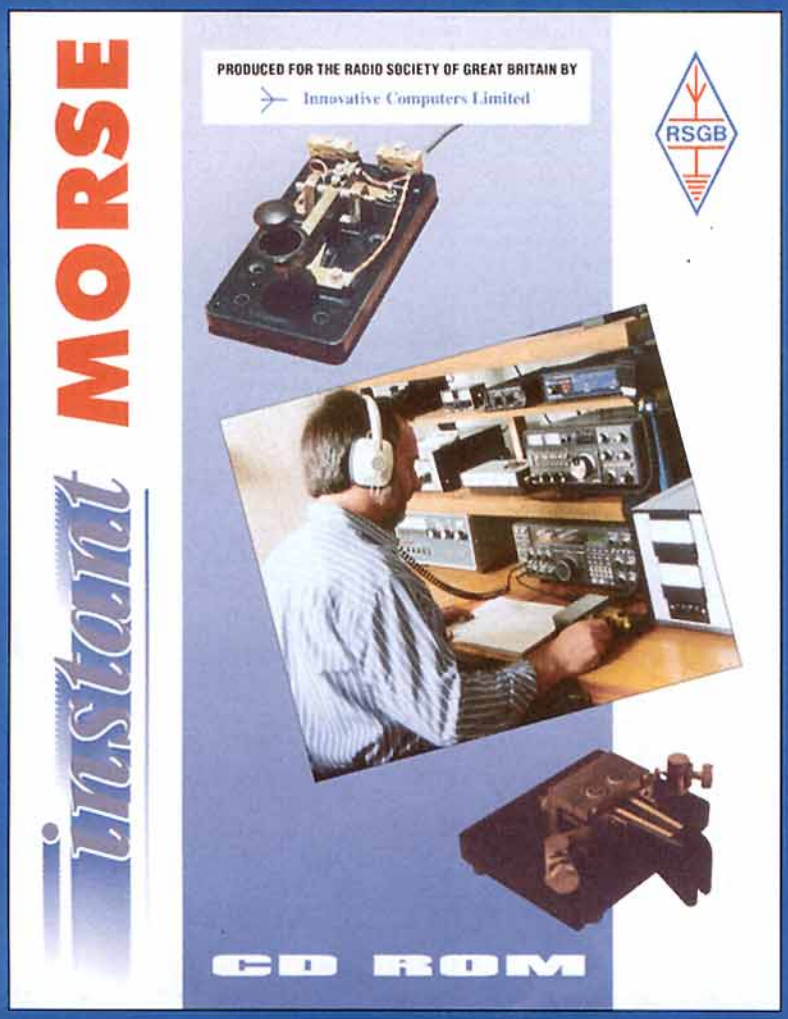

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for the Radio Amateur and SWL

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Filter 15 – 21MHz Notch	(AKD)	£8.50	£7.23
Filter 20 – 14MHz Notch	(AKD)	£8.50	£7.23
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HOW TO ORDER

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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.

PAYMENT. Payment may be made by post, enclosing a cheque or postal order. These should be crossed and made payable to 'Radio Society of Great Britain'. If sending cash please use registered post. We accept Visa and Access (Mastercharge) cards and our telephone number for credit-card orders is 01707 660888. Our Giro account number is 533 5256.

DELIVERY. Goods will be despatched to UK destinations by 2nd class letter post or parcel post, or surface mail to overseas destinations. Please allow 28 days for delivery.

ORDER FROM: **RSGB SALES (CWO)**
Lambda House,Cranborne Road,
Potters Bar, Herts EN6 3JE

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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**
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- **RST codes**
- **First Aid Section**
- **Equipment Log**
- **Contest dates**
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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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softcase CTCSS £295 FT901DM 100W HF vgc £350 - Joe evenings. 01236 720204 (Glasgow).
MUTEK TVVF144A high performance 10M-2M transverter 10 watts output £130. Sony ICF-2001D air FM/LW/MW/SW PLL synthesized receiver £200. Squeeze keyer ETM-3 £40. 12 volt regulated, metered 12amp protected PSU BNOS £45. Advance OS240 dual beam oscillopscope £80. Wireless world March 69-September 82. Tim 0181 393 9691 (Epsom).
OSCILLOSCOPE Dynamco dual beam 12MHz b/w £85. Valves galore, 100s of brand new bxd items including many vintage and CV types, SAE for lists. 01273 557766 (Brighton).
PK232 BMX with Pakratt stilll in box complete with leads, manual, software very little used; £200. Reason for sale; disinterested. Yaesu FTV-707 transverter for FT-707 transmitter 144MCS SSB £120 with manual. 0189 2852144 (Rotherfield, Sussex).
PK232 multimode data controller with leads & manual £150, also HF-linear 1kw RMS out 1.8-30MHz NEC CQ301 little used £900 ono. 01892 663298 (Crowborough).
PNEUMATIC telescopic mast folded length 1680mm extended length 8000mm with compressor; £500 ono. Tel 01524 422372 day 01524 420048 eves. (Morecambe).
PROFESSIONAL Linear ENI 550L cost £5K+ 50 dB gain 50W 1.5 to 400 MHz. H.P SIG. GEN. 616B 1.8 to 4.2 GHz. Marconi SIG.GEN. 801D/I/S 10 to 480MHz Various Cossor 89 series CRT. Offers on all above. 01734-791488 (Wokingham).
QRT sale. Items still available include almost new 600W HF linear amp, FM dual-bander, MFJ-989C 3KW ATU, masts & aerials, Details Oct 95 Radcom. All prices negotiable! Grab yourself a bargain! G0EOL, QTHR. 01606 554857 (Winsford, Cheshire).
QUANTITY discharged PMR units several mobils for ATC sae for list buyers to collect G3HHM QTHR in new call book. 01527 62972 (Redditch, Worcs).
RACAL RA17 £195. Tektronix 564 storage o'scope £110. 4/405MHz signal generator £115. Marconi TF2600 VTVM £45. Kenwood LF30A LPF £30. 01293 885701 (Crawley).
RACAL RA17 vgc; £150. Realistic DX302 comm. Rx vgc; £80. Tel after 6pm buyer collects or pays carriage. 01472 602335 (Cleethorpes).
RADCOM in easibinders. 1984 to 1992. complete set. offers. Buyer to collect. G8FRL Mobile 0585 949648. 01223 213057 (Cambridge).
RN ELECTRONICS 6M transverter RN 6M/02 144 IF together with 7DB switched attenvator 2W O/P, boxed in large di-cast box. full instructions £125. Dartcom WX SAT scanning receiver LCD frequency readout, latest Dartcom filter mods. boxed with S meter built in PSU speaker. full documentation £140. Free: Philips BM75 series 12in monitor free but £12 towards carriage. Kent Keyer PCB (built) and instructions £20. G0KTN QTHR 01225-703726 (Melksham, Wilts).
ROTATOR c/w alignment bearing control £50. 2 metre antenna GP58 £25. Mutek preamp SLN A 144S £15. Cambridge 6 chan modified FM £30. G4VPU. 0191 2522303 (Whitley Bay).
SCORPION 2M transvert 50W output made for all 101-!! Tcvrs £80 19 ele 2M beams new; £50 ea. Taylor inst circuit analyser £50. Yaesu FT720R 2M £85. 01507 480315 (Nr Louth).
SHACK clearance ofers invited. Trio TS830S, TS700G, TR220GX + M/M 70cm 100W Linear DRAE 24A PSU PRO 2006 PRO 43 Yupiteru 5000 scanners. Philips HCS31 8 inch CTV Monitor ICS Fax1 + printer. Opus IBM/XT + monitor RX. Mutek 70 cm pre-amp 12AB Tech. Tradipper. Ranger 10M FM/M. Psion organiser J. Bram 70cm 1 x 18 1 x 48 ele microphones, MH1BB. YM48A. 444T. AR40 rotator. Motorola MX340 + charger ring after 6pm. 01384 255816. (West Midlands).
SILENT key G0VAN, Yaesu FT767GX 2M & 6M fitted, rarely used mint condx; £950. Also Yaesu MD-IC8 desk microphone, bxd unused £70 no offers, buyer collects. 01785 49420 (Stafford).
SILENT Key sale (GW7AXK) IC2E £90: FT790R £200 TR2600E 2M H/Held with ST2 Base/charger unit £100. Daiwa linear 2M 20Watt £25 Yaesu AD2 Diplexer £20. Revex W540 SWR/PEP meter £30. MFJ411 morse trainer £60 (cost £90). Contact GW0DJC QTHR.01639 896866 (Port Talbot).
SILENT keys sale TenTec Corsair II power supply spkr Shure mic; £500. Yaesu FT757GX FM CW filter fitted; £575. SMC 35A PSU; £100. FT2IIRH 2M mobile; £250. FT208R 2M handheld, NC8 charger, PA3 car adaptor; £140. BNOS 12A PSU; £40. 18AVT/WB vertical £90 KW107 ATU; £80. Hansen FS710A SWR power meter; £70. Tokyo HC200A ATU; £50. Toyo T-200 dummy load; £25. Tel 01707 659015 (office hours) and ask for John Davies.
SOLID state 2M tcvr with SSB/FM/CW/AM repeater type FT221R swap for laptop or 486/33 computer system. 01201 66299 (Poole).
SONY Pyxis GPS receiver all accessories supplied complete superb quality handheld instrument pristine condition boxed £646.25 accept £250 G3CEO QTHR. 01734-411389 (Reading).
TEN TEC OMNI V power supply 3 extra filters; £1200 TS520SE with mic; £200. 01303 814194 (Ashford).
TEN TEC Century 22 6 band HF CW TCVR with keyer, calibrator £240. Fairmate HP200E RCVR 1-1300 MHz £140. Diamond SX-200 SWR/PWR meter 1-8-200 MHz £45 bencher paddle key £35. all items boxed with manuals. Chris G0PVN. 01525 220576 (Dunstable).
TH28E complete as new hardly used, bxd with manual new boom mic/head set unused total list £341, bargain £219 ono. 0151 426 3251 (Merseyside).
TNC Surplus brand new Kantronics KPC-9612 1200 + 9600 Bauds £195 + P&P. Complete set novice kits £10 + P&P Paul 01931 713359 (Penrith).
TOKYO 2m to HF transverter VGC. boxed with manual £150 ono. R.N electronics 10m to 6m transverter VGC. £100 ono. Ham International Multimode II professionally converted to 10m with RA certificate £100 ono. All VGC boxed with manuals. GW7PPJ (Colin). 01443 690608 (Merthyr Tydfil).
TOWER 60 feet wind up 20ft lowered lattice work type excellent condition £350 possible P/EX for radio equipement. 01268 570421 (Wickford, Essex).
TRIO 9130 2M multi mode, mobile mount, £250. Codar AT5 TX, T28 Rx, 250/S PSU £50. Eimac 3-500Z unused £100 all carriage extra or collect, G3RB, QTHR. 0191 2530504 (Whitley Bay).
TRIO TH-41E 70cm thumbwheel handheld, two healthy Nicad packs, boxed £99. BNOS 25A PSU, as new, boxed. £99. G4OHB QTHR. 01562 710801 (near Bromsgrove).
TRIO TR2300 2m FM handheld in vgc £90. Datong ASP automatic RF speech processor £35. Datong FL2 Multimode audio filter £30. SME Sentinel auto VHF pre-amp £15. Lafaytte TM-16A field strength meter 3-55 MHz £10 01224 317398 (Aberdeen).
TRIO TR7500 2m FM mobile in vgc. Include mike manual and mobile mount. £100 GM3FRZ QTHR 01224 317398 (Aberdeen).
TRIO TS515 80-10M 100W SSB/CW CW filter, VFO-5 PSU some TLC needed; £150 ono. Trio 2300 2 FM also in need of TLC £50 ono. Deecom 2M half wave £8 ono. 2M Colinear £20 ono. DRAE VHF/UHF wavemeter; £15 ono. CB/10M conversion board & suitable rig £10 ono. Mechanical bug key £10 ono. ATARI 800XL computer, with accessories; £15 ono. Mobile antennas for 20m, 15m and 2m, any offers. Tel Mark G4EZR (answerphone) buyer collects. 01689 821014 (Orpington).
TS 530S with MC5 desk Mic narrow CW Filter manual and box like new £350 FC 902 ATU twin meters SWR and power £100 01779 642867 (Bristol)
TS-530S all band HF.TX-RX vgc one owner Mic,Manual, box £400. Tokyo HL 36U 70cms Linear + preamp £60. Dymar 1785 Modulation meter VHF-UHF AM-FM £40. Pye UHF SIG-GEN model SG5U 370-470 MHz £20. Bicatest cable tester (TDR) needs battery hence £50. Micronta bench digital meter £35. All excellent condition G3MWV not QTHR 01263 512872 / 512664 (Cromer).
TS670 6M 10W multimode includes 10M 15M 40M bands good condition £395 ono buyer inspects and collects ask for David. 01977 558706 (Castleford).
TULIP 486SX computer keyboard mouse 14in SVGA colour monitor 170mb HD 4mb RAM loaded with amateur software plus professional word processor buyer inspects & collects genuine reason for sale (upgrade) price £550 ono. Stuart, GM0CAQ. 01261 833298 (Macduff).
VERSATOWER 30ft min tower complete with head unit and base post. vgc dismantled ready for collection. £250 10A PSU used once. £40 13GL Tonna 2m antenna £15. AR300XL rotator with control unit £35 01491 872779 (Wallingford, Oxon).
VERSATOWER 80ft with accessories no reasonable offer refused. 01489 892455 (Bishops Waltham).
YAESU 74M new fitted FM steel case mike £500. Tono terminal unit RTTY CW etc as new £225. 0181 876 1108. (Richmond, Surrey).
YAESU FT757GX FC757AT FP7576X, manuals H/Mike cables bxes completer station. Immaculate £650 Diamond vertical antenna DP-CP5 80-10 Mhz. Trap radials. excellent condx. £70 Jaybeam 2 mtr quad used loft only. £30 G4ZTP QTHR 01202-432610 (Bournemouth).
YAESU FT-480R 2metre multimode transceiver v.g.c. £225. 7 element 2M beam antenna £15 5/8 wave mobile antenna £10 lot £235 01723-582019 (Scarborough).
YAESU FT-790R II never used multiband portable rechargable with charger boxed £400. Post or collect when payment cleared. GM0WLE. 013552 21820 (East Kilbride).
YAESU FT101ZD MK III tcvr 160-10m. Good unmodified condx, fan and FM board fitted. Manual and spare PA valves; £325ono. G0BBN, QTHR. 01268 755350 (Benfleet).
YAESU FT221R and YC 221 digital display handbook, boxed, excellent original condition £330 ono G4MBZ QTHR. 01252-837581 (Camberley).
YAESU FT480R 2m.multi mode transceiver inc. mobile bracket £275. Microwave modules 144 MHz to 28 MHz transvertor £60. Buyer collects or carriage extra. PRDNZ-12.PM5 PRDNZ-12.PM5 01767 260462 (Potton, Beds).
YAESU FT736R Multimode £999. Alinco DJ580E, spare battery PAK, charger, £299. Tokyo HL13OU amplifier 120W £319 all mint all ono. 01705 786773 (Portsmouth).
YAESU FT980 bxd with manual £550. G4FOL, QTHR. 01256 474491 (Basingstoke).
YAESU FTV-250 2 metre transverter for FT101 / FT102 series brand new boxed with manual bargain £70. Tel 01278 458579 (Bridgwater).
YAESU FTV9017 transverter 6m/4m/2m/70cm £400. Linears-MM50/100 (new and unused) £125. MM144/100 £80, MM432/50 £80, BNOS 6m/50w £80, SSB electronics 70cm/100w £160. Totsuko TR2100M 2m/10w SSB/CW tranceiver £80. Yaesu FRG7 receiver £50. Yaesu FC902 ATU £100. BNOS 12A PSU £50. 01702 217783 (Southend-on-Sea).
YAESU FTV901R transverter, fitted 2M module only £120 FDK multi-II FM2M 10/1W gwo, £30. Quantity 1200 bxd tape £1ea. plus carriage. 01286 831340 (Caernarfon).

WANTED

23 ELEMENT Tonna antennas for 1296MHz (three required) also Tonna stacking frame and four way splitter for these aerials. G0JDL 01502 518301 (Lowestoft).

ALTRON AQ 6-20 mini beam 3 or 4 ele in good order, at a reasonable price. G0UHS. Rob. 01253 767775 (Blackpool).

ANTIQUE wireless equipment, crystal sets horn spkrs, early valves, pre-war television, spy sets early military gear; cash and collect - G4ERU, 5 Luther Road Winton, Bournmouth BH9 1LH. Tel/Fax 01202 51040.

ANTIQUE wireless equipment, crystal sets, horn spkrs, early valves, pre-war television, spy sets, early military gear: cash and collect - G4ERU 5 Luther Road Winton, Bournemouth BH9 1LH Tel/Fax 01202 510400.

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).

EDDYSTONE EB 35 MK II also Di cast spkr wanted by private coll. Phone Alan Admiral Jervis Hotel 01538 702187 (Oakamoor).

KENWOOD / Trio VFO 230 or 240 for TS530. Missing out on DX listening 5 up! Mike G4OTY QTHR. 01225 866476 (Bath).

PAIR of high impedance headphones approx. 2000 ohms GWO for use with valve equipment. Phone Ned G8GZZ Anytime. Cheers! 01483 723506 (Woking).

TEN-TEC Corsair MK 2 model 561 with matching p/supply model 260 incl. 1.8kHz SSB filter & CW filter. All vgc, no mods. Also needed for spares, FDK750E multimode working or not. Alan G0HKG, QTHR. 01787 223356 (Colchester).

YAESU SP901P spkr with lead, also FV901DM digital VFO with lead, bxs handbooks. Excellent external condx no chipped or scratched paintwork. These items desperately required to complete Yaesu station. Boxes not necesary if condx correct. Your price for excellent items. All letters answered, G0DIC, Dick Fixter, 18 Linley Drive, Boston Lincs. PE21 7EJ.

80M CAPCO loop antenna wanted by amateur located on Eastbourne seafront with no chance of putting up wire aerials on Hotel. Contact Ken G3WXB 01323 720059 Fax 013237 38788.

BENCH mounting box, pan folder & notcher. Also wanted, manual or circuit for Lafayette HA350. Loan or copy, expenses paid. G3WCE, QTHR. 01603 250910 (Norwich).
CIRCUIT diagram FDK Multi 700EX FM 2m transceiver, any costs covered Tel 01727 763770 evenings (St Albans).
CIRCUITS scopes Hameg HM207 DC-scope (Testgear Acton Ltd). Tektronix M360. Grundig 340R Heathkit GEN-16-82U. Steepletone stereo -300 H/Kit meter AV3U G0IPT 0181-8833474 (Muswell Hill).
COLLINS 55G1 preselector - Nicad battery NB-P1 for JVC portable video HR2200 dead or alive. G3VXZ QTHR. 01628-27250 (Maidenhead).
COLLINS 75A-4 Rx also Drake L-4B linear amp. G3TKR, QTHR. 01535 645574 (Keighley).
CRT telefunken type D14-131-GH green phosphor or equiv. Required to replace tube in a solatron scope type CD1740. Would also consider a duff 1740 with a good tube. G4MNB, QTHR. 01793 826325 (Swindon).
DIRECTIONAL couplers R+S type ZPW or SWOB1Z & HP type 8502IC also HP cal set 85023C all "N" conns thanks. 01743 884858 (Shrewsbury).
FOR IC-505; FM unit IC-EX248; NiCad pack IC-BP10, and charger BC-15 6M-halo colinear antennae. For FRG770 memory unit. Graham, G4FUJ, QTHR. 01242 518776 (Cheltenham).
HEATHKIT 0S2 scope any reasonable condx, CW filter for Kenwood TS140S phone eves after 7pm. 0114 2553103 (Sheffield).
HP8554B Spectrum analyzer RF section 1250 MHz wanted. Bob G3VVT.QTHR. 01539-720789 (Kendal).
HRO receiver prefer model 5. Write or call G3LYU with price including delivery costs. Have QRP gear to go if wanted. 0116 2876459 (Leicester).
ICOM Kenwood Yaesu & ADR receivers. Best prices paid collection possible. 01480 406770. Martin (St. Neots).
ICOM world clock GE5 Icom desk mike SM8 Icom speaker filter SP20 Icom SWR/power HF meter Icom antenna tradpole MT240X. 0114 2367622 (Sheffield).
LINEAR amplifier for Kenwood TS830S 20/80m interested in SB220 GWO or faulty TL 922 if repairable and price reasonable G3CSY QTHR/96. 01524 410058 (Morecambe).
MANUALS for Thomson colour monitor CM36512S1 or Chassis SCM1 or any circuits help no experience spared Ted, G4TLY, QTHR. 01666 822935 (Malmesbury).
OMNI V FM adapter M256 your price paid phone 01474 534694 G3JLB QTHR (Gravesend).
SPY sets wanted by private collector SSTR-1 SSTR-5 RS6 RS8 GRC109Tx/Rx AMK3 MK119 MK121 MK122 MK123 MK124. Bill, G8PUJ, QTHR. 0181 505 0838, eves. (E. London).
SSM Europa-B 4 metre transverter wanted. Also 2m version for spares. G4BZI QTHR. 01244-351357 (Chester).
TL922 Linear, must be in first class condition. G3RB QTHR. 0191 2530504 anytime. (Whitley Bay).
TO complete a repair can anyone please supply the following valves. DF72/CV2101 DAF 70/ CV2104, DL75/CV2102. Derek G3KXB 01227 792340 (Whitstable).
TONNO 500E service manual. Circuit diagram any information circuit diagram on 119 set. 9J2BO PO Box 34554 Lusaka Zambia.
WELLER TCP soldering iron with PU2 power supply stand, price to Terry. 01754 610331 (Skegness).
WIRELESS set number 19 in unmodified working condx with leads PSU & variometer phone Paul, 0374 406137 (Isle of Wight).
YAESU FC10 auto antenna tuner for FT840, also SP6 extn, speaker G4FAB, QTHR. 01942 820854 (Wigan).

EXCHANGE

AOR SDU 5000, must be good condx, gwo, cash waiting. Collection possible. 0148 334954 eves (Guildford).
ICW-2E 2m/70cm h/held Nicad packs charger spkr/mic carrycases headset etc for TS-130V or similar QRP'ISM HF rig with warc. Graham (QTHR) 01242 518776 (Cheltenham).
PLAIN paper fax machine Xerox 7020 high volume business model exchange for combined fax, phone & answerphone contact Les, G8PWT. 01622 687275 (Maidstone).
SONY Camcorder TR550E new unused boxed unwanted insurance payout invoice manual included wanted HF TS 850 SAT IC736/8 phone after 6pm 01202 479144 (Christchurch).

CLUB NEWS

DEADLINE - Items for inclusion in the February 1995 issue must be sent to HQ marked "Club News - DIARY", to be received by 24 December 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 - 7, Projects in Hand; 14, HF CW/SSB; 21, Xmas Casual Night. Details 0117 9654886.

RSGB CITY OF BRISTOL Group - 19, Christmas Party. Details 0117 9672124.

SOUTH BRISTOL ARC - 6, Annual club darts match; 13, Christmas social; 20, 'Hair of the dog';27, Greeting Calls on GB4WAW; January 3, CW activity evening; 10, Build your own - under instruction. Details 01275 834282.

BEDFORDSHIRE

SHEFFORD & DARS - 7, The G1GSN challenge to build a radio receiver in one hour; 14, Chairman's mince pie night. Details 01462 700618.

BERKSHIRE

BRACKNELL ARC - 13, 25th Anniversary cheese and wine party; January 10, AGM. Details 01344 420577.

READING & DARC - 14, AGM & cheese and wine. Details 01734 698274 (eves).

BUCKINGHAMSHIRE

AYLESBURY VALE RS - 6, Construction contest. Details 01296 437720.

CAMBRIDGESHIRE

CAMBRIDGE & DARC - 8, Talk 'Naval Video' by David, G3FKS; 15, Xmas social. Details 01954 200072.

CHESHAM & DARS - 13, Talk 'FT102 Repairs' by Dave, G0WBX; 20, Christmas meeting. Details 0494 676391.

CHESHIRE

CHESTER & DARS - 12, Christmas Social. Details 0151 608 3229.

MID CHESHIRE ARS - 6, On the air evening; 8, Xmas dinner; 20, On the air evening; 25, Xmas Day net 11am. Details 01606 592207.

STOCKPORT RS - 13, AGM. Details 0161 432 3741.

CLEVELAND

EAST CLEVELAND ARC - 1, Talk 'The Internet' by Matthew, 2E1CIQ; 15, Planning meeting; 22, Christmas Pool competition. Details 01642 475671.

CLWYD

CONWY VALLEY ARC - 6, Talk 'Control by DTMF' by John, GW3JGA; January 3, Quiz with Rhyl ARC. Details 01745 855068.

CORNWALL

CORNISH RAC - 3, Bring and buy sale. Details 01209 820118.

POLDHU ARC - 12, Anniversary of first transatlantic broadcast from club site in 1901. Details 01326 240144.

PLYMOUTH RC - 5, Constructors cup competition; 12, Table top sale; 15, Coach trip to TARS Christmas party and 'Kwiz Kup'. Details 01752

ST AUSTELL ARC - 4, Slow Scan by Keith, G0KTD and Dave, G4KNI. Details 01726 72951.

DERBYSHIRE

BUXTON RA - 12, Social night. Details 01298 25506.

DERBY & DARS - 5, Junk sale; 13, Constructors contest; 20, Christmas social. Details 01773 852475.

DEVON

APPLEDORE & DARC - 18, The Christmas Social. Details 01237 476124.

TORBAY ARS - 15, Xmas party. Details 0803 526762.

DORSET

BLACKMORE VALE ARS - 12, Quiz night. Details 01935 814055.

EAST SUSSEX

HASTINGS E & RC - 15, Christmas dinner. Details 01424 830454.

SOUTHDOWN ARS - 7, VHF contest night; January 8, AGM. Details 01825 763022.

ESSEX

BRAINTREE & DARS - 4, Cheese and wine party; 18, On the air evening. Details 01787 460947.

CHELMSFORD ARS - 5, 'Centenary Marconi Lecture' by Stanley Wood; January 2, Video show. Details 01245 256654.

COLCHESTER RA - 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 - 1, AGM. Details 01242 242336.

GREATER LONDON

ACTON, BRENTFORD & CHISWICK RC - 19, Xmas Quiz. Details 0181 992 3778.

BROMLEY & DARS - 12, Christmas social; January 16, AGM. Details 0181 777 0420.

COULSDON ATS - 11, AGM; January 8, Competitive construction evening. Details 0181 684 0610.

CRAY VALLEY RS - 7, Talk 'Optical Communications re-visited' by G0FDZ; 21, Christmas dinner. Details 0171 739 5057 (office hours).

CRYSTAL PALACE & DRC - 16, Christmas party and video show. Details 0181 699 5732.

EDGWARE & DRS - 14, Junk sale; January 11, AGM. Details 0181 204 1868.

RS of HARROW - 1, Demonstration of cellular radio data by Chris, G4AUF; 15, Annual construction contest; January 5, Society celebrates 50th anniversary. Details 01895 632377.

SILVERTHORN RC - 1, Junk sale; 8, On the air evening; 15, On the air evening; 22, Christmas party. Details 0181 505 1871.

SOUTHGATE ARC - 14, AGM. Details 01707 850146.

SUTTON & CHEAM RS - 16, Junk sale; 21, Christmas buffet. Details 0181 644 9945.

WIMBLEDON & DARS - 8, Xmas social. Details 0737 351313.

GREATER MANCHESTER

BURY RS - 12, AGM. Details 0161 762 9308.

ECCLES & DARS - 5, AGM. Details 0161 773 7899.

OLDHAM ARC - 14, Talk '1994 British Mount Everest Medical Expedition' by Dr A Taylor, G4SSC. Details 0161 627 1639.

SOUTH MANCHESTER RC - 1, Talk 'Practical PCs' by G0AOV; 8, Talk 'The Miller Effect and Neutralising' by G2HW; 15, Talk 'African Update' by G3SVW; 22, Christmas party. Details 0161 969 1964.

STOCKPORT RS - 13, AGM. Details 0161 439 4952.

GWYNEDD

DRAGON ARC - 4, Surplus equipment sale; 18, Christmas party. Details 01248 600963.

HAMPSHIRE

ANDOVER RAC - 5, AGM. Details 01980 629346.

BASINGSTOKE ARC - 4, Xmas social; 27, 2m Direction finding competition. Details 01256 26050.

ITCHEN VALLEY - 8, The Radio Amateur's Workshop. Details 01703 813827.

THREE COUNTIES ARC - 6, Skittles evening; 15, Christmas dinner. Details 01428 606298.

WINCHESTER ARC - 15, Christmas party. Details 01962 860807.

HEREFORD AND WORCESTER

BROMSGROVE ARS - 12, Talk 'ATUs and Matching' by David, G3PGQ; January 9, On the air evening. Details 01527 542266.

DROITWICH ARC - 5, Party night. Details 01905 778794.

HERTFORDSHIRE

CHESHUNT & DARC - 20, Christmas party. Details 01992 464795.

DACORUM ARTS - 5, Video 'Clandestine Radio During World War Two'; 19, Talk 'PMR Conversions'. Details 01582 620507.

HARPENDEN ARC - 7, Junk Sale. Details 01727 860631.

WELWYN - HATFIELD ARC - 4, AGM; 18, Christmas social. Details 01920 462241 (eves) or 0181 982 7298 (day).

HUMBERSIDE

GOOLE R & ES - 10, Dinner; 15, Christmas lecture by G4DBN; 22, Quiz; 29, New Year meeting 'look ahead to 96'. Details 01757 638539.

GRIMSBY ARS - Please note the new secretary is G Smith, G4EBK. Details 01472 887720.

HORNSEA ARC - 6, Talk 'Paddle Steamers' by G7NNT; 13, 'The Last Word?'. Details 01964 562258.

ISLE OF MAN

ISLE OF MAN ARS - 11, AGM. Details 01983 294309.

KENT

EAST KENT RS - 1, Talk 'Playing with Antennas' by Erwin, G4LQI; 15, Cheese and wine party. Details 01277 743070.

MEDWAY R & TS - 1, Talk 'Microwave Ovens' by Peter, G0GIR; 15, Christmas party. Details 01634 710023.

SWALE ARC - New secretary John Bunting, G7MHZ, 4 Springfield Rd, Sittingbourne, Kent ME10 2NB tel: 01795 426 486.

LANCASHIRE

PRESTON ARS - 7, 'Own Choice Kit' construction competition; January 4, An illustrated talk. Details 01772 686708.

THORNTON CLEVELEYS ARS - 4, Business meeting; 11, Quiz; 18, Christmas party. Please note that meetings will be at: Frank Townsend Community Centre, Beach Road, Thornton Cleveleys until further notice. Details 01253 853554.

LEICESTERSHIRE

LEICESTER RS - 4, Talk 'Forensic Science'; 11, On the air evening; 16, Annual dinner; 18, Mince pie and social evening. Details 0116 2917250.

LOUGHBOROUGH & DARC - 12, Talk 'Titanic - the Radio Connection' by Ian, G8SNF. Details 01509 231289.

LINCOLNSHIRE

SPALDING & DARS - 1, Talk by G0JLF from Wood and Douglas; 3, Junk Sale; 16, Annual dinner. Details 01775 750382.

LOTHIANS

LOTHIAN RS - 13, Video evening. Details 0131 314 2689 (office hours).

MERSEYSIDE

LIVERPOOL & DARS -. Details 0151 722 1178.

WIRRAL ARC - 13, Chairman's night; January 11, AGM. 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 - 6, Christmas dinner; 13, Talk 'A Club's View in Russia' by Terry, G0IRQ; 20, On the air evening; 27, On the air evening; January 3, On the air evening; 10, Talk 'Tropo Propagation' by Jim, G3YLA. Details 01603 789792.

YARMOUTH RC - January 11, Contest plans. Details 01493 721173.

NOTTINGHAMSHIRE

SOUTH NOTTS ARC - 6, Open forum; 20, Christmas dinner; January 10, AGM. Details 01509 672734.

SHROPSHIRE

SALOP ARS - 14, Christmas dinner. Details G7SBD QTHR or @ GB7PMB.

SOMERSET

TAUNTON & DARS - 1, 'The GDO and Its Uses' by Graham, G0GTR; 8, Christmas dinner. Details 01823 680778.

WEST SOMERSET ARC - 5, Quiz night. Details 01984 631470.

WINCANTON ARC - 4, Talk 'HF DXing' by Ian, G3KZR; 18, Open night with a video from the RSGB collection; January 8, Talk 'Aerials 2 - The Sequel' by Dave, G3ZXX. Details 01963 370352.

YEOVIL ARC - 7, Talk 'The National VHF Post Code Charity Challenge' by G3ZXX; 14, Talk 'Workshop Practice' by G7SDD; QSOs and Sausage Rolls; 28, On the air evening. Details 01258 473845.

SOUTH YORKSHIRE

BARNSLEY & DARC - 11, Talk on radar by Jack, G4JJ. Details 0836 748958.

DRONFIELD & DARC - 4, Novice on the air evening; 18, On the air evening. Details 01246 290250.

SHEFFIELD ARC - 4, Talk 'Antennas On A Shoestring' by Andrew, G0HSA; 11, Christmas dinner; 18, Grand Xmas quiz and best DX of the month reports. Details 0114 244 6282.

STRATHCLYDE

PAISLEY (YMCA) ARC - 6, Talk 'Real DX' by Jimmy, GM3CIX. Telephone 0141 889 6860.

SUFFOLK

FELIXSTOWE & DARS - 4, Talk on antennas by Richard, G0RZG; 12, Christmas video. Details 01394 273507.

SUDBURY & DRA - 5, Quiz night. Details 01787 313212 (before 10pm).

SURREY

DORKING & DRS - 8, Xmas dinner; 19, Xmas meeting. Details 01306 883718.

ECHELFORD EARS - 14, Christmas party; January 11, Bring and buy. Details 01344 843472.

TAYSIDE

DUNDEE ARC - 5, Construction evening; 19, Construction evening. Details 01382 739179.

TYNE & WEAR

SOUTH TYNESIDE ARS - 11, Christmas party. Details 0191 537 3602.

WARWICKSHIRE

STRATFORD-UPON-AVON RS - 11, Open evening; Christmas greetings on the air, 1100UTC 145.275MHZ. Details 01789 773286.

SILENT KEYS

WE REGRET to record the passing of the following radio amateurs:

G3BLI	Mr F Thompson	10.09.95
G3VBH	Mr L D C Parker	16.09.95
G4BXL	Mr R Day	19.09.95
GW4GDD	Mr E J Pope	21.06.95
G4PKY	Mr R S Harvey	23.09.95
G4SOU	Mr H L Cockram	21.02.95
G6NG	Mr A N Harris	
GW7UTP	Mr T H Truss	22.09.95

WEST GLAMORGAN

SWANSEA ARS - 7, AGM; 21, Pre-Christmas get together. Details 01792 295412.

WEST MIDLANDS

STOURBRIDGE & DARS - 4, On the air evening; 18, Xmas festivities and club videos; January 8, On the air evening. Telephone 01384 395206.

WEST SUSSEX

CHICHESTER & DARC - 5, Christmas party. Details 01243 573541.

WEST YORKSHIRE

DENBY DALE & DARS - 6, Talk 'Sky Update' by Phil, G4FSQ; 20, Xmas party. Details 01484 861782.

HALIFAX & DARS - 19, Xmas social. Details 01422 202306.

KEIGHLEY ARS - 7, Night on the air; 21, Christmas buffet; January 11, On the air evening. Details 01274 496222.

LEEDS & DARS - Please note the new secretary is Malcolm F Robertson, 2E1CRL, 67 Oatland Gardens, Leeds LS7 1SL.

WAKEFIELD & DRS - 5, Talk 'Game for a Laugh' by 2E1DML; 12, On the air evening; 19, Christmas Social. Details 0113 282 5519.

WILTSHIRE

SWINDON & DARC - 7, Christmas dinner; 21, Chairman's treasure hunt. Details 01793 822705.

TROWBRIDGE & DARC - 6, Family Christmas party; 20, What's On for '96. 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'.

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.

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 - The Paddocks, Long Road, Canvey Island, Essex. Doors open at 10.30am. Features amateur radio, computer and electronic component exhibitors, bring and buy, RSGB Morse testing on demand (two passport size photos required), home made refreshments, free car parking with space outside main doors for disabled visitors. Admission £1. Details David, G4UVJ on 01268 697978.

11 FEBRUARY

CAMBRIDGE & DARC - Ambulance Station, Addenbrookes Hospital. Features trade stands, bring and buy, refreshments and car boot sale. Doors open at 10am. Talk in to G8EVY on S22. Details John, G0GKP on 01954 200072.

NORTHERN CROSS Rally - Thornes Park Athletics Stadium, Wakefield. Easy access from M1 junctions 39 & 40 - well signposted with talk-in on 2m and 70cm. Doors open at 11am (10.30am for disabled and bring and buy). Details Dave, G0FLX on 0113 238 3622.

24 FEBRUARY

11th RAINHAM Radio Rally - Rainham School for Girls, Derwent Way, Rainham, Gillingham, Kent ME8 0BX. M2 motorway, Junction 4, A278, then the A2 at Rainham. Just follow the RRR arrows. Talk-in on S22 GB4RRR. Doors open 10am to 3.30pm. Disabled visitors from 9.30am. Admission £1.50, under 14 year olds free. usual mix of trade stands, bring and buy. Many specialist groups represented including Raynet, RNARS, KR Group and the Kent ATV Group. Plenty of off road parking, licensed bar, food and refreshments. Details Martin, G7JBO on 01634 365980.

TYNESIDE Amateur Radio Society Rally - Temple Park Centre, South Shields. Admission will be by programme which is priced £1. Doors open at 10.30am and 10am for disabled visitors. There will be 2 metre and 70cm talk-in from 7.30am. As well as the usual traders, there will be a bring and buy stand opening at noon and Morse tests will be available on request (don't forget to bring two passport size photographs). Plenty of free parking as well as a restaurant and a bar. Details Jack, G0DZG on 0191 265 1718.

25 FEBRUARY

BARRY Mobile Rally - Barry Leisure Centre, off Holton Road, Barry. Doors open at 10.30am and 10.00am for disabled visitors. With trade stands, bring and buy, refreshments, swimming pool, free car parking. Details Brian, GW0PUP on 01222 832253.

2 MARCH

WEST WALES Amateur Radio & Computer Rally - Details 01545 580675.

9/10 MARCH

LONDON Amateur Radio & Computer Show - Details 0181 882 5125.

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.

24 MARCH

PONTEFRACT & DARS Rally - Details 01977 677006.

14 APRIL

BURY RS RALLY - Details Laurence, G4KLT on 0161 762 9308.

SWANSEA ARS Rally - Details 01792 404422.

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 01606 77787 (evenings).

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.

7 JULY

YORK Radio Rally - Details 01904 426421.

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.

HUMBER Bridge Radio & Computer Rally - New venue. Details 01482 837042.

1 SEPTEMBER

BRISTOL Radio Rally & Computers & Electronics Market - Details 01275 834282.

13 OCTOBER

KIDDERMINSTER & DARS Rally - Details 01384 894019.

CONGRATULATIONS

To the following who our records show as having reached fifty years continuous RSGB membership this month:

Mr D T Arlette, G0AEW
Mr R G Rugg, G2BRR
Mr J E Forde, G2FSP
Mr M Arthur, GW2FYV
Mr N R Paul, G3AUB
Mr R T Cunliffe, G3BZB
Mr W H Borland, G3EFS
Mr J R Davey, G3FPN
Mr C Taylor, VK5CE

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.

DECEMBER

3	GB2OAY	Old Anniversary
8	GB2DX	'DX'
9	GB4BR	Bowes Railway
15	GB4RN	Royal Navy
25	GB0QRP	Low Power
28	GB2SR	Stelar Radio

- Stuart Senior, G4MIB, would like to borrow a copy of the manual for the **Hammarlund HQ-215 receiver.** If you can help, please contact Stuart on 0181 674 6452, or write QTHR.

- Ray Raymer, G6FDI, needs a wiring diagram for the **15-pin D-sub connector** for an **ICL NB386s laptop computer** (or the manual), so he can use it with a Philips CM11342 monitor. He is also looking for a manual or other information on the Philips 3120 IBM compatible computer. If you can help please contact Ray, G6FDI@GB7LEN or write QTHR.

- Peter Davies, G1XCB, is looking for the user manual for the **Commodore 64 VIC1525 printer.** If you can help, please contact G1XCB QTHR or tel 01457 853397.

- RSGB member Konstantinos Monastiriakos, SV1AYC, is trying to build a **1940s** style transmitter and receiver and is looking for information on **CV65, CV1331, CF50 (Philips) and CV243/4045 A (STC Kent) valves.** He believes the first two were used on Mk 18 or Mk 22 sets, but needs to know the filament voltages and their use. If you can help, please write to Konstantinos at Mesologiou 10, Likovrisis 141 23, Athens, Greece.

- Ken Adams, G0VDK, and D M Norman, G3WOQ, require information on **Commodore disk drives models 1541 and 1551.** Please send any details to G3WOQ QTHR.

- Paul Swain, G4GXQ, requires a circuit diagram. or preferably the manual, for a **Collins TCS receiver**, with modification information for **two 12J5 metal valves** to replace the **12A6s.** If you can help call Paul on 01625 250505 or write to G4GXQ QTHR.

- Chris Smith, G3MPF, is trying to obtain a circuit diagram for a **Japanese 200W 1.8 to 28MHz SSB / AM 12V linear amplifier, model SL 250 DX.** If anyone can help, please call 01772 813867, or write to G3MPF QTHR.

- Douglas Byrne, G3KPO, would appreciate any information on the **KB wire recorder and record player** with rolltop front. Contact G3KPO QTHR, tel: 01983 56766 or fax: 01983 564708.

- Peter Lord, G4UOG, needs a service manual or circuit diagram for a **Philips CM8533 colour monitor** (as frequently used with BBC Micros). All costs re-imbursed. Please write to Peter Lord, Quartier les Laves, Route de Colomars, 06790 Aspremont, France.

- Malcolm Perry, G8AKX, needs any information or circuits regarding the **Siemens 0.01 - 25MHz test set**, comprising three interconnected units - the **G2020 frequency generator, D2021 level receiver** and the **W2021 level generator.** He is also looking for a **McMurdo Red Range 24-pin socket** as used in the Advance scopes for the plug-in units. If you can help, please write to G8AKX QTHR.

- Stan Casperd, G3XON, requires information and a circuit diagram for the **Ekco AC77** and **Invictor 55 vintage wireless sets.** Please call 01483 36953 or write to G3XON QTHR if you are able to help Stan.

RADCOM HELPLINES **Helplines** FOR MEMBERS

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 October and November *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, QTHR, ARDF (direction finding) Committee – Geoffrey Foster, G8UKT, QTHR.

EMC: Advice on solving breakthrough and other electromagnetic compatibility matters: First contact your local EMC Co-ordinators - see this page. 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, QTHR.

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*.

EMC Co-ordinators

WHEN A MEMBER has an EMC problem which they cannot deal with themselves, the first point of contact should be their nearest co-ordinator. In many cases the co-ordinator will be able to give the necessary advice, but where this is not possible, the problem will be passed to a committee member who specialises in that particular type of problem.

What to do for advice

If you are an RSGB member and are experiencing difficulties in solving an interference problem, please look up the EMC co-ordinator for your zone from the list below and give him or her a ring.

Before you do so:

1. Make sure that you have done everything possible to solve the problem yourself.
2. Arm yourself with as much information as possible which will be useful to the co-ordinator.
3. Remember that the co-ordinator is a volunteer, so please ring at sociable times.
4. Remember also that the scheme only offers telephone advice at present - no visits will be made.

Zone A The North of England

Mr A Armstrong, G0FBW - County Durham, tel:0191 5864500

Mr N Carr, G0JHC - Lancashire - tel: 01772 742710

Mr S Dimmock, GD8COH - Isle of Man, tel: 01624 862802

Mr S Ellis, GD3LSF - Isle of Man, tel: 01624 673303

Mr FG Sawyer, G3SLN - Manchester, tel: 0161 643 9014

Mr RP Smith, G3SVW - Cheshire, tel: 0161 969 3999

Mr D Smith, G3LIS - Lancashire, tel: 01695 577960

Mr GA Valleley, G4YRS - North Yorkshire, tel: 01748 850430

Zone B Midlands

Mr B Harrison, G4UJS - Shropshire, tel: 01948 880392

Mr A Jones, G1KEA - W Midlands, tel: 0121 743 4039.

Mrs S Morley, G0MCV - Loughborough, tel: 01533 374999

Zone C SE England

Mr P Daly, G0GTE - Hertfordshire, tel:01438 724991

Mr GL Halse, G3GRV - Hertfordshire, tel: 01442 214972

Mr K Hendry, G0BBN - Essex, tel: 01268 755350

Mr AD Maish, G4ADM - Surrey, tel: 0181 335 3434

Zone D SW England

Mr LK Ayre, G3DPR - Hampshire, tel: 01425 615676

Mr P Bertram, GJ8PVL - Jersey, tel: 01534 855568

Mr G Brown, GJ4ICD - Jersey, tel: 01534 877067

Mr M Goodfellow, G4KUQ - Bristol, tel: 0117 971 6093

Mr S O'Sullivan, G8VPG - Bristol, tel: 01225 873098

Mr LJ Parry, G8AMK - Berkshire, tel: 01344 423704

Mr K Watkins, G3AIK - Somerset, tel: 01935 825266

Zone E Wales

Dr C Barnes, GW4BZD - Gwynedd, tel: 01248 602027

Mr W Holt, GW0SGG - W Glamorgan, tel: 01792 299510.

Mr J Lawrence, GW3JGA - Clwyd, tel: 01745 853255

Zone F Northern Ireland

Mr D Kernaghen, GI3USK, tel: 01232 426743.

Zone G Scotland

Mr R Adam, GM4ILS - Morayshire, tel; 01343 545842

Rev S Bennie, GM4PTQ - Isle of Lewis, tel: 01851 703609

Mr G Brooks, GM4NHX - Caithness, tel: 018478 31570

Mr D Morris, GM3YEW - Perth, tel: 017388 50533

The LAST WORD

NEW HEIGHTS FOR SATELLITE TV

I've just spent a whole weekend watching a splendid television presentation devoted to the latest in analogue and digital technology and amateur TV. Live demonstrations from the Lopik tower (all 200-odd metres high of it), was one of the principal features of the Dutch extravaganza. Proposals to 'do away with' the Morse requirement for access to 'our' HF bands were also discussed during a high-quality marathon broadcast promoting amateur radio.

Where was this programme to be found? On a transponder of the Eutelsat 2F3 Satellite (16 degrees east) made available by the Dutch PTT. Co-hosted by the European Satellite User Group and following on from the success of a similar event the previous weekend from London, Goonhilly and Madley, the show deserves a medal for its perfect blend of technical, historical and other information. Please record my thanks, as just one of numerous viewers throughout Europe and the Middle East, to all involved in this wonderful enterprise.

For once I was able to enjoy my hobby in the living room with equal interest from my wife, Helen, and 13-year old daughter, Robyn.

Steve Anderson, G0EAT

[We hope to publish a feature on the reception of satellite TV signals in next month's RadCom - Ed*]*

KEY BEARINGS

With reference to the letter from Gordon Crowhurst, G4ZPY (*The Last Word* November 1995), the use of ball race bearings in Morse key pivots is not a new idea, having been used by a number of manufacturers over the years. Indeed, my own company, Kent Engineers, uses ball races exclusively.

All bearings have their merits and failings. Low speed, continual start / stop and oscillatory motion adversely affect every bearing regardless of type or make. Precision miniature ball races are affected less than plain or oil impregnated bushes due to all components within the bearing being of hardened steel and manufactured to extremely high tolerances. It is sometimes incorrectly assumed that in Morse key applications this type of bearing will have uneven wear because of the small amount of movement of the balls. However, in practice, over a period of time the balls rotate around the entire circumference of the bearing, thus ensuring even wear. They can be expected to give long and trouble-free operation, especially when fitted with dust seals and lubricated. These miniature precision bearings are ideal for Morse key pivot applications, giving smooth operation with minimal friction and side play, which is so important in ensuring consistent contact alignment and maintenance of gap.

When considering plain and oil impregnated bearings it is as well to realise that some compromise must be made between the free operation of the key arm and bearing play. Oil impregnated bearings are designed to operate with a film of oil between the shaft and the bearing and have by design shaft clearance. Depending on the type of bearing this can be in excess of 0.002in, giving a small amount of movement of the pivot which is greatly exaggerated at the end of the key arm, thus giving unwanted movement at the contacts.

I must disagree with Gordon on his comment that there is little difference in the frictional area of a ball race and bush type bearing. However, the frictional area of various types of bearings is of relative unimportance, the most important factor being the coefficient of sliding friction, for which ball race bearings are far superior.

It is very much a matter of personal choice as to the type of Morse key used and a matter of individual preference as to its settings. With any key speed will only come with practice and experience.

Robert S Kent, G4POY

. . . I found Gordon Crowhurst's, G4ZPY, description (*The Last Word* November 95) of the use of ball race bearings on Morse keys as "a gross misuse" totally misplaced. It is well known that the 'best' key is the one with which an operator feels most comfortable.

Old timers and pros will recall that, not all that long ago, when few non-traditional designs were available or even permitted for official use, awkward keys were 'modified' by bending this and that, replacing knobs and springs and sliding small bits of newspaper between the back contacts to reduce bounce. Nowdays, the available design range of keys is very wide - with many of the most popular ones possessing all, or none, of the features personally favoured by Gordon.

We all have our individual preferences and if someone just happens to get a kick out of happily using a key weighing a couple of kilos with tap-dancing winged cherubs engraved all over it - then good luck!

Mike Robertson, G3USX

LIFE MEMBERSHIP

I have been thinking of dropping you a line for some time about the correspondence (*The Last Word* May, July and August 95) from old members, but I really thought you would have had claims from even older members. For the record, I have a membership certificate dated 18 April 1931 identifying me as BRS 536; it was signed by the then President of RSGB / BERU, H Bevan-Swift, who was well known at the time for ending an argumentative discussion with the immortal words: "The President has spoken!"

I have been a member ever since, and only wish I had taken out Life Membership then! If my memory serves it would have cost £10, a lot of money for a schoolboy. My father, although interested in wireless since WWI (he attended the inaugural meeting of the Wireless Society of London in 1913) was unwilling to advance the sum for what might have been a passing whim.

I passed my GPO 12WPM Morse test in 1930 while in the school cadet corps, and became G2QY on 9 June 1934. I never had an AA ['artificial aerial' - *Ed*] licence.

I hope that the above is of some interest, and I would like to take this opportunity to congratulate you on the vast improvement in the Society's 'Bulletin'.

G P Anderson, G2QY

[We are pleased to inform Mr Anderson that, in common with all members with more than 60 years of continuous membership, he will be granted free life membership at his next renewal - Ed.*]*

TIME WASTERS?

Reading through *Members' Ads*, one cannot help but notice the frequent reference to so-called 'time wasters'. I have advertised numerous items in *RadCom* and various other periodicals over the years. Most adverts attract a number of replies, typically three or more per sale. Some enquiries are very serious, whilst others are simply window shopping, but either way every enquirer is a *potential* customer.

If an item attracts interest but no sale results, then surely it is down to the vendor: perhaps the item is over priced, or alternatively under sold. If the vendor misses an opportunity by offering a first refusal, he should remember the golden rule: the first customer to come up with the money gets the goods! If the so-called 'time wasters' had not replied, the item would probably remain unsold.

Making a sale will inevitably require some effort on the part of the vendor and may occupy some of their time as well as requiring some negotiating skills, simply placing an ad is seldom enough. The inclusion of comments such as "no time wasters" is counter productive. After all, why should I waste my time responding to an ad when the vendor clearly doesn't wish to give me any of his time in return?

Mike J Grierson, G3TSO

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.

PLANNING RULES

It is not the Morse test that needs scrapping, but the ridiculous planning laws that are destroying our hobby. I have been trying for eight months to get planning permission for a 3-ele 6m, 12-ele 2m and a 17-ele 70cm beam on a 2in diameter mast which will wind up to 35ft. To the back of me there are open fields, as I live in the country. My first application was flatly refused along with several others as my local council is refusing all applications (none has been passed in the last two years). Fortunately my HF wires don't need planning permission, otherwise I would be off the air altogether.

We can all pass the Morse test and RAE with a bit of effort, but when we do pass them both we are then faced with idiotic planning laws. These are far harder than the RAE and Morse, as without good aerials we can't operate anyway, especially on VHF / UHF, which are my main operating bands.

Colin Shepherd, G0COL

RSGB DARED!

I wonder why I am paying nearly £3 per month for *RadCom*, a good magazine no doubt - but expensive! *You* will argue that I get a lot more services for my money, but I don't because I don't use other services. If I want other information I must subscribe to other RSGB newsletters.

And why should I support a Society which is trying its best to keep me, a Class B licensee, off shortwave, when the RA want to drop Morse and *give* me a Class A? People can still learn Morse if they wish to improve their facilities.

If the RSGB became a registered charity - as many societies are - members could covenant their subscriptions and you would get 25p or so in the pound back from the Inland Revenue. That would be worth around £8 per member, so you could reduce the subs or provide better services.

Please feel free to print this if you dare!

Billy Garrett, G1WRG

[As you see, we did dare! But we feel we also deserve the right of reply. The original 'code-free' licence came about as a direct result of an RSGB initiative, so if it wasn't for the RSGB no Class B licensees would be on the air at all! Of course, this benefit is for all Class B amateurs in this country, and not just for RSGB members, but without sufficient support the RSGB would simply not be able to carry out this work on behalf of all amateurs. There are countless other benefits of RSGB membership (see the Annual Report and Accounts*). As regards Mr Garrett's suggestion of the RSGB becoming a registered charity, the Society's Honorary Treasurer, Richard Horton, G4AOJ, writes that "The Society could only become a registered charity if we could satisfy the Charity Commissioner that our objectives were charitable. The only acceptable objectives for charitable status are religious, educational or the relief of poverty. Certain National Heritage institutions such as the National Trust also qualify. Simply put, the Society's aims and objectives do not fall within those required for charitable status"* - Ed]

COMPUTER LOGGING

Many stations participating in the RSGB National Field Day are now using 'real time / on line' computer programs, where all one needs to do is enter the callsign of the station heard and press 'return'. The computer then takes over and does all the work, checking whether the callsign is a duplicate, and if not then sending all the appropriate contest exchanges etc. Indeed, with this system there is no need to even have a Morse key on site.

NFD has a Restricted Section with limitations on type and height of antenna etc. Bearing in mind that in Field Day there is plenty of traffic to work, I feel that such operating gives an advantage beyond any of the existing limitations. Is there not a case for limiting computerised operating to the Open Section?

Instead for ease of administration computerised check sheets and logging could be universally valid. Computers are quite good at reading Morse, especially when sent by other computers. Perhaps soon we will be able to set up the station, switch on the PC and return 24 hours later to collect the floppy disk.

Brian Holden, G4SXE

[Chris Burbanks, G3SJJ, Chairman HFCC, draws member's attention to the notes on computer logging in the HF NFD report on pages 81 - 83 of the November RadCom*. Part of the skill in CW contest operating is in copying the Morse and certainly contest operators would wish that to continue. The HFCC has noted G4SXE's comments and would welcome further suggestions* - Ed*]*

CLASSIFIED ADVERTISEMENTS

Classified advertisements 55p per word (VAT incl) minimum 14 words (£7.70). Please write clearly. No responsibility accepted for errors. Latest date for acceptance — 1st of issue month.

All classified advertisements MUST be prepaid.

NB: CHEQUES SHOULD BE MADE PAYABLE TO RSGB.

Copy and remittance to: **Malcolm Taylor Associates, East Wing, Old Manor House, Hunts Common, Hartley Wintney, Hants, RG27 8AA.**

NB. Members' Ads must be sent to "Members' Ads," RSGB Hq.

FOR SALE

G3LLL's SPECIAL OFFERS. Ten Tech Corsair 2 £750, VFO for same £149 pair £850 – JRC NRD525 rec. £699 – FC107 ATU £149 – Ten Tech 2kw ATU £199 – TR10 JR599/TX599 £249 – AVO8 mk6 & case £85 – monitor scope SM220 for TS830 etc £220 – SEM Z Match & EZITUNE £109 – R7100 25 –2000 MHz all mode as new & int PSU £950 ono – FC757 auto ATU £149 – FT736 boxed as new £1200 – **NEW ITEMS.** FT990 AC & DC £1795 & £1575 few only – IC728 (super mobile/base ex dem 2 year gt) list £1089, £875 – IC736, 738 etc at good prices – Holdings Amateur Electronics, 45 Johnston St, Blackburn BB2 1EF. Normally open Tues, Wed, Fri & Sat but check first hols etc (01254) 59595.

G4TJB QSL Cards printed to your specification, send large SAE for samples and full product list. Unit 6, Worle Industrial Centre, Coker Road, Worle, Weston-super-Mare, BS22 0BX. Tel/Fax: (01934) 512757.

"RAYNET" YELLOW REFLECTIVE TABARDS with "RAYNET". Medium £11.00, Large £11.50, XLarge £12.00. "RAYNET CONTROLLER" 50p extra. EPSON PX4+ lap top computer, built-in printer, charger Eprom for packet £46.50 inc. pp. Nonreversible battery connectors line/panel mounting (10 pairs/pack) £6.50. Mike Watson G8CPH, Ipswich (01473) 831448.

MOSLEY ANTENNAE — All the famous British Manufactured Antennae, direct from us including spares/replacements. Mustang, Elan, TA-33Jnr etc. Full details shown in our Handbook, price £1.25 refunded upon purchase of Antennae, Mosley Electronics, 196 Norwich Road, New Costessey, Norwich NR5 0EX (Administrative address only).

ANTI-T.V.I. CUSTOM BUILT AERIALS, Trap-dipoles, multibanders, traps, baluns, parts. Reconditioned TX/RX's, Linears ATU's. Data 38p SAE, Aerial Guide £1.50. G2DYM, Uplowman, Devon EX16 7PH. Tel: 01398 361215 any time.

QSL CARDS. Gloss or tinted cards. SAE for samples to Twrog Press, Penybont, Gellilydan, Blaenau Ffestiniog, Gwynedd LL41 4EP.

AMIDON TOROIDS, SAE for price list. "Choke Baluns" Models for G5RV £28.25, Dipole £36.54, Yagi to fit 1.5" or 2" booms £37.15, VHF model, covers 30-250 MHz £18.00, all prices inc P&P or send SAE for full details. Ferromagnetics, P.O. Box 577, Mold, Clwyd, N. Wales CH7 1AH.

LANDWEHR VHF/UHF MASTHEAD PREAMPLIFIERS 2 metre 145mas £147 and 70cm 435ma £152. Post & packing £4. Write or phone for leaflet. Qualitas Radio, 23 Dark Lane, Hollywood, Birmingham B47 5BS, Tel: 0121-430 7267.

ESSEX AMATEUR RADIO SERVICES. New and used amateur equipment bought & sold. PX welcome. All warranted & serviced. 8am till 9pm. Ring Alan — 01268 752522, 4 Northern Avenue, Benfleet, Essex SS7 5SN.

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SAMSON GERMAN EL-KEYERS. XMAS PRICE REDUCTIONS ON ETM-9C AND ETM-9COG SUPER MEMORY KEYERS. PHONE 01531-820960 FOR DETAILS. G5BM. QTHR.

CHRISTMAS QSLs: MAKE YOUR OWN ATTRACTIVE CARDS from our transparent callsign labels (eg on local picture postcard views) 1000 £8.70 including P&P – also address labels etcetera; please send your order, or a SAE for samples to J Lewis, (RB5), 27 St Leonard's Road, St Annes FY8 2PF (G3 WBI).

PHILIPS RADIO MX294/MX293 PROM PROGRAMMING SERVICE, don't waste time buying and fitting P.C.B. and EPROM kits to select frequency. Buy the PROM(82S129) that fits in the PROM socket in the radio, fitted in seconds. Any frequencies to order £9 ppi. Contact Steve G4RFC, 90 Westcombe Park Road, Blackheath, London SE3 7QS, Tel 0181 293 4989 after 7pm.

QSL!! AMATEUR/SWL CARDS SASE for card samples, white/coloured. J&I Print, 33 Recreation Road, Haverhill, Suffolk CB9 8BY.

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"ALL RISKS" INSURANCE for portable/mobile/base station amateur radio and ancillary equipment. A service for RSGB members only. Also public liability and equipment insurance for affiliated clubs and societies. Details and leaflets from Jim Stroud, Amateur Radio Insurance Services Ltd, Shepheards Hurst Green Lane, Outwood, Surrey RH1 5QS. Tel: 0134-284-4000. Fax: 0134-284-4554.

COMPUTER SOFTWARE HARDWARE

G4UXD's 'QSO' MORSE TUTOR/PRACTISE DOES EVERYTHING! Reviewed Feb/94/95 'Novice News'. PCs, BBCs, Archimedes. Adjustable speed/delay, 150 tests! Teaches correct keying! £10.99. SAE details. P. Brandon, 1 Woodlands Rd, Chester CH4 8LB, 01244 683563.

SUPER-DUPER, the PC CONTEST LOGGER. "Highly recommended" — RadCom, September 1993. With printed manual and upgrades for 12 months. HF £25.00, VHF £25.00, both £39.00. Paul O'Kane EI5DI, 36 Coolkill, Sandyford, Dublin 18. (00 353 1295 3668). E-mail okanep@iol.ie. Web Home Page http://www.iol.ie/~okanep/

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TimeLOX6 for Microsoft™ Windows™; Keep your IBM-PC clock accurate using MSF 60kHz time signal. £14.95. Companion receiver kit available, can also use MAPLIN kit. G3ZLX (QTHR). E-mail 100343.2137@compuserve.com.

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MISCELLANEOUS

SHACKS CLEARED for SKs and QRTs in Southern England. I need your junk. Call for further information. Chris, G3TUX (Haslemere) 01428 641771.

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ADVERTISERS INDEX

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5th December 1995

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All-Mode HF Transceiver FT-1000MP

The year was 1956. Electronic communication throughout the world was on the threshold of significant and remarkable change. Intrigued by the development of single-sideband radio theory, a young engineer and amateur radio experimenter painstakingly assembled an SSB transmitter. Word of his successful efforts spread quickly among his friends, and soon radio amateurs from all over the country were requesting transmitters just like it. Thus was born the first invention of JA1MP, founder of Yaesu. Though his key is now silent, in tribute to his leadership and exceptional contributions to the radio art, the FT-1000MP carries the memory of his call sign.

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Blending digital and RF technology, the FT-1000MP features a Yaesu exclusive: Enhanced Digital Signal Processing (EDSP). Beginning on the receive side with Yaesu's industry-standard high-intercept front end design, the RF signal is then fed to the IF stages, where an impressive array of 8.2 MHz and 455 kHz IF filters (including a built-in Collins SSB Mechanical Filter) establish the tight shape factor so important in obtaining high dynamic range and low noise figure. Finally, the EDSP system provides specially-designed filter selections and response contours for maximum intelligence recovery.

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