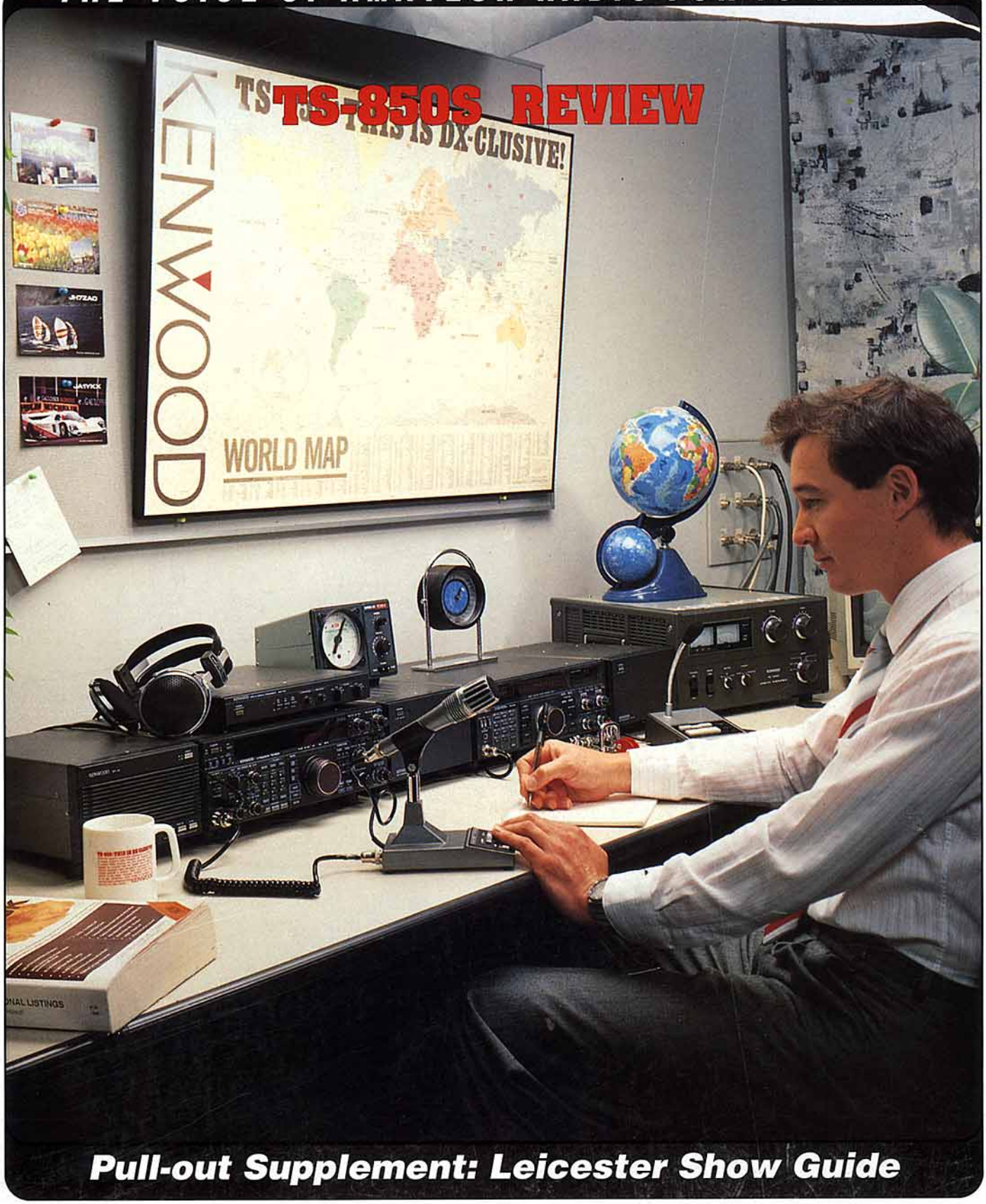
Radio Communication

The Journal of the Radio Society of Great Britain

October 1991

Volume 67 No 10

THE VOICE OF AMATEUR RADIO FOR 78 YEARS



TS-850S REVIEW

Pull-out Supplement: Leicester Show Guide

KENWOOD

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Radio Communication

RadCom's even bigger!

Your magazine this month runs to a grand total of 92 pages featuring:

* **Sixteen pages of technical information,**
* **Our regular full-colour section,**
* **A 16-page Leicester Show Guide supplement . . .**
* **. . . including four pages of Product News of interest whether you are going to the Show or not.**

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TECHNICAL FEATURES

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35 **THE PETER HART REVIEW: Kenwood TS-850S HF Transceiver**
RadCom's world-reknowned reviewer, G3SJX, takes a good look at this very popular mid-price radio, together with the optional matching digital signal processing unit. Colour feature.

39 **EUROTEK - ideas from abroad**
This month's contribution from our linguist Erwin David, G4LQI, is different. Firstly, it is a page longer than usual and secondly it is about the technical aspects of new products seen at Ham Radio '91, at Friedrichshafen. Colour feature.

42 **FIRST STEPS IN HOME CONSTRUCTION: Part six - Completing the PSU**
Those who have stayed the course will this month have a tested and working variable power supply, thanks to John Case, GW4HWR. If you haven't started yet, now is the time to gather together all six installments and get constructing. A kit is available from Badger Boards / JAB. Colour feature.

47 **LOOP ANTENNAS - Facts, not Fiction**
A J Henk, G4XVF, now an F.I.E.E., concludes his explanation of how to evaluate the real performance of loops and gives his views on how to make best use of their unusual properties.

See you on Stand One at Leicester

COVER PICTURE:
This month's Peter Hart Review features the popular Kenwood TS-850S HF transceiver.
PHOTO: Lowe Electronics

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RADIO SOCIETY OF GREAT BRITAIN

THE NATIONAL SOCIETY WHICH REPRESENTS UK RADIO AMATEURS
Founded in 1913 incorporated 1926. Limited by guarantee
Member society of the international Amateur Radio Union

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UK associate member under 18: £12.75. Family member: £11.95
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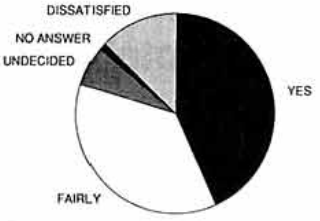
Affiliated club or society/registered group (UK): £30.00 (including *Radio Communication*): **£17.95** (excluding *Radio Communication*) (Subscriptions include VAT where applicable)

Membership application forms available from RSGB HQ

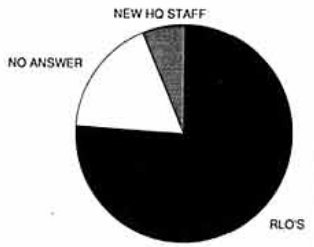
HQ NEWS: Members Survey

FOR THE last few months the Society has been sending out a survey form with the subscription renewal request. The number of members responding has been most encouraging and the results fascinating. The following charts show the outcome to date:

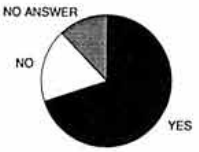
Are you satisfied with your Society?



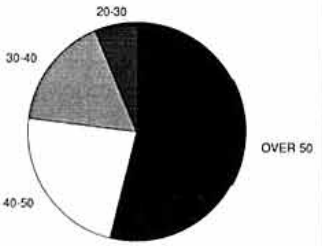
Do you want advice from:



Do you want the RLO scheme to be extended to improve exchange of news and views between Council, HQ and members?

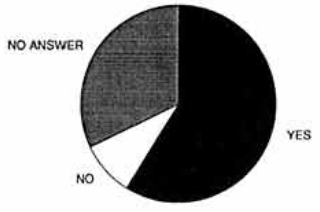


Age group?

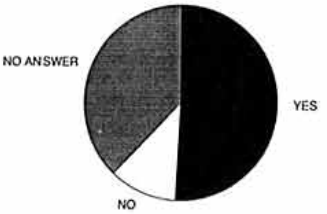


Should a fighting fund be raised by RSGB to finance action by AROS and RIS?

Should Raynet be independent from, but affiliated to the RSGB?



If you prefer RSGB to run Raynet, should non-RSGB members pay Raynet subs?



Philip Smith
General Manager

NEWS & REPORTS

RA Annual Report Launch

ON 2 AUGUST, the Radiocommunications Agency launched its first Annual Report. Hilary Claytonsmith, G4JKS, was present.

Chief Executive, John Michell, opened by saying the RA was an executive agency of the DTI, directly answerable to Government. The main function of the 500 staff, 300 of whom work at Waterloo Bridge House, was to regulate the radio spectrum. This extremely wide ranging job was vital and was carried out in the best interest of the national economy. Much of the spectrum was highly congested, especially below 2GHz and Mr Michell stressed that choices had to be made and that regulation was essential. The radio users themselves, as the RA's customers, were involved as much as possible.

The RA followed a policy to deregulate as far as possible the use of low power devices where interference was minimal. Also to be included were cordless LANs, radio data links to replace wires between computer terminals.

In 1991-92, there would be an extensive survey of how customers view the RA's services and what is wanted from the Agency. The results would determine new services and the quality of services adopted in 1992/3.

A leading role was played internationally with Head of Branch, Michael Goddard chairing the European Radiocommunications Committee. For WARC 92 the RA is coordinating the UK view and is participating fully in the development of the European position.

Referring to the previous week's launch of the Novice Licence, Mr Michell said it was aimed at encouraging people of all ages to take up amateur radio; particularly teenagers, who might subsequently make careers in electronics and engineering.

The work of the RIS was mentioned and it was stressed that more effort was being put into prevention rather than prosecution. Ten percent of the RA budget was spent on research projects including the prediction of propagation of radio signals.

Mr Michell summed up the year as one of achievement with objectives met, efficiency improved, quality of service maintained and a financial surplus achieved. Increases in fees had been kept below inflation.

For over twenty years, the European state of Albania has banned amateur radio. Now ZA is active again, thanks to the IARU.

Welcome back Albania

At the Tokyo Hamvention on 24 August, Mr Agim Muco, Secretary General of the Albanian PTT, announced to a delighted audience that amateur radio would be introduced into Albania. He also announced the foundation of the Albanian Amateur Radio Transmitters Society.

The change of heart, which comes at a time of political change throughout eastern Europe, came about following much work by the International Amateur Radio Union (IARU) and some of its member societies including JARL (Japan), ARRL (USA), and ARI (Italy). Others providing support have been the Northern California DX Foundation and Yaesu of Japan. Individuals mentioned have been Dick Baldwin, W1RU, (IARU President), Seppo Sisatto, OH1VR, Kan Mizoguchi, JA1BK, and Martti Laine, OH2BH, who is a consultant to the Albanian PTT. A program of instruction has been started making use of the efforts of twelve foreign amateurs, including some top DXers. The first amateur radio contact, in Mid-September, was between stations in the PTT building in Albanian Capital Tirana and ITU Headquarters in Geneva, in the presence of ITU Secretary General Dr Pekka Tarjanne. The visiting instructors will be putting ZA firmly back on the map again using the callsign ZA1A and because of the huge demand expected, amateurs are asked to avoid duplicate contacts to allow as many people as possible to make first-time Albanian QSOs.

It is worth noting that this IARU success could not have happened without funds levied from member Societies, such as the RSGB. So when a non-member DXer says to you "the RSGB does nothing for me", remind him of this fact. The next little job for the IARU is defending 7MHz and other bands on behalf of all radio amateurs at next year's World Administrative Radio Conference.

Pictured during the recent fact-finding visit of senior RSGB staff to the ARRL were (l to r) Dave Sumner, K1ZZ (ARRL Executive Vice-President), Janet Cragg (RSGB Accounts Manager), Barry Shelley (ARRL Business Manager) and Philip Smith (RSGB General Manager).

Council Nominations, Last Chance

NOMINATIONS FOR the RSGB Council Elections must arrive at RSGB HQ by noon on **10 October** which means that application forms should be requested *immediately*. Call Justine Coles at RSGB HQ on 0707 49855. Full details of how to nominate someone for the Council can be found on page 6 of August's *RadCom*, and a list of vacancies is on page 7 of last month's edition.

HQ Vacancy

THERE IS still time to apply for the job vacancies advertised on page 5 last month. It is important to stress that, although the job requires knowledge and skills, it is *not* an executive one. The idea is, to quote last month's *HQ News*, "to replace one 'chief' with several 'indians'". Ideal would be someone who has taken early retirement and wishes to put something back into amateur radio, though applications are welcome from others, of course.

● STOLEN FROM A vehicle between Weymouth and Bath on 15 August: Trio TW4000A S/N 4091189.Contact Weymouth, or Avon and Somerset Police if you have any information.

RSGB QSL Bureau Sub-Managers

SEND *YOUR* CARDS (outgoing) to the RSGB HQ QSL Bureau, PO Box 1773, Potters Bar, EN6 3EP. For receiving *other people's* cards (incoming), stamped self-addressed envelopes (of a size which will prevent cards having to be folded) should be deposited with the appropriate QSL Sub-manager from the list below. Note that the outgoing service is a benefit available to RSGB members only; non-members sending cards to Potters Bar risk having them destroyed.

Two Japanese radio amateurs visited the RSGB's QSL Bureau in March. On the left is Hiroyuki Tsukahera, JP1TRJ, a student, and on the right RSGB member Mr. K Naguro, JA1IST, Product Planning Manager of Trio-Kenwood Europe Limited, who is now G0PMQ.

G0AAA-AZZ Mr K Plumridge GW4BYY, Swn-y-Gwynt, High St., Llanberis, Gwynedd, LL55 4EH.

G0BAA-BZZ Mr M J Cuckoo G6ECM, 15 Fair Oaks, Herne Bay, Kent, CT6 6EU.

G0CAA-CZZ Mr P Jobson G3HLF, 52 Old Road West, Gravesend, Kent, DA11 0LN.

G0DAA-DZZ Mr J F Purvess G0FWP, 14 Hunger Hills Drive, Horsforth, Leeds, LS18 5JU.

G0EAA-EZZ Mr R Jobson G4ZYW, 37 Rushdene Road, Brentwood, Essex, CM15 9ET.

G0FAA-FZZ Mrs A Burchmore G0ARQ, 49 School Ln, Horton Kirby, Dartford, Kent, DA4 9DQ.

G0GAA-GZZ Mr N P Roberts G4KZZ, 79 Mellowdew Road, Coventry, CV2 5GP.

G0HAA-HZZ Mr J T Macrae G4DXI, Park House, 1 Highsted Rd, Sittingbourne, Kent, ME10 4PS.

G0IAA-IZZ Mr C J Webb G4JFF, 68 Higgs Field Crescent, Cradley Heath, Warley, W Midlands, B64 6RB.

G0JAA-JZZ Mr J A Towle G4PJZ, 63 Digby Avenue, Mapperley, Nottingham, NG3 6DS.

G0KAA-KZZ Mr K Draycott G3UQT, 28 Ladywood Road, Kirk Hallam, Ilkeston, Derbyshire, DE7 4NE.

G0LAA-LZZ Mr C Lennox G4LXU, Blazefield House Farm, Blazefield, Pateley Bridge, Harrogate, N Yorks., HG3 5DR.

G0MAA-MZZ Mr R Veale G4LEA, 6 Grantson Close, Brislington, Bristol, BS4 4NA.

G0NAA-NZZ Mr E G Allen, G3DRN, 30 Bodnant Gardens, Wimbledon, London, SW20 0UD.

G0OAA-OZZ Mr D Bloomfield, G0KUC, 8 Sunningdale Drive, Boston, Lincs, PE21 8HZ.

G0PAA-PZZ Mr A Spence RS90961, 6 Woodend Terrace, Aberdeen, AB2 6YG.

G1 series Mr R Kingston, G4HHB, 36 Hunter's Oak, Hemel Hempstead, Herts., HP2 7SW.

G2 Series Mr C H Adams, RS10906, 4 Park Gate Gdns, London, SW14 8BQ.

G3AA-ZZ Mr R Pasquet, G4RRA, 64 Bricks Bury Hill, Upper Hale, Farnham, Surrey, GU9 0LY.

G3AAA-DZZ G3DRN (details under G0NAA sub-manager)

G3EAA-HZZ Mr E L Simpson, G3GRX, 'Everdene', Fell Lane, Penrith, Cumbria, CA11 8AW.

G3IAA-KZZ Mr N J Entwistle G0BRM, 4 Stirling Close, West Row, Bury St. Edmunds, Suffolk, IP28 8QD.

G3LAA-NZZ Mr J G Holland G3GHS, 'Tanglewood', Off Portheast Way, Gorran Haven, St Austell, Cornwall, PL26 6JA.

G3OAA-PZZ Mr J H Brazzill G3WP, 43 Forest Dr, Chelmsford, Essex, CM1 2TT.

G3RAA-TZZ Mr D Buckley G3VLX, 'Little Oaks', Park Road, Marden, Tonbridge, Kent, TN12 9LG.

G3UAA-VZZ Mr M Newton G3UKW, 11 Chestnut Close, Rushmere St. Andrew, Ipswich, IP5 7ED.

G3WAA-ZZZ Mr I Batley G0IID, 3 Folldon Ave, Fulwell, Sunderland, Tyne & Wear, SR6 9HP.

G4AA-ZZ G4RRA (details under G3AA-ZZ sub-manager)

G4AAA-AZZ Mr D Roebuck G0LJM, 23 Alexandra Road, Shipley, West Yorks., BD18 3ER.

G4BAA-BZZ Ms L Harper G4FNC, 'Three Oaks', Braydon, Swindon, Wilts., SN5 0AD.

G4CAA-CZZ G3HLF (details under G0CAA-CZZ sub-manager)

G4DAA-DZZ G3VLX (details under G3RAA-TZZ sub-manager)

G4EAA-EZZ G4ZYW (details under G0EAA-EZZ sub-manager)

G4FAA-FZZ G0ARQ (details under G0FAA-FZZ sub-manager)

G4GAA-GZZ Mr J C Terry G4GEU, 126 Dawberry Fields Rd, Kings Heath, Birmingham, B14 6NZ.

G4HAA-HZZ G0LJM (details under G4AAA-AZZ sub-manager)

G4IAA-IZZ G4JFF (details under G0IAA-IZZ sub-manager)

G4JAA-JZZ G4PJZ (details under G0JAA-JZZ sub-manager)

G4KAA-KZZ G3UQT (details under G0KAA-KZZ sub-manager)

G4LAA-LZZ G4LXU (details under G0LAA-LZZ sub-manager)

G4MAA-MZZ Mrs C Wilding G4SQP, 92 Ravenhill Drive, Codsall, Wolverhampton, WV8 1BW.

G4NAA-NZZ Mr M Musgrave G4NVT, 49 Vowler Road, Langdon Hills, Basildon, Essex, SS16 6AQ.

G4OAA-OZZ Mr W Dykes, G1UKE, 9 Severnmead, Hemel Hempstead, Herts., HP2 6DX.

G4PAA-PZZ Mr R Colvin, G0BXQ, 46 Beechwood Ave, Woodley, Reading, Berks., RG5 3DG.

G4RAA-RZZ G3VLX (details under G3RAA sub-manager)

G4SAA-SZZ Mr A Bell G4MHQ, 22 Ryde Place, Lee-on-Solent, Hants, PO13 9AU.

G4TAA-TZZ Mr J Porter G3YZR, 94 Oaken Grove, Haxby, York, YO3 8QZ.

G4UAA-UZZ Mr D Lavis G0DMT, 48 Gilda Crescent, Polegate, East Sussex.

G4VAA-VZZ Mr R C Powell G4VAA, 11 North Park, Fakenham, Norfolk, NR21 9RG.

G4WAA-WZZ Mr L Gaunt G4MLV, 31 Moat Hill, Birstall, Batley, West Yorkshire, WF17 0DX.

G4XAA-XZZ Mr S R Tyler G4UDZ, 2 John Court, Hoddesdon, Herts, EN11 9LZ.

G4YAA-YZZ Mr D J Newbury G0ENR, 8 Mayfield Road, Pershore, Worcs, WR10 1NW.

G4ZAA-ZZZ Mr J Densem G4KJV, 'Cotswold', Startley, Chippenham, Wilts., SN15 5HG.

G5 & reciprocals G4RRA (details under G3AA sub-manager)

G6AA-ZZ Mr F Harris G4IEY, 4 Merestones Dr, The Park, Cheltenham, Glos., GL50 2SS.

G6AAA-ZZZ Mr D J Brooks G4IAQ & G4IAR, 28 Avon Vale Rd, Loughborough, Leics., LE11 2AA.

G7AAA-ZZZ Mr D J Hudson G6OVO, 62 Derron Avenue, South Yardley, Birmingham, B26 1LA.

G8AA-ZZ G4IEY (details under G6AA sub-manager)

G8AAA-ZZZ G0FWP (details under G0DAA-DZZ submanager)

GBxAAA-MZZ Mr M W Stoneham G4RVV, 'Hafnia', 139 Hever Ave, West Kingsdown, Sevenoaks, Kent, TN15 6DT.

GBxNAA-ZZZ Mr A Devereaux G8PJJ, 39 Lower Green Road, Rusthall, Tunbridge Wells, Kent, TN4 8TW.

GD series Mr G W Ripley GD3AHV, Corlea Bungalow, Ronague Road, Ballasalla, Isle of Man.

GI class A Mr A Higgins GI3YMT, 1 Cairnshill Park, Cairnshill Road, Belfast, BT8 4RG.

GI class B Mr J M Bruce GI4SJB, 56 Ardmore Road, Holywood, Co Down, BT18 0PJ.

GJ series Mr H Chater GJ2LU, 106 Rouge Baullion, St. Hellier, Jersey, Channel Islands.

GM bureau Mr G E Bell, GM4LKJ, 21 St. Andrew's Crescent, Dumbarton, Strathclyde, G82 3ER.

(GM0AAA-ZZZ) Mr A Stewart GM4TOQ, 'Three Acres' Cochno Rd, Clydebank, Dunbartonshire, G81 6PU.

(GM1,6,7 & 8) Miss K Hunter GM0JHE, 160 Tresta Road, Glasgow, G23 5DE.

(GM2AA-GM2ZZ) Mr J T A Johnston GM3LYY, The Dolphins, Montgomerie Drive, Fairlie, Ayrshire, KA29 0DZ.

(GM2AAA-GM3ZZZ) GM3LYY (details under GM2AA sub-manager)

(GM4 series) Mr E Bell GM4LKJ, 21 St Andrews Crescent, Dumbarton, G82 3ER.

GU series Mr S T Henry GU4GNS, 'The Hermitage', L'Ancresse, Vale, Guernsey, Channel Is.

GW 2,3,4,5 Mr K Hudspeth GW0ARK, 67 Bloomfield Rd, Blackwood, Gwent, NP2 1LX.

GW 0,1,6,7 & 8 Mr D C Green, GW3MRI, 4 Ogwen Drive, Lakeside, Cardiff, CF2 6LH.

RS Mr D Borne, G4CYW, 'Roughways', Chub Tor, Yelverton, Devon, PL20 6HY.

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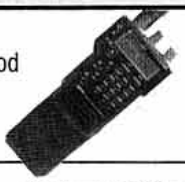


C528 £359 extended receive mod
TH77E extended rx **£397**

BARGAIN IC24ET £299

HF TRANSCEIVERS

FT757GX Yaesu (RRP £969) £869 save **£100!!**

NEW TS450S £1150 (RRP)
TS850S Kenwood
RRP £1399 £ PHONE

FREE 20 AMP PSU or FREE FINANCE
(Goods at rrp only).

RECEIVERS

IC-R72 ICOM £585 cash price
AR2000 £259 inc latest mods
IC-R1 ICOM £339
MVT7000 £289

2 METRE HANDHELDS

TH27E Kenwood inc nicad/charger **£254**
New! FT26R Yaesu inc nicad/charger **£239.95**
IC2SE ICOM inc nicad/charger & receive extend! **£249**

VHF/UHF BASE STATIONS

TS790E Kenwood £1499
IC-275E (2 metre) ICOM £999
FT736R YAESU £1299

2 METRE/70CM MOBILES

TM241E Kenwood £295
TR751E Allmode £599
FT5200 Yaesu £599
TM702E Kenwood £455

Free modifications available, please enquire

ALINCO

DJIFE new Mini 2m Handy with Airband **£229**

DJ560E 2m/70cm Handy with Ext Rx **£336**

DR590E 2m/70cm mobile **£472.50**

ROTATORS

G250 200kg/cm. Light duty **£75.95**
G400 600kg/cm. Medium duty **£145**
G400RC 600kg/cm. Round cont **£175**
G600RC 700kg/cm. Med/large **£229**
Other models — discount prices on request.

NEW! CONTEST HEADSET

This NEW headset from TELEX has 50-15000Hz response and noise can-celling dynamic mic favouring 100-8000Hz

SAE for data sheet and PRICE.

RADIO TECH MODIFICATIONS

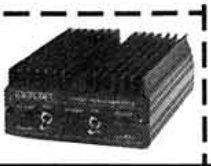
This excellent new book from USA gives hundreds of Mods, for receive/tx, repeater etc, etc

£14.50

MICROSET LINEARS

New well-made range from Italy

VUR30 FM dual band amplifier 2m/70cm	**£229**
SR100 2m 4/25 IN-100W OUT Preamp	**£159**
R50 2m 1/7 IN-50W OUT Preamp	**£99**
R25 2m 1-4 IN-30W OUT Preamp	**£79**



TONNA ANTENNAS

We have imported this excellent range for years. Still available in all our shops.
SAE for catalogue

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Fax: 0245 381436
Hours: 9-5 (closed Thursdays)

GLASGOW
Unit 17, Six Harmony Row,
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Tel: 041 445 3060
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NEW ICOM IC-7100 RX

CASH PRICE **£995**

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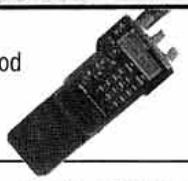
C528 £359 extended receive mod
TH77E extended rx **£397**



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SR100	2m 4/25 IN-100W OUT Preamp	**£159**
R50	2m 1/7 IN-50W OUT Preamp	**£99**
R25	2m 1-4 IN-30W OUT Preamp	**£79**

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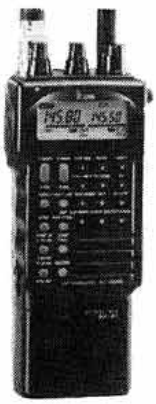
AR3000 SCANNER RX

CASH PRICE **£695**

NEW ICOM IC-2SRE

2M HANDY WITH BUILT-IN-SCANNER!

£425



ICOM IC735

HF TRANSCEIVER (RRP £1000) OUR PRICE

£889 - SAVE £101

ay you unbelievable part-exchange prices OR will slash the price outrageously!

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AMATEUR RADIO EQUIPMENT

N5660P PEP METER

C101 Meter SWR/PWR 1.8/150Mhz 15/150/1500W	£59.95
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CN460M Meter SWR/PWR 140/450Mhz 15/150W	£64.50
CNW319 Aerial Tuner 1.8/54Mhz 200W	£179.95
CNW419 Aerial Tuner 1.8/30Mhz 200W	£199.00
CNW518 Aerial Tuner 3.5/30Mhz 2.5KW PEP	£299.00
CNW727 Aerial Tuner 144/432Mhz inc Meter	£169.95
CS201 Aerial Switch 2 way 530Mhz 2.5KW PEP	£18.95
CS201G Aerial Switch 2 way 1.3Ghz 1KW PEP N	£27.50
CS401G Aerial Switch 4 way 500W 1.3Ghz N	£96.95
CS401 Aerial Switch 4 way 500Mhz 2.5KW PEP	£69.95
DP830N Digimeter 1.8-150Mhz 1.5kw 140/525-150W	£232.75
LA2035R Linear Amp 2M+preamp 1-4 IN/20W OUT	£87.45
LA2065R Linear Amp 2M 10-15W IN/60-70 OUT preamp	£134.95
LA2080H Linear 5W IN/80W OUT	£159.95
LA2155H Linear Amp 1.5-25 IN/150 OUT preamp	£299.00
NS448 Meter SWR/PWR 900-1300Mhz 20W	£95.10
NS660P Meter PEP/HOLD 1.8-150Mhz 15/150/1500W	£132.15
U66VN Sensor for NS660P 140/525Mhz	£61.25
N663BN Meter SWR/PWR 140/525 30/300W	£143.85
PS120M2 Power Supply 1-15vdc 9-12A max	£69.95
PS140 Power Supply 13.8vdc 12/14A max	£69.95
PS304 Power Supply 3-15vdc 24/30Amp max	£129.95
RS40X Power Supply 1-15vdc 32/40A max	£189.00

ALL DAIWA PRODUCTS AVAILABLE — FULL CATALOGUE ON REQUEST

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COMET *'THE EFFECTIVE ANTENNA'*

NON RADIAL: Mobile antennas independent of vehicle ground plane.

CHL24J 144/432 Mhz, Unity/2.15dB, 100W Only 29cms long	£14.80
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CHL24J 144/432 Mhz, 2.15dB/5dB, 100W, 0.8 metres long	£25.85
CHL25J 144/432 Mhz, 3dB/5.5dB, 120W, 0.93 metres long	£30.45
CHL250H 144/432 Mhz 3dB/5.5dB 200W 0.95 metres long	£33.50
CHL260 144/432 Mhz 4.5/7.2dB 130W 1.5 metres long	£38.30

2X4 SERIES + TRIBAND mobiles & base station antennas.

CA-2X4KG 144/432 Mhz 6.0/8.4dB 120W SSB 2.06 metres	£40.83
CX-702 Mobile Tribander 50/144/430Mhz 2.15/6.0/8.4dB 120W 2.1m	£45.95
CX-725 Base Tribander 50/144/430 Mhz 2.15/6.2/8.4dB 200W 2.43m	£75.00
CX-801 Mobile Tribander 144/432/1296 Mhz 3/6.8/9.6dB 100W 1.0m	£36.40

2X4 SERIES & DUAL BANDERS featuring the unique super linear converter system.

CA-2X4DXM 144/432 Mhz 8.8/12.2dB 200W 6.05m	£135.50
CA-2X4MAX 144/432 Mhz 8.5/11.9dB 200W 5.4 metres "N" G.-fibre	£102.00
CA2X4WX 144/432 Mhz 6.5/9.0dB 200W 3.18 metres G.-fibre	£80.70
CA-2X4SUPERII 144/432 Mhz 6.0/8.4dB 200W 2.43 metres G.-fibre	£79.00
CA-2X4FX Compact 144/432 Mhz 4.5/7.2dB 200W 1.79 metres	£57.00
CA-2X4BX 144/432 Mhz 3.0/6.0dB 120W 1.15m	£38.80
CPX2010 PRESTIGE Base Antenna for 2M (9.5dB) 70cms (13.2dB) 7.9 metres long 4 Section 200W The Highest Gain Dual Bander in the World!	£146.00

DUPLEX & TRIPLEXERS Zinc alloy diecast

CFX514 Triplexer 50/144/430Mhz M/M/M/M with leads	£36.75
CFX514J Triplexer 50/144/430Mhz M/M/M/M with sockets	£41.90
CFX5140 Triplexer 1.3-90 Mhz + 130-200 Mhz + 380-500 Mhz	
PL259	£38.95

MONO BANDER MOBILE ANTENNAS

CA287C 7/8 wave 5.2dB 200W 1.89 metres double co-phase	£23.00
CA430TM 3 x 5/8 wave 432Mhz 6.8dB 150W 1.47 metres	£30.60

MONOBAND BASE ANTENNAS

ABC21 5/8 wave Ground Plane 144 Mhz 3.4dB 200W 1.4 metres	£26.25
ABC22A 2 x 5/8 wave 144 Mhz 6.5dB 2.87 metres	£38.40
ABC23 3 x 5/8 wave 144 Mhz 7.8dB 200W 4.5 metres	£65.00
ABC71 5/8 wave ground plane 432Mhz 3.4dB 0.84 metres	£24.95
ABC72 2 x 5/8 wave GP 432Mhz 200W 5.8dB 1.07 metres	£35.60

B SERIES

B-10 144/430Mhz Dual Band Mobile Slimline Black 0/2.15dB 50W 0.3M long	£16.95
B-20 144/430Mhz Dual Band Mobile Slimline Black 2.15/5.0dB 50W 0.775M long	£23.70

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GENUINE BUDGET SAVING BARGAINS AT THE LEICESTER SHOW STAND S33 AND AT ALL ARROW SHOWROOMS

0% FINANCE

FINANCE SUBJECT STATUS

Many items available on 0% finance. Please enquire if the equipment you want qualifies — if not we can probably save you the finance charges anyway!

WIGAN Greensway Arcade, Gerrard Street, Ashton-in-Makerfield, Wigan, Lancs Tel: 0942 713405

LEICESTER DAVE FOSTER (Agent) Tel: 0533 608189 Latest calls 8.30pm please!

IMMEDIATE DISPATCH! Just Phone with your card number

VISA

LOWE ELECTRONICS LTD

Not a lot of them about . . .

. . . 2 metre multi-mode transceivers, that is. The **TR-751E** gives you full coverage of 2 metres in FM, USB, LSB and CW at a time when other manufacturers seem to have abandoned the multi-mode mobile. Tuning steps are available to suit each mode; from 50Hz on SSB to 12.5kHz for channelised FM.

Power output is 25W in all modes with switchable reduction to 5W. Receiver performance is excellent with GaAsFET devices giving high sensitivity and good dynamic range.

Further features include dual VFOs, memories, programmable bandscan, memory scan, repeater and true reverse repeater operation, all-mode squelch, noise blanker, semi-BK CW keying with sidetone, RIT and an optional VS-1 voice synthesiser which tells you the operating frequency - great for mobile use.

Try the **TR-751E** at any of our regional centres and experience the Kenwood skill of making complex equipment easy to operate.

TR-751E . . . £610.00 (VS-1 . . . £32.95)

TS-790E - Just when you thought it was impossible

Impossible to design and produce a multi-band VHF/UHF transceiver which would render all others obsolete? Meet the TS-790E!

The TS-790E gives you all-mode operation on 2 metres, 70cm and, with an optional internal fitting, 23cm as well. Power output is 45W on 2M, 40W on 70cm and 10W on 23cm. To fully appreciate the excellent receive qualities of this rig, read the even-handed review by Peter Hart G3SJX in November 1990 RadCom. Get hold of a copy if you can or we'll send you one from Matlock.

It is fashionable in some quarters to sneer at the microprocessor, but Kenwood's software adds a new dimension to complete control over a wide range of facilities including dual (triple) band monitoring, cross-band operation, full duplex operation facilities and others.

TS-790E . . . £1525.00

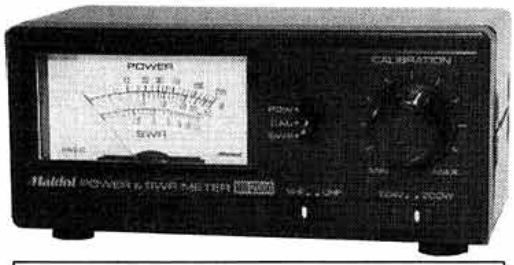
HOKUSHIN Aerials and Power/SWR Meters

For many years now we have sold these highly reliable products. We are now adding to the range both aerials and meters and details on the full range are available upon request. Here are two examples.

HS-WX290 3-Band Vertical

Gain: 3.0dB (144MHz)
6.0dB (430MHz)
8.4dB (1200Mhz)

Glass Fibre GP
Height: 1110mm
Cost: £64.95 (inc VAT)
Ideal for use with the TM-741E (see Sept '91 RadCom inside front cover.)



We look forward to seeing you at the Leicester Show 25/26 October

Power & SWR Meters MR-1000 HF/VHF

Freq. range: 3.5MHz - 200MHz
Measurable Power Range:
0 - 50W (CW) & 0 - 200W (CW)
Dimensions:
153mm(W) 70mm(H) 112mm(D)
Cost: £49.95 (inc VAT)

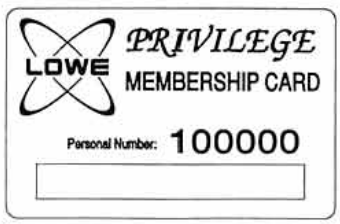
MR-2000 VHF/UHF

Similar spec. as MR-1000 with freq. range of 130MHz - 512MHz.
Cost: £49.95 (inc VAT)

PRIVILEGE CLUB - Are you a member yet?

On 1st August we launched the Lowe Electronics Prvilege Club. It is not a credit scheme but a simple and effective way for us to be able to reward the loyalty of our customers.

Can you afford NOT to be a member of the Lowe Privilege Club? It has many benefits. Phone, fax or write to us in Matlock for details or pop in to one of our centres.



HEAD OFFICE & MAIL ORDER: Chesterfield Road, Matlock, Derbyshire DE4 5LE

Buy locally - Trust technically
Look to Lowe

This month we are highlighting our centres at Barry and Cambridge. Lowe Electronics has nine centres spread across the country. Each one is managed by an enthusiastic licenced radio amateur and supported by a team of knowledgeable RF engineers at Matlock. When buying sophisticated electronic equipment, there is no greater reassurance than being able to deal locally with a company you can trust technically.

BARRY

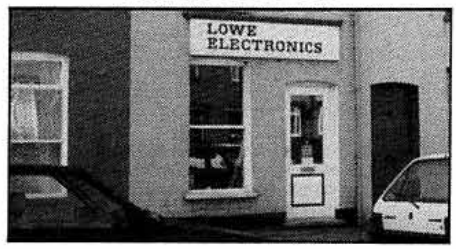
Situated in the port town of Barry, our centre is conveniently close to the shopping centre but with plenty of free parking outside the centre itself. Our manager is Ceri Jones GW0JCB who is a keen CW operator and also enjoys listening on the Marine and Air bands. His wife Jan GW0NQR ably assists at busy times.

With the recent installation of new aerials, the shop is well set up for licenced radio amateurs to put the HF and VHF rigs through their paces and for the short wave listening enthusiasts to comprehensively evaluate the many and varied features required for different listening interests. This is a particularly good site for listening to Airband.

A warm welcome is waiting from us all whether you are an old friend or new customer. Located just three miles from Cardiff Airport, we will be particularly pleased to welcome visitors to our fair land. Come in for a chat and see what it's all about.

Lowe Electronics Ltd
251 Holton Road, Barry, S Glamorgan CF6 6HT
Tel: 0446 721304 Fax: 0446 735662
Managed by Ceri GW0JCB

CAMBRIDGE



Our centre in Cambridge opened in 1984 with Tony Collett G4NBS as the new manager and he is still there. It is located to the North side of Cambridge with easy access from the A45, so you can avoid all the traffic jams in the city. There is plenty of free street parking outside and a frequent bus shuttle service from the city centre and railway station.

A large selection of receivers and transceivers are on permanent demonstration and the remainder are in stock and available for demonstration on request.

For airband enthusiasts, the catchment area of the shop includes all the military airfields in East Anglia, so we hold in stock a full range of suitable receivers and publications.

Tony, a licensed radio amateur for 20 years, gives good, friendly service which is backed up by ten years of detailed knowledge of amateur radio, short wave listening and their product ranges. The centre is open Monday to Saturday but closed between 1.00pm and 2.00pm each day.

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162 High Street, Chesterton, Cambridge CB4 1NL
Tel: 0223 311230 Fax: 0223 315099
Managed by Tony G4NBS

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Bournemouth BH10 6BW
Tel: 0202 577760
Fax: 0202 593882
Managed by Colin G3XAS
(Closed on Mondays at present)

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Unit 6, Ferry Steps Ind Estate
Bristol BS2 0XW
Tel: 0272 771770
Fax: 0272 772500
Managed by Tony G4CYE

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Cumbernauld Airport Main Foyer
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Tel: 0236 721004
Fax: 0236 738322
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DARLINGTON
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56 North Road
Darlington DL1 2EQ
Tel: 0325 486121
Fax: 0325 381485
Managed by Hank G3ASM
(Closed on Mondays at present)

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Lowe Electronics Ltd
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Slough, Berks SL3 8XB
Tel: 0753 545255
Fax: 0753 545277
Managed by Tom G6PZZ

LONDON (MIDDLESEX)
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Fax: 081 868 2676
Managed by Fred G4RJS

Telephone: 0629 580800 (4 lines) Fax: 0629 580020

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DY5 3LQ.

NEW FIBREGLASS COLINEARS

2 mtr fibre glass encased colinear

This half wave over a halve wave colinear gives 4.5dB gain over a dipole, measures just 86" high and 1" diameter. No radials or tuning is required. The aerial is completely waterproof and incorporates a SO239 connector. Supplied with clamp for up to 2" masts. **£39.95 + £3.50 carr.**

70 cms fibre glass encased colinear

A triple half wave colinear giving 5 dB gain over a dipole measures just 60" tall and 1" diameter like its 2 mtr equivalent. Needs no radials and requires no tuning. Again this antenna is completely waterproof and incorporates an "N" type socket. Supplied with a mounting clamp for up to 2" diameter masts. **£30.95 + £3.50 carr.**

The above two antennas offer very little wind resistance and are ideal where there are severe climatic weather conditions or unsightly Yagi arrays are out of the question.

END FED HALF WAVES

Our new 2 mtr end fed half wave is similar in design to the above colinears, this antenna however is encased in a 1" diameter plastic tube measuring just 52" tall, an SO239 socket is enclosed in a 10" aluminium base which also takes the supplied mast clamp for up to 2" dia masts. **£14.95 + £3.50 carr.**

Our new 70 cms end fed half wave is of the same construction as the above 2 mtr version but only 31" high and has an "N" type socket at the base. It is completely weatherproof and is supplied with mast clamp. **£14.95 + £3.50 carr.**

The above two aerials are perfect where space is limited and large aerials cannot be used. No tuning or radials are needed.

Our new 4 mtr end fed half wave has a fibre glass and aluminium base section and a two piece radiating element. The overall height is 90" and is terminated with a SO239 socket supplied with mast clamp. **£17.95 + £3.50 carr.**

All the above half waves are ideal for both base station or portable use and offer good omni-directional, low angle radiation.

New 6mtr version available £29.00 + £4 carr.

STAINLESS STEEL FITTINGS ★ NEW ★

We are now able to offer to mail order customers a large range of stainless steel fittings, including wire, nuts, bolts, washers, self tapping screws and jubilee clips in various sizes. Please telephone for details.

NEW FIVE BAND H.F. MOBILES ★ NEW ★

Covering 10, 12, 15, 17 and 20 mtrs, this antenna consists of a black helically wound fibreglass base approx 57" long plus the stainless steel whip sections for the above bands terminated with a 3/8 UNF thread. These are very easy to tune and offer excellent value at **£29.95 plus £3 carr.**

★ Stand No. S60 at Leicester ★

A SMALL SELECTION OF OUR MASTS NOW AVAILABLE BY POST

MAST SETS IN STEEL OR ALUMINIUM
OUR STANDARD MASTS ARE SUPPLIED IN 4' x 5' INTER-LOCKING SECTIONS IN THE FOLLOWING DIAMETERS:

	Steel	Ally	P&P
1¼" dia.	£10.00	15.00	3.50
1½" dia.	12.00	20.00	4.50
2" dia.	18.00	36.00	5.00

Guy Rope Kits
1 x 3 way guy ring
6 x thimbless
12 x wire rope grips
3 x turnbuckles
30 metres wire rope

STD £15 p&p £4
H/DUTY £18 p&p £4

SEE THE NEW 4x5' TRIBAND ANTENNAS AND TRIPLEXERS?

We also stock HB9CV's, ZL Specials, Slim Jim's 2 Mtr & 6 Mtr Halo's, trap dipole kits, SWL aerials and ATU's, discones, traps, baluns, copper wire, insulators, dipole centres, rope, spreaders.
Winches 400lb **£13.50** 800lb **£17.50** 1000lb **£20.50** 1200lb **£24.00** 1400lb **£26.00** + carr **£5.00**
Wall brackets, fixing bolts, u bolts and mast clamps guy rings, thimbles, turnbuckles and rope grips and large range of tuning caps & roller coasters etc.
As you can see all our products are too numerous to mention. Send £1 refundable against any purchase for our full catalogue and price list.

TEL: 0384 480565 **FAX: 0384 481330**

Visa and Access

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AMERICA'S FINEST HAM-RADIO EQUIPMENT!

We at HRS dedicate ourselves to bringing the very finest US manufactured equipment to the UK Radio Amateur. Due to our enormous bulk buying power we can import this equipment at sensible prices, and ensure its distribution throughout the UK dealer network.

We trust you have proven for yourself, as we have, that US manufacturing and quality is still a force to reckon with in the Amateur Market. For example, study some of the ingenious circuitry of the latest HF transceivers from Ten-Tec. Take a look at the innovative tuners, filters, meters, and packet equipment from MFJ, not to mention the vast range of beams, verticals and antennas we supply from names like Cushcraft, Hygain, Butternut, Mirage and KLM. We now also stock paddles and keyers from one of the world's most famous manufacturers – Bencher Products.

Call your nearest stockist today, and try out some of these exciting new product ranges . . . we know you'll be impressed!

If your local dealer is unable to supply any of these items contact us direct.

HRS
Electronics Plc

Contact: Alan Hiscox, HRS ELECTRONICS PLC, Garrets Green, Birmingham
TEL: 021 789 7171 FAX: 021 789 8040

R. N. Electronics

Professionally designed equipment for amateurs

SEE US AT
LEICESTER SHOW
STAND 58

MODEL NO.	DESCRIPTION	PRICE
TRANSVERTERS		£
RN6/2/25	2-6m transverter 25W	229.00
RN6/10/25	10-6m transverter 25W	238.00
RN4/2/10	2-4m 10W transverter	229.00
RN4/10/10	10-4m 10W transverter	238.00
RN4/6/10	6-4m 10W transverter	238.00
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RN4RX	4m Receive Converter 2m I.F.	42.00
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RN4/10RX	4m Receive Converter 10m I.F.	42.00
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RN-LNA/M/6	6m Mast-head Pre-amp (200W power)	109.00
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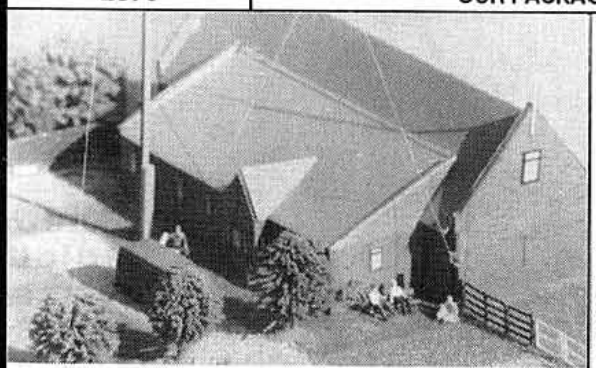

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*specification guaranteed: 50 - 905.

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By connecting an external 13.5 ~ 16V DC power supply, a full 5 Watts of output power is available. You can choose 3.5W, 1.5W or 500 mW of low output power.

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The large easy-to-see function display with lighting shows operating frequencies, S-indicators, and memory or call channels for both bands. Independent volume and squelch controls allow you to change settings in each band separately.

24-hour clock with an ON/OFF timer

This function can be used for convenient scheduled QSO and standby receiving, turning the transceiver ON and OFF as specified to conserve battery power.

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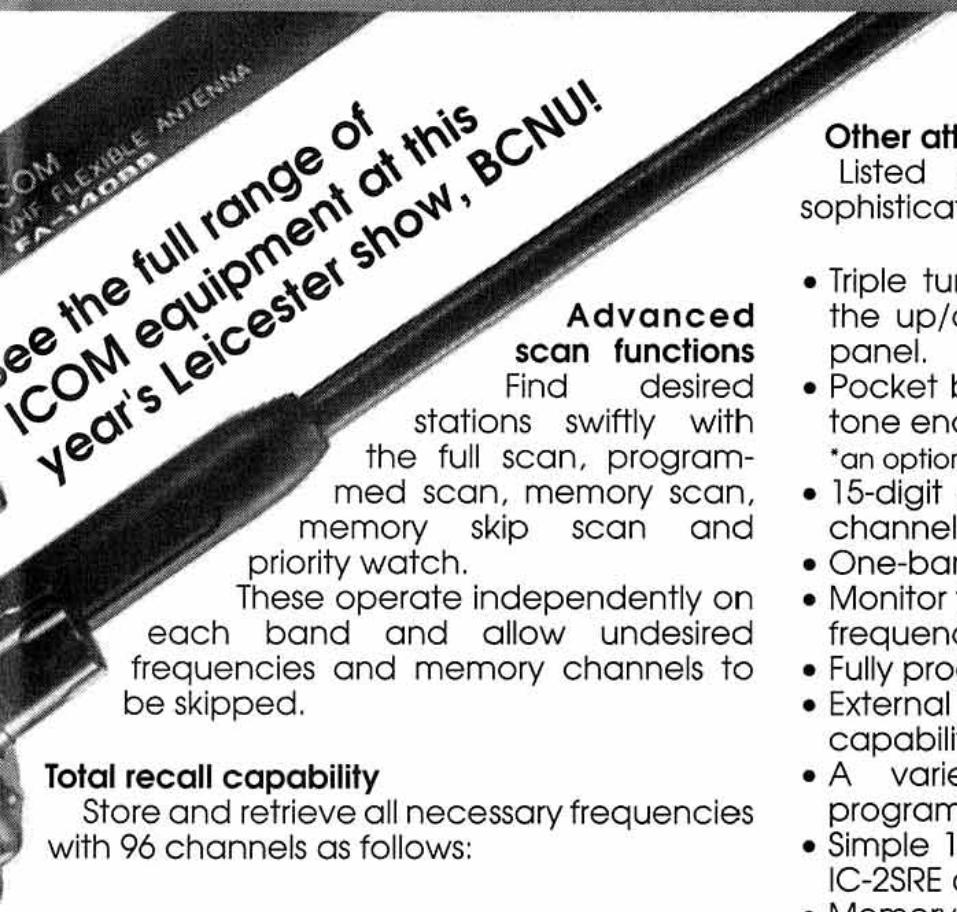

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HF NEWS

JOHN ALLAWAY G3FKM
10 Knightlow Road, Birmingham
B17 8QB

THE FIRST British Novice licence holders are now on the air and beginning to enjoy the pleasures of real communication. I'm sure that their unusual callsigns will tend to make them targets for collectors of prefixes and DXCC countries - even to the extent that some of them might develop pile-ups! If you're not familiar with the system, their prefixes are 2E (England), 2M (Scotland), 2W (Wales), 2D (Isle of Man), 2J (Jersey), 2U (Guernsey), and 2I (N Ireland). If you find one - please remember *your* early days and be patient. On HF they are allowed to use 1.950 - 2MHz (on CW/telephony/RTTY/data), 3.565 - 3.585MHz (CW only), 10.130 - 10.140MHz (CW only), 21.1 - 21.149MHz, 28.1 - 28.190MHz, and 28.225 - 28.300MHz (all CW/RTTY/data), and 28.3 - 28.5MHz (CW/telephony).

G2DRT reports that the first radio amateur to become a cardinal, Roger Mahony, W6QYI, was elevated in a ceremony at the Vatican on June 28. He is an active amateur, flies a helicopter, and is one of the church's youngest cardinals.

ALBANIA

FANTASTIC NEWS received in a special bulletin from IARU HQ! A press release dated 24 August says: "It was announced today in Tokyo that a programme has been established which will lead to the introduction of amateur radio in Albania.

Mr Agim Muco, the Secretary General of the Albanian PTT made the announcement. During a short address at the Tokyo Hamvention, he announced the foundation of the Albanian Amateur Radio Transmitters Society. He also announced that as a result of support from the International Amateur Radio Union, several of its member societies, and certain honoured individuals, amateur radio transmissions from Albania would commence on 15/16 September 1991.

Under the sponsorship of the IARU, and with assistance from the JARL (Japan), the ARRL (USA), the ARI (Italy), the NCDXF (USA), and Yaesu (Japan), a programme of instruction and introduction has been adopted by the Albanian government which is intended to form the beginning of amateur radio in Albania. Mr Richard L Baldwin, W1RU, Mr Seppo Sisato, OH1VR, Mr Kan Mizoguchi, JA1BK, and Mr Martii Laine, OH2BH in his capacity as consultant to the Albanian PTT, have all been instrumental in the early phases of this project.

Part of the overall programme - scheduled to begin in mid-September - will consist of training selected Albanian students as well as operation of amateur stations by instructor/operators. Amateurs from a number of nations will take part in this operation. Further information will be available shortly . . . .

THE NORTHERN CALIFORNIA DX FOUNDATION

A PRESS release dated 28 July from the NCDXF gave the news that K6TMB, WZ6Z, W6OSP, WB6ZUC, W6DU, W6SZN, W6OAT, K6UD, W6QHS, WA9WYB, and N6ST have been elected as directors for the 1991-1992 term. W6DU is President, K6TMB vice-president, W6ISQ corresponding secretary, and K6UD recording secretary. Jack Troster, W6ISQ, was one of the founders and has now become more active again. Jack is the IARU Region 2 Beacon Coordinator and closely involved with the NCDXF beacon programme. It is now being suggested that time-sharing systems like those on 14, 21, and 28MHz be installed on 18 and 24MHz. Perhaps it will be possible to choose frequencies in packet-free areas for them?

CONTESTS

CQ WW DX SSB CONTEST

0000 26 October - 2400 27 October

Work the world - 1.8 to 28MHz but not WARC bands. Single-operator single and multi-band, multi-operator single and multi-transmitter and QRP classes (the last allows up to 5W *output*. Exchange RS plus *CQ* zone (UK is in Zone 14). QSOs with own continent count one point, with others three. Own country may only be worked for country/zone credit. Multipliers are the numbers of DXCC and WAE countries plus *CQ* zones worked on each band added together. Use separate logs for each band and if you make more than 200 QSOs on a band you must also send in a 'dupe' sheet. Give date, UTC, station worked, numbers in and out, and points claimed. Also clearly mark new multipliers. Check for duplicate QSOs - the presence of these in a log can cause disqualification. QRP entrants must clearly note this fact on their cover sheet and state the actual power used. All entries must be postmarked no later than 1 December 1991 and sent to *CQ Magazine*, 76 North Broadway, Hicksville, NY, 11801, USA. Sample log and summary sheets are available from that address in exchange for a large SAE and some IRCs - sorry but I do not have a supply of either.

ON CONTEST

0700 - 1100 6 October 3.5MHz SSB

0700 - 1100 13 October 3.5MHz CW

Contact Belgian stations and DAs (Belgian Forces in Germany). Exchange RS/T and serial number from 001. ON and DA stations will give their club code. Each QSO counts three points. Each different club worked counts as a multiplier. Send logs not later than three weeks after the contest to: Welters Leon, ON5WL, Borgstraat 80, B-2580 Beerzel, Belgium.

In the **1991 UBA Contest** SSB Section **G5LP** scored 21,528 points on 7MHz to be top foreign station on that band. G4PKP scored 143,104 in Class B and G3XYZ 7,506 and GX4CVK 6,417 in Class C. In the CW section UK entrants were G3URA 5,460 (on 7MHz), and G5LP (89,614) and G3ESF (46,998) in the multiband class.

In the **1991 PACC Contest**, **G4IQM** scored 13,104 points, **GM3KLA** 12,455, G3ESF 12,188, G0LZL 10,089, G4ZIB 4,488, G2VJ 4,280, G4ZME 3,300, G0IEZ 3,255, and G3ING 310. **GB5TT** scored 5,712 points in the multi-operator section.

DARC FAX CONTEST 1991

0800 27 October to 2000 28 October

3.5, 7.14, 18, 21, 24, and 28MHz. Exchange name, QTH, RST and QSO number *by FAX only*. One point per QSO - multiplier is one for each DXCC/WAE list country on each band. Each JA, PY, VE/VO, VK, W/K, ZL, ZS call area and UA9-0 will count as a country. Logs must reach Erhard Stephan, DF8ZW, Geschwister Scholl Str. 1, D-6054 Rodgau 6, Germany no later than 1 December 1991. I can supply copies of the rules (SASE please).

Results of the **1990 VK-ZL-Oceania Contest** show **G5MY** as leading UK station in the phone section with 360 points followed by G0JDK with 322. In the CW section **G3WPF** led the way with 4,032 points followed by G3DYY with 884 and G5MY with 720. Rules of this year's event appeared last month.

DX NEWS

RSGB DX News Sheet says that the Ministry of Telecommunications in **Tchad** has issued a statement which made amateur radio legal again from 9 July 1991. TT8SA can often be found near

PHOTOGRAPH: 5Z4FN

Dr John Allaway recently visited the Radio Society of Kenya which just happened to coincide with the July shack meeting. The gathering included the following 5Z4s and others. Back row: SWL Thurura, Jim – FM, Gad – RY, Lynn – DU, Waldo – BJ, Rod – BH. Middle row: Patel – EA, Paul – FO, John – PA3 CXC, SWL Chenge, Andrew – FT, SWL Mohamed. Front row: Christine – LL, Chris – CO, Jim – 7Q7 JH, Ted – OT, Peter – PL, Gerard – PT

BAND REPORTS

Not the usual level of interest this time with holidays and poor conditions no doubt taking their toll. However - the top 1991 28MHz score is now over 200 so the year can't have been all *that* bad so far. . . .
Thank you for your input to G2HKU, GM3CSM, G's 3GVV, KSH, LPS, RHM, GW4KGR, G4NXG/M, G8KG, G0's AEV, OFE, and the UK DX Packet Cluster (via G4PDQ). Calls in italics were stations on CW.

3.5MHz

0000	CE0ZIS, ZP5FGS
0100	CY9CWI, VP8ML
2100	3C0CW, 8Q7CO, 9Q5TE

7MHz

0000	*C9RZZ, FY5FA, 9L1US*
0100	J39GH, *UA3O/N2AA*, V44KW
0600	HF0POL
1100	*N6AR*
2000	3C0CW, *3W4DK*
2100	*SV8/DJ4LK/P, VK3YD*, 8Q7LO
2200	*D44AA, ES7R/0, JJ1VKL/4S7*
2300	*HI8A, YC0UNC, ZD8LII, 9V1XQ*

14MHz

0600	FK8FI, FO4DL, KH6LW/LH7, *VP9/W9BA*[sx], YI1BGD
0700	FK/F1HQY, G4LAF/MM (near FO), KH2/WB3STU, VK9NS, *ZK1XB*
0800	*A35CA*, FO8MD, *W5NFS/KL7*
0900	*5W1JU*
1100	VY2YN
1500	CY9CWI, V85XYL
1700	C9EZZ, V85GA, 9M6OO
1800	BV2BT, JT1BV
1900	VQ9RS, YI0VP, 3B9FR
2000	*FR5DD*, HS1BV, ST0DX, V63WP, *3D2CA*
2100	A71BK, HF0POL, NH6U, ST2YD, T40PAN, VP8CGL
2200	3C0CW, 9M2/VK2DXI
2300	PJ4CR, *G4AAL/8R1*, V85IR

21MHz

0600	A35IJ
0700	A35MX, FY5EM, HL9HH, 9X5HG
0800	A35IN. TR3IGL
0900	BY3AA, BZ4RBX, *XU1NQ*
1000	HL0Y
1100	FO5CS
1400	S79IVJ, 3C0CW, 7Q7RM
1500	ST0DX, *TR8GL*, YI1BGD
1700	C9RZZ, HS1BV, VK6IH, ZD7SM
1800	*A22GH*, BV2DQ, KL7XD, *XU1NQ*, 5H3RA
1900	A71BP, D68RH, V51JM, ZS9S
2100	ZL4JO, 9M8PV
2200	V31PC, 9K2SH

28MHz

0700	HS0AIT
1100	TY2AB, *3C0CW*, 9X5SW
1400	YC0VP, 5Z4FM
1800	HV3SJ, ZD9BV
1900	VP8CFM

QTH CORNER

A35EA	ZL1AMO, R.Wright, 28 Chorley Av, Auckland 8, New Zealand.
C9RZZ	SM7DZZ, Svalortsv 46 A, S-24021 Loddekopinge, Sweden.
CY0SAB	VE1CBK, Wayne King, RR 1 Site 35 Box 32, Windsor Junction, N.S, B0N 2V0, Canada.
KP2A/KP5	WA2NHA, 159 W.Newell Av, Rutherford, N.J, 07070, USA.
ON4CLM	PO Box 110, B-8300 Knokke-Heist, Belgium.
VR6TC	(new) George Stevens, WD6GUD, 11130 Dempsey Av, Granada Hills, CA 91344, USA.
XY0RR	Box 812, Sofia 1000, Bulgaria.
XU1NQ	OK1NQ, Josef Kordac, Lounskych 3 888, CS-14000 Prague 4, Czechoslovakia.
3C0CW	EA3CUU, Box 220, Olot 17800 Gerona, Spain.

EIGHT BAND TABLE NO 7

CALL	1.8	3.5	7	14	18	21	24	28	TOTAL
G3KMA	138	256	311	322	215	321	200	312	2075
G3XTT	161	221	270	308	172	303	154	282	1871
G3GIQ	71	210	273	321	145	319	131	305	1775
A92BE	58	156	206	312	196	294	182	272	1676
GM3PPE	68	164	180	249	173	236	138	213	1421
G3NOF	5	100	104	320	115	321	104	288	1357
G3TXF	71	166	215	290	17	287	12	251	1309
G4OBK	123	155	202	277	33	251	11	226	1278
G3JJG	51	102	186	226	131	253	114	199	1262
G3JXN	42	96	160	243	106	239	112	252	1250
G4NXG/M	2	33	75	215	72	230	118	225	970
Average	72	151	198	280	125	278	116	257	1477

For the next table please send your scores to reach G3GIQ no later than 8 October 1991.

21.225KHz from 1100. *DXpress* says that 5U7NU has closed down and that he will be on the air again soon from **Mali**. A22AA, in **Botswana** is often near 21.230MHz after 1630. XT2BW in **Burkina Faso** keeps schedules at weekends around 21.260MHz from 1800 and will make arrangements for QSOs on 14 and 28MHz.

XQ0X should return to **San Felix Is** this month for a period and hopes to have RTTY and do some operating via satellites. Stations in **Bulgaria** have been allowed to use 18 and 24MHz since 1 July. Stations in **S.Korea** are being allowed to use the HL30 prefix until the end of 1991.

ON4CLM is a special event station located in Knokke, Belgium. It commemorates the liberation of the town in 1944 by Canadian forces and will be on from 27 October until 3 November. A 15 x 23cm award will be available to those making contact - it costs US $5.00 or 10 IRCs with all proceeds going into a welfare fund. Look on 3.515, 3.685, 7.012, 7.045, 14.020, 14.145, 21.020. 21.245, 28.020 and 28.545MHz. Award applications and the special QSLs available for listeners should be sent to the address in *QTH Corner*.

EXPEDITIONS

VP2M/AA5AU and VP2M/G0AZT should be in **Montserrat** until 7 October. They will use all bands (including WARC) with CW on all of them and RTTY and SSB on 14 - 28MHz. XE2FL is expected to visit **Revilla Gigedo** between 20 October and 10 November using the callsign XF4I.

RSGB DX News Sheet contains a report from *QRZ DX* that AA2AV, N6KI, WJ2R, W6MKB, AB6BH, and KM1R are planning a visit to **Vietnam** next month. They hope to have two stations on the air on all bands/modes using some of the equipment left behind by the 3W8RR team, plus IC751A transceivers and linears loaned by ICOM.

DXNL says that FD1EDZ will be with a scientific expedition on board a ship which should be near **S Shetland Is** from 27 November to 27 December, **S Georgia Is** between 23 January and 14 February, **S Sandwich Is** from 17 to 28 February, and **Bouvet Is** or **Tristan da Cunha** from 1 to 15 March, and arrive in S Africa on 25 March.

According to *DXpress*, G4ZVJ will be in the Pacific area from early this month until December. He expects to visit **Fiji** (3D2VJ), **Tonga** (A35VJ), **W Samoa** (5W1VJ ?), **American Samoa** (KH8/G4VZJ), and possibly also **New Hebrides**, **Niue**, and **Tuvalu**. He will have a TS440S and vertical/delta loop/dipole antennas. Most operation will be on CW but he may also try AMTOR and RTTY.

AWARDS

WORKED ALL OY

The rules for this award have been amended and it has been extended and it is now available for VHF contacts and to listeners. WAOY I requires 35 points for European stations and 25 from others; WAOY II 25 and 15, and WAOY III 15 and 10 points respectively. Only QSOs with permanent stations count and each counts as one point. QSOs with club stations OY6FRA, OY6NRA, and OY6JAM count double.

These apply to contacts made since 1 Jan 90 and all bands 1.8 to 28MHz may be used (including WARC). QSOs between 11 Apr 65 and 31 Dec 89 count at the old rate which is that only 3.5, 7, 14, 21, and 28MHz contacts may be claimed and that stations outside Europe count two points per QSO on 7 and 14MHz. Listeners may apply but confirmed reports dated 1 Jan 1990 or later must be held. Send certified list plus 15 IRCs or US$10 to FRA, Awards Manager, Arne Juul Arnskov, OY1A, PO Box 343, FR-100 Torshavn, Faroe Is.

THANKS

THANKS GO to the *Heard Is DX Bulletin* (VK9NS), *DX-NL* (DL3RK), the *Ex-G Radio Club Bulletin* (WA8TGA), the *Long Island DX Bulletin* (W2IYX), the *RSGB DX News Sheet* (G4DYO), the *Lynx DX Group Bulletin* (EA2KL), and *DX'press* (PA3DZN).

I need to receive everything for the **December** issue by **17 October** please.

1991 28MHz COUNTRIES TABLE

G0OFE	203	(SSB)	GM4CHX	81	
G0JZA	190		G4YNG	75	
G0DOO	187		G2FQR	63	
G0AEV	175		G4NXG/M	63	
G4DXW	159		GM0GEI	55	
G0KDS	146		G0DUS/M	54	
G4MUW	133	(SSB)	G4XAH	43	(RTTY)
LA0SC	113		G2AKK	31	(CW)

Propagation NEWS

Compiled from reports supplied by G3FKM, G3FPK and the Propagation Studies Committee

HF

UNFORTUNATELY THE G8KG report was inadvertently not sent to the editor by G3FKM last month but for the sake of completeness here it is:

"Solar indices continued to be high in late June and the first three weeks of July. The 27-day average for the 2800MHz solar flux had been above 200 solar flux units (sfu) for more than 40 days and had climbed to 209 - values which in the winter season would result in good conditions on the higher bands.

The provisional monthly average for June was 207 sfu and that for July may well prove to be rather higher. The geomagnetic field was reasonably stable in late June and early July but there were major disturbances in mid-July, though not on the scale of those reported last month.

When this report appears in print we shall be at the start of the 1991/92 DX season on the HF bands. Present indications are that Cycle 22 is proving to be markedly double-humped with the current solar indices being significantly higher than could reasonably have been expected a year ago. This augurs well for HF conditions in the coming season though there will almost certainly be more and bigger magnetic upsets than there were during last winter."

Smithy's report for September goes as follows:

"As cautiously predicted in last month's report, July's provisional monthly sunspot number (174.1) and solar flux (212 sfu) were somewhat higher than the values for June. The early part of August, however, saw a rapid fall to a daily value of only 139 on 11 August but this was followed by an equally rapid rise to 290 sfu eight days later which brought the 27-day average back above 200. This suggests that we are still in the second hump of the double-humped cycle. After a quiet last week in July the geomagnetic field became very active with the average of the Boulder A index for the first 19 days of August being over 10 and with only one daily value below 10. As a result, HF band conditions were very variable, though with a few good spells."

VHF

THOSE WHO regularly listen to the Sunday *GB2RS News Broadcasts* may recall that on 1 September we reported strong evidence of a massive restructuring taking place in the Sun. By 21 August the sunspot count had reached 472, 13% higher than the previous maximum for Cycle 22.

We won't know for many months yet, after all the numbers have been smoothed out, whether the peak was in July 1989, or if it will be displaced to a later date by this phenomenon. When these notes were written on 1 September, the active side of the Sun was supposed to be rotating away, but a couple of huge spot groups were visible, one near the west limb, the other to the east of the central meridian. For VHF operators, the high average A indices, resulting from enhanced geomagnetic activity, have kept the auroral pot boiling. There were significant events on 2 and 12 August, when the A indices were 38 and 35 respectively, and lesser ones on the 1st, 20th and 22nd when they were 6, 27 and 31. A indices of 21 - 50 are classed as sub-storm.

Sporadic-E openings on 144MHz this summer were very rare so the breakfast-time event on 13 August, following the previous day's excellent aurora, was welcome. Previous Es openings this year were very brief and only affected small areas, but this one lasted two hours and stations all over England and Wales made contacts with stations from Austria to the Black Sea.

The most likely triggers were a sharp upper ridge combined with a high metallic ion input at the peak of the Perseids meteor shower. IARU Sporadic E Co-ordinator Jim Bacon, G3YLA, will be making a detailed study of this event when more data are available. Members' reports to the *VHF/UHF News* column are an essential source of such data.

HF F-LAYER PROPAGATION PREDICTIONS FOR OCTOBER 1991

The time is represented vertically at two-hour intervals 00(00)GMT for each band, ie 00=0000, 02=0200, 04=0400 etc.
The probability of signals being heard is given on a 0 (indicated by a dot) to a 9 scale; the higher the number the greater the probability with 1 meaning 10 to 19 per cent of days, and so on. Additionally 50MHz F-layer and 1.8MHz openings are indicated by a plus (+) sign in the 28 and 3.5MHz columns.

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	...1888871..	...2999984..	...59999971.	...888889941	422876678986	987544446899	875311113688	+42.....4++
MALTA	....887663..	...29988851.	...59999983.	1..788889962	653876678997	998744457899	998421124788	++5.....4++
GIBRALTAR	....465442..	....687675..	....8998983.	...198889961	331687778996	997865446899	998632223689	+++4.....3++
ICELAND	.....35541..	....157763..	....3899861.	....6889983.	21..87778983	873565556898	888642224678	+++4.....35+
** ASIA								
OSAKA	...175.....	...2872.....	...48741....	...476432111	1..253235654	....2..14773	1551	.........22.
HONGKONG	...499851...	...5888731..	...37777641.	...156568732	2...23236886	2.......14786	1574	.........24.
BANGKOK	...5+++972..	...5788994..	...25777972.	1....25568952	4....2236987	3.......4788	1.......1576	243
SINGAPORE	...6888882..	...5788894..	...347679721	1...25568953	4....2236997	2.......4787	1575	242
NEW DELHI	...6+9982...	...678884...	..1346677211	2.2115568543	631..2236888	73......4789	51......1577	2........245
TEHERAN	...7++9972..	...8778994..	1.2745679731	314523468964	8552..137998	973.....4789	841.....1577	52.......245
COLOMBO	...7++9983..	...66889951.	1.1336679832	311114468964	73...1137998	71......4789	4.......1577	245
BAHRAIN	...7+88972..	...77788851.	2.2634779843	524412568976	8651..236999	973.....4789	85......1578	52.......245
CYPRUS	...7++99851.	...89999972.	2119888899953	534877789986	977644567999	997311235899	8841....2688	+5.......3++
ADEN	...7++89851.	1..766889732	312633679975	744311468998	9851..136999	973.....4789	85......1567	52.......245
** OCEANIA								
SUVA/S	....156611..	....367832..	....6777651.	...27656772.	..156323661.	...53...44..	...2....11..	.....
SUVA/L	11.1331..373	32.35531.574	231676432763	123875444841	..275212561.	...42...34..	...2....11..	.....
WELLINGTON/S	....57741...	....788632..	...38777651.	...58656772.	..165323672.	...33..144..	...1....12..	.....
WELLINGTON/L	11.........11	22.12.....33	232352...254	1236631.1552	..265211362.	...32...34..	...1....11..	.....
SYDNEY/S	...5988741...	...6988863..	...68778861.	...576568831	...253236961	....2..1474.	.........151.	.........2..
SYDNEY/L	....2.....21	.1..42....43	121.7421.174	111275321374	...263123761	....3...363.	.........41.	.....
PERTH	...7898651..	...6888773..	1.1467678631	2.1245468864	2...12137997	4785	1572	.........24.
HONOLULU	.........3..	.........151.	....31..472.	.1..531.672.	.232532165..	.15631..32..	..23....1...	.....
** AFRICA								
SEYCHELLES	...77787441.	1..766886732	312433678975	733211468998	973...136999	95......4789	82......1567	5........235
MAURITIUS	...78+899621	1..777889852	421434779986	743211568998	962...236899	84......3789	72......1577	4........245
NAIROBI	...787898742	2..766789964	532633479997	854411158999	9961...26999	984.....3788	861.....1577	53.......244
HARARE	1..677789853	31.766689975	641633379998	874411168999	9961...36899	984.....3789	861.....1577	53.......244
CAPETOWN	1..477889864	42.676789986	751754468999	984621248999	9974...16899	9851....3789	873.....477	54.......45
LAGOS	21.2++88+974	42.486679986	762773348999	984851127999	99872...4899	8994....1689	7771....477	454......45
ASCENSION Is	11..98768763	33.197667886	7624843359998	985771.13899	99984....699	89861....389	7873....167	454......35
DAKAR	11..9++8+973	22..98768995	6633853359998	886583113899	99986....699	88863....389	7773....167	444......35
LAS PALMAS	....8+98984.	99999972	231298889995	563588778998	998876556899	999753223699	88852...1378	+++2.....4+
** S. AMERICA								
Sth SHETLAND	11..27888873	32.158888885	663377666688	886675453478	898852121146	67862.....13	3563.....1	.23.....
FALKLAND Is	.1..48+88873	22..68877885	553287654588	886575421378	9998521...47	89962.....15	6873.....2	354.....
R DE JANEIRO	29766762	221.48766785	553277433588	886475111389	999752....69	99863.....37	8773.....15	554.....2
BUENOS AIRES	38878872	111.58866784	453177633477	776475411268	9997521...37	89863.....5	7774.....2	454.....
LIMA	.....+88861	1876673	232.13643356	56524442.137	8996531....6	79963.....3	5774.....1	254.....
BOGOTA	.....1+88761	3876673	222..5642256	55411542..37	8985331...17	89863.....4	6774.....1	454.....
** N. AMERICA								
BARBADOS	.....8+88861	8866783	232.17632386	56513651.178	9985532...48	99863.....16	8764.....4	544.....
JAMAICA	.....1+88761	2876672	221..4753365	553.2553..47	8984432...16	89863.....4	6774.....1	354.....
BERMUDA	.....5+88861	7877772	221.17654585	453.36521378	8884532...48	88863.....16	77741.....3	444.....
NEW YORK	.....188885.	3887862	21...5765675	442.15553477	88734322.147	89863.....15	67741.....2	344.....
MEXICO	......18874.	387651	11..1.574344	442.3.452125	78725222...3	59863.....	27741.....	.44.....
MONTREAL	.....178874.	3888861	11...5776784	442.15554577	886243221257	88863.....25	67741.....2	344.....
DENVER	.......4762.	68741	11.....177553	331.1.255334	67523.232..3	58853.....1	26741.....	.34.....
LOS ANGELES	.......1762.	.......2863.	11.....48542	331.1..56322	575241.34..1	378531..1...	.4731.....	..4.....
VANCOUVER	.......241.	.......462.	17741	32.....27643	564231.25323	368531..3...	13641.....	..3.....
FAIRBANKS	.........1..	.........13..	11124631	21..22236752	453353236654	346631..3322	1243....11..	.....

The provisional mean sunspot number for August 1991 issued by the Sunspot Data Centre, Brussels was 175.5. The maximum daily sunspot number was 300 on 21 August and the minimum was 75 on 10 August. The predicted smoothed sunspot numbers for October, November and December, are respectively: (classical method) 130, 128, 125; (SIDC adjusted values) 130, 130, 130.

VHF/UHF NEWS

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

IN SPITE OF its being the main holiday period, the August postbag was surprisingly full. A mixture of propagation modes brought something for everyone - auroral, tropospheric, sporadic-E, plus a good Perseids meteor shower.

BAND PLANNING

THERE WAS UNIVERSAL opposition to the proposal that 144.475MHz be designated for AFSK packet radio. First, the WAB enthusiasts, who hold regular nets in the 144.425 - 144.500MHz segment, were sure it would seriously affect their activities, since many QSOs are with distant mobiles with marginal copy.

Second, Colin Morris, G0CUZ (WMD), confirmed G3UTS's point that this region is used for SSB MS skeds, adding it is a useful overflow area for local traffic during tropo openings. Third, Mr M B Hopkins, G0OEI, the chairman of the Willenhall and District ARS, reported that 144.475MHz has been used for some considerable time by G4EYY for on-air morse tuition.

The overwhelming conclusion is that this proposal, which would be contrary to both the existing UK and IARU Region 1 band plans, is just not on. Majority opinion favoured reallocating a frequency adjacent to the three existing ones to provide an additional channel. Many suggested that packeteers ought to accept 12.5kHz channel spacing within the existing segment to accommodate two more channels.

Tim Trew, G8JXV (SRY), is a packet radio user. He wrote; "If some pressure is not put on packet users to improve the efficiency of the mode, then any new frequencies will become as congested as the current allocations." Most suggested that further expansion of the mode should be directed to the higher bands where extra activity would be welcome and wider bandwidths less of a problem.

This issue has certainly brought a lot of useful comments from VHF band users, some of whom use packet radio. Peter Burden, G3UBX (WMD), chairman of the RSGB VHF Committee, is active on the mode and has also received many letters and messages, so we are well briefed on your views for our September meeting.

Please note that the VHF Committee has *not* made any decisions on this matter; in parliamentary terms, we are still in the 'Green Paper' stage. As with the recent revision of the 70MHz band plan, we are giving ample time to seek members' views which will be carefully considered before adopting any new proposals.

METEOR SCATTER

ALASTAIR MCBEATH, vice-president of the International Meteor Organization, has kindly forwarded a copy of his *1992 Meteor Shower Calendar*. He mentioned that higher than normal activity has been detected around 22 - 23 January for the past three years, so that might be worth noting in your 1992 diaries.

Comet Halley is the parent body of the four streams which make up the Orionids. The 1991 IMO Calendar gives 21 October as the date of maximum. For those with computer programs, the Right Ascension is 95° and the Declination +16° at maximum. The radiants are above a mid-UK horizon from about 2100, through midnight, to about noon.

Reflection efficiencies exceed 50% as follows: NE/SW 2300-0500; E/W 0130-0730; NW/SE 0400-0930 and N/S 2300-0100 and 0600-1030. The shallow inclination of their orbits does not usually produce a pronounced peak, so reflections could be above average between 19 and 24 October.

The Taurid streams are associated with Comet Encke and the southern one is expected to peak on 3 November. The ZHR (Zenithal Hourly Rate) is below 10 but likely to be fairly constant for a week around the peak. Best times are: NE/SW 2000-0100; E/W 2130-0330; NW/SE 0000-0530 and N/S 1900-2300 and 0200-0600.

MOONBOUNCE

WITH NEW MOON on 7 October, any 5/6 weekend EME activity will be marred by Sun noise. On the following two weekends the Moon will be in the south, ie with negative declinations. The 26/27 weekend is much more favourable, being just after full Moon, and sees the first leg of the ARRL EME Contest.

This is a perigee weekend, the Moon's declination varying from +23.7° at Friday midnight, through 25.0° by midnight Saturday, back to 24.2° by the end of the contest. London moonrise on the 25th is around 1745 at 52° azimuth, with moonset on Saturday morning at 1030 at 310°. A North American window exists 0745-0930.

The next moonrise is around 1830 at 49° with a 75min Asian window, and moonset is at 1130 on Sunday morning at 311°; a North American window is available 0845-1030. The last moonrise is around 1940 at 50° with an Asian window till about 2100.

50MHZ

GENERAL NEWS

Most of these items were taken from the August *6M Information* provided by Ted Collins, G4UPS (DVN). Yugoslav beacon 4N3SIX is now operating continuously on 50.013MHz. It sends ten 1s dashes then the message, "4N3SIX Slovenia JN76HD. Pwr 10W Ant 5El Yagi QTF 325. Info/QSL via YU3GO AR." YU3GO told Ian Galpin, G1SMD (DOR), that it will be moved to the mountains in JN76MC to join 4N3ZHK on 28.251MHz. The French beacon FX4SIX (JN06) has moved frequency from 50.0465 to 50.314MHz; G4UPS copied it on 22 August.

9Q5TE became active from Zaire on 18 August, QSL via SM0BFJ. 9Q5EE is also reported QRV. ZC4KS has been on from Cyprus since 25 August using 10W and a dipole; QSL via JCISB, Episkopi, BFPO 53 and overseas folk should add "via London, England." Doug Woolley's new Paraguayan call is ZP6CW; he was widely worked as ZP6XDW. 5H3RA has acquired the 5H1YK transceiver and antenna so may be operating from Kenya by now.

A Swedish group obtained written permission to use 50.110MHz on the Estonian island of Saaremaa. Using the call ES0SM (KO08XL) in the period 8-17 August, they made nearly 400 QSOs with 10W and a 4-ele Yagi. QSL via SM0KAK, whose new QTH is; Platavagen 18, S-19140 Sollentuna, Sweden.

IK2GSO's June operation from IM0 (JN48XE) netted Enrico 25 countries. He worked 110 stations in the British Isles in EI, G, GD, GJ and GW. Ted lists 21 Yugoslavian stations in the 2 and 3 call areas reported worked up to 25 August. They are in JN65, 75, 76, 85, 86 and 95.

ACTIVITY

Es propagation up to 25 August was reported on all days except 6, 9 and 19, the majority to the Mediterranean and Scandinavia. An interesting novelty was PA0DYY/MM who was in JN00 on the 10th and JM09 on the 11th. In an aurora on the afternoon of the 12th OY/G4ODA (IP61) was worked plus GD, GI, GM and OZ stations but activity was low.

The Perseids shower brought QSOs for several readers in the 11-13 period but the YUs were using 50.110MHz for the mode according to Geoff Brown, GJ4ICD. G1SMD called on 50.350MHz for MS contacts but heard nothing. Did anyone hear random calls on this band plan QRG?

African stations were heard/worked on 7, 8, 10, 11, 22 and 26 August, usually in the 1700-1800 period. They included 7Q7RM, A22BW, Z23JO, ZS6XJ and ZS9A. The 9L, V5 and FR5 beacons were heard in Jersey on 7, 8 and 10 August.

144MHZ

THE PERSEIDS

Opinions differ widely on this year's Perseids shower. G0CUZ reckons it was good, with a small peak on 12 August, 1500-1700, then very good on the night of 12/13 with many bursts over one minute duration. Colin made about 20 QSOs with six new squares including OY/G4DHF (IP61) on random SSB on the 11th and ES0SM on CW next day.

John Hoban, G0EVT (YSW), didn't think much of the shower, though. He noted lots of random activity with short, strong bursts, but with little from Scandinavia. He has obtained 12 months temporary planning permission for a 20m tower and this has improved things to the north. He bayed two 14-ele Yagis for the shower but was very disappointed with the results.

Ian McCabe, G0FYD (LNH), had his first completed MS QSO with OH1AF on the 144.2MHz random SSB QRG on the 12th. At 0953 on the 13th, Mark Holloway, G4YRY (DVN), completed with LA8KV (JP52); he received 30-45s bursts.

Ela Martyr, G6HKM (ESX), made her first ever MS QSO on the 12th with OY/G4DHF and thinks she will try the mode again. Arlen Pardoe, GM0HUO (FFE), completed on SSB on the 12th with HG1YA (JN87), I3LGP

(JN55) and OK2ZZ (JN89). He thought bursts were shorter than last year, didn't hear any SMs and found few east Europeans.

Tom Melvin, GM8MJV (LTH), was generally pleased with the shower, completing with stations in DL, HA, I, OK, OY, SM, SP and YU. Tony Jones, GW4VEQ (GDD), had a successful SSB sked with YU7EF (KN04) on the 13th, a QRB of 2034km. He also completed random SSB contacts with EA3, I1, I2, OK2, SP9 and YU2 stations.

Lyn Leach, GW8JLY (GNS), thought the shower was slightly better than average. It brought him three new squares; SP6GZZ/P (JO83), SP3MFI/P (JO82) and IK2DDR (JN55). Other skeds and random QSOs were completed with I1, I5 and YU2 stations. GW4LXO (GNS) completed with 10 stations, including HB9FAP (JN46) and IN3TWX (JN56) on CW.

SPORADIC E

At last there was a good two-hours opening towards the Balkans starting around 0650 on the 13th. Mike Ray, G4XBF (SRY), was operating /P in JO00 with G0NFA, G1KAW, G4RKV and G4RRA. They worked LZ7A (KN11) and OE, SP and YU stations. I heard Jack Mitchell, G3KEQ (KNT), saying he had worked LZs in KN33, and KN43 on the Black Sea coast.

Between 0833 and 0858, G0CUZ worked YU1-4 and YU7, while LZ1ZB (KN12) was a new square. There was a 3min opening at 1208 when he contacted YU1LA (KN04). G0EVT worked 20 YUs in JN56, 65, 75, 76 and 94. G0FYT worked five YUs in JN76, JN94 and KN04 in the morning phase and YU2SB (JN95) at 1204.

G4YRY was on from 0750, Mark's best DX being LZ2AB (KN33). He also worked YU1, 5 and 7 and OE3. G6HKM didn't hear any LZs but did work YU2YF (JN85) for a new square. GW8JLY missed the opening but reported that GW4ZQV (GWT) and other GWs worked many YUs. In a 4min opening at 1545 on 28 July GW4ZQV worked three 9Hs in JM75. The 13 August event was quite widespread over G and GW but GM8MJV said it didn't reach his QTH in East Lothian.

AURORAS

It was certainly all happening during the Perseids as there was a good aurora in the afternoon of the 12th. G0FYD was QRV 1331 - 1808 and Ian's QSOs included OY/G4DHF, LY2BFR (KO15), ES0SM and SM5s in JO89. GM0HUO listed QSOs on CW with F and DL and on SSB with G, OY and PA stations, 1528-1745.

GM8MJV started with OY/G4DHF at 1345 and went on to work nearly 100 stations in DL, F, G, GU, LA, ON, OZ, PA, SM and Y by 1719. A surprise contact at 1620 was with OH7AXB (KP32WH) who was S9 with no auroral tone; he was running 160W and four 21-ele Yagis. GW4VEQ operated 1815 - 2002 and Tony worked OY/G4DHF, ES0SM and DL, F, G, GM, LA, OK, PA and SM stations. At 1914 he contacted some joker signing UA9QF (MO16TO), a QRB of 4181km, who varied from RST559 to 52A.

On 2 August there was a four hour aurora starting at 1330. G0CUZ, G0FYD, G4YRY and GM0HUO took part and countries worked included DL, EI, G, GD, GM, ON, SM and SP. Other, minor events occurred on the 20th, and at 0605 on the 22nd GM0HUO heard beacon OY6VHF (IP62) at S9A at 0° bearing. Twenty minutes of CQing brought Arlen no replies.

TROPO

G4YRY caught tropo openings to north Spain on 4 and 5 August working EA2ARD (IN93) and EA1CTT (IN63). On the 10th Mark contacted EA1TA (IN53) and on the 13th, EA2AWD/MM (IN75). There was propagation to southern France and northern Spain on August 18 - 22. Stations worked included EA2AGZ/P (IN91), F6HRE (IN93) and several EA1s in IN53, 63 and 73.

430MHZ

G0CUZ WROTE; "On 18 August I made a 70cm QSO!" It was with EA2AGZ/P, a new square, followed by EA1DKV (IN53). Jim Trainer, G1LMC (NLD) worked PE1s LMX and HXD (JO33), LA8AK (JO38), OZ9IT (JO46) and OZ1IPU (JO59) from 2013 on 29 July. He runs an IC-490E, 50W to two 19-ele Yagis at 55ft ASL.

Rick Royall, G8ESB (YSN), thinks there is more activity now. He still runs his weekday evening skeds with G6JQV (DYS) at 1800 on 432.210MHz, followed by GM0DNH (TYS) on Monday, Wednesday and Friday. The latter is keen to work more stations south of the border.

MUNROS

SCOTTISH READERS SHOULD know that hills over 3,000ft in Scotland are known as Munros, after Sir Hugh Thomas Munro who published a list of them in 1891.

James Gentles, GM4WZP (LTH), is a keen climber and set himself the goal of operating from all 277 Munros on 144MHz. He has now completed this six year-long DXpedition and his claim to have been the first person to have had a radio contact from each summit has been acknowledged by a representative of the Scottish Mountaineering Club.

James has accumulated a wealth of experience in hill walking and portable QRP operation from remote locations. He has written an extensive article on these operations, complete with diagrams, maps and analyses of the results, and it makes fascinating reading. Well done, OM.

LOCATOR SQUARES TABLE
Starting date: 1-1-1979

Callsign	50MHz	144MHz	430MHz	1.3GHz	Total
G3IMV	360	457	125	52	994
G0CUZ	-	364	75	-	439
G4DHF	-	342	-	-	342
G4IJE	415	338	5	2	760
G4RGK	121	311	145	52	629
G4XEN	66	301	115	6	488
G4RRA	-	292	80	-	372
G4PIQ	-	289	108	-	397
G4YTL	-	269	-	-	269
G4SSO	-	267	99	-	366
GJ4ICD	473	264	119	59	915
GW8JLY	-	267	36	-	303
GW4LXO	367	258	108	48	781
G4DEZ	116	249	62	54	481
G3FPK	-	246	-	-	246
G6HCV	355	241	-	-	596
GW4VEQ	-	241	-	-	241
GW4FRX	-	235	-	-	235
G6HKM	316	228	112	49	705
G0EVT	186	221	57	-	464
G4DOL	-	219	-	-	219
GM0EWX	404	211	18	-	633
G4TIF	231	204	111	-	546
G0GMB	-	202	103	-	305
GM4CXP	50	201	32	-	283
G8LHT	169	192	93	17	471
G1KDF	309	184	104	39	636
G0FYD	134	177	6	-	317
G1LSB	73	177	144	-	394
G4XBF	-	176	-	-	176
G0EHV	-	173	80	-	253
G1SWH	201	166	62	9	438
G6YIN	163	158	72	-	393
G4MUT	160	155	94	34	443
G0OFE	264	152	-	-	416
GJ6TMM	162	151	52	-	365
GW6VZW	273	143	6	-	422
G4TGK	-	139	-	-	139
G8PYP	228	122	35	-	385
G8XTJ	130	121	-	-	251
GW4VVX	81	120	-	-	201
GM0CLN	-	116	-	-	116
G1SMD	206	112	-	-	318
G6MXL	84	100	52	22	258
G7CLY	-	100	2	-	102
G1UGH	119	97	-	-	216
G0NFH	124	81	22	11	238
GM0CLN	-	81	-	-	81
GU7DHI	194	73	-	-	267
G0HVQ	200	71	-	-	271
G7BXB	18	66	5	-	89
GM0GDL	-	55	-	-	55
G0JHC	360	48	-	-	408
GM1ZVJ	72	48	-	-	120
G6ODT	-	33	49	-	82
GW7EVG	-	28	-	-	28
GM1BVT	92	23	-	-	115
GM0GEI	224	-	-	-	224
GM1XOG	169	-	-	-	169

No satellite, repeater or packet radio QSOs.
'Band of the month' 144MHz.

SIGN OFF

GERRY SCHOOF, G1SWH (MCH), telephoned the sad news that Bob Nixon, G1KDF, from Ormskirk died at the end of August. Bob contributed to the various VHF columns I have edited since 1976 and was a keen participant in the tables. The **December** deadline is **Thursday, 24 October** and the **January** one is **Thursday, 21 November**.

MOONSTRUCK!

IN AUGUST, we published a photo, ostensibly of an aurora. It turns out that this was moonlight! That will teach me not to take at face value an explanatory note written by someone no longer on the staff - *Ed.*

SWL NEWS

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

WITH ALL THE summer's maintenance of antennas behind us, October brings plenty of opportunity to put them through their paces. There is activity every weekend.

The first sees the Australia/New Zealand SSB contest (VK/ZL) when many stations are active from the Pacific trying to work the rest of the world. The CW section for this event is the following weekend.

At the same time, the Cray Valley Society has decided to run its SWL contest, more on this later. For UHF types, the IARU Contest will be held over the 24 hours from 1400 on 5 October. Main activity is on 430MHz but for a listener to enjoy himself, an anticyclonic weather pattern is really needed to make the event exciting - otherwise it can be rather tedious.

The 13th sees the Society's 28MHz event. Participation is on the wane but, who knows, this year might see a better entry. On the 18th and 20th is the annual Jamboree On The Air (JOTA). This is not a contest (hooray! I hear you all shout) but there are many special event stations active just waiting to be logged. They not only appear from the British Isles, but from Luxembourg, Malta, South Africa and even further afield. There are awards for hearing a set number of special event JOTA stations, so why not keep a note of the usual log data for the special event stations, and I will print the rules for the awards in a later *SWL News*.

The RSGB 21MHz CW contest is also on 20 October. The late Brad Bradbury made this event his own, but I am sure if he were still with us he would be delighted to see greater participation. Why not take a listen and put in an entry?

Finally, there is the culmination of the month's activity with the *CQ* World Wide SSB contest on the last weekend - 25/26. Regulars will know that the bands are alive for the whole of the 48 hours and whenever you turn on the rig there will be sufficient activity to keep the headphones glued to your ears for a few hours! Many DXpeditions are planned to coincide with the event, leading to many exotic spots being activated. You cannot help but find a new one, even if you have over 250 countries heard.

So, if I have whetted your appetite for what should be an exciting month, please try to spend some time by the rig, and why not write and tell me about it afterwards?

CRAY VALLEY ACTIVITY

OWEN, G4DFI HAS WRITTEN to say that the Cray Valley Society has re-scheduled its contests this year so that they take place alongside the VK/ZL contests. There should still be sufficient activity to make for some interesting logs.

The CVRS is retaining the successful rules employed last year, and an SASE to Owen Cross, G4DFI, 28 Garden Avenue, Bexleyheath, Kent, DA7 4LF, will get you a copy of them. There were 15 entries last year and it is hoped that the same level of participation can be maintained.

HF CHALLENGE

TIME ONCE AGAIN TO to remind everyone that the *SWL News* SSB challenges coincide with the SSB leg of the *CQ* World Wide Contest on 26/27 October, with the CW leg four weeks later. To save valuable space, the rules will be exactly the same as in 1990 (see page 57 of October **1990** *RadCom*).

The rules are simple enough - if anyone has any doubts they only have to write or telephone - and I hope for the usual entry, but will be delighted with more!

DXTV

IT IS SURPRISING the number of comments I receive about the inclusion of DXTV News. Brian, GW0GHF, is the latest to admit to being rather a DXTV fanatic. He uses all homebrew equipment and has seven switchable Band 1 antennas in a rather small loft. The buffered IF output goes via a double screened 7Ω cable to an unmodified Hitachi 9" mono television.

He also records the DX he views on video, feeding the camera socket on a VCR and playing back as normal on Ch36 into an 18" mono TV. Brian has seen some interesting pictures this season from RUV Island (Iceland) on E3 on 15 July, Norwegian and Swedish test cards on E2 and E3 on 8 July, Yugoslavia on 5 July, and good pictures from Estonia on R2 on 18 June. Brian has also noted some Eastern European pictures on ChR3, which is 77.25MHz.

VHF HAPPENINGS

THE SPORADIC-E SEASON on 144MHz has been non-existent this year. The warning chain set up early in June has not had to operate once, and things on 50MHz have been little better. The only countries reported have been CT1, F, I, IT9, OE, OH, YU and ZB2. Nothing exceptional there and no F2 or TEP openings noted either. Mick Toms BRS31976 has, however, taken his countries/squares/fields totals to 50/127/22.

On aurora, 13 July provided strong signals on both 50 and 144MHz, but my reporters all arrived home from work only to see the conditions fade within minutes. The hope for a second phase did not occur. All-in-all, an extremely disappointing summer. Perhaps we will be blessed with some decent late Es, a good Perseids Shower and some good Autumnal Tropo. Time will tell!

HF REPORT

WITH MANY OF MY REGULAR reporters on holiday at the time of compiling this report, it is not as comprehensive as usual. GW0FYC wrote too late to have information about the Newport ARS mini-expedition to Alderney included in last month's column. If any listener heard GU4EZW or GP1NRS between 7 and 14 September and a card is required, the QSL should go to GW4EZW via the Bureau or to PO Box 33, Newport, Gwent, with sufficient postage for a direct reply.

Mick Toms' only HF activity during the month was helping to run the special event station GB2DTS. The group made a good number of contacts, including OA4ML, V21AK, J73JM/KP2, VP8CGL, VK6NS, VP8CFM (South Orkney) and 7Q7JH.

Other reports show that HF conditions were not too hot in July. The only real DX noted on 28MHz was 9L1US, while 21MHz provided KG6UH/DU1, D68JM, BY5RY, V85GA, VR6TC, 5Z4BI and 9M8PV. 14MHz came up with FJ/FG5ED, HC8GR, HK0TCN, PJ4/WG3I, TG9AFA, ZF2QJ and 8R1JV. It seems that conditions on 27 July were the best of the month as DU, V85, HL and 9M8 were audible together with many JAs and W7s romping like locals.

Phillip Davies, G1EMD, has purchased an Icom R72 receiver to take the place of his Eddystone 840A. Despite critical reviews, Phillip finds the receiver to be very good. If it performs as well as my Icom R70, he will not be disappointed.

FINALE

PLEASE KEEP WRITING with news - and don't forget those photographs. The deadline for the **Christmas** issue is early. Please ensure that your news reaches me no later than **2 October**.

Cliff Adams, BRS10906, has been the Sub Manager for G2 callsigns for the last 12 years. This photograph shows him with Racal RA1217 and Collins 75S3C receivers and a Codar PR30 preselector. He has heard 246 countries and passed on the information that if anyone needs Pitcairn Island, they could try listening for Irma, VR6ID, who has a regular schedule with Jim, G3OKQ, at 0630 on 14.308MHz several times a week. The QSL route is simple enough - Irma Christian, Box 2, Pitcairn Island, South Pacific Ocean.

Novice NEWS

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

A LETTER I wrote to BYLARA (British Young Ladies' Amateur Radio Association) triggered a memory for Shirley, GM4LUS, and she spent an enjoyable evening rooting through old magazines and memories. A BYLARA member since 1980, she just knew that there was *something* somewhere, ... she was right. A photocopy of the articles reached me, and I offer a potted version to you:

Like many amateurs, Shirley had not found the learning of Morse easy, and vowed to bury the key in a very deep hole once the test was behind her. Having passed, however, she found that she really enjoyed listening to the practice stations and writing it down - because now she didn't *have* to.

The trend of thought continued. She could send and receive couldn't she? She had worked hard - pity to waste all that effort. Right, she would use it, and began to plan. She drew up a standard 'rubber stamp' contact, and practised until it could have been sent in her sleep. She was now ready for the *real thing*.

When she heard someone calling CQ at a copyable speed, she returned the call and to her horror he replied. She was prepared. Standard QSO at elbow, she embarked on her very first HF CW contact. Things were going well when half way through the contact, panic set in. Shaking hands, clammy palms and a disobedient key do not make for an enjoyable first QSO, so it was brought to a hasty end with no well-practised details of QTH, RST etc given. A letter sent with the QSL card, explaining that this was the first Morse contact, brought a reply offering encouragement to continue, which Shirley did until her life took a different turn (as lives do!) and spare time vanished (as it does!).

Practice is the only way to gain confidence. Shirley offers some practical advice:

1) Arrange to meet a friend in some quiet corner in the CW section of a VHF band.
2) Have a 'crib sheet' ready. Rubber stamp QSOs are a good way to get practice. Remember that for some foreign stations, that is the limit of their English.
3) Listen around for some nice slow CQ calls; perhaps they are in the same position as you. Not all full-blown Class A amateurs are experienced.
4) Listen for other Novice callsigns. They will be grateful for some practice too.
5) Answer CQ calls until you feel more confident. When they begin to bore you, you are ready to move on.
6) *Never* send faster than you can read. This applies to your CQ calls and to answering others.
7) Do not be afraid to ask the other station to send more slowly (QRS). It is only by practice that speed is built up, and the other station does not know that you are struggling unless you say so.
8) Most of all, enjoy yourself. This is a hobby and hobbies are for fun.

DRAGON AT LARGE!

IN AUGUST I reported on the problems in rural areas, and the issue of a Novice newsletter in the Gwynedd area. The Dragon Amateur Radio Club also issues a newsletter, and in it Dewi, GW0ABL, the Chairman, makes a couple of practical suggestions on ways that all amateurs could help.

There may be times when an Instructor needs help. Tuning a transmitter perhaps, or in a demo on the erection of aerials, when another pair of hands and eyes would be very welcome. Many amateurs do not want the full commitment of instructing students, but would be willing to give occasional help if asked. If you feel like this, why not make yourself available as an assistant, given reasonable notice? At a later stage you may then have the confidence to tackle an Instructor's job yourself.

Another idea. As the course is practical a variety of equipment is required. For example, test meters and soldering irons are not usually owned in quantity, and a few spares can save time for all. Have you anything which could be borrowed? Also, any surplus gear donated to the local training scheme could be passed around as it was needed by different groups of students.

PHOTOGRAPH: LOCAL PUBLICATIONS LTD

Lincolnshire's first 'hands-on' Industrial Electronics day at the Robert Manning School, Bourne. (l to r) Ian Clare, David Johnson (G4DHF), Joann Mackie, Kathine Riley, Louise Hallam, Tamsyn Jackson, Richard Folk, David Mason.

HANDS-ON EXPERIENCE

THE ROBERT Manning School at Bourne took part in a radio and electronics training day on Saturday, 29 June. This was part of Lincolnshire's Technical and Vocational Education Initiative, sponsored by local industry. Twenty-one pupils of the school took part. These youngsters with little or no prior knowledge of electronics were able to build a simple medium-wave broadcast receiver, helped and guided by a team of industrialists, teachers and instructors, their first taste of the world of electronics in industry.

Just before 9am, David Johnson, G4DHF, Industrial Coordinator at the school, gave a welcoming address and introduction, followed by an address entitled "The need for a trained workforce in electronics - an industrialist's view" given by Ian Buffham, G3TMA, of Currie and Brown Technology Ltd, and Michael Bowthorpe, G0CVZ, of Link Control Technology. Head of Electronics, Richard Folk, opened the practical session with a simple introduction to components and the circuit diagram, and building began at 10am.

The Spalding and District Amateur Radio Society was represented by the Chairman, Robert Offer, G1ZJP, who was actively involved. Work continued until 12.15pm, when David Jackson, G4HYY, outlined the RSGB's Project YEAR (Youth into Electronics via Amateur Radio) initiative.

It was time well-spent. Around 25 transistor radios were successfully constructed, including one built by the Deputy Headmistress! In fact, 100% success is claimed, and even more gratifying, (to me at least) is the fact that as many girls as boys took part. In later discussion, almost every pupil said that before this experience, they would not have believed themselves capable of building a working electronic project. Further, they *all* wanted to continue in their study of the subject.

To quote Headmaster Michael Kee: "Such activities make a significant contribution to Curricular Development and in the forging of meaningful links between School and Industry. I am looking forward to the development of this initiative"

There should be a *positive* development as a radio club has been formed, hopefully to be on air early next year with the callsign G0RMS, (I'll be looking for you!). Similar ventures are planned for other schools throughout the County.

A LITTLE HELP GOES A LONG WAY

RSGB NOVICE Course Training Objective 6 (operating techniques), states: "Write a suitable report and send to selected stations." May I make a plea that if you receive such a report, you acknowledge it in exactly the same way as you would an SWL report?

If possible, send it direct, if that is the way it comes; second class post will do. It would be very encouraging for Novices to get early proof that radio amateurs are a helpful, friendly crowd. A 17p stamp is a small price to pay to prove it!

NOVICE NEWS 2

THE SUMMER issue of *SPRAT* contains the first edition of the G-QRP Club's *Novice News*, ably

PHOTOGRAPH: DONALD STEWART

Disappointment for (l to r) Keith, Stuart and John of Alford Academy (GB2JUNO) when they heard only packet during their first sked with GB1MIR. Thankfully, the next pass resulted in 59 reports both ways.

presented by Dave, G0NEZ. His job is to help Novices of all ages.

For those readers who are not (yet?) G-QRP Club members, I will whet your appetites and tell you briefly what is there. After introducing himself, he points out that, due to the basic principle of the Club (use of low power) members are in the unique position of having extensive experience in successful use of the odd watt or two, and would like to help newcomers.

The column contains a summary of the bandplan, the make-up of Novice callsigns and a plea to all Club members to work as many Novices as possible (a plea which applies to *all* amateurs). Dave comments that a request to QRS may be heard so a straight key may be a useful piece of equipment to keep close at hand!

Looking forward to your next column Dave, I hope your postman is kept busy too.

GB2JUNO

ALFORD ACADEMY Amateur Radio Club using the callsign GB2JUNO was operational from 7 May to 3 June with an extension granted to 1 July. Apart from the contact with Helen Sharman there were two special events. Mick, GM6VUL and Iain, GM0MYV sent the details:

First there was a fun weekend held on 18 and 19 May, open to the public with local amateurs invited to operate. To say that the fun weekend was a success is, perhaps, an understatement. Besides giving the opportunity to set up the satellite tracking equipment for the big event, three HF stations were active on 21, 14 and 7MHz as well as 2m FM/SSB operation. Although conditions were poor on 14 and 7MHz, an impressive 345 contacts were made. Drew, GM3YOR had many contacts into Japan and USA on the 21MHz band.

The equipment used was: Two TS-940S rigs with 1kW linear amps feeding G5RVs and/or a vertical, an FT-901DM feeding a five band trap dipole and an FT-225RD, MML 200W amplifier into a 7/8 over 7/8 collinear. Special thanks to Alec at Amcomm Services Ltd in Montrose for the gift of a 5-element XY Yagi, and to SMC Ltd at Southampton who loaned their demonstration G5699B Az/El rotator, interface and software. This latter caused no QRM, working extremely well through a Nimbus 286 PC computer.

Special thanks too to Drew, GM3YOR, Robbie, GM4UQG, and son Robert for travelling from the Glasgow area to help out. Also to: GM0JKF, GM0JEF, GM0FET, GM8MUE, GM6WTT and GM7ITG - all local amateurs, and GM3NHW who was on holiday from Edinburgh.

Sunday night saw everything ready for the 2m link with the space station. Great disappointment for all - John, Stuart and Keith (the boys chosen to speak to Helen), parents, two camera and two radio crews - as only packet was heard.

News that QRM was making things difficult for Helen led to a reorganization of GB2JUNO's power and aerials and, once again, everything was ready. Nothing at all was heard on the first slot on Thursday and the waiting media debated - should they continue to wait? The BBC crew decided "Yes".

At the allotted time, GB2JUNO gave GB1MIR a call and the ecstatic sighs of relief from the assembled crowd when Helen replied made all the effort worth while. Contact was logged from 2009 to 2013BST with a two-way signal report of 59. Keith and John had their questions answered from space, but unfortunately Stuart's question did not reach Helen before she vanished over the horizon.

The second was a trip to one of Benachie's summits. Radio operation and a barbecue were planned but the wind and rain were not! It was enjoyed just the same, as were other school activities at a lower level - sea fishing, etc.

GB2JUNO contacted 532 stations, met several other amateurs, had a lot of fun (in spite of the worries) and have the experience of a lifetime to recount to their grandchildren.

SCROOGE'S CORNER

IMPROVISATION is the watchword for Ian, G3ROO. He has sent a few ideas, but this month the emphasis is on nice cheap insulators. At low power levels two or three plastic coat buttons strung together form a neat, light, insulator that works extremely well. You have an angler friend? A metre length of monofilament fishing line is another idea. Ian tells me that he has never bought an insulator in his life!

A tip from John, G3BDQ, when work is needed outside (perhaps an antenna job) and the weather is cold, or the job involves a heavy piece of metal (maybe the body of an S0239 socket), a small soldering iron can't cope. If you wrap the body of the cold iron with aluminium kitchen foil, shiny side down, just leaving the tip uncovered and secure with a few turns of copper wire round the foil, you will be surprised at the extra heat-holding ability of your soldering iron. The iron will suffer no harm. Note that only a *low voltage* iron must be used outdoors for obvious safety reasons.

Mothers, wives and daughters, like all the fair sex, buy jars of cosmetic potions and lotions (don't men too?) and Geoff, G4NPQ, uses the large shiny screw tops when discarded. Any scruffy old tuning knob can be transformed by filing the end flat and, getting it in the exact centre, gluing it into the jar lid with epoxy glue. A small hole previously drilled in the rim of the lid enables a small screwdriver to reach the grub screw in the old knob inside.

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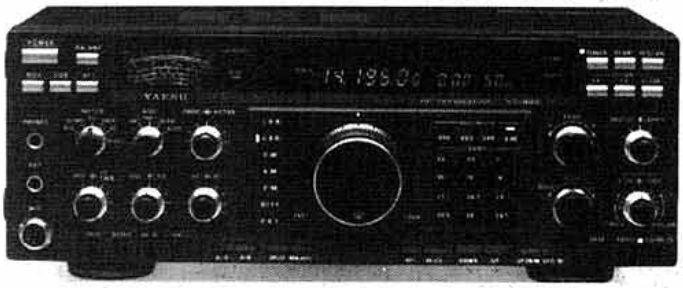

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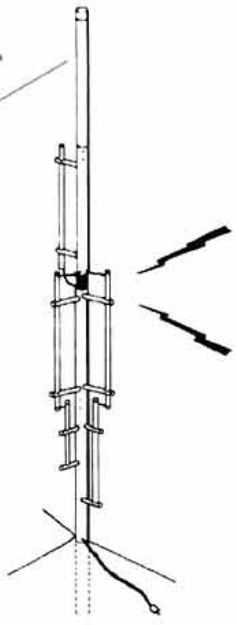

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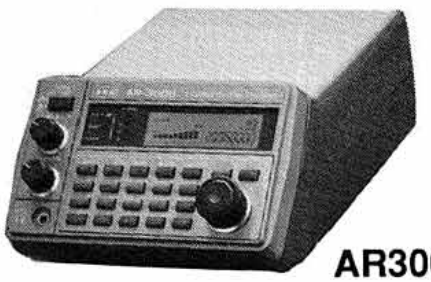

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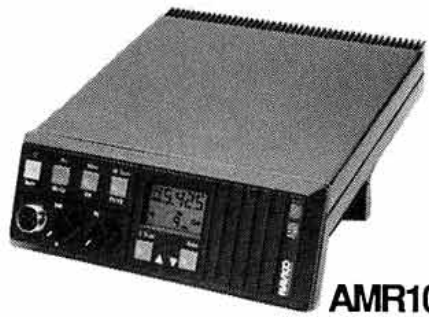

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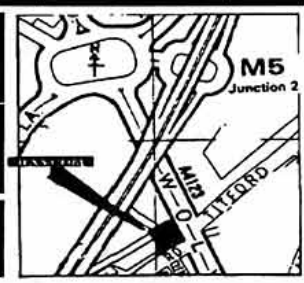

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TOPICS

PAT HAWKER G3VA

OSCILLATOR BASICS, CRYSTALS AND THE VXO.

MIKE HALL, G3USC (Euroquartz/Brookes Crystals of Crewkerne, Somerset), was provoked into writing to me by the item on the 'Harris' cathode-follower LC oscillator/Q Multiplier (*TT*, February 1991) - an item which he felt contributed little of value to oscillator technology. But also, to put it briefly, to reflect his feeling that too much of the material published in the amateur-radio periodicals and books tends to ignore the basic fundamentals of oscillators, both crystal and LC, in magnifying the minor variations between the relatively few basic configurations. He believes that many oscillator circuits, presented under the name of the designer, who may have done little more than introduce a minor (but possibly useful - *G3VA*) modification to one of the very few basic circuits: "Had the authors attempted to explain the basic theory a little better instead of trying to make the reader run before he could walk, I know that I for one would have had, much earlier than I did, a better understanding of the fundamental principles involved.

"The two, and only two, conditions which must be satisfied for oscillation to take place at the wanted frequency are the Barkhausen Criteria, namely that the initial gain around the oscillatory loop (the loop gain) must be greater than unity and that the phase shift around the loop at that frequency must be zero. Non linearity or an AGC circuit limits the loop gain to exactly unity after a (short) period of time which is determined by the circuit final Q, having taken into account the Q-multiplier effect of the positive feedback. The amplitude would otherwise build up and something would become exceedingly hot! . . . . All oscillators employing a feedback network consisting only of one inductive element and two capacitive elements (or vice versa) which provide the necessary phase shift of 180° around a single stage of gain, also ideally giving 180° phase shift, can be boiled down to the Pierce (one inductive, two capacitive elements) and the Miller (two inductive, one capacitive elements).

"But what, you may be asking, about the Colpitts, Gourier-Clapp, Hartley, Vackar and others? If you check these oscillators against the basic Miller and Pierce - remembering that the Miller oscillator depends upon the 'Miller Effect' (ie the effective anode-grid or collector-base capacitance) - you will find that the differences are no more than which active-device electrode is at earth potential or, if tuneable, how the tuning is arranged. With transistors, the Pierce had the emitter earthed, but in the Colpitts it is the collector. Similarly the Miller has the emitter earthed; for the Hartley it is the collector. Or, to look at the effective tuned circuit, is it the capacitive arm that is tapped? - a Pierce. Or is it the inductive arm that is tapped? - a Miller: **Fig 1**.

"The bona-fide variants (Colpitts, Hartley, Gourier-Clapp, Vackar etc) do indeed offer advantages for specific applications: for example better amplitude stability over a wide tuning range, or better frequency stability with supply-voltage variation."

But G3USC was far from happy with the claims made for the 'Harris' oscillator which he considers to be merely an unexciting Hartley variant of the Miller, or in another configuration a Colpitts variant of the Pierce, with no particular merits of its own. He believes that the term Class A - if by such is meant good gain linearity over the full operating cycle - can be applied only to oscillators where the amplitude is held at a low level by a separate AGC circuit, an approach that is commonly adopted in high-quality oscillators.

Subsequently, G3USC admitted that his criticisms of the way oscillators are commonly presented in the amateur-radio media were influenced by his professional experience in dealing with enquiries from amateurs who, he considers, usually fail to specify correctly the crystals they order. This has the result that the crystals do not work as intended, often leading to lengthy (and always costly) correspondence advising how to specify crystals for use in specific circuits and applications: "Being myself a radio amateur made me sympathetic to this problem but it sometimes required second-guessing which could result in the crystal still not doing exactly what was required; the result a dissatisfied customer and the risk of acquiring a bad name for my company. Unlike catalogued components which can be bought and sold by part number, the sale of quartz products which have to be made to special order is a hazardous business indeed when dealing with a hobbyist."

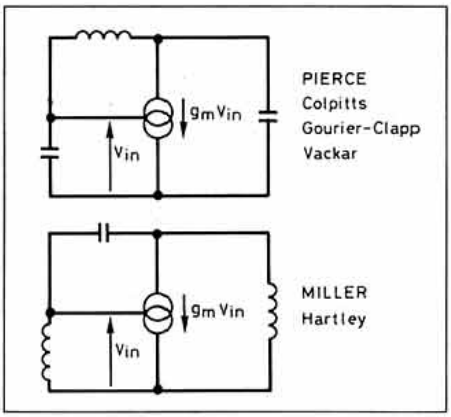


Fig 1: The two basic single active-device oscillator circuits with some derivatives.

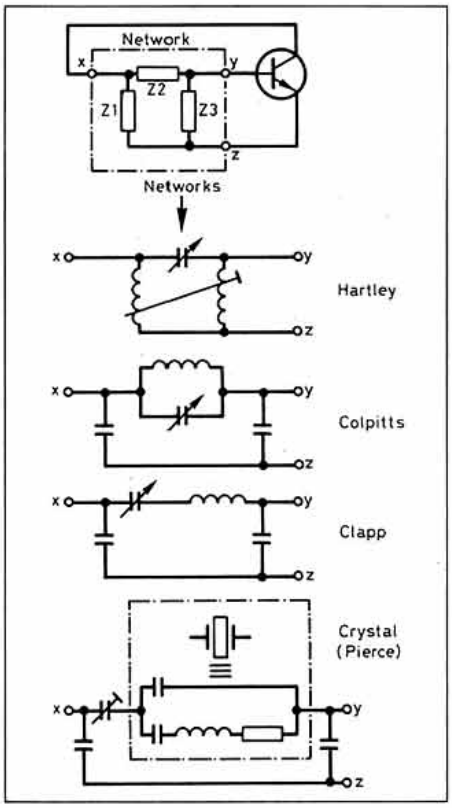


Fig 2: How the three feedback impedances are arranged in Hartley, Colpitts, Clapp and Pierce oscillators.

It is thus important that amateurs should recognise that crystals behave differently in different circuit arrangements, with different load impedances, with different drive levels, or in series-resonant or overtone oscillators. It would clearly be impossible, each time a different oscillator circuit was published in *TT* or elsewhere, to provide detailed theoretical information at a level capable of being understood by newcomers and old-timers alike, together with a full guide on how to specify crystals, but I can claim to have referred to these topics from time to time.

Some 25 years ago a digest of information from the 1960s booklet *Guide to the specification and use of quartz oscillator crystals* published by EEA (then the Radio Communication & Electronic Engineering Association) was given in *TT* and subsequently reproduced in all editions of *Amateur Radio Techniques*. (The seventh edition - ART7 - has been out of print for several years but has just been reprinted; hopefully one day there may be an ART8). The 1960s EEA 36-page booklet was clearly published in an attempt to overcome the difficulties that resulted from a lack of understanding on how correctly to specify crystals then evident even among professional engineers. It is by no means certain that even today this a problem affecting only radio amateurs!

More recently (*TT*, January 1984, pp40-42) I included some information on crystal basics, the effects of load capacitance, 'sleeping sickness' in crystals, 'rubber crystals' and the use of low-cost crystals and ceramic resonators. Again in *TT*, September 1989, p43, I reproduced a diagram from Professor Mike Underhill's, G3LHZ, IEE Conference tutorial paper 'Fundamental limitations of oscillator performance'. This diagram (**Fig 2**) shows the three basic network components in terms of Hartley, Colpitts, Clapp and crystal (Pierce) oscillators.

Yet undoubtedly there remains some confusion about the basics of crystal oscillators. Recently, for example, Jesper Fogh Bang, OZ1XB, enquired how and why a variable crystal oscillator works. He questioned how it is possible to alter the frequency of a "solid rock" of quartz. Such a question can be answered only by considering the electrical equivalent of a crystal (**Fig 3(a)**) and the recognition that like any other resonant circuit, its frequency can be changed, if only slightly, by changing the external impedance into which it is connected. In effect, in a VXO, one does not change the resonant frequency of the crystal itself, but adds external 'trimming' components in the form of a variable

capacitance plus in some cases additional external inductance of as high a Q as possible.

The extent to which one can control the frequency of a VXO is governed by the parameters L, C_i, R, C_o of the equivalent circuit and these will vary with different types of crystal. It will be noted from Fig 3(a) that a crystal provides at the same time both parallel and series-tuned resonant circuits, slightly spaced from each other. A significant difference between a conventional LC circuit and a crystal is the sharpness of these resonances, governed by the Q which, for a quartz plate, may be between about 10,000 and 1,000,000 compared with about 300 for a high-grade inductance/capacitance tuned circuit. Crystals have very high inductance, very low internal capacitance: in rough terms representative values for a 400kHz crystal could be about L = 7.61H, C_i = 0.02pF, C_o = 16pF and R = 400Ω - notice the value in Henrys rather than the usual mH or μH!

With the usual 'parallel-resonance' form of oscillator, the crystal unit is designed to operate as an inductive impedance connected to an amplifier which appears capacitive at the crystal socket. It is this load capacitance which is the main external influence in determining the precise operating frequency. Crystal units are designed for a specific load impedance, with crystals marked with their parallel resonant frequency for a standard value of load capacitance: usually 30pF (formerly 20pF) in the UK, 32pF in the USA.

With a different load impedance, the frequency of oscillation changes slightly, although excessive loading may result in no or unreliable oscillation. For relatively small changes in load impedance, the frequency changes a small amount without affecting the stability and activity of the crystal. This is most easily affected by putting a variable reactance either in series or parallel with the crystal, the choice being decided by the nature of the oscillator circuit. For example, with a Pierce/Colpitts oscillator, the load capacitance can be changed by putting a variable capacitor across the crystal socket or in series with the crystal: **Fig 3(b) and (c)**. The degree to which the frequency changes with a change in load impedance depends in part on the relationship between C_i and C_o. The primary use of such frequency 'pulling' is to provide a trimmer on VHF equipments to compensate for the gradual change of crystal resonance due to 'ageing'. As noted in *TT* (January 1984), a typical HC6/U style of plated crystal with a nominal frequency of 4055.526kHz (series resonance

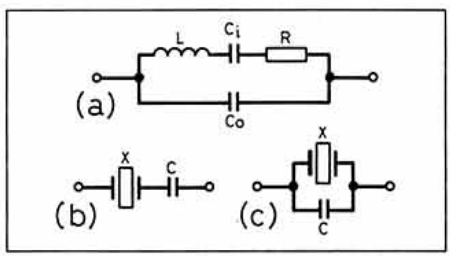


Fig 3: (a) The electrical equivalent of a quartz crystal unit; (b) An external series capacitor tends to raise the frequency of oscillation; (c) A parallel capacitor tends to lower it. Additional frequency shift can be achieved with a combination of external capacitance and inductance.

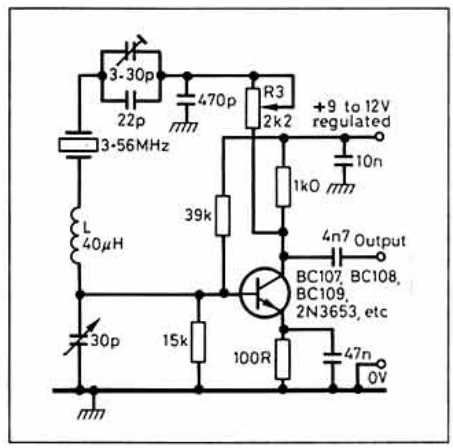


Fig 4: Representative practical 3.5MHz VXO with inductive and capacitive loading providing a tuning range of about 3.5kHz at 3.5MHz without significantly degrading the stability. With some (older) crystals an appreciably greater tuning range can be achieved provided a high-grade, high-Q, mechanically stable loading inductance (see *TT*, June 1984 'The VXO revisited').

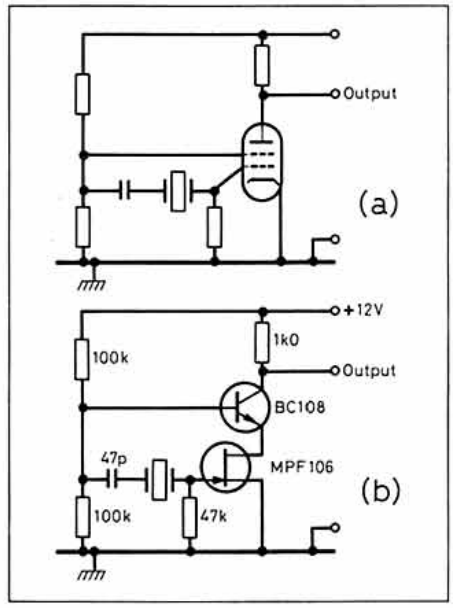


Fig 5: (a) Modified Pierce crystal oscillator using the screen-grid of a tetrode or pentode valve to provide the feedback path but with the output taken from the 'electron-coupled' anode; (b) Using a hybrid cascode arrangement with FET and bipolar transistor to form a solid-state equivalent of (a). (*Electronics Australia*).

4053.960kHz) at a circuit loading of 30pF might have a frequency of 4056.976 for 10pF loading and 4054.518kHz at 100 pF loading, a span of about 2.5kHz. VXO circuits (eg **Fig 4**) are designed to enhance this frequency variation, by adding external inductive as well as capacitance reactance. For HC6/U plated crystals the maximum effective pulling range, without significant degradation of stability, is of the order of 1.5kHz per MHz, ie some 15kHz at 10MHz. The larger, older crystals in air-gap mountings (eg FT243) can give greater range of stable variation but it should be appreciated that individual crystals vary and that departing from the conditions from which a crystal is intended may have other deleterious effects. In any crystal oscillator it is desirable to keep the crystal drive as low as possible: less than 5mW up to 10MHz for HC6/U and similar small plated crystals; less than 1mW for overtone circuits or crystals above 10MHz. Older non-plated crystals can be driven rather more heavily but, for long-term stability, drive levels should always be kept low.

To round off this rather long section, it seems worth drawing attention to an item in the 'Circuit & Design Ideas' feature of *Electronics Australia* (August 1991, p66) contributed by R H Bennett of Auckland, New Zealand, as follows:

"A crystal oscillator circuit which was often used with tetrode and pentode valves was a modified Pierce oscillator (**Fig 5 (a)**). This is a form of electron-coupled oscillator, the feedback path being from screen-grid to control-grid, with the screen-grid used as the oscillator 'anode'. Output is taken from the anode with no direct connection to the actual oscillator circuit - this aids stability. (It also permits a harmonic tuned circuit to be included in the anode circuit to provide frequency doubling in the one stage - *G3VA*).

The circuit shown in Fig 5(a) is not directly convertible to FET use, because the gates in the FET do not draw current as did the screen grid of a valve. However, using a hybrid cascode circuit with FET as the lower stage and a bipolar transistor as the upper stage, the circuit (**Fig 5(b)**) behaves like the valve modified Pierce oscillator.

MORE ON COMPACT LOOP TRANSMITTING ANTENNAS

INTEREST CONTINUES IN the use of compact loop antennas for transmission, for reception and for direction-finding. This month there is space only to consider the development of HF transmitting loops ('magnetic antennas') along the lines described by Roberto Craighero, I1ARZ, in *Radio Communication* (14 MHz and above, Feb 89, pp38-42; 1.8, 3.5 and 7MHz, Feb 1991, pp38-40) and in the various references quoted in his articles, including many *TT* items since 1967 [see also 'Loop Antennas - Facts, not fiction', *RadCom* last month and this, and this month's *Eurotek* - Ed]. Their use has become well established, with few disappointments provided always that the basic design criteria are followed.

Dick Kelsall, G4FM, has rearranged the equations given by Ted Hart, W5QJR, in the 1988 edition of *The ARRL Antenna Book*. He writes: "Quite a number of amateurs are now using small loop antennas basically along the lines originally developed in the 1960s for the US military and finding them of value, particu-

	14MHz	7MHz
Radiation resistance	0.78Ω	0.048Ω
Loss resistance (22mm tube)	0.17Ω	0.012Ω
Efficiency	97.8%	80%
Inductance	4.7 μH	4.7 μH
Reactance	413Ω	206.6Ω
Tuning Capacitance	27.5pF	110pF
Q	435	3443

The last three values are readily calculated from the preceding ones.

Table 1

larly if they have a restricted QTH. The equations given by W5QJR provide a most helpful insight into the design of these loops. A little rearrangement makes them easier to use and to decide on the best size for the bands required.

"In designing a loop it is convenient to think in terms of circumference (S) only and to express the enclosed area of a loop (A) in terms of S: $A = S^2 / (4 \Pi)$. Further it helps to use "S x F" (circumference x frequency) as the variable when plotting radiation resistance (R_r), loss resistance (R_l) and efficiency. Since wavelength (metres) x frequency (MHz) = 300, one can see from the graphs (**Fig 6**) where the practical limits to loop circumference lie (0.125 to 0.25λ). Working in feet, 300 becomes the familiar number of 984.

"For example, a loop to cover 7 to 14MHz would need to have a circumference of about 0.125 λ on 7MHz and 0.25λ on 14MHz. Thus 14 x S = 246 for the quarter-wave on 14MHz, giving S = 17.6ft, ie a loop diameter of 5.6ft." From the graphs, **Table 1** can be produced.

Several novel features are to be found in the loop antennas initially designed by Zygmund Chowaniec, G3PTN, and subsequently also constructed, in a slightly different form, by G H Lucas, G3TWE. Both loops are intended primarily for efficient operation on 7MHz, but function with lower efficiency on 3.5MHz (G3TWE also mentions 10MHz).

G3PTN writes: "I started two years ago with a loop for the higher end of the HF spectrum, made along orthodox lines. My conclusion was that there is not much to be gained in performance in comparison with a good dipole antenna if you have space for this. (A point emphasised in I1ARZ's 1989 article - *G3VA*). However, the situation is different on the lower HF spectrum where there are a number of benefits, size being but one.

"For optimum efficiency, the circumference should be about 5 or 10% less than a quarter-wave at the required frequency. To construct a loop from 25mm or 30mm copper tubing presents a number of problems since, unless the tubing can be formed into a circle, it is likely to be made into a square, hexagon or octagon, introducing joint resistance with consequent lowering of the Q.

"I decided to use coaxial cable, rather than tubing, but instead of using a single loop I constructed two loops in parallel, along the lines of a folded dipole, spaced 3in apart. My cable is standard ½in (RG8U) coax, 32ft per loop, forming an 8ft square (using quad-like spreaders and a centre pole). This loop is designed for maximum efficiency on 7MHz.

"According to computer calculations, such spaced cables offer a performance roughly similar to that of 3in-diameter tubing. Predicted and measured bandwidths agree.

"Mechanically, it is rather difficult to mount a tuning capacitor at the top of a loop. Current distribution in the loop is approximately uniform but nevertheless there is maximum current opposite the high-voltage open gap across which the tuning capacitor is connected. It is thus advantageous, both mechanically and electrically, to have the capacitor at the base of the loop and the coupling loop at the top, the reverse of the orthodox arrangement. In practice, such an arrangement appears to give improved performance for a given height of the loop over ground. No adverse effect was apparent from the capacitor being at the lower end.

"It appears to be common practice for the coupling loop to be half-shielded rather than a true Faraday shield. The reason may be that this can make it easier to obtain a unity SWR. It is accepted that there is a definite relationship between the conductor sizes of the link coupling and of the antenna loop, a factor of five or ten or so. If the link is made of RG8 cable with 25mm tubing, this will result in a shielded-half of a ratio 25:1. A loop made on the lines as above produced at best a 1.4:1 SWR. A loop constructed of RG8 cable, using outer as a conductor, produced immediately 1:1 SWR. A Faraday shield was made using aluminium foil all the way round, reducing the pick-up of local electrical interference etc with the SWR remaining 1:1."

G3PTN's notes are rather cryptic and it seems useful to add comments made by G H Lucas, G3TWE, even though to some extent these duplicate the statements of G3PTN. G3TWE writes:

"To re-cap, the basic design criteria for a compact loop antenna:

(a) Ohmic resistance must be minimum;

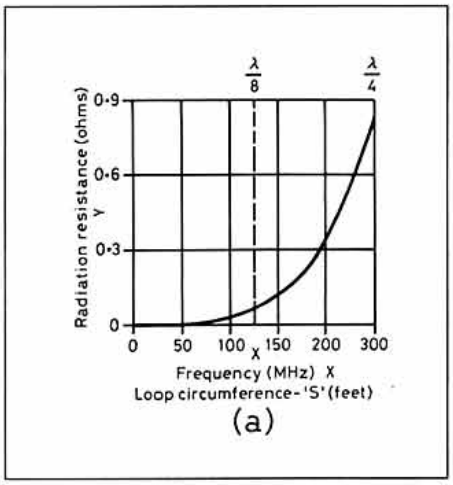
(b) Area enclosed must be maximum, hence a circular loop gives better performance than an equivalent square;

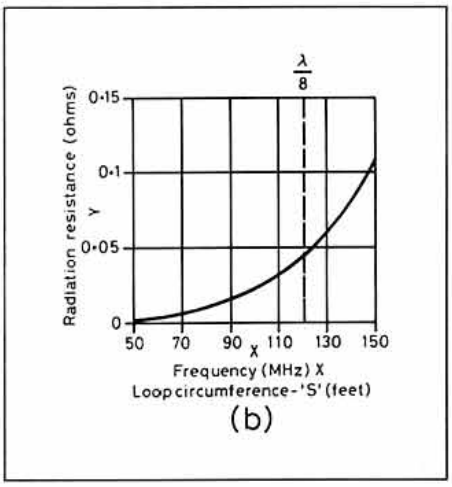
(c) The Q must be maximum even though this will result in very low bandwidth at the lower frequencies; any attempt to earth the main loop at the current node will degrade the Q;

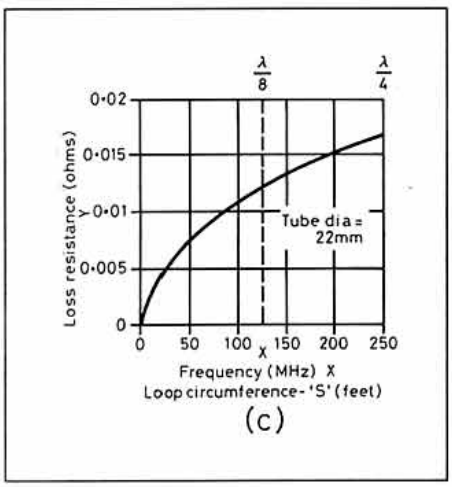
(d) The tuning capacitor *must* be of the highest quality, with wide spacing and preferably split-stator. This is expensive, if bought new, but costs can be re-couped in the construction of the main loop; my 3.5/7/10MHz loop cost £85, the cost of the capacitor and its motorised drive;

(e) The diameter of the conductor of the main loop must be as large as possible, preferably about 50mm copper tubing with no soldered connections or joints, where only a single loop is to be used.

"The problem presented by (e) can be overcome by using two 10m lengths of good coaxial cable, inners and outers strapped together in parallel and spaced by about 4in.







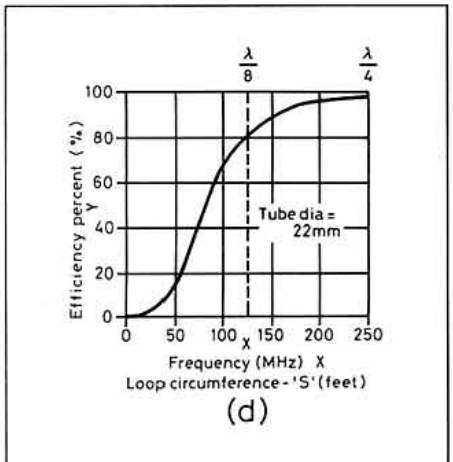
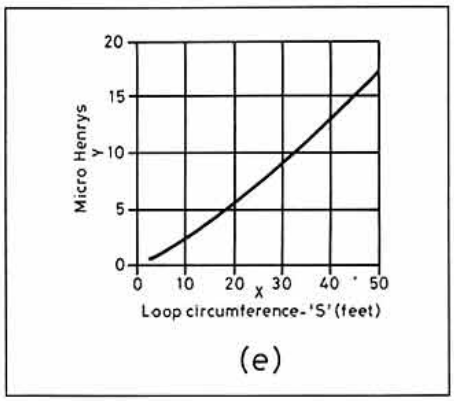


Fig 6: A useful series of graphs by G4FM to aid the design of compact loop transmitting antennas. (a) Radiation resistance; (b) Radiation resistance (expanded for low frequency x circumference products); (c) Loss resistance (25mm tubing); (d) Efficiency; (e) Inductance.



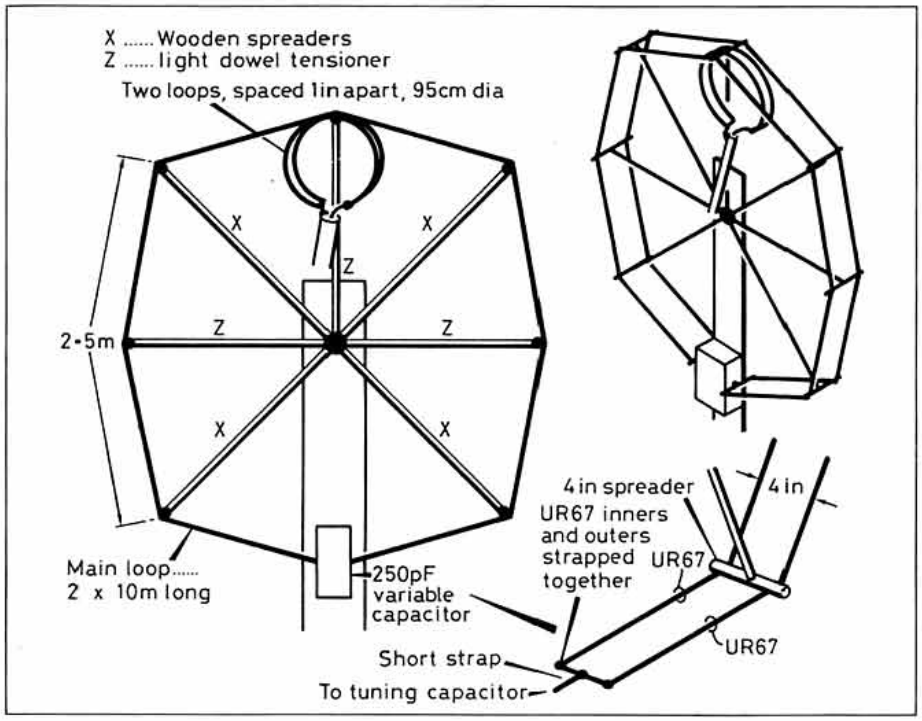


Fig 7: G3TWE's version of the two-coaxial-cable loop antenna originally developed by G3PTN.

This, to RF, will look like 50mm or more copper tubing. G3PTN uses RG8U, I use UR67, the conductors being braced by diagonal spreaders to form a square, and then tensioned further by light-weight spreaders to push the complete assembly into the form of an octagon, thus nearly satisfying (b) above: see **Fig 7**.

"The capacitor assembly in its box weighs about 2kg. It seems poor engineering practice to have this waving about at the top. As with the G3PTN original, the whole antenna is turned upside-down: the capacitor at the bottom, the coupling loop at the top. It must be remembered that there maybe up to 5kV of RF at the tuning capacitor - the antenna should be sited or protected so that there is no likelihood of any person (particularly children) or pets etc coming in to contact with high RF voltages.

"The diameter of the coupling loop is not critical; anything between 10 to 20% of the diameter of the main loop should be satisfactory. What is critical is the ratio of the size of the materials used in the loops (compare to the principles of gamma matching for Yagi arrays). Anyone who is unable to obtain a better SWR than about 1.3:1 with an accurately tuned loop is probably using the wrong gauge of conductor in the coupling loop. My coupling loop is again fabricated from two turns of the same UR67 cable used in the main loop, inners and outers strapped and spaced about 1in. This spacing may be varied to adjust the SWR for optimum on the highest frequency band, the lower bands will then follow.

"The loop will work with normal inductive coupling and it is unnecessary to go to the complication of using Faraday or half-Faraday coupling until development work is completed. SWR and transmitter performance will not be affected. However, there is considerable advantage to be gained in terms of static and electrical noise level in the receive-mode by using a full Faraday screen on the coupling loop. G3PTN has achieved this by threading the coupling loop through a length of garden hose and wrapping the whole issue in aluminium foil.

"Mounting: If the loop is to be mounted horizontally then it should be well up in the air - preferably a half-wave above ground. In most cases, however, such a loop will be mounted in the vertical plane and can be just a few feet above ground. My loop has its bottom about 1m off the ground, with the top about 4m high, partly concealed in fruit trees and mounted on the side of a garden shed. As with any high-Q antenna the loop should be in the clear as far as is possible. There is an advantage in elevating the assembly off the ground.

"Despite the satisfactory performance of this type of loop antenna, I still feel that it would be outperformed by a really good half-wave dipole in the clear, by one or two S points. But where real-estate is limited and a low visual impact is considered essential, a well-engineered loop is capable of surprisingly good results."

MORE ON SPACE-CHARGE 'TETRODE' VALVES

IT IS STRANGE how often an odd enquiry such as Dr Going's search for background information on the Phillips DAH-50 diode-heptode low-voltage valves (*TT*, May and August) reveals unexpected byways of radio technology. I have rashly assumed that the 1940 DAH-50 marked the introduction of space-charge-grid valves. In fact, by then, such valves had been around in Europe for almost 20 years. If only the index in my copy of *Saga of the Vacuum Tube* by Gerald F J Tyne (1977) had been more informative, I would have discovered far earlier that "the (Phillips) type D V1 was a space-charge tetrode which had originally been marketed under the designation Q in 1921 ... the anode and space-charge-grid was 2 to 10 volts". The bright-emitter tungsten filament operated at 3.5V 0.5A. Then, in 1924, the Phillips Miniwatt series with dual-emitter filaments (4V, 0,1A) was extended to include the A441, again a space-charge-grid tetrode for an HT of about 15V.

Another Dutch valve manufacturer, M Heussen & Co of Arnhem (sold in the UK under the brand name Champion) from July 1922 marketed a space-charge-grid valve, type VE, which had a 3.8V filament and 8V anode, But this type of low-voltage valve never seems to have much impression in the UK.

Further information on these valves, including the DAH-50 has come from Dick Rollema, PA0SE, including an article describing the construction of a small portable receiver with built-in loop antenna ('A 1940 Walkman' - PA0SE) which used two DAH-50 valves, weighed 1.3kg, and ran from four 4.5V torch batteries; this was in the Dutch magazine *Radio-Expres*.

PA0SE who was a schoolboy in occupied Holland actually made 'covert' use of the A441 in the later stages of the war. He writes:

"When, in May 1943, the Germans confiscated the radio sets of Dutch citizens, my parents handed in our beautiful 1936 Radio Bell superhet. For my father, I built, as a substitute, an 0-V-1 (two valve, regenerative detector/audio amplifier) short-wave receiver using 4V filament valves. The set ran from a rechargeable battery (accumulator) for the filaments and the HT came from a mains PSU. Later, possibly 1944, the domestic mains supplies were cut altogether because of the shortage of coal in the power stations. (This was probably after the Dutch railway strike that began in early September 1944 leading to the ghastly famine of the 'hunger-winter' of 1944/45 - *G3VA*). My father had good contacts at Phillips and at my suggestion returned from one of his business trips to Eindhoven, while still under German control, with two A441 space-charge-grid valves. I made a new 0-V-1 HF receiver with these two valves and plug-in coils on valve bases. At first the 4V accumulator could still be charged at the Stork engineering-works at Hengelo, where we lived, and which had its own power plant. But this facility came to a sudden end, thanks to precision bombing by the RAF. The radio was then run from hard-to-get 4.5V dry batteries (my father knew the owner at the local battery factory). Since the set needed only 15V 'HT', the set could be run from four or five 4.5V batteries.

"The set brought us news from the BBC and from Radio Oranje (the Dutch service broadcast from London) until the end of the war in May 1945. As we were the only family in our street lucky enough to be able to listen to the news, my father staged a 'news conference' for our neighbours every night in our home. What the German military dentist who occupied one of our upstairs rooms thought about this daily event and the fact that my father regularly spent time every morning and afternoon in our attic (where the receiver was hidden in a bookcase) remains a mystery, but he caused us no trouble and turned out to be a decent chap when it was all over. I wish now I had preserved this set but that is not something one thinks about when young!"

PA0SE is still puzzled that space-charge-

grid tetrodes, with their low HT requirements, were not more widely used. (Possibly the major reason was the fact that they could not provide enough power for a loudspeaker and were thus only suitable for headphone reception - *G3VA*). He believes that they enjoyed some popularity in the Netherlands in the 1920s, and also in France and Germany. J Wolthuis, PE0RTX tells him that the German RV2.4P45 (see August *TT*) a pentode with space-charge-grid was used in some German wartime military radios. PA0SE adds:

"A remarkable application of the space-charge-grid tetrode was a two-terminal oscillator. This was found independently in 1924 by two Dutch experimenters and hence became known as the Numans-Roosenstein oscillator: **Fig 8**. It seems that John Scott-Taggart (2ST in the '20s) published a similar oscillator in 1922 using a valve with two anodes (Negatron). The circuit comes from a 1929 Dutch book on short-wave radio reception.

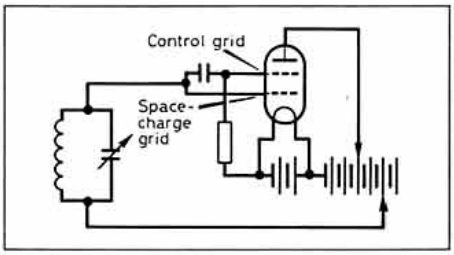


Fig 8: Two-terminal Numans-Roosenstein oscillator using A221 space-charge-grid tetrode as described for a wavemeter in a 1929 book published in Holland. (*PA0SE*)

"The oscillator functions as follows: When the control grid goes more positive the anode current increases. As the total current from the cathode (filament) remains about the same, the current flowing towards the space-charge grid decreases, although since this grid is connected to the control grid it becomes more positive.

"A decreasing current with increasing voltage represents a negative input resistance and the similarity with the later Transitron negative-resistance oscillator is obvious. The circuit oscillates readily with only a few volts 'HT' and works down into the audio-frequency range given a suitable tuned circuit.

"The Dutch amateur P Bakker has thoroughly investigated the space-charge-grid tetrode, and has also tried using modern pentodes in this way. This turned out to be possible provided that the control grid was connected to the cathode, the screen-grid used as a space-charge grid, and the suppressor grid used as the control grid - an interesting possibility for any collector restoring an old set using space-charge valves, or wishing to demonstrate that valves can be used at 'solid-state' voltages."

10A PSU WITH THREE-TERMINAL IC REGULATOR

MIKE FODEN, G3UPA, PROVIDES details of a simple, low-cost power supply unit providing 10W output at about 14.5V using a 78M12, 0.5A voltage regulator IC (or equivalent) in conjunction with a 2N3772 series pass transistor: **Fig 9**.

He writes "It is fairly common knowledge that the range of fixed-voltage IC regulators can give a higher voltage output than their designed ratings by simply adding a resistor in their common lead. This principle can be carried a little further by adding a small signal transistor and a suitable series pass transistor to provide a high-current regulated supply with a low component count.

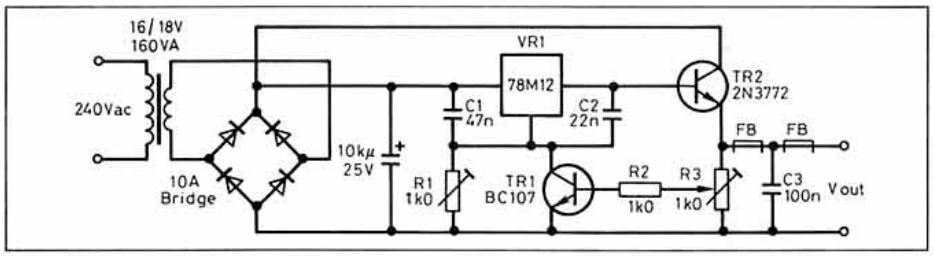


Fig 9: Simple 10A, 13.8V regulated PSU using standard fixed-voltage IC regulator. Note that it is advisable to provide some form of over-voltage protection to guard against failure of the series-pass transistor TR2. Components: TR1 BC107/8/9, TR2 2N3772, VR1 78M12 0.5A, 12V IC regulator, R1, R3 1K0 potentiometers, R2 1K0 1/4W. Disk ceramic capacitors: C1 0.47μF, C2 0.22μF and C3 0.1μF.

"Operation is as follows: A variable resistor, R1, is connected in the common lead of the IC regulator, VR1, to increase voltage output from 12V to about 14.5V. A small-signal transistor, TR1, is connected in parallel with R1 with its base connected to the main output. The current in the regulator common line is now divided between R1 and TR1. If the output voltage tries to fall under load, the current through TR1 will fall, causing more current to flow through R1, hence increasing the output voltage of VR1. This is because the quiescent current in the common lead of VR1 is constant.

"Setting up is quite straightforward. Set R3 to the zero voltage end of its travel and then adjust R1 to the required maximum output (eg 14.5V). Then adjust R3 to give the required output voltage from the PSU, that is 13.8V. The PSU is then capable of supplying an output of 10A at a regulated 13.8V.

"The maximum current available is governed mainly by the transformer and rectifier. A 2N3772 pass transistor is capable of running at 20A and 150W, subject to temperature limitation. The pass transistor requires a substantial heatsink. A rating of less than 2° per Watt should be adequate for 10A output. C1 and C2 are the usual anti-parasitic components recommended for all fixed-voltage regulators. C3 and the ferrite beads offer some protection against RF getting back into the supply.

"I have been using the system for two years to run my HF transceiver, using two pass transistors and a 25A transformer with no problems. However it should be noted that the supply, as shown, does not include over-voltage protection against failure of the pass transistor etc. In my own PSU, I have added a 25A-rated relay which operates should the output voltage rise above 14.5V, giving some degree (non-instantaneous) of over-voltage protection. A conventional thyristor-type over-voltage protection circuit would give faster-acting protection."

CONSTRUCTIONAL TIPS AND TOPICS

Two useful suggestions have been received from Dick Biddulph, G8DPS, of the RSGB's Technical and Publications Advisory Committee:

Marking Printed Circuit Boards

When building a piece of gear on a complex PCB, I have found it useful to mark some of the tracks so that it is easier to place the right components in the right holes. The so-called 'Magic Marker' is quite good but, to the best of my knowledge, is available only in two colours plus black. Staedler, the drawing-office people, make pens for overhead-projector foils. The waterproof ones, called 'Lumocolor' permanent, come in five colours plus black and make a clear mark on a PCB. It can be soldered through but, for a *concours d'elegance* project, the marks can be removed by meths. - *Dick Biddulph, G8DPS.*

A Different Way with Veroboard

Veroboard is not too good at VHF when used as the makers intended. But if it is glued strip-side up to a piece of plain copper-clad board which then forms an earth-plane, it is quite good. It is necessary only to make .25in (6mm) holes at intervals to connect the ground-plane to one or two of the strip conductors. DIL (dual in-line) packages can be used with their legs spread out as large surface-mounted devices. - *Dick Biddulph, G8DPS.*

TS-850S HF TRANSCEIVER

Let Peter Hart G3SJX do the talking

CW KEYING PERFORMANCE . . .

" . . The keying characteristic was near optimum with low distortion and narrow spectrum."

SPURIOUS REJECTION . . .

" . . Rejection of all image and IF related responses was in excess of 100dB. This is an extremely good result. The receiver was also remarkably clear of other responses and particularly good close-in where many rigs tend to show up problems. No response was worse than 100dB down."

TRANSMIT PERFORMANCE . . .

" . . .The reported transmit quality was excellent. The processor added real punch and, with this operational, it was beneficial to select high boost. The CW transmission was narrow and click-free."

The facts are here in this issue of *Radio Communication*, so it only leaves us to add that the worldwide demand for the TS-850S has been enormous and Kenwood are at present unable to manufacture enough of them to meet it.

If you are considering an HF Transceiver, this is the one you MUST try before you buy. It is set up and 'on air' at all our Regional Centres.

LOWE ELECTRONICS LIMITED

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Barry (S Wales): 0446 721304 ***Bournemouth**: 0202 577760 **Bristol**: 0272 771770 **Cambridge**: 0223 311230
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Sole appointed UK Distributor for KENWOOD Amateur Radio

The Peter Hart Review

TS-850S

Kenwood HF Transceiver

KENWOOD HAS, by tradition, offered the customer a wide choice in HF transceivers with an extensive range of models from the TS-1xx budget series to the TS-9xx top of the range models. For over five years, the TS-440S has held the middle ground and achieved a reputation as a popular and excellent radio for use at home or in the car. This year, Kenwood has launched two new HF transceivers in the middle price bracket. Recently, the TS-450S has been unveiled as a successor to the TS-440S and is similar in size. Earlier in the year, the larger TS-850S was unveiled as a 12V radio for base use. Although, the TS-850S has more features and is a little more expensive, there are many similarities in the functions and new features provided.

PRINCIPAL FEATURES

MANY OF THE FUNCTIONS of the TS-850S are implemented in a similar fashion to the top-of-the-range TS-950S (reviewed *RadCom* April 1990). The usual modes are provided - USB, LSB, CW, AM, FM and FSK. The FSK shift is selectable to 170, 200, 425 or 850Hz at power-on and also selectable for high tone or low tone operation. The receiver covers the frequency range 30kHz to 30MHz with the transmitter inhibited outside the exact amateur allocations. The review model covered the European allocation 1.81 - 2.0, 3.5 - 3.8, 7.0 - 7.1MHz etc, the model available in the US would cover the relevant US allocations.

Tuning is in 10Hz steps at 10kHz per revolution of the tuning knob on SSB, CW and FSK and in 100Hz steps at 50kHz per revolution of the tuning knob on AM and FM. An extra fine position may be selected giving 1Hz steps at 1kHz per revolution on all modes which can be useful for critical tuning on CW or RTTY. A separate small click-step rotary control allows rapid changes in frequency at 10kHz per step, 240kHz per revolution. This same control is used for memory selection. Up/down keys scroll through the amateur bands, or in 1MHz steps for general coverage operation if the 1MHz key has been selected. Each band store retains the last used frequency, mode, filter selection and front-end preamplifier status for each band setting.

The usual twin VFOs are incorporated which may be operated split, and a key (TF-SET) allows the transmit VFO to be rapidly selected for receive and/or tuning. Note that the band store retains the last used settings of both the A and B VFOs per band. A numeric keypad allows the frequency to be entered directly.

MEMORIES

100 memories are included which store frequency, mode, filter setting and front-end status for both single and split-frequency use. Ten of the memory channels will also store programmed scan setting limits. The usual storing and loading facilities are provided, including memory preview. A quick memory facility provides a simple single keystroke store and recall of up to five settings on a last-in first-out basis.

Scanning may be initiated in a variety of different ways, similar to the TS950; across the entire tuning range, across all active memory channels, between decade memory sectors or between up to ten stored programmable scan limits. The scan speed is adjustable and scan hold can be selected.

Receiver and/or transmitter incremental tuning (clarifier) operates over the rather narrow range of +/-1.27kHz in 10Hz steps or +/-2.54kHz in 20Hz steps. Larger offsets need split frequency working.

RECEIVER

Separate push buttons scroll through the available filters in the 8.83MHz and 455kHz IFs in a similar fashion to the TS-950S. The bandwidths are 6000, 2700, 500 or 270Hz at the 8.83MHz IF and 12000, 6000, 2700 or 500Hz at the 455kHz IF. The CW filters are an optional extra fitment and, if not fitted, are skipped in the scrolling. Other bandwidth filters are available for fitment but in this case the display legends will not be representative. Variable bandwidth is provided by slope tuning giving independent adjustment of the low and high frequency slopes of the IF passband. An IF notch is provided at the 455kHz IF but no AF filters.

The receiver front-end is switchable between normal operation at full sensitivity and AIP (Advanced Intercept Point) giving reduced sensitivity but improved strong signal handling. An additional 6, 12 or 18dB input attenuator may also be selected. Other receiver functions include three AGC speeds, twin noise blankers, all-mode squelch, tone control and the ability to select reverse sideband operation on CW and FSK. This is particularly useful on CW for moving adjacent channel interference when a narrow IF filter has not been fitted. The CW pitch may be set between 400Hz and 1000Hz in 50Hz steps.

TRANSMITTER

The transmitter power is variable from 20W up to 100W nominal. Transmit SSB features include an RF-based speech processor, monitor for transmission quality, VOX and an audio treble-boost switch. A particularly quiet fan is fitted and a sub-audible programmable tone encoder for operation with appropriate repeaters. On CW, full and semi break-in is provided and a built-in keyer. The keyer weighting is adjustable in 16 steps to give dot:dash ratios between 1:2.5 and 1:4.0. In addition, for the standard weighting of 1:3, auto-weighting can be selected to make this ratio either increase or decrease with speed. A 'bug' mode is also selectable giving automatic dots with manual dashes.

A Tune key provides two functions. On receive, it enables CW netting to be performed by 'zero-beating', effectively shifting the receive frequency by the pitch frequency and setting in the centre of the IF passband. On transmit, a carrier is generated at half power for tuning linears and ATUs. Note, though, that linears can only be tuned for best linearity and power output with full drive. Tuning at half power will result in 'flat-topping' and distortion.

DISPLAY

At first sight, the display appears to be a fluorescent panel as used with the majority of rigs. However, it is in fact a multicoloured backlit liquid crystal display. The brightness is similar to fluorescent units although the useable viewing angle is not quite as wide. The display indicates frequency and RIT/XIT to 10Hz resolution, memory number, mode, various status messages and filter bandwidth. Also included are two 30-segment bar me-

ters. One indicates signal strength / transmit power and the other indicates ALC / compression level / VSWR. A peak hold function may be selected.

The connectors on the rear panel provide the usual interfaces to a linear amplifier, data terminals for packet, RTTY or AMTOR, CW keyer and keying paddle, IF output for monitor scope, audio in/out, power etc. The VOX controls are also located on the rear panel. Four connectors are dedicated to interfacing to the DSP-100 DSP unit (see below) and another to the AT-300 remote auto-ATU. One omission appears to be the lack of a facility to connect an external receiver or an external receive antenna.

The TS-850S may also be used to drive a transverter. However, it is not a very convenient drive source if it is intended to use as an HF rig as well. The IF output is reallocated for transverter drive and the converter output is connected to the main antenna socket. There is little protection against transmitting into the back end of the converter receiver output. The display can be set to indicate frequencies directly on 50, 144 or 432MHz. However, this can only be done by performing a power-on setting operation after setting the rig to 28.00000MHz and the display will then not be useable on HF without performing another power-on reset. It would have been better to extend the UP/DOWN band keys to cover the VHF bands and provide the necessary interface connectors.

Most of the functions of the radio may be controlled from a PC via the IF-232C serial interface at 4800 bit/sec. The digital recorder (see later) and quick memory functions may also be operated from a remote keypad.

The parameters of some 35 of the radio's functions may be selected at power-on. These include enabling/disabling of beep and alarm tones, step sizes, display parameters, FSK and CW keyer settings, sub tones, recorder settings etc, etc.

OPTIONS

A number of internal options may be fitted. These include additional IF filters for CW and narrow sideband, voice synthesiser to announce frequency, high stability TCXO, auto-ATU matching up to 2.5:1 VSWR with band memories, and a digital recording unit. The digital recording unit will record three Morse messages up to 50 characters in length using the internal keyer or three voice messages of length 8, 8 and 16 seconds using the microphone. The messages may be chained but cannot be used to record the receiver output directly. One interesting accessory is the DSP-100 digital signal processor. This external unit provides functions similar to the unit fitted internally in the TS-950SD. DSP techniques are used to generate a higher quality transmit voice signal, an accurately shaped CW envelope (for minimum key clicks with user control over rise and fall times) and improved demodulation on receive. Front panel controls allow the audio filter bandwidths on both receive and transmit to be tailored. The unit can also be used to generate a DSB signal.

The rear panel provides a comprehensive range of connectors.

The transceiver came with a massive 202 page manual, 74 pages in English and the remainder in Spanish and French. Installation, operation and interconnection to accessories is reasonably well described using fold-out charts for each mode. Block and circuit diagrams are included with minimal information on maintenance and adjustments.

DESCRIPTION

THE TS-850S MEASURES 33.9cm (W) by 13.5cm (H) by 37.5cm (D) and weighs 10.9kg. The construction is conventional and a 7cm speaker faces upwards in the top of the case. A hatch in the top gains access to the digital recorder and voice synthesiser units.

The receiver is a triple conversion superhet with IFs of 73.05MHz, 8.83MHz and 455kHz. The transmit chain functions in reverse, generating SSB at 455kHz and mixing through 8.83MHz and 73.05MHz to final frequency.

MEASUREMENTS

ALL THE MEASUREMENTS were made powered from a 13.55V PSU and are detailed in the accompanying table. Additional comments are as follows.

S-METER CALIBRATION

The S-meter measurements are only approximate due to the resolution of the bargraph display. SSB, CW, AM and FSK gave the same results and the linearity was excellent. The FM result was, as usual, very poor.

SPURIOUS REJECTION

Rejection of all image and IF related responses was in excess of 100dB. This is an extremely good result. The receiver was also remarkably clear of other responses and particularly good close-in where many rigs tend to show up problems. No response was worse than 100dB down.

AGC

The attack time was constant at about 4ms although in the fast setting, there appeared to be some overshoot to the settling characteristic.

STRONG SIGNAL PERFORMANCE

The third order intercept varied somewhat from band to band and substantially higher figures were measured in the AIP position. The results are comparable with the TS-950S. The close-in dynamic range degrades but not as much as some other more expensive rigs and not until quite close-in. The reciprocal mixing performance is excellent, virtually identical to the TS-950S. The inband linearity measured with 200Hz tone spacing was better with slow AGC settings and improved markedly with the RF gain control turned down.

SELECTIVITY

The review radio was not fitted with any optional filters. The effective selectivity curve is shown in **Fig 1**.

POWER OUTPUT

The power output on CW, FSK and FM was similar and could be reduced to 10W with the power control or virtually zero with the carrier level also reduced. The power output reduced markedly as the load VSWR increased above 2:1. Note that the review rig was not fitted with the auto-ATU.

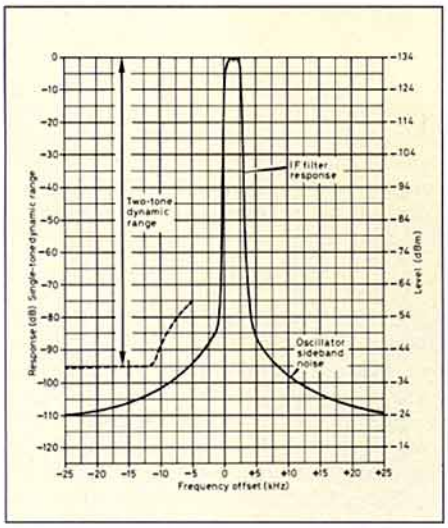

Fig 1: Effective selectivity curve on SSB.

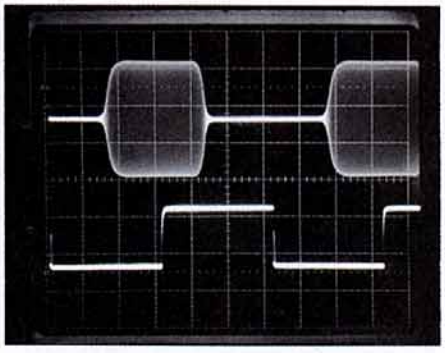

Fig 2: CW keying waveform at 40WPM. Horiz scale 10ms/div.

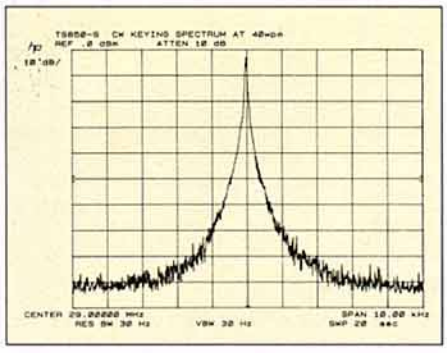

Fig 3: CW keying spectrum at 40WPM. Horiz scale 1kHz/div; vert scale 10dB/div.

KENWOOD TS-850S MEASURED PERFORMANCE

RECEIVER MEASUREMENTS

FREQUENCY	SENSITIVITY SSB 10dB s+n:n NOR	AIP	INPUT FOR S9 NOR	AIP
1.8MHz	0.16µV (-123dBm)	0.56µV (-112dBm)	22µV	112µV
3.5MHz	0.11µV (-126dBm)	0.35µV (-116dBm)	16µV	79µV
7MHz	0.11µV (-126dBm)	0.35µV (-116dBm)	16µV	79µV
10MHz	0.11µV (-126dBm)	0.35µV (-116dBm)	14µV	71µV
14MHz	0.14µV (-124dBm)	0.45µV (-114dBm)	18µV	89µV
18MHz	0.13µV (-125dBm)	0.35µV (-116dBm)	20µV	89µV
21MHz	0.16µV (-123dBm)	0.45µV (-114dBm)	25µV	100µV
24MHz	0.09µV (-128dBm)	0.35µV (-116dBm)	18µV	89µV
28MHz	0.09µV (-128dBm)	0.35µV (-116dBm)	16µV	89µV

	INTERMODULATION (50kHz TONE SPACING) NOR		AIP	
FREQUENCY	3rd ORDER INTERCEPT	2 TONE DYNAMIC RANGE	3rd ORDER INTERCEPT	2 TONE DYNAMIC RANGE
1.8MHz	+4dBm	91dB	+11dBm	89dB
3.5MHz	+4dBm	93dB	+15dBm	94dB
7MHz	+8dBm	96dB	+21dBm	98dB
14MHz	+10dBm	96dB	+24dBm	99dB
21MHz	+15dBm	99dB	+26dBm	100dB
28MHz	-6dBm	88dB	+15dBm	94dB

FREQUENCY OFFSET	RECIPROCAL MIXING FOR 3dB NOISE	NOR	BLOCKING AIP	TX NOISE IN 2.5kHz BANDWIDTH
3 kHz	85dB	not meas	not meas	-75dBC
5 kHz	89dB	-31dBm	-13dBm	-83dBC
10 kHz	100dB	-28dBm	-10dBm	-90dBC
15 kHz	105dB	-10dBm	>+6dBm	-95dBC
20 kHz	108dB	-10dBm	>+6dBm	-96dBC
30 kHz	112dB	-10dBm	>+6dBm	-99dBC
50 kHz	117dB	-10dBm	>+6dBm	-100dBC
100 kHz	122dB	-10dBm	>+6dBm	-101dBC
200 kHz	127dB	-10dBm	>+6dBm	-103dBC

MODE	FILTER (8.83/455)	BANDWIDTH -6dB	-60dB
SSB,CW	2.7/2.7	2470Hz	3780Hz
AM	6/6	6520Hz	11.1kHz
FM	-/12	13.2kHz	21.7kHz

TONE SPACING (7MHz BAND)	3rd ORDER INTERCEPT	2 TONE DYNAMIC RANGE
5 kHz	-23dBm	75dB
10 kHz	-2dBm	89dB
15 kHz	+6dBm	95dB
20 kHz	+7dBm	95dB
30 kHz	+8dBm	96dB

S-READING (14MHz)	INPUT LEVEL SSB	FM
S1	0.9µV	0.9µV
S3	1.8µV	1.3µV
S5	4µV	1.8µV
S7	8.9µV	2.4µV
S9	20µV	3.4µV
S9+20	200µV	6µV
S9+40	2mV	10µV
S9+60	20mV	18µV

AM sensitivity (28MHz): 0.6µV for 10dB s+n:n at 30% mod depth
FM sensitivity (28MHz): 0.11µV for 12dB SINAD 3kHz pk deviation
AGC threshold: 0.6µV
100dB above AGC threshold for +1dB audio output

AGC attack time: 4ms approx for all speed settings
AGC decay time: 0.2-0.3s (fast), 0.8-1.4s (medium), 2-5s (fast)
Max audio before clipping: 1.3W into 8Ω at 1% distortion
Inband intermodulation products: -30 to -40dB (see text)

TRANSMITTER MEASUREMENTS

FREQUENCY	CW POWER OUTPUT	SSB(PEP) POWER OUTPUT	HARMONICS (3rd)	INTERMODULATION PRODUCTS 3rd order	5th order
1.8MHz	112W	120W	-63dB	-24dB	-38dB
3.5MHz	115W	120W	-63dB	-26dB	-38dB
7MHz	114W	120W	-65dB	-24dB	-40dB
10MHz	114W	118W	-63dB	-23dB	-48dB
14MHz	112W	117W	-68dB	-20dB	-36dB
18MHz	111W	114W	-70dB	-16dB	-32dB
21MHz	109W	112W	-69dB	-16dB	-32dB
24MHz	106W	110W	-70dB	-24dB	-33dB
28MHz	103W	108W	-75dB	-28dB	-32dB

Carrier suppression: 65 to 70dB
Sideband suppression: >70dB
Transmitter noise: see table above
Transmitter AF response at -6dB: 500 - 2600Hz
Transmitter AF distortion: <1%
FM peak deviation: 4.5kHz

Microphone input sensitivity: 3.5mV for full output
T/R switching speed (SSB): mute-TX 16ms, TX-mute 3ms, mute-RX 20ms, RX-mute <1ms
Power into load mismatch: 2:1 VSWR 58 - 99W, 3:1 VSWR 25 - 35W

NOTE: All signal input voltages given as PD across antenna terminal. Unless stated otherwise, all measurements made on SSB with the receiver front-end set to maximum sensitivity and operating from a 13.5V PSU. All two-tone transmitter intermodulation products quoted with respect to either originating tone.

SPURIOUS OUTPUTS

The second harmonic was generally some 10dB worse than the third which is given in the table. Non-harmonic spurious outputs were very low, at around 80dB or lower.

SSB PERFORMANCE

The PA intermodulation performance is poor compared with the performance achieved by higher voltage PA stages used in mains powered base stations. However, reducing power to 80W gave a noticeable improvement. The distortion degraded further with the compressor in circuit. Results with the DSP-100 were very similar although the audio bandwidth was of course adjustable.

CW KEYING PERFORMANCE

Fig 2 shows the keying spectrum at 40WPM and **Fig 3** the keying envelope. Full and semi-break-in gave similar results. The keying characteristic was near optimum with low distortion and narrow spectrum. Results with the DSP-100 in circuit were surprising. Except at the slowest rise and decay setting, the spectrum was considerably wider.

T/R SWITCHING SPEED

The receiver exhibited a particularly clean recovery and the results indicate entirely satisfactory operation on all data modes.

ON-THE-AIR PERFORMANCE

THE RADIO PERFORMED very well in all situations. The review rig was not equipped with CW filters and I must admit I really missed a good narrow filter at times. However, the slope tuning performed remarkably well and went a long way towards filling this gap. The notch filter was disappointing, rather too broad – a consequence of implementing this function at 455kHz as against another conversion to 100kHz as used in the top-of-the-range models. Both the HF and LF performance was good although the LF bands were very noisy during the review period. The receiver also performed very well on VLF (below 100kHz), unlike many radios, which is usually an indication of good synthesiser performance.

The reported transmit quality was excellent. The processor added real punch and with this operational, it was beneficial to select high boost. The CW transmission was narrow and click-free. The DSP unit did not seem to add much to the overall transmit performance.

The ergonomics were generally good and the VFO free of clicks. Synthesiser performance is excellent. However, the quality of the push keys was poor and there was a tendency for them to stick engaged. As a user of both SSB (with PTT not VOX) and CW, I do not like having to select VOX when on CW.

CONCLUSIONS

THE TS-850S IS A GOOD all-round performer for a mid-price radio. The list price is £1325 without ATU or £1473 inclusive of auto-ATU. The DRU-2 digital recording unit costs £88 and the DSP-100 is £429. I would like to thank Lowe Electronics of Matlock, for the loan of the equipment.

Peter Hart, G3SJX

IDEAS FROM ABROAD

Eurotek

COLLECTED AND DESCRIBED BY ERWIN DAVID, G4LQI

'HAM RADIO '91', the international meeting and exhibition cum flea market of the German amateur radio society DARC at **Friedrichshafen** on Lake Constance (of pre-WWII Zeppelin fame), was this year's biggest European amateur event; Erwin David looked for things not seen at UK shows.

SMALL HF TRANSMITTING LOOPS

THESE SO-CALLED 'MAGNETIC' antennas have taken decades to become popular among amateurs. By 1968, a US Army development reported by K Patterson had been 'amateurized' by McCoy, W1ICP, and Hart, W5QJR, commented on by our own Pat Hawker, G3VA, and theorized and tried out by 'Spenny', G6NA. Thereafter, almost nothing until the mid-'80s.

Four manufacturers exhibited such antennas, including Capco from the UK. One firm, *Chr Kaeferlein*, DK5CZ, stood out because of the variety of both its professional models with automatic tuning unit and its amateur models which have diameters of 3.4, 1.7 or 0.8m. Each loop can be fitted with a variety of single or split-stator tuning capacitors to produce 21 different combinations of size, frequency range (up to 6:1, between 1.75 and 30MHz) and power capability (100-500W), all beautifully catalogued (**Fig 1**).

I noted interesting differences between DK5CZ's booklet and W5QJR's writing in the *ARRL Antenna Book*, 15th (1988) edition, the best DIY guide I know of on this subject.

- **Tuning capacitors:** W5QJR says: "A vacuum variable is an excellent choice, provided one is selected with adequate voltage rating". DK5CZ states that the high loop currents heat and thereby distort the thin metal in vacuum capacitors and consequently detune the loop. He has designed air-dielectric capacitors which, in spite of their thick, widely spaced plates and massive contact areas to the loop, have such a low minimum capacity that a tuning range exceeding 6:1 is obtained.
- **Tuning motors:** While recognizing the need for high resolution, W5QJR recommends a stepper motor with integral gear train. DK5CZ found that even with a stepper motor with 0.1° resolution, best SWR sometimes required tuning between adjacent positions; he uses DC motors.
- **Earth:** W5QJR calculated that a ground plane of radials two loop diameters long creates below a vertical loop a ground image which effectively doubles the area of the loop and enhances its efficiency; he specifies each size of loop with and without radials. DK5CZ recognizes no such advantage of a ground plane and specifies the gain of his antennas mounted vertically at 10m above earth.

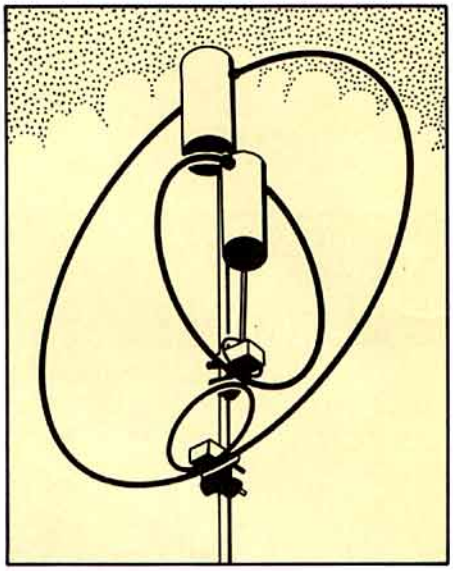

Fig 1: Two tunable magnetic antennas at right angles on one mast cover all amateur bands, 1.8 - 30MHz.

A Annecke, DJ6OO, has introduced another solution to the capacity-range/tuning-resolution problem: **interchangeable one-band loops** attached to a single mounting with tuning capacitor and its remote control unit. This capacitor has a range of 55 - 62pF, 13%, which will tune the whole 6%-wide 10m band and more than the width of the 12, 15, 17 and 20m bands for which loops are also available. This does away with the wide capacity ratio required to tune continuously a frequency range exceeding 2:1 and the need for a high-resolution remote tuning mechanism. All components can be bought separately, or as a kit or complete system.

A WIDE-BAND HF VERTICAL

K H MUEHLAU ANTENNENBAU claim that their 8.45m high *slimline* antenna provides low-angle radiation (12 - 17°) when erected near level ground at an SWR below 2:1 over the continuous range of 3.5 - 30MHz without traps. It looks like a sleeve dipole of which the upper radiator is only approx one third the length of the sleeve, the latter being flanked by four radials, each of different length and shorter than the sleeve. No additional radials are required (**Fig 2**). Rated for 250W, (500W PEP), no efficiency figures are given. The antenna can be easily taken apart and reassembled for transport.

VHF/UHF ANTENNAS AND AN AMPLIFIER

DIRECTIONAL DUAL-BAND ANTENNAS are not common in the UK, but here two configurations from the Japanese manufacturer *Maspro* were offered by *Bogerfunk*. One has a 2.13m high radiator said to be 2 x $^5/_8\lambda$ on 145MHz and 5 x $^5/_8\lambda$ on 435MHz, with three radials, and two sets of stacked reflectors, one for each band (**Fig 3**). The horizontal pattern in the ad shows a not-very-deep null off the back on 435MHz and none on 145MHz.

The other antenna looks like a Yagi with a two-band radiator and separate parasitic elements, all on one 1.35m boom (**Fig 4**). A stacking kit is available.

The same dealer offers a dual-band both-ways amplifier from *Tokyo-Hi-Power* for use with dual-band hand-helds: 0.3 - 5W in, 30W out on transmit; 14dB gain on receive. With automatic band and T/R switching it is suitable for cross-band duplex.

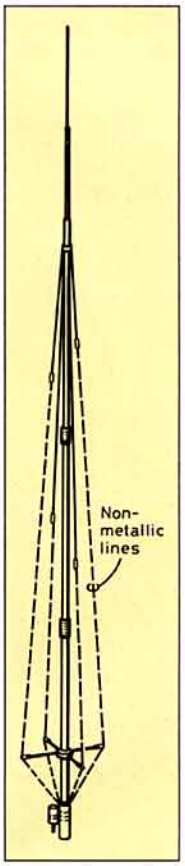

Fig 2: (Left) A wide-band vertical, 8.45m tall, provides low angle radiation with an SWR < 2:1 from 3.5 to 30MHz.

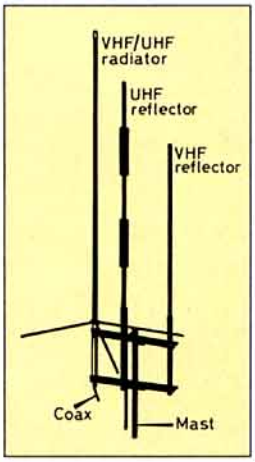

Fig 3: (Above) Separate 145MHz and 435MHz reflectors added to this dual-band vertical collinear give extra gain but no sharp null off the back.

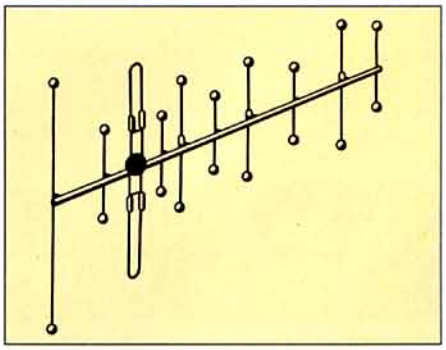

Fig 4: 145/435MHz Yagi can be used horizontally or vertically, singly or stacked.

DL4KCJ, trading as *SMB Elektronik*, from whom I bought a dual-band collapsible log-periodic several years ago, now offers a very simple dual-band antenna; an extra 435MHz $\lambda/4$ rod is 'planted' on the ground plane centre of a 145MHz **ground-plane vertical**. For

continued on next page ▶

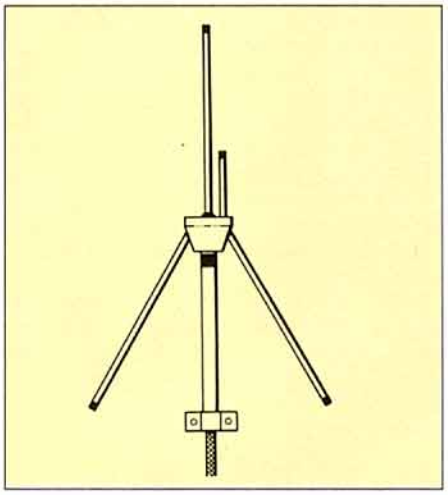

Fig 5: Adding a 435MHz λ /4 stub turns a 145MHz ground plane vertical into a dual-bander.

VHF operation this rod is inconsequential; on UHF, however, with the lower third of the VHF radiator it becomes a λ /4 transformer matching the 50Ω coax to the upper two-thirds of the radiator, λ /2 at UHF. A sleeve blocks RF on the outside of the coax and doubles as the mounting tube (**Fig 5**). The same firm claims to have raised the gain of their 145MHz HB9CV beam from 4.2 to 5.2dBd by optimising its dimensions.

ANTENNA SUPPORTS AND HARDWARE

LIGHT-WEIGHT TELESCOPIC fishing rods of thin fibreglass-reinforced plastic up to 9m long were sold by *S Hari*, DK9FN. The equivalent UK price would be £35 each. If you feel tempted to build a full-size 7MHz Yagi with them, I suggest reading how VK2AVA did it in the *ARRL Antenna Compendium*, Vol 1, p142.

Antenna builders *Hummel* showed an alternative to crank-down-and-fold-over masts. An **aluminium lattice tower** with square cross section is erected on a concrete foundation. A 1.20m high cage surrounds the tower and rides up and down on it. On the outside at the bottom of this cage there is a platform carrying the rotor, at the top there is a bracket for a thrust bearing. This bracket can be undone so that the stub mast, with rotor, can be swivelled to a horizontal position for convenient antenna mounting or adjustment. Once the stub mast is returned to its vertical position and the thrust bearing tied down, the cage, with rotor, stub mast and antenna, is winched to the top of the tower (**Fig 6**). There is a safety catch to take the load off the winch rope. Towers come in heights of 8 to 18m, self supporting up to 12m.

As all goes together with bolts and nuts, the maker offers its towers in kit form, or preassembled in 3m sections or erected on site. Various hand cranked and electric winches are offered and all stainless steel hardware is available separately. I saw a man standing on the rotor platform, holding on to the stub mast, then riding up the tower on an electric winch. This is not recommended but the manual does state that by removing one cross strut a thin person can get into the tower and safely climb up inside.

Frick Geraetebau showed their *Flammex Pull* line of square-section **telescopic masts**. The largest extends from 6 to 20m; another model mounts on a vehicle and telescopes from 2.5 to 10m; for this a 24Vdc winch is offered.

EASTERN EUROPE COMES ALIVE

THE NEW BULGARIAN COMPANY *Telzet* showed a line of HF linear amplifiers with Soviet valves and an equally sturdy ATU. Also offered for sale were these valves and fixed and variable vacuum capacitors which looked like the Jennings products (USA) that have recently appeared on the UK surplus market.

A 5-BAND HF TRAP YAGI

THE 3-ELEMENT 20/15/10m BEAM from *Fritzel* needs no introduction. New is the addition of two trap elements for 17/12m on the same boom which had to be extended from 5 to 6.25m to get the spacing right. Having done that, the maker's gain measurements confirm that neither set of elements compromises the performance of the other.

THE FLEA MARKET

REMARKABLE BY UK standards was the enormous offering of **used professional test equipment**; German labs probably replace their instruments more frequently than their UK counterparts. Far-from-obsolete instruments were offered at prices up to £3000. I wonder who would pay that at a flea market, even if it were only a fraction of the new price.

There was a lively trade in **collectables** such as WWII military kit and even earlier broadcast receivers, and valves.

SMDs were sold by the Dutch trader PA2JSL. *Technical Topics*, June 1986, mentioned their limited availability to amateurs. Now, five years on, they are available as surplus! PA2JSL had resistors, capacitors and switching, PIN and varactor diodes, all packed in strips of 15. A pack of over 1000 assorted PCs cost £8.

The ultimate software was sold by the same PA2JSL: a paste to be smeared on an antenna; if so treated, birds will not sit on it for a year and spare those sitting under it any embarrassment. 100g jars, enough for one 10-el 2m Yagi, sold like hot cakes at £4!

Note: Addresses and telephone numbers of all firms mentioned are available from G4LQI, QTHR. Send a SASE plus one 22p stamp for up to two copied pages.

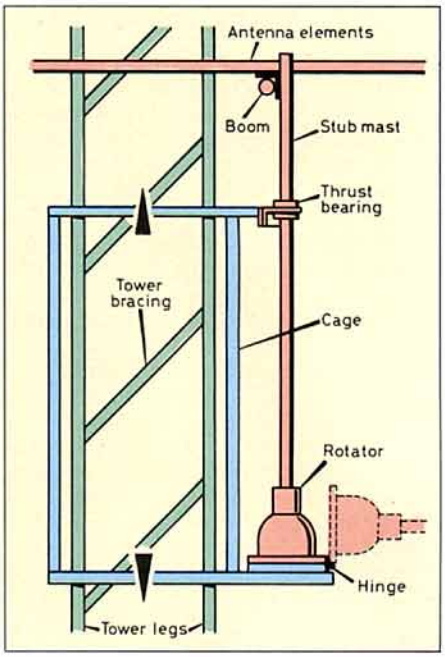

Fig 6: A cage carries antenna(s), stub mast and rotor up and down a fixed lattice tower

Timestep

Weather Satellite Systems

Timestep produce weather satellite systems that operate from Meteosat, GOES, GMS, NOAA, Meteor, Okean and Feng Yun. Using an IBM PC compatible computer enables the display of up to 1024 pixels, 768 lines and 256 colours or grey scales depending on the graphics card fitted. We support all known VGA and SVGA cards.

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The image above is taken from the AVHRR sensor of NOAA 11 HRPT using our new HRPT system. It will be available from summer 1991 at a cost of approximately £1200.00 less antennas. The antenna system can be two Timestep Yagis or a 1.2M dish.

Several unique features are available (depending on the software version) such as: NOAA latitude and longitude gridding, NOAA temperature calibration, False Colour with autoshade, Pan and Zoom, Transect, Histogram and variable equalisation, 3D display, 100 frame animation from Meteosat, Live on screen display at up to 1024 x 768 x 256, Mouse interactive operation, Median filter to remove country outlines from Meteosat and a Laser dump facility. New options and features are being added all the time.

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RADCOM CONSTRUCTION FEATURE

First Steps in Home Construction

A series of articles by John Case, GW4HWR

PART SIX: COMPLETING THE PSU

At last, we reach our target; a working variable-voltage Power Supply Unit. Also, some useful tips on fault finding.

THE HEATSINK

THE MATERIALS FOR THIS WERE detailed in Part Two (June 91) and the dimensions for drilling were given in Fig 13 last month. The diagram shows the heatsink as viewed from the back of the chassis. The holes for the PCB have already been marked. These and all other holes associated with the heatsink are drilled 1/8" or 3mm - do not forget a touch of lubricant on the drill tip. Put two 9.5mm, 6BA screws through these holes so that the heads are towards you as viewed in the diagram, lightly fix with *full* nuts. Temporarily fit the PCB on to these screws and secure with half nuts. The holes in the board and heatsink should be large enough to allow for some adjustment. Make the holes a little larger if necessary. When the PCB is fitted satisfactorily, carefully bend the leads of Q4 in a gentle curve so that the transistor sits flat against the heatsink in the position shown in Fig 13. Mark the fixing hole on to the heatsink plate. Remove the PCB and screws and drill the hole.

Next, fit the aluminium foot. The fixing holes for this are drilled in the position shown in the diagram and the plate used as a template to mark the holes on the foot. Note that, if the box is home-built, the angle must lie 1.5mm below the lower edge of the heatsink to allow the foot to fit between the angle pieces along the edge of the chassis. Also, mark the two holes used to fix the assembly to the chassis. Fig 4 (in Part Two) shows these staggered from the other holes at right angles.

Drill the four holes in the foot and temporarily bolt it to the heatsink. Place in the position shown in Fig 4, and when satisfied that it will fit and allow room for the mains cable, etc, mark through the fixing holes on to the chassis and drill these. Mark on the foot the position of the U-shaped clearance for the Q4 fixing nut. Remove the foot, drill the holes and file the clearance. Remove burrs from all holes but take care not to 'countersink' the hole for Q4 as it will reduce the contact area between the transistor tab and the heatsink. A fine file or a carborundum sharpening stone rubbed over the surface will ensure that it is flat.

If the output of the PSU is likely to be at 1A for considerable periods, it is advisable to paint both sides of the heatsink with matt black paint, having first scoured all surfaces with fine wire wool or Brillo pad to remove grease and provide a key for the paint.

Re-assemble all parts as before, except that a 6BA shake-proof washer should be used under each nut. When satisfied that everything is in the correct position, tighten all nuts. Now put a tiny smear of heatsink compound (Vaseline will do) on both sides of the rectangular insulator, which should be supplied with the TIP31A, and slide it under the tab of Q4. Put the smaller diameter of the bush (also supplied) into the hole of the tab and then pass a 9.4mm 6BA screw through the heatsink and bush securing it with a half-nut (no washer) and lightly tighten.

Check the resistance between the transistor tab and the heatsink, using the highest resistance range. It should be near enough infinity, ie the needle of the meter stays on the left-hand end of the scale. If it is not, re-check the assembly of insulator, bush and transistor tab. Also, check the resistance between pins +25V and 0V with the positive lead of the meter connected to 0V. A value in excess of 1kΩ should be obtained. Repeat the test with pins 'Red' and 'Blue' where the resistance should be about 2kΩ.

CONNECTING UP AGAIN

CONNECTING THE PCB TO C1 AND the panel components should not present any particular problems but it makes it much easier if a number of different coloured PVC 'hook up' wires are available. It is best to make the connections before the heatsink and PCB are fixed in position. The suggested lead lengths allow for this. Start with the +25V input pin on the PCB. Take 100mm of red wire, strip about 10mm, twist the wires together, carefully wrap around the pin and solder. Repeat with 100mm of black PVC wire to the 0V pin. Twist the two leads together, strip 10mm from the outer ends, solder and clip to 5mm. Solder the red wire to the positive and the black to the negative terminals of C1.

Next, 150mm of red wire and 100mm of blue are attached to the 'red' and 'blue' pins respectively. Prepare the other ends as before, twist the leads together and solder to the red and blue terminals on the panel. *Note*: Neither the 0V input or 'blue' output pins of the PCB must be connected to chassis; the copper has been removed from the area around the fixing holes to avoid accidental short circuits. Now three pieces of wire, each 100mm long, grey, white and pink are connected to pins G, Slider and P. Twist the leads together and connect the outer ends to the tags on VR1 as indicated in the inset of Figure 11 (see Part Five). It may be easier to make these last connections if VR1 is temporarily removed from the panel.

Finally, two 100mm pieces of yellow wire are connected to the pins marked S2, and connected to S2 as shown in Fig 4. It would be advisable to check that the pins used are shorted together when the switch is in the 1A position. Bolt the heatsink assembly on to the chassis and tuck the wires just installed into a neat position.

DOES IT WORK?

AT LAST! REPEAT THE resistance test outlined at the end of the last paragraph. The values obtained will be lower and will indicate the inclusion of the reservoir capacitor with an initial flick towards zero ohms. Short circuits, ie the meter staying at zero ohms, must be investigated before proceeding. Also check that there is no connection between the earth terminal (green) and the other two on the panel.

Put the current switch to the 100mA position and connect the

meter to the red and blue terminals. As you are measuring voltage, the polarity of the meter is now correct. Set the meter to 12V DC (or higher). Check that the switch on the mains socket is off and plug in the PSU. Put the unit switch to the ON position and switch on the mains. **Do not touch anything inside the chassis.** The bulb in the ON/OFF switch should light and the meter indicate some voltage. Rotation of the control should give voltages ranging from 4.5 to 14. If these results are not obtained, switch off and disconnect from the mains. **Do not attempt to fault-find with the unit connected to the mains.** Fault finding practice is described below.

THE COVER

FINISH OFF BY CUTTING OUT the cover using a piece of 18SWG aluminium. The dimensions are given in **Fig 15**. Use the bending bars as before but *do not* use a hammer on the metal as it will mark. Hold a block of wood against the bend and hammer the wood.

Mark and drill the four fixing holes. Place the cover in position on the chassis so that the rear edge just overhangs the back panel. Mark the position of the holes on the chassis angle pieces and drill them using a 44 drill. The cover is held in place by four self-tapping screws. It may be finished by spraying or painting, but an excellent result can be obtained by covering with book cloth. This method was used in the prototype. The cloth was glued to the aluminium using a contact adhesive such as one made by Hermetite which is very easy to use and does not contain solvent. It is generally obtainable from car accessory shops. Coat both cloth and aluminium and allow to dry. Turn in about 20mm at front and back and trim the other edges close to the aluminium. Cut out the cloth around the holes with a sharp pointed knife and use a plain washer under the head of each screw. Fix a small self-adhesive foot near each corner of the chassis and construction is complete.

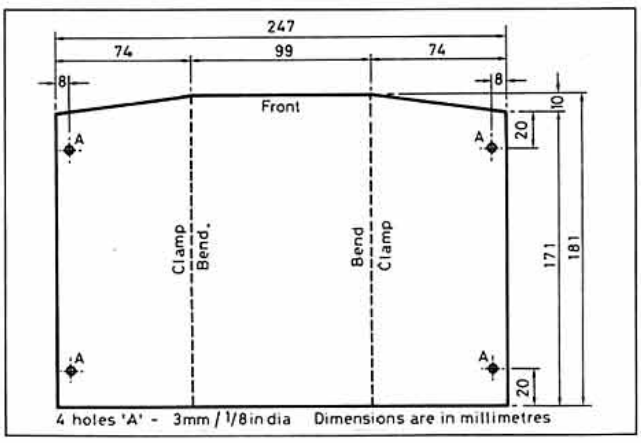

Fig 15: Details of cover. Material 18SWG aluminium.

TESTING

HERE ARE A FEW SIMPLE tests to check that the completed PSU comes up to specification, plus fault-finding techniques to enable out-of-spec units to be put right safely. If all of the instructions have been followed, it is likely that all will be well. However, there will be the odd occasion when something goes wrong. The following should help.

A number of 0.5W resistors in the range 56Ω to 220Ω would be useful to make the initial tests. Set the current limit switch to 100mA, switch the meter to a suitable DC voltage range, connect it to the output terminals and switch on. As above, variation of the voltage control should cause the output voltage to change from a little over 4V to about 15V.

CORRECTIONS

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Resistor values at the top of the first column inadvertently acquired the unit 'W', rather than 'Ohm'. Apologies if this confused anyone.

John Case informs us that his comment regarding the limitations of the Cirkit HM-102BZ is no longer correct as this meter now has a 10A range.

Set the voltage to 11V and then connect a 220Ω resistor across the output terminals of the PSU, the voltage should hardly change. Repeat the test with an output voltage of 10V and a resistor of 100Ω. The fall in voltage will be a little greater because the current demand has gone up to 100mA.

If all is well, check the function of the current limit circuit: Leave the output at 10V and connect a load of 56Ω. This would normally cause a current of just under 200mA, but if limiting takes place correctly the output voltage should fall to just about 5.6V, indicating that the current has been limited to 100mA (5.6 divided by 56 = 0.1; Ohms Law). Similarly, if a load of 47Ω is used, the voltage will fall to just under 5V. If the load of 100Ω is reconnected, it should be possible to vary the output voltage up to about 11V after which there will be little increase even if the control is turned fully clockwise.

If all of the above tests prove satisfactory, it is almost certain that current limiting will also be correct in the 1A position of the limit switch. However, if you wish to make a positive test, a 4.7Ω resistor rated at 5W will be required. With the limit switch at 1A and the output voltage set to 5V, connect the load. The voltage should remain at 5V, but when the voltage control is turned clockwise there should be only a small increase. The only possible cause of malfunction would be a short circuit across R8 or the wrong value in use. If the above results are not obtained, switch off and disconnect from the supply. **Do not work on the unit whilst it is connected to the mains.**

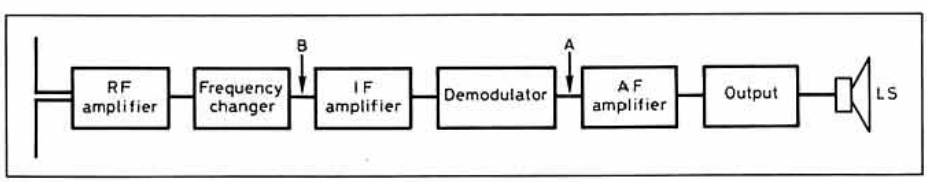

Fig 16: Block diagram of a basic radio receiver.

TRANSFORMER RATING

CONSTRUCTORS USING THE Radiospares (RS) transformer should not allow the PSU to operate at 1A output continuously. It will be quite safe if the duty cycle is of the order of 2 minutes on and 2 minutes off as would be expected with a small VHF rig for example.

FAULT FINDING TECHNIQUE

CONSIDER THE BLOCK DIAGRAM OF a basic superheterodyne radio receiver shown in **Fig 16**. The input to the device comes from the aerial and is processed in each block in turn and finally the output signal is delivered to the loudspeaker. Normally, each stage will be coupled to the next by means of either a capacitor or a transformer. In either case, only the AC component of the signal will be passed to the next stage. In the event of a fault causing the voltages around one stage to be incorrect, those in the other stages will not be affected. Fault finding is normally carried out by dividing the circuit into pieces and testing the individual sections. This is known as the 'half split' method of fault finding. For example, in Fig 16 an audio frequency signal at 1000Hz could be injected at point A. If the fault lies after this point there will be either no output, reduced or distorted output, but if the AF stages are in working order normal output would occur. In the latter case, an intermediate frequency signal could be injected at point B.

The circuit used in the PSU (Fig 3 - see Part Two) is what is known as a DC amplifier. It is rather more difficult to locate the input and the output of the circuit. Basically, the circuit input is the positive PSU output terminal which applies a voltage to the base of Q1 via VR1. The difference between this voltage and the reference at the emitter, provided by D1, is amplified by Q2 and Q3, and applied to the base of Q4 (this can be considered as the output of the DC amplifier) controlling its resistance and therefore the DC output voltage.

The amplifier must be able to respond to the DC level of the signal so that amplification of any error in the output voltage can take place. DC is defined as a voltage which does not change, so any variation in level is actually an AC component superimposed on the steady DC level. Now, the importance of all this is that a fault which causes an incorrect voltage in any part of the circuit will produce similarly incorrect values everywhere else in the circuit. For example, in Fig 3 if Q4 becomes open circuit the output voltage would be zero. Q1 will be non-conductive and its collector voltage will rise to 25V. This is

Tran.	Ve	Vb	Ve
Q1	3.3V	4.0V	4V-14V
Q2	3.5V-13V	4V-14V	13.5V
Q3	14V	13.5V	3.6-13.5V
Q4	4.2V-13.5V	3.6V-13.5V	14V
Q5	Up to -0.6V-0.6V Dependent on output current	0V	3.3V

Measured voltages at transistor electrodes with respect to the blue output terminal. The input voltage to the panel was 14V. Where a range is given the value depends on the setting of VR1.

Table 1.

SYMPTOM	Trans.	Ve	Vb	Vc	Probable fault
Output 13.5V fixed *	Q1	14V	5V variable	14V	D1 o/c
	Q1	3.3V	4.1V	3.6V	Link missing
	Q1	3.3V	4.1V	14V	Q1 collector o/c
	Q1	3.3V	4-14V	14V	Q1 base o/c
	Q1	3.3V	0V	14V	VR1 slider o/c
	Q2	14V		14V	Q2 s/c
	Q3	14V		14V	Q3 s/c
	Q4	14V	5V	14V	Q4 s/c
Output 3.3V fixed	Q1	3.3V	4.0V	3.3V	Q1 s/c
Output very low 1.0V fixed	Q3	14V	1.2V	1.2V	Q3 o/c or C4 leaky
Very low ouput 1.4V variable	Q5			0.5V	Q5 or D1 s/c
No output	Q2	0V	14V	0V	Q2 o/c
	Q4	0V	14V	14V	Q4 o/c
No current limit 100mA range with 56 ohm load. VR1 to max	Q5	–1.0V			Q5 o/c

All voltages measured with respect to the blue ouput terminal. Input voltage to panel; 14V.
* This value will be in the order of 22V while the unit is in the box and operated from the mains.

Table 2. Fault finding chart.

connected directly to the base of Q2 so that its emitter voltage will rise to almost 25V. Because Q2 is conducting fully, ie it is saturated, its collector current flowing into the base of Q3 will cause that transistor to saturate and to raise the base of Q4 to about +25V. Because Q4 is open circuit it cannot conduct. Note that the circuit is trying to work; the output voltage is too low so it tries to drive Q4 into conduction. The 'half split' method will not work in this circuit because as we have seen, Q1 relies on Q4 to provide its working voltage. In this situation it is quite normal to over-ride some parts of the circuit. This could take the form of applying a voltage to replace that which has been lost. In the above example we could connect 10V across the output terminals, or short-circuit the collector and emitter of Q4. This would allow Q1 to work more or less correctly. Variation of the voltage control should cause a change in collector voltage as the base voltage is moved above and below the emitter voltage. The change will be rather sudden but that does not matter, it will be passed to Q2 to produce changes at the base of Q3 and so on.

Another point of great importance is that if a voltage of more than 0.8V is found between the base and emitter of a transistor with a polarity which should cause it to conduct (ie base positive in the case of an NPN type), the device will be very hot and about to 'die', or it is 'dead' already! Q4 in the above example is in this state.

If it becomes necessary to check the resistance of a component whilst it is in circuit, remember that there will probably be parallel paths present which will result in different values to those obtained when the component is not in circuit. For example, if we try to measure the resistance of D1 in the PSU PCB we could connect the positive lead of the meter to 0V and the negative to the cathode of D1. A resistance in the order of 3kΩ will be indicated, and as we have connected the meter to measure the reverse resistance of the diode we might be tempted to believe that D1 is faulty.

Examination of the circuit will show that from the cathode of D1 there is R3 (560Ω) in series with R1 (820Ω), VR1 (5kΩ) and R3 (2.2kΩ) back to the anode of D1, a total of about 8500Ω. There are other high resistance parallel paths through various transistor junctions, all of which conspire to give the rather low and possibly unexpected resistance. Similarly, if we check the resistance across C1 and connect the positive lead of the meter to the positive of C1, a very low resistance will be indicated because, (a) C1 is incorrectly polarised and (b) the diodes in BR1 will all become conductive, placing a very low resistance in parallel with C1.

FINDING THE FAULT

INSPECT THE PCB VERY CAREFULLY to ensure that all components are correctly placed and are of the specified value (you should have done this before switching on, but check again). Check especially the five transistors, making certain that all are correctly connected and that Q3 is the PNP type. Presumably these transistors were tested as recommended in Part Five but it is possible that one or more has been incorrectly inserted in the PCB. Also, check the polarity of D1 and finally inspect the copper side of the PCB for any short circuits caused by solder bridges between tracks. If the inspection does not reveal any defect proceed as follows.

Still without connecting the PSU to the mains, disconnect the lead to the 25V pin on the PCB and connect a spare wire to this terminal. Also connect an extra lead to the 0V terminal. Next a DC supply in the order of 12 to 20V is required. Another PSU would be ideal but if this is not available, batteries will do almost as well. Avoid using types capable of high currents such as a car battery unless you are prepared to use a 1A fuse in an 'in line' carrier connected close to the battery terminal. This is necessary to avoid damage to your PCB in the event of a short circuit, or in the worst case a fire that can be quite difficult to put out. In any case, it would be a good idea to start building up a collection of connector leads, so a red one with a crocodile clip at each end and an in line fuse carrier close to one end will be very useful.

The voltages obtained with an operational circuit are given in **Table 1**. These values and those in **Table 2** were taken from a completed PCB mounted on a heatsink and supplied with 14V (from a completed and operational PSU) applied between +25V and 0V pins of the faulty unit.

Look in the first column of Table 2 for the symptom of your PSU then measure the emitter, base and collector voltage of the transistor given in the second column. If these are the same as, or very near to, the values in Table 1, proceed to the next row. If they are as in Table 2, the fault should be the one given in the last column. If a fault is located and corrected but the unit still fails to work, remember that faults do not necessarily come singly - so be prepared to look for a second one.

Take great care when checking the voltages at the lead-out wires of transistors. When measuring the base voltage, it is very easy to short the base connection to the collector. This is the best way of despatching a transistor which behaves as one of the fastest acting fuses ever. Be especially careful when testing around metal can types like the BC108 because the can is internally connected to the collector.

When all appears to be well, with a controllable voltage of about 4.2-14V, box up and only then re-connect to the mains. Now give yourself a pat on the back - congratulations on completing your first successful project!

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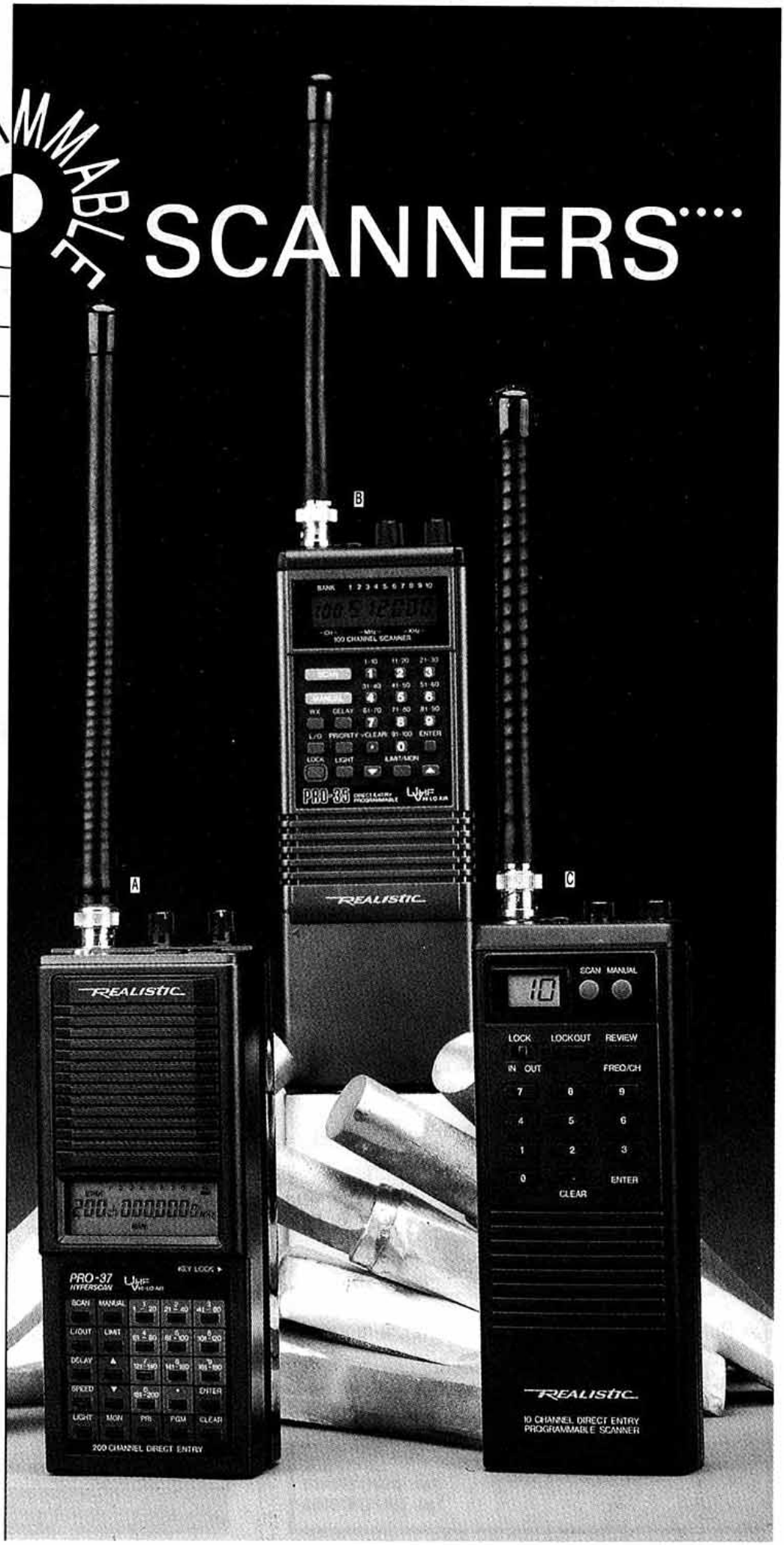

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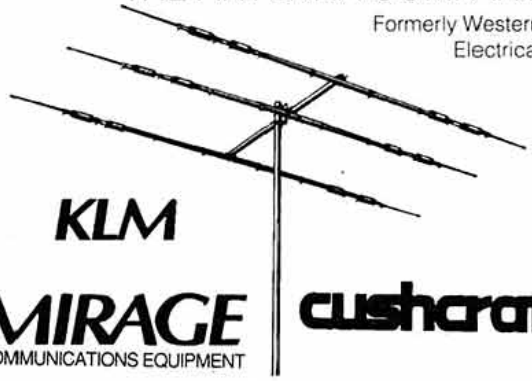

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RADCOM TECHNICAL FEATURE

Loop Antennas

Facts, Not Fiction

The conclusion of an article by
A J Henk, C. Eng., M.I.E.E. (G4XVF)

EFFICIENCY REVISITED - THE SIGNIFICANCE OF Q

THE Q (OR 'GOODNESS FACTOR') of a tuned circuit can be defined in several ways, but the most helpful here is to use the ratio of inductive reactance to resistance, assuming all the resistance to be in the inductor. In practice this is not the case, but the assumption does not introduce errors if we are only looking at the total losses and don't start trying to allocate different bits to the capacitor etc. Later we will have a brief qualitative look at where losses arise. Wherever they do, though, they can be included in the inductor for calculation purposes. In our case the resistance is the total R_t and therefore we can say:

$$Q = \frac{\omega.L}{R_t}$$

We also know that $R_t = R_l + R_r$, so that we can deduce that:

$$R_l + R_r = \frac{\omega.L}{Q}$$

It is now but a tiny step to the final denouement, the efficiency of the antenna overall. If we substitute for $(R_l + R_r)$ in Equation 2 (see part one), we obtain the relationship:

$$\text{Efficiency } (\eta) = \frac{Q.R_r}{\omega.L} .100\% \qquad (5)$$

This result is interesting because it is so simple. It does, however, beg the question "how do we know the Q?"

LOSSES - WHERE DO THEY COME FROM?

BEFORE GOING INTO THAT any further, lets take a slightly closer look at the losses we are likely to find in a practical system. The most obvious one is the RF resistance of the conductor, and this is not difficult to calculate. In practice, however, it is probably not worth the effort because it is but one of several sources, most of which are not calculable and may well exceed the conductor resistance contribution. These sources include:

- capacitor losses (several components here)
- insulation losses
- other constructional losses (asymmetry, etc)
- losses due to the environment.

Capacitor losses are, of course, determined by the quality of capacitor being used. When you are looking for extremely high Q-values coupled with the high working voltages associated with these on loop transmitting antennas, the need for a good quality capacitor for this voltage and Q makes the construction of the antenna a very expensive privilege. However, without the costly component you will not approach the Q as calculated solely on the RF resistance of the conductor. You probably won't anyway.

Insulation losses in other parts of the assembly cannot be ignored as the loop has to be supported and terminated somehow. The best material the author has found which is both available and easy to work is polystyrene which has a dissipation factor of 0.00007 at 1MHz and 0.0001 at 100MHz. This is only equalled by strontium titanate ceramic, other ceramics being 2-10 times as lossy. Polycarbonate scores an unimpressive 0.01 at 1MHz: Teflon is almost as good as polystyrene but very expensive [2].

A departure from perfect (electrical) symmetry will result in currents flowing in parts of the system where no currents should flow. Such parts of the system can be expected to be more lossy than the conductor and primary insulation, adding to the total system loss. It is to maintain this electrical symmetry that the need to identify the electrically neutral point arises when tapping into a loop, as described above.

Losses due to the environment are perhaps the most difficult to handle. To isolate a loop from its electrical environment (most notably the ground and supporting steelwork) by, say, half a wavelength is difficult to say the least at 14MHz and well nigh impossible at 3.5MHz. By its very nature the loop is designed to couple as well as possible into its surroundings, and such spacings as these will be needed to ensure that the presence of other items does not reflect losses into the system.

More confusion? Just when we were reaching what appeared to be a final conclusion? Not really: after all, what we need to know is R_l as a total of all these effects without being too interested in how much comes from each source (unless we are going into the design business, which is an entirely different mat-

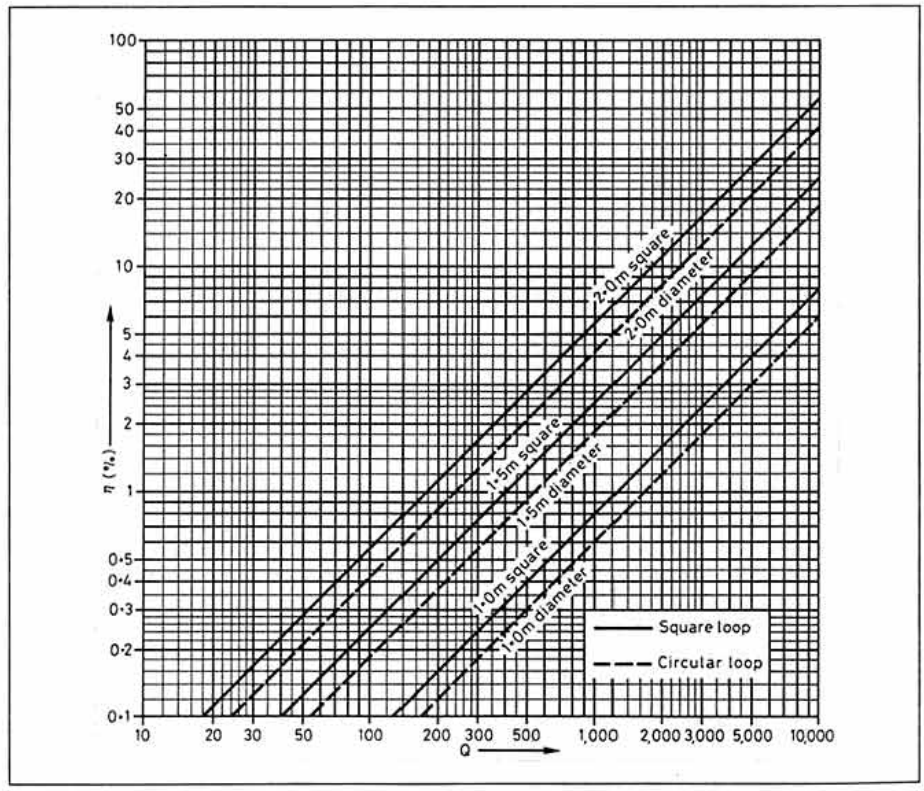

Fig 4: Antenna efficiency measured against Q for loops at 7MHz.

THE INDUCTANCE OF A LOOP

AN IMPORTANT feature of a loop, whether used as an antenna or not, is its inductance. This can be calculated quite accurately if the dimensions are known and the right formulas are used. Most formulas are traceable to an early document published by the USA National Bureau of Standards [3] back in the days when the triode valve was very much a novelty. It says much for this document that it has not been surpassed for these kinds of data. For circular single turn loops it gives:

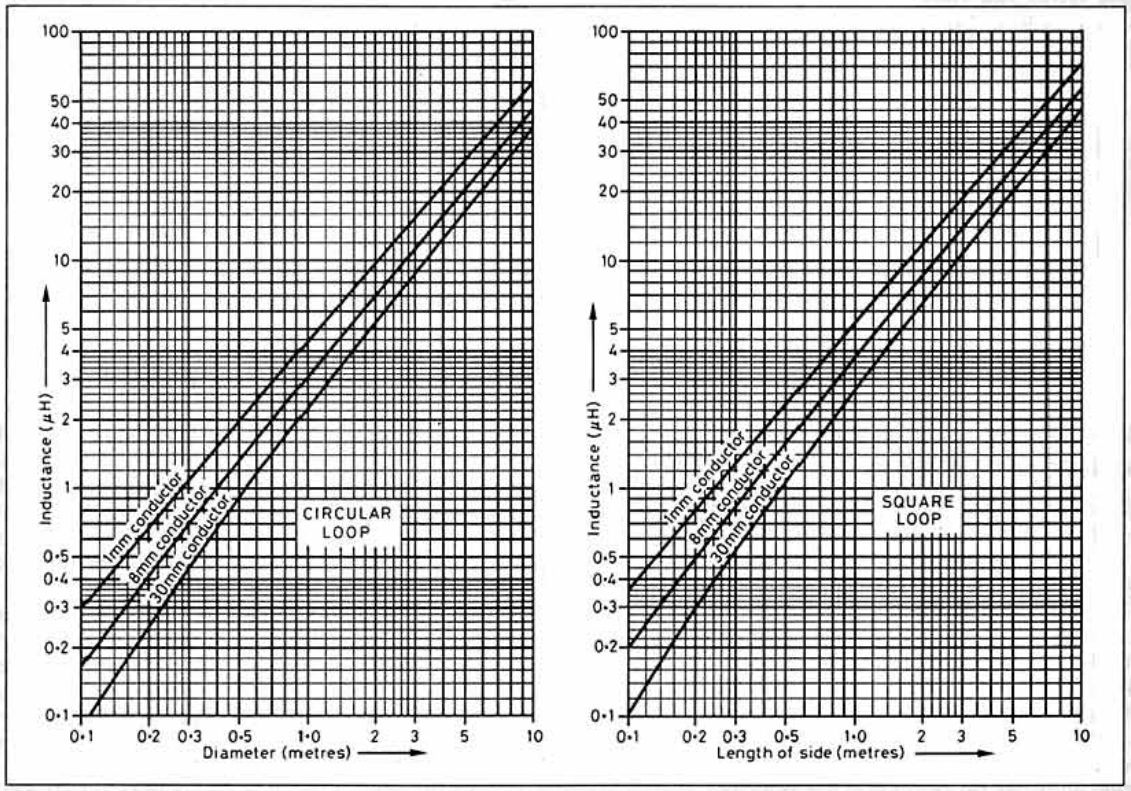

Fig B1: Inductance of single turn loops, (a) circular and (b) square.

$$L = 0.01257.a.\left[2.303.\log_{10}\frac{16.a}{d} - 2\right]\mu H$$

where a = mean radius of loop in cm
d = diameter of conductor in cm

and for square single turn loops it gives:

$$L = 0.008.a.\left[2.303.\log_{10}\frac{2.a}{d} + \frac{d}{2.a} - 0.774\right]\mu H$$

where a = length of one side in cm
d = diameter of conductor in cm

Inductance values for single turn circular and square loops with dimensions between 0.1 and 10m are given in **Figs B1a and B1b** respectively. There are plots for three different conductor sizes covering the range of most practical designs: values for intermediate sizes can be interpolated by eye.

If you want to be very precise it will be necessary to appreciate that, particularly at low frequencies, inductance is frequency-dependent. This would mean that the conductor wall thickness (of the tubing) would need to be taken into account. However, these differences are very small and the formulas given above are the high-frequency ones which assume that the current density is zero (due to skin effect) on the inside of the tubular conductor. They can, of course, be used with both solid and tubular conductors. Formulas for multi-turn loops and coils can be found in [3] though they are not reproduced here. The characteristics of such coils requires one or more tables of correction factors whose values depend upon the dimensions of the winding. Unfortunately, there is no simple accurate alternative and the reader is referred to the NBS document for further details. An approximate formula for multi-turn loops, derived from NBS, is given in [2].

ter). We can determine this by direct measurement of Q and calculation (knowing R_r) or, better still, if we insert the values into Equation 5 above we will have the efficiency directly. The procedure for the Q measurement will be described in a future article: for the moment we will assume that we know its value.

ALL LOSSES REVEALED THROUGH Q

THE Q IS INFLUENCED BY ALL the effects listed above, including, significantly, the operating environment of the loop. Therefore, if the measurement is taken with the antenna in its normal working position, all the effects will be present and the R_l and therefore efficiency will be that which is obtained in normal operation. It will be found to be very different from that calculated from conductor losses alone, unless the conductor is very thin and/or the loop is very small. To avoid errors due to feeder and transmitter loading it is necessary for the feeder to be disconnected from the aerial for the measurements so that nothing is connected to the feeder socket on the antenna. Thus it is the *unloaded Q* which is important here.

It should be noted that this method is perfectly valid for all magnetic loops, of whatever construction, shape, number of turns and coupling method. Any losses, however introduced, will show up in the Q measurement and will therefore be taken into account in the efficiency.

THE EASY WAY

TO SAVE A LOT OF COMPUTATION a set of graphs (**Figs 4,5 and 6**) has been prepared which enables efficiency to be read off against measured Q for the 40m and 80m amateur bands for reasonably sized loops, both square and circular.

Although the formulas used, and given above, are capable of high accuracies, the need for such precision in practice is questionable. After all, an inaccuracy of 10% in the efficiency corresponds to a change in radiated power of about 0.4dB. Results read off the graphs will be substantially better than this provided all the parameters correspond to those stated on the curves. In practice, within a band, things don't change much if the loop size and Q are constant, so there's not much to be gained by a lot of toil with correction factors for conductor diameter, etc.

An exception to this general statement is the frequency sensitivity, and it is worth correcting for the frequency within the band at which the efficiency is needed, particularly at 3800kHz. The curves in Figs 4 and 5 are plotted for the low-end frequencies of 3500kHz and 7000kHz respectively, and the correction necessary for other frequencies can be found from Fig 6. The correction factor from the figure is used as a multiplier for the efficiency, for example an efficiency of 5% at 3500kHz becomes 5.5% when the correction factor is 1.1. The correction for the 7MHz band is much smaller, although rather more dependent on the Q-value. A single value of 1.04 at 7100kHz should be used, and is accurate in the mid-Q ranges where practical designs lie.

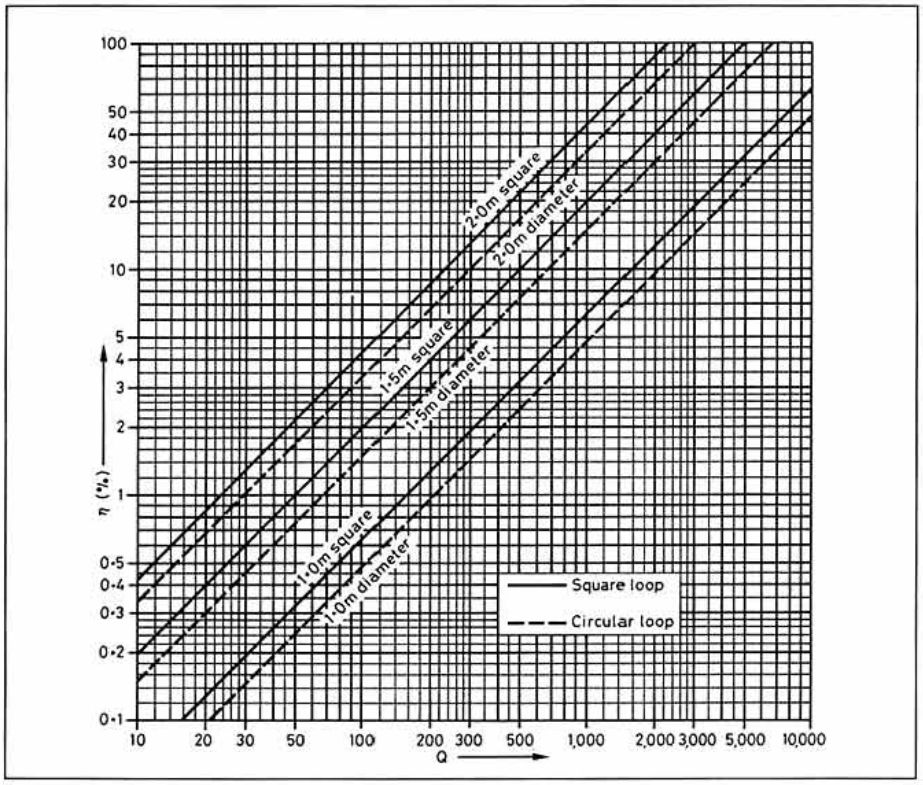

Fig 5: Antenna efficiency measured against Q for loops at 3.5MHz.

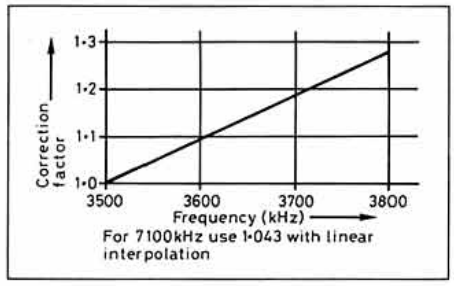

Fig 6: Correcting for higher frequencies.

Interpolation is again straightforward and is linear.

There will not be much correction required over the bottom ends of the bands but, particularly in the case of 80m where the width of the band allocation is a significant percentage of the frequency, some correction may be wise in the SSB region. There will be small efficiency differences if the conductor diameter is not the same as for the plots but, in the main, these will be far less than the difference in Q performance (which will be taken care of by the measurements) caused by the same diameter changes, and will be secondary effects.

PERFORMANCE AND EFFECTIVENESS

LOOP AERIALS CAN BE VERY effective indeed given the right circumstances. Their strength lies in their receiving performance which does not require high efficiencies. On the MF and HF bands the achievable signal to noise ratios (and hence readability) which can ultimately be achieved with a practical antenna system depends on how much stronger the wanted signal is than the background noise on the band. This noise, a combination of general noise and identifiable interference, is normally strong enough for the receiver-generated noise to be completely submerged in it. Indeed, from a highly efficient aerial it can be several tens of dB higher than the receiver background. This means that the efficiency of the receiving antenna can be greatly reduced without affecting the signal to noise ratio, as both the signal and the noise are reduced together and the 'missing' strength is returned noiselessly by the receiver's AGC. Thus our loop can provide good service here, as was found in the days of early portable wirelesses. It is compact, unobtrusive and can be very portable. This feature means that we no longer have to strain every muscle to achieve astronomical Q values, nor to construct large and ungainly loops to achieve large values of radiation resistance. (Note, incidentally, that receiving aerials need radiation resistance - that's reciprocity for you!) Also the bandwidth is limited, not by a steeply rising VSWR which can pose a risk to a transmitter, but by how much sensitivity you can afford to lose before receiver noise becomes a problem. This makes the loop a far more tame animal and promising prospect than when seen as a transmitting antenna, where efficiency is all.

RADCOM TECHNICAL ARTICLE

Its advantages don't end here, though: there are two further features which are very valuable at the receiving end. The first is the directional property of the loop. It will not respond to signals arriving at right angles to the plane of the loop (ie 'sideways-on'). Thus there is, as it were, a line of zero sensitivity running through the centre of the loop at 90° to its plane and passing through the centre. This can sometimes be arranged to point directly at a source of local interference. With the plane of the loop vertical which is the normal case, this line is horizontal and parallel to the ground. Since local interference generally originates at ground level, rotating the loop can often cause a useful reduction of its effects. Signals from the same general direction but arriving via the ionosphere (normal radio signals) will enter the loop at a higher angle of elevation and therefore not be attenuated to the same extent if at all. The signal to interference ratio is thus improved.

The second is more subtle in origin but can be very dramatic in effect. Since the loop is primarily sensitive to the *magnetic* component of the received wave and the majority of local interference comprises *electric* fields (they are generally induction rather than fully radiated fields) the loop signals are surprisingly clean and QRM-free.

Don't expect miraculous performances when transmitting on your 1.5 metre diameter loop on 40m or 80m. I was surprised at the low efficiencies I was apparently achieving (based on Q measurements) and even had little enough faith to suspect the formulas (or, to be precise, how I had applied them). It was not until carefully controlled field trials of two identical loops in the far-field region had been conducted over a line-of-sight test range (on Epsom Downs) using the reciprocity principle, and with appropriate correction for ground proximity, that I became fully satisfied with the mathematical model. Off-air signal reports on normal QSOs were obtained suggesting quite a good performance and it was only later that the truth emerged. The two factors contributing to the apparent performance were the 'QRP reporting effect' (and reports became far less optimistic when the other station was not told it was a new loop) and the poor performance of the average amateur wire aerial with which one inevitably compares reports.

Returning to the concept of improving the signal to noise ratio at the receiver, the only way the transmitting station can contribute to this (within a fixed bandwidth) is by increasing the average transmitted power. Given, in the case of amateur radio, that there is a limit to the permissible RF power of the transmitter, the performance of the aerial is obviously paramount. Thus we need high efficiency as our primary requirement, and we have seen how difficult it is to achieve this using a magnetic loop. The aerial designer who strives to obtain, say, 10% efficiency out of his 1.5m diameter loop on 80 metres will need to achieve a Q-value (including ground losses) of over 5000. This designer needs to be hot stuff on the key because, with this high Q and correspondingly narrow bandwidth, his SSB rig is not going to last long with the VSWR hitting over 2.6:1 only 350Hz (yes Hertz!) either side of the loop's centre frequency, even supposing the other station can decipher the sharply filtered speech. He will also have great fun tuning the thing - standing within 5 feet of it will throw it off resonance by its full bandwidth - and he will also have to save up for that very expensive tuning capacitor because there will be over 6kV across it

VOLTAGES AND CURRENTS IN THE LOOP

THE BIG DISADVANTAGE OF the magnetic loop antenna for transmission is the low radiation resistance, typically a few milliohms. Large currents are required to achieve useful radiated powers and these are very difficult to generate. Because the tuned elements are in series, these currents also flow through the inductor (the loop itself forms the inductor) and the tuning capacitor.

The reactances of these two components are equal (but opposite in sign) when the loop is correctly tuned, so the voltages across them are also equal (and opposite). The tuning capacitor therefore needs to be rated at this voltage, as well as needing extremely low losses - not an easy combination to achieve.

If a 100W CW signal is correctly matched into the loop, the voltage across the capacitor can be calculated from the expression:

$$V = 10.\sqrt{Q.\omega.L} \text{ Volts RMS}$$

and the current flowing round the loop from:

$$I = 10.\sqrt{\frac{Q}{\omega.L}} \text{ Amps RMS or } I = \frac{V}{\omega.L} \text{ Amps RMS}$$

where $\omega = 2.\Pi.F$; F is in MHz and L in µH.

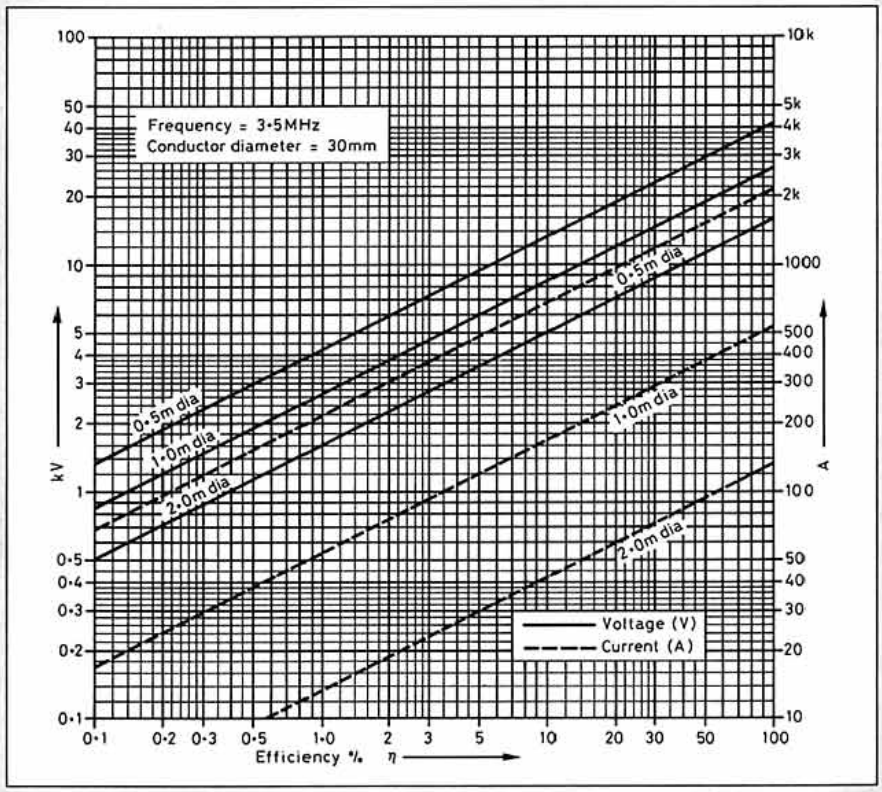

Fig B2: The voltage across the tuning capacitor at 3.5MHz. Halve the voltage for 7MHz.

Corrections can be made for other power levels, for example a 400W PEP SSB signal will double the values.

A set of curves giving these values for circular loops of three different diameters is given in **Fig B2**: the curves are plotted for 3.5MHz. All the results are inversely proportional to frequency, so halve the 3.5MHz voltage value for 7MHz and so on. The current is affected in the same way. Again, the figures should be doubled for 400W PEP SSB.

It is worth noting that for a high-efficiency (100%) loop 0.5 metres diameter operating on 80m with 100W CW, there can be up to 89.8 **Mega**volt-amps circulating in the system, but, of course, never more than 100 watts. Food for thought.

with 100W going in, and nearly 13kV at 400W PEP on SSB!

Ramstrom [1] makes a telling observation where he is describing field tests on a three turn loop: "On 4MHz the loop gain was 20dB below a full size dipole and . . . on 6MHz the loop was (also) 20dB below."

This was a loop constructed professionally using the highest grade materials and suggests an achieved efficiency of about 1%. The potential user of a transmitting loop, particularly at the lower frequencies, is very strongly recommended to perform his own measurement of Q and check his loop's efficiency for himself rather than to take optimistic claims at their face values. There may be surprises in store!

To finish on a purely personal note, I have designed a mobile antenna making the best use of the features of magnetic and electric antennas. One of my problems in achieving a satisfactory mobile performance was, as is often the case, the interference from the car's electrics etc. A 750mm circular single turn loop made out of 3mm aluminium rod and tuned with a small trimmer was coupled into the rig with a smaller coupling turn. This can be orientated to reduce the car-generated noise almost to zero. It is, of course, self defeating now to try to use this for transmitting and so a second antenna was mounted alongside; a 2m long base-loaded whip. The combination of the high-efficiency whip for sending and the quiet receiving loop makes for one of the most effective mobile antenna systems I have ever encountered.

In another example the author's small battery operated 80m receiver for CW, which has a small (400mm) loop on the top and a low-noise front end, can frequently copy signals indoors which are inaudible on a 30-ft external vertical whose measured efficiency exceeds 50% The efficiency of the 400mm loop is about 0.001%. Small loops can be great fun. ❑

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[1] Ramstrom, S: 'HF Loop for Transmitting and Receiving', *IERE Conference Proceedings* No 50, 1981 Radio Receivers and Associated Systems, pp 455-487.

[2] *Reference Data for Radio Engineers*, Edited and Published by ITT

[3] US Department of Commerce, National Bureau of Standards, Washington DC, *Technical Note C74* - January 1937, 'Radio Instruments and Measurements'

[4] Foster, D, 'Loop Antennas with Uniform Current', *Proc IRE*, October 1944, pp 603-607

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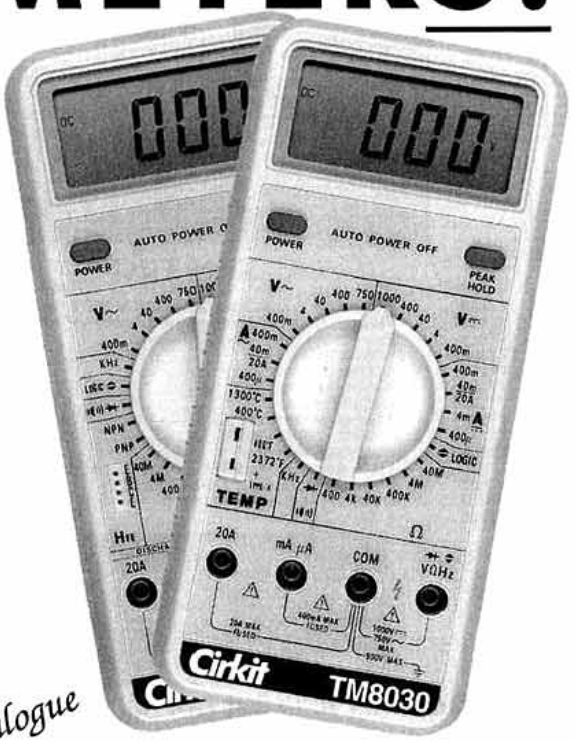

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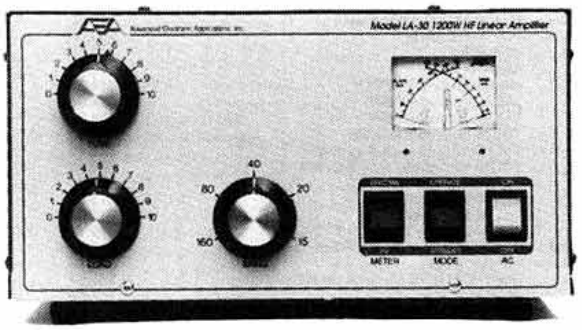

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THE RSGB SELLS a wide range of filters to help solve EMC problems (see page 70) but this range does not include any mains filters normally used for fitting on receivers, Hi-Fi, TVs etc. These are commercially available from a number of suppliers including RS Components, Maplin, and Cirkit at prices ranging from a few pence for components to fit into a circuit board to around £40 for a plug-in mains filter handling 6A. Of course, the simplest mains filter is just to wind the mains lead round several ferrite rings. As it is difficult to wind more than half a dozen or so turns of mains lead round a ferrite ring, two or four rings should be used together.

If you do have a problem like the one mentioned above with a thermostat or similar device, a mains filter could well be the answer. All three of the above suppliers sell filtered chassis plugs for fitting in your own equipment for around £10. Cirkit has a filtered four-way distribution block for around £25 which could be useful where you need a 'clean' supply to a number of items. RS Components has a lead with an in-line filter, around £10, particularly useful for temporary use as a replacement power lead for items with the moulded type of socket often found on computer printers, sewing machines etc. They also sell plug-in and wire-in filtered mains plugs ranging from £26 to £40, depending on the type and current rating. Alternatively, if the equipment is your own, and you are confident of your ability, you might want to try out the cheaper method of building your own 'spike' suppressors. Some circuit designs are given in **Fig 1**. Fundamentally, they are all low-pass filters. The filters should be fitted as close to the item being filtered as possible,

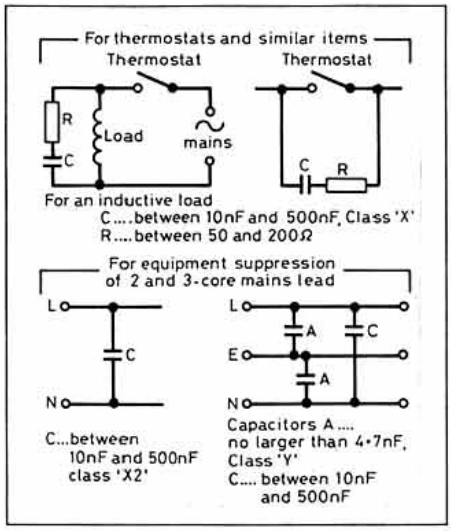

Fig 1: Some mains filters for suppressing thermostats etc

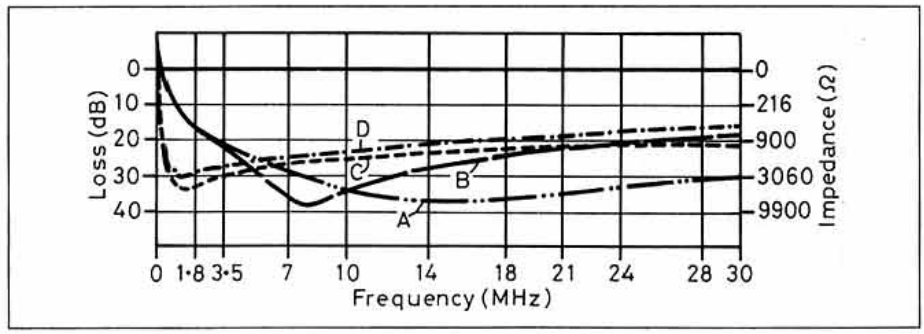

Fig 2: EMC performance of four types of ferrite ring. Curve C shows the type currently supplied by the RSGB.

and ideally should be assembled in a screened container. Any filters with capacitors to earth must be earthed. It should really go without saying that you should *make sure* that the capacitors are the appropriate 'X' or 'Y' class to BS2135 (rated for AC) and the final assembly is totally safe before using it!

FERRITE RINGS

WINDING CABLES THROUGH ferrite rings (torroids) as mentioned above can be an effective way of reducing or eliminating breakthrough in a variety of equipment and can also reduce the interference radiated by computers etc. A leaflet *Reducing RF breakthrough using ferrite rings* is available from RSGB HQ. There are many different grades of ferrite with different characteristics. For suppression applications, the requirement is to provide as much impedance as possible with a given number of turns at a particular frequency. There is no need for low loss in the ferrite, in fact high loss can be an advantage because it reduces the chance of unwanted resonances. Surplus unmarked rings can often be found on sale at radio rallies, but if their type number and characteristics are unknown, they may or may not be suitable for suppression applications. Rings with a smooth, coloured coating may not even be ferrite at all, but powder iron material which has a much lower permeability than ferrite and is far less effective for suppression.

Figure 2 shows the result of some measurements made by EMC Committee member G1OSC on four different types of ferrite ring, each 25.4 mm inside diameter. In each case, 14 turns were wound on a pair of identical rings. The inductance is proportional to the square of the number of turns so if fewer turns are used, more rings are required to give the same impedance. For example, instead of 14 turns on two rings, 10t would require four rings and 7t would require eight rings to achieve the results shown! The curves show the loss in a 50ohm circuit at frequencies up to 30MHz. The approximate impedances are also shown with a logarithmic scale.

Curve 'A' shows the characteristics of a pair of Mullard FX 1588 cores which give excellent performance on the higher HF bands but have not been manufactured for some years. They are marked with their type number and surplus cores can sometimes be found on sale at rallies. Curves 'B', 'C' and 'D' show the characteristics of three different grades of ring currently available from another manufacturer. These have no markings and cannot be distinguished by appearance. 'C' is the type currently supplied by the RSGB and gives the best performance of all on 1.8 and 3.5MHz. Although 'B' is better than 'C' on the 7 to 18MHz bands, 'C' gives better performance than 'B' on the 28MHz band and on VHF bands (not shown). 'C' is therefore considered to be the best 'all round' core currently available for HF and VHF.

At VHF, stray capacitance becomes very significant and a higher impedance may be obtained with fewer turns. A more detailed article is being prepared on the subject of the HF and VHF characteristics of the ferrite rings and filters supplied by the Society.

OLDY BUT GOODY!

YOU CAN'T BEAT THE old tricks! During some tests on the effectiveness of various ferrite toroids for reducing breakthrough, the results of which will feature in another article, the old 'junk box' medium wave ferrite aerial rod was re-discovered and found to be at least as effective as the toroids at VHF frequencies, and a lot easier to wind cable round too!

DID YOU HEAR?

. . . . the one about the RIS officer who was asked to find out the source of a TV breakthrough problem and discovered that the breakthrough disappeared when a table lamp which was standing on top of the TV set was moved! A ferrite ring on the lamp lead did the trick as the owner did not want to move the lamp. It is likely that the mains lead of the lamp was acting as a receiving antenna and coupling the amateur's signals into the TV set.

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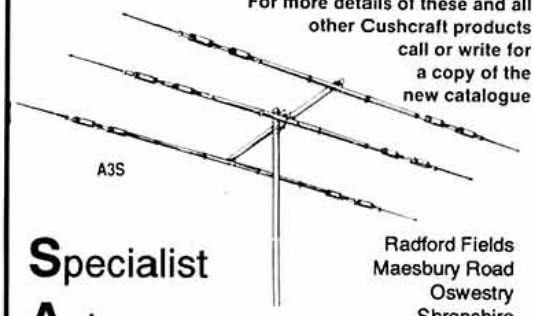

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CONTEST NEWS

All rules should be read in conjunction with the General Rules published in December 1990 (VHF/UHF/Microwave) and January 1991 (HF)

HF RULES

7MHZ CW CONTEST 1992

TRANSMITTING SECTIONS

1 General: The General Rules for RSGB Contests, published in the January 1992 issue of *Radio Communication* will apply to UK participants. All entrants should note that there are **CHANGES IN THE RULES** compared with those of the 1991 event, and that Multi-operator entries will now be accepted. Overseas entrants should calculate their multipliers on the number of different county codes received from UK stations.

2 Eligible entrants: Overseas (including EI) - all licensed amateurs. British Isles - as per General Rules. Single- and Multi-operator entries will be accepted in all transmitting sections.

3 When: 1500GMT Saturday 22 February to 0900GMT Sunday 23 February 1992.

4 Sections: (a) British Isles **(b)**Europe including EI **(c)**North America **(d)**South America **(e)**Africa **(f)**Asia **(g)**Oceania.

5 Frequency/Mode: 7.000-7.030MHz CW only.

6 Contest Exchange: RST and serial number, commencing with 001. UK stations must also send their County Code as printed in the January 1992 edition of *Radio Communication* and other current RSGB publications.

7 Scoring:

British Isles stations contact only overseas stations for points. Each completed contact with a station in section (b) will count 5 points, in sections (c), (d), (e) and (f) fifteen points and in section (g), thirty points. Multipliers as per General Rules.

Overseas stations contact only British Isles stations. For each completed QSO, stations in section (b) score five points, in sections (c), (d), (e) and (f) score fifteen points, and in section (g) score thirty points.

Multipliers: 1 for each British Isles County worked.

The **final score** is the total of QSO points times the number of Multipliers worked.

8 Logs: Overseas entrants are invited to use the stationery provided by their National Society. British Isles entrants are referred to the General Rules. Checklists ('Dupe Sheets') are requested where more than 80 QSOs are made and please don't forget the list of multipliers.

9 Address for logs: RSGB HF Contests Committee, c/o SV Knowles G3UFY, 77 Bensham Manor Road, Thornton Heath, Surrey, CR7 7AF, ENGLAND.

10 Closing Date for logs: British Isles entrants, 22 March 1992; Overseas entrants, 19 April 1992.

11 Awards:

Single-operator:- The Thomas (G6QB) Memorial Trophy to the leading British Isles station. Certificates of merit to the second- and third-placed British Isles stations, and to the leading entrants in each overseas section.

Multi-operator:- Certificates of merit to the leading groups in each section.

Additional certificates may be awarded at the discretion of the HF Contests Committee.

RECEIVING SECTION

Single-operator entries only will be accepted. Rules as for the transmitting section except where specified below. Holders of transmitting licences for frequencies only above 30MHz may enter the receiving section.

7 Scoring: British Isles SWLs should log only overseas stations in contact with British Isles stations participating in the contest. Overseas SWLs should log only participating British Isles stations in contact with overseas stations. Scoring and multipliers as for the transmitting section.

8 Logs: Columns to be headed: time GMT; callsign of station heard; report and serial number sent by that station; County Code sent by that station (if applicable); callsign of station being worked; multiplier (if new); points claimed.

NOTE. In the column headed "station being worked" the same callsign may only appear once in every three contacts except when the logged station counts as a new multiplier.

11 Awards: Certificates of merit to the leading entrants in each section.

HF RESULTS

LOW POWER CONTEST 1991

This contest was, as always, keenly fought with good scores being made despite the modest power levels. As usual, many more people took part than entered; come on, folks, it really is not difficult to write up a log and drop it in the post.

Several operators remarked on how busy the bands were, especially 7MHz. Certainly there were plenty of QSOs to be had.

Several comments were made regarding possible changes to the current format. Some suggested involving the nearer European countries in the contest, others a repeat event in the Autumn. These, and the other suggestions made will be considered by the HFCC.

Congratulations to all the award winners, and to the remainder - better luck next year.

AWARD-WINNERS' EQUIPMENT:

G4EDG: TS830 with 5763 valve PA
G4PZQ: R600 Rx, Howes Kit Tx
G4OGB: TS430 with 2 x 1RF510 PA
G3BPM: Drake TR7 with 2N3866 PA
G3LTO: DC RX TCVR, 2N3053 PA

G4DRS

Posn	Call	QSOs (80)	QSOs (40)	Points
1	G4EDG *	25	61	1225
2	G4PZQ +	22	57	1130
3	G4OGB +	24	46	1015
4	G0IVZ	19	51	1010
5	G4ARI	23	50	1005
6	G4CZB	24	45	1000
7 =	G3BPM #	20	40	900
	G0IDE	18	44	900
9	G4ECI	18	44	815
10	G4SXE	19	38	790
11	G3KZR	20	32	735
12 =	G3CQR	14	38	715
	G0CGB	15	36	715
14	G3PDX	-	45	650
15	G3LTO @	-	41	585
16	GW3SB	17	21	545
17	G3LHJ	9	30	535
18	G3DUX	-	38	495
19 =	G3AWR	-	29	435
	G3EAO	6	23	435
21	GM0GNT	-	17	245

Checklogs received with thanks from G0HDJ, G3GC, G3LIK, G5LP, GW3GWX.

* 1930 Committee Cup.
+ Certificate of Merit.
# Certificate: Leading 1-Watt Entry.
@ Certificate: Leading All-Homebrew station.

SUMMER 1.8MHZ CONTEST 1991

A good turn-out for this contest, which produced some outstanding (manual) log-keeping. A look at the results table will show a whole host of very closely-matched stations, many separated by only one point. Try as I might, after much cross-checking, I could not find fault with many of these logs. This level of scrutiny did reveal a number of stations requiring re-scoring *upwards*, in particular one who did not claim points for contacts he made with GB and GS stations. Remember: *you* can work *them* for points, it is they who cannot enter. I'm afraid that GB2SSD, who put in an outstanding effort, had to be re-classified as a check log for this very reason (General Rules for RSGB HF Contests - Rule 5). One overseas competitor evidently misread 'countries' for 'counties', and re-scoring his log improved his placing by 5 positions. Surprisingly, only five stations used computers for scoring, and four of these were using the G3WGV program.

Congratulations to the award-winners of course, but also to those who battled so hard for the tightly-contested placings just below. The moral is clear: never let up and never give up early. Just a few minutes off-air can cost you many places in the results table.

G4BKI

Posn	Callsign	QSOs	Points
1 *	G4BWP	105	570
2 *	G3VYI	81	488
3	G3OXC	73	444
4	G3OLB	70	440
5	G3RSD	70	435
6	G3ULN	67	421
7	G3SQX	62	411
8	G4OGB	65	410
9	G3BPM	61	403
10	G2MJ	58	389
11	GM3CFS	55	375
12	G0IDE	58	374
13	G3HKO	56	373
14	G3GMS	52	371
15	GM3UM	50	355
16	G3AWR	49	351
17	G5MY	52	346
18	G4CZB	50	345
19	G0LZL	52	336
20	G3BZU	52	326
21 =	GW3JI	45	310
21 =+	G0NND/M	45	310
23	G0CGB	45	305
24	G3NKS	43	304
25 *	ON6BR	41	288
26 *	PA3AMA	32	236
27	ON4ACG	30	205
28	SP5GH	27	201
29	PA3FNE	35	190
30	OK2BWJ	25	185
31	HB9FMD	25	180
32	DJ9WH	25	175
33	G3ZGC	18	139
34	OH2BLF	3	24

* - Certificate winner.
\+ - Multi-operator entry.

Check Logs gratefully acknowledged from: G2AFV, G3MCX, GW0KZW, GB2SSD *(see text)*.

HF CONTESTS CALENDAR - 1991.

Oct 1	28MHz Cumulatives (Aug 91)
Oct 5/6	*VK/ZL SSB (p15, Sep 91)*
Oct 5/6	*Ibero-American SSB (p15, Sep 91)*
Oct 9	28MHz Cumulatives
Oct 12/13	*VK/ZL CW (p15, Sep 91)*
Oct 13	21/28MHz Phone (Apr 91)
Oct 17	28MHz Cumulatives
Oct 19/20	*Wkd all Y2 CW/SSB*
Oct 20	21MHz CW (Apr/Jun 91)
Oct 26/27	*CQ WW SSB (p16, Oct 91)*
Nov 9	Club Calls Contest (Sep 91)
Nov 9	*YL/OM CW/SSB*
Nov 9/10	*OK DX CW/SSB*
Nov 9/10	*WAE RTTY (p16, Aug 91)*
Nov 16-17	2nd 1.8MHz CW (Sep 91)
Nov 16/17	*Austrian 1.8MHz CW*
Nov 17/17	*Oceania QRP (WIA)*
Nov 23/24	*COWW CW*
Dec 6/7/8	*ARRL 160m DX (CW)*
Dec 13/14	*ARRL 28MHz (CW/SSB)*

7MHZ CW CONTEST 1991

An improved entry in the UK and DX sections this year, but a fall-off from EU, where there was also some confusion over the revised scoring system. A large proportion of EU logs were rescored by the adjudicator, but no-one was penalized providing the County Codes were recorded. Once again the listener section was poorly supported, with only 3 logs received.

Conditions overall were well below their best, but some good DX was worked and a total of 100 multipliers appear in the logs - 71 DX and 29 EU. A feature of this contest were the 'ex-pat' entrants, who were prominent in all the overseas sections. In particular, Andy Chadwick ZD8VJ was able to work virtually all the UK participants, thanks to a BBC Rhombic beamed on G. Several overseas entrants commented on the low level of UK activity during the night, which was probably due to the poor path to the USA making the small hours unproductive for all but those with the most commanding signals.

Congratulations to G4DJX, operator of G3VER/P, who wins the Thomas Trophy for the Verulam Contest Group after a see-saw battle with seasoned entrant Al Slater G3FXB. Al, who quickly established an early lead, was overtaken late in the contest, probably as a result of the extra flexibility of Verulam's rotary 3-ele beam as against his own fixed 3-ele wire array. GW4TTU, operating GW8GT, completes the leading trio having made good use of his monster antenna, a 2-ele quad at 75ft agl.

Entrants' Comments:

Problem with new computer-logging program, so could only call CQ for the entire contest - *G3VHB*

PLEASE listen to the end of my call! - *GW3INW/HK3*

G3VER/P consistently strong - *VK2AYD*

Long periods of calling CQ with no answers - *G4AXD*

G3LET

TRANSMITTING CONTEST

BRITISH ISLES

Posn	Callsign	QSOs	Mults	Points
1 +	G3VER/P (op G4DJX)	496	74	349280
2 *	G3FXB	486	74	324490
3 *	GW8GT (op GW4TTU)	460	70	298550
4	G4LET	424	74	280830
5	G3VHB	392	61	198555
6	GM3YOR	359	63	180810
7	G4ODV	324	66	179850
8	G4RFR (op G3SQX)	353	66	179520
9	G0IVZ	350	63	144650
10	G3UFY	351	55	144650
11	G3IGW	315	57	137940
12	G4ERW	348	54	132570
13	G0JNZ	320	49	121765
14	G3VYI	279	46	93150
15	G0NND/P	321	40	89800
16	G3YEC	268	46	85560
17	G2QT	217	44	75240
18	G5MY	233	45	71550
19	G3RXP	255	39	64350
20	GM3YEH	198	45	58950
21	G3NKC	207	44	58520
22	G3JJG	213	42	57960
23	G3MPB	230	38	55290
24	G0IDE	197	41	54735
25	G3GLL	206	41	53095
26	G3LIK	210	39	50895
27	G4CZB	202	36	48240
28	G3JSR	220	35	45850
29	G4AXD	173	40	42400
30	G2AFV	167	36	36180
31	G3NKS	133	36	36180
32	G4IQM	160	33	32670
33	G3BPM	146	36	32580
34	G3ZDW	139	34	31960
35	G4UZN	149	31	28365
36	G0LZL	121	31	24025
37	G3HKO	123	30	22765
38	G3OLU	111	28	18200
39	G3AWR	95	27	17415
40	G3GMM	73	27	12825
41	G4BKI	75	25	10920
42	G4EBK	86	21	10290
43	GM3UM	59	24	8460
44	G4BWP	59	20	8100
45	G4BLX	45	21	5670
46	G3ZGC	19	8	760
47	G4OTY	7	6	270
48	G3ILO	5	5	125

EUROPE

Posn	Callsign	Score
1 *	EI4VIJ (G3HZL)	30500
2 *	EA6ZY (G6ZY)	28160
3 *	DL8WN	22360
4	OK1AGA	21715
5	SP5EXA	21560
6	EA3GDA (G3LGY)	19475
7	EI5DI	18900
8	HA8FK	18135
9	SM5NBE	15912
10	LA1IE	14630
11 =	Y25ZN	14430
11 =	DL4FN	14430
13	LZ1V	14288
14	YO8BAM	14246
15	YO8KOS	14040
16	HA1TC	13615
17	DL4XU	13475
18	Y21YT	13140
19	UC2OG	12969
20	DL2HQ	12460
21	PA0LVB	12250
22	DJ1FH	11748
23	DF4QW	11655
24	OK8AW	11560
25	Y27EO	11390
26	DF3QN	11288
27 =	Y37ZE	10560
27 =	OK1ACF	10560
29	OH2BEF	9625
30	HB9DX	9000
31	DL1ZQ	8990
32	OK2SG	8410
33	OK1DMS	8381
34	Y33TL	8308
35	HA2NI	8091
36	OH3YM	7980
37	UA6BPJ	7812
38 =	OK2BWJ	7280
38 =	YU5GX	7280
40	LY2PAQ	6760
41	Y31EM	6291
42	YO9FMB	6240
43	YO4FSJ	5880
44	YU7KM	5798
45	Y49JM	5610
46	OH7NW	5350
47	RA4AI	5103
48	SK0MT	4875
49	Y22JR	4680
50	Y31NJ	4575
51	OH8LAE	4512
52	UA6LFQ	4378
53	DK9EA	4290
54	UA3DJY	4272
55	LZ1MC	4080
56	Y23HE	3795
57	DL5JQ	3565
58	SM5BDY	3500
59	Y35WF	3400
60	YU7SF	2700
61	YO2LEF	2640
62	RA3SU	2574
63	PA3BEJ	2125
64	HB9CEY	2000
65	UQ2GTF	1690
66	LZ1FJ	1650
67	OK2PAW	1442
68	YO9FJW	910

DX

1 *	ZD8VJ (G4ZVJ)	63000
2 *	RA9OW	56990
3	UZ9MXM	50310
4	UD6DKW	34650
5 *	VK2BJ (G3PEK)	21120
6	CT3FT	17160
7	VK2AYD	16380
8	CT3DJ	11280
9 *	HP1AC	9768
10	UA9XR	9570
11 *	VE3JKZ	6720
12	VU2PTT	1950

RECEIVING CONTEST BRITISH ISLES

1 *	BRS 1066	39400

EUROPE

1 *	UB5-075-145	2592

DX

1 *	UA9-154-1171	27150

\+ - Trophy Winner
* - Certificate Winner

Checklogs gratefully received from: G3DYY, G3HAL, G3OXC, G4ECI, G4KGK, GW3JI, GW3SYL, DL6YAO, SM0CSX, SP5UGF, SP6SO, UB4DWJ, UV3DRH, Y41XF, Y49ZL, YL2ME, YO8KAN, GW3INW/HK3, UA9AKW, UL7TJ.

COUNTY ROUNDUP 1991

It is surprising (in view of the regular calls for the RSGB to support more SSB events) and a degree disappointing that the phone section received only half the support of the CW section. However, those who participated appeared to enjoy themselves and, as usual, there were very many more stations active than there were entries received.

Logs varied from very good, with excellent supporting documents to downright untidy, with a number of entrants losing points due to inaccurate recording of callsigns and contest exchanges. Not all the computer logs conformed to the standard RSGB Log Sheet format, which can give rise to problems for the adjudicator. Nevertheless, no entries were disallowed, not even that from the gentleman who put his clock *forward* to get GMT!

Entrants' Comments:

A smashing little contest - *G0CGB*

First entry since it changed from Region Roundup ... much enjoyed, busy all the time - *G2HLU*

A lot of fun so keep formula as it is - *G4KGK*

ATU caught fire at start - *G3VYI*

A brief entry, but last place is better than none - *G3ZGC*

G3AEZ

CW SECTION

Posn		Callsign	QSOs	Mults	Points
1	*	G3NKC	103	65	20085
2	*	G3GLL	96	67	19296
3	*	G4KGK	96	66	19008
4		G3TBK	107	60	18840
5		G3VYI	97	62	18042
6		G4ARI	95	63	17955
7		G3OXC	96	62	17856
8		G3JJG	94	63	17766
9		G3RSD	90	63	16632
10		G0IVZ	95	57	16245
11		G3KHZ	88	61	16104
12		G4EBK	89	58	15486
13		G4OGB	86	59	15222
14		G2HLU	87	58	14964
15		GW3WWN	84	59	14868
16		G3DPX	79	61	14457
17		G0IDE	76	57	12996
18		G3HKO	80	54	12960
19		G4SND	78	55	12815
20		G3GMS	75	57	12768
21		G4XPE	73	55	12045
22		GM4SID	81	51	11883
23		G5MY	74	52	11544
24		G0LZL	67	50	10050
25		G4OOS	68	48	9120
26		G3SB/P	61	48	8640
27		G3GMM	59	44	7788
28		GM3UM	56	42	7056
29		G3IZD	61	39	6784
30		G0CGB	51	39	5967
31		GW4HBK	55	33	5445
32		G0ADH	49	37	5402
33		G4ZME	50	35	5005
34		G3KKJ	50	32	4576
35		G3ZGC	42	34	4284
36		G3IGU	40	34	4046
37		G0GKH	40	29	3480

SSB SECTION

1	*	G3NLY	138	74	30636
2	*	G3TBK	119	71	25347
3	*	G4ARI	138	59	24426
4		G3NKC	87	63	16191
5		G3FNM	96	50	14400
6		G3FFH	91	53	14310
7		G3IZD	100	53	13939
8		GW4HBK	100	46	13800
9		G2HLU	82	45	11070
10		GW3WWN	91	47	10481
11		G0ADH	68	47	9588
12		G0GDU	55	41	6765
13		G3IGU	39	31	3503
14		GI0LRZ	28	24	2016
15		G0MJQ	29	23	1978
16		GM3UM	23	19	1311
17		G3GMM	23	19	1273
18		G0MTF	14	14	588
19		G3ZGC	10	9	270

* - Certificate Winner

1ST 28MHZ CUMULATIVE CONTEST 1991

Once again this series of contests was very poorly supported, with only five logs and one checklog received by the closing date! Ironically, the few who did enter seemed to enjoy themselves, although G2HLU felt it was "a lot of hard work for little reward".

There were several G stations worked by entrants whose exchanges indicated very respectable QSO totals ... how about an entry next time - you might be surprised at your placing!

Propagation during most sessions favoured the West, although the session on 8 May saw some European traffic and G2HLU worked 9V1OK in the CW section.

Thank you for your comments. G0AEV sent a most constructive letter with his entry and the points raised have been noted. Thanks also to G4RCG for a useful checklog from Club Station GX4NOK.

G4IQM

CW SECTION

Posn		Callsign	Points
1	*	G0AEV	324
2		G2HLU	272
3		GW3SB	107

SSB SECTION

1	*	G4WEY	713
2		G0FUV	483
3		G0AEV	449

COMBINED

1	*	G0AEV	773

* - Certificate Winner

CHAIN LETTERS

It is a long time since I last received a chain letter - so long that it is hard to date it precisely, but somewhere around 15 years ago seems about right. They were common then, along with 'Pyramid Selling' and any number of other con tricks intended to part us from our money. Eventually, legislation changes in the USA and UK made it (not always, but usually) illegal to participate, and this did away with most of them.

For those who may not be familiar with the beast, a brief description follows:

The letter contains an explanatory preamble, usually either threatening or cajoling in nature, followed by a list of names and addresses. The instruction is that the recipient should send a specified sum of money to the person whose name appears first on the list, then copy the letter a number of times, deleting the existing first name, and adding the recipient's own name/address to the end of the list. The copies should then be sent to friends or acquaintances. The letter always includes the strongest instructions not to break the chain. Eventually, when the recipient's name rises to the top of the list .... It's PAY DAY!

Taking a letter with a list length of only 4, a contribution of $1 and a copy factor of 20, let us apply a little analytical arithmetic. Assuming that everyone who receives a letter follows the rules, the originator of the letter receives $8000 when the third stage recipients contribute. For these third stage participants to be certain of receiving their $8000 each, then 168,400 punters must have been conned into the chain. If you get a letter where there are already 4 names in the list, then a minimum of 149,904,820 people will have had to pay up before your $8000 is guaranteed! That's a lot of people!

Why do I raise this subject, and why did I choose these factors? Funnily enough, I have just received a chain letter employing these parameters. My letter already contained a full list of four names (surprise, surprise!), three of which were well-known contesters from an Eastern-Bloc country, and was headed "FOR HAMS ONLY". Do we have that many Radio Amateurs world-wide? I think not.

And what was my response? Initially, annoyance that our hobby should be made the vehicle of such a low-down scam. Reason soon prevailed, however, and the rather pretty Bulgarian stamp now forms part of my daughter's collection. The remainder of the letter, excluding a small solid residue, awaits photosynthetic recycling courtesy of the local flora (I burned it). I would urge any other person who receives a copy of this letter to do the same!

G3UFY

VHF RESULTS

1ST 1991 23CM FIXED CONTEST

This new event generally proved popular with the entrants, with almost all reporting good levels of activity. There were however, a couple of exceptions to this feature, and with no apparent good reason (they were not remote from the main activity, nor did they declare poor stations). Conditions were slightly enhanced, particularly over the North Sea from the eastern side of the country, although stations further west were able to take advantage of the opening towards the end of the event. The biggest problem here however, was lack of activity from PA/DL until the end of the contest, when G4KUX netted around a dozen PA QSOs! Here, the committee is working to improve the level of coordination and awareness of our contest dates amongst the rest of Europe.

Logs were very variable in accuracy, with many perfect, but some not good at all - indeed, G8OPR's win was due to his excellent quality log. Congratulations and certificates go the the winners & runners-up in all sections, and we look forward to seeing good activity during the second event in October. *G4PIQ*

SINGLE OPERATOR SECTION

Pos	Callsign	Score	QSOs	Loc	Pwr	Ant	DX Call	km
1	G8OPR	5887	31	91FE	100	55Y	PA0EZ	479
2	G8IZR	5777	38	83RM	200	2.5m	PA0QC	552
3	G3WHK	4219	37	91VJ	100	55Y	G4KUX	374
4	G4DEZ	2969	20	01IN	15	4 x 55Y	G4KUX	379
5	G3MEH	2956	25	91QS	100	1.05m	DF0HS	468
6	G8HHI	2879	20	91OH	50	55Y	G4KUX	374
7	G6HKM	2801	21	01FT	10	43Y	G4KUX	347
8	G8GDZ	2702	24	92AK	100	4 x 23Y	G0BPU	220
9	G8ZQB	1910	17	92JN	50	27QLY	G4KUX	231
10	G8DQK	1449	14	83RK	2	55Y	G3WHK	277
11	G8REQ	1261	10	83KH	8	23Y	G6HKM	294
12	G8GFF	923	9	91XN	10	23Y	G8IZR	276

MULTI OPERATOR SECTION

Pos	Callsign	Score	QSOs	Loc	Pwr	Ant	DX Call	km
1	G4KUX	12970	40	94BO	200	8 x 23Y	PE1MPT	600
2	G1ZMS	420	4	90WX	200	2 x OLY	G8IZR	320

OVERSEAS SECTION

Pos	Callsign	Score	QSOs	Loc	Pwr	Ant	DX Call	km
1	PE1EWR	1313	5	11SL	50	23Y	G4KUX	501

144MHZ CW CUMULATIVES 1990

The number of entrants and the number of participants bear no relationship to each other. If you wish to keep the contest please support it this year. Certificates to Andy and the Venerable VHF Manager Sir. G0CLP's locator missing because the adjudicator put him in Holland JO21RL! *G4DEZ/G8HHI*

Pos	Call	QRA	Pts	Best DX	Km
1	G4PIQ	JO01MU	1188	Y23ZI/P	724
2	G4ASR	IO81MX	976	PA3BAS	582
3	G4ERG	IO93SR	850	G0KON	356
4	G0CLP/P	-	746	PA3BAS	540
5	G4WKN	IO92OG	655	GI4OWA	523
6	GI4KSO	IO64XK	558	G4PIQ	552
7	G4OUT	IO92AT	415	GM4CXM	381
8	G3JJZ	JO01AJ	291	G1DWQ	287
9	G4ZVS	IO92BK	288	GM4CXM	422
10	G1SMD	IO90AR	167	G4ERG	348

Checklogs received from G4PTE & G4XPE.

144 MHZ JANUARY 1991

Congratulations to G4PIQ who again wins this contest in the single operator section and also to G4FKA in the Others section. Certificates go to both and also to GW4VEQ as runner up.

Activity was very low but that seems to be the norm for all activity on bands VHF and above.

G8HHI

OPEN SECTION

Pos	Call	Pts
1	G4FKA/P	487
2	G3ZYP/P	54

SINGLE OPERATOR FIXED

1	G4PIQ	1031
2	GW4VEQ	691
3	G4WKN	670
4	G4HUP	603
5	GM4AFF	511
6	G0CUZ	383
7	G4OUT	308
8	G0ADH	303
9	G4ZTR	209
10	GM0NXP	238
11	G3FPK	186
12	G3KZR	164
13	G0BYA	25

RSGB VHF CONTESTS CALENDAR - 1991

5/6 Oct	432MHz-24GHz SWL and IARU (Mar 91)
8 Oct	1.3 & 2.3GHz Cumulatives (Mar 91)
16 Oct	432MHz Cumulatives (Mar 91)
20 Oct	70MHz CW (Mar 91)
23 Oct	144MHz CW Cumulatives (Mar 91)
24 Oct	1.3 & 2.3GHz Cumulatives (Mar 91)
27 Oct	2nd 1296MHz Fixed/SWL (Mar 91)
1 Nov	432MHz Cumulatives (Mar 91)
3 Nov	144MHz RSGB CW (Mar 91)
2/3 Nov	144MHz CW Marconi/RSGB 24 Hour (Mar 91)
8 Nov	144MHz CW Cumulatives
9 Nov	1.3 & 2.3GHz Cumulatives
17 Nov	432MHz Cumulatives
25 Nov	1.3 & 2.3GHz Cumulatives
1 Dec	144MHz AFS & Fixed & SWL (Mar 91)
3 Dec	432MHz Cumulatives
10 Dec	1.3 & 2.3GHz Cumulatives

A full list of 1991 RSGB VHF Contests appears on page 65, December 1990 *RadCom*. Dates of publication of rules in *RadCom* are shown in brackets.

Northern Lights Contest Group cleaned up at the VHF Convention, being awarded the Telford Trophy (50MHz), the VHF Committee Cup (23cm), the G6ZR Trophy (13cm), the 1951 Council Cup (70cm), the Mitchell Milling Trophy (144MHz) and the Surrey Trophy (VHF NFD Open). Left to right at the back - G4APA, G4GCM, G4CJG, G1GEY, G4KUX; with G4UJS (l) and G4XUM in front. Bob Harrison, G4UJS, was appointed the RSGB' Trophies Manager recently, presumably to save on postage costs!

DIRECTION FINDING

BANBURY QUALIFYING EVENT

As 21 teams assembled at Kineton High School, Warwickshire, good signals were received from both stations. It soon became obvious that the hidden stations were located 180° apart, ensuring that navigators would not have an easy afternoon.

Tx A, G3TRY/P, was located just 11km from the start, 6km NE of Stratford upon Avon, the crew nested in a hedgerow between two wheat fields. A hidden wire fed into 1200ft of aerial laced through woodland running down steep slopes to the Avon. In places near vertical-drops of over 100ft caused competitors to think before they leapt. Most teams spent lengthy climbs up and down towards the river only to discover later that no physical activity was required to reach the hidden station. Two competitors surprised the operators by checking in before 1400, whilst one team spent over two hours searching without reward.

Tx B, G4MDF/P, was located 22km from the start, 7km SE of Banbury, on the banks of the Cherwell. Only six teams attempted this station first, and were rewarded by a DFers delight. The site was surrounded by river, canal, mainline railway, motorway and a dark marshy wood not shown on the OS map. The aerial, also 1200ft long, ran along overgrown river banks, through hawthorn thickets, deep into woodland, ending in a dark watery hazard. Nearby wire fencing also formed part of the aerial and served to draw contestants through woodland and onto the canal banks. One competitor having found his first transmitter before 1400, confused by signal strengths, decided to walk over 7km cross country. Fellow competitors took pity on the bedraggled soul, and ensured that his car was delivered close to the hidden station to ease his discomfort.

Afterwards 55 people sat down to tea at Hardwick Community Centre, Banbury. Andy Mead was presented with the Banbury Amateur Radio Society Shield. Then Andy and Brian Bristow took time to explain how easy the days events had been.

Pos	Name	Club	Time at Tx A	Time at Tx B
1	A Mead	Colchester	13.52	15.23
2	B Bristow	Mid Thames	14.21	15.24
3	A Collett	Colchester	14.30	15.28
4	C Plummer	South Manchester	14.35	15.30
5	D Holland	South Manchester	14.19	15.32
6	K Howell	Mid Thames	14.43	15.34
7	G Foster	Mid Thames	14.21	15.44
8	G Whenham	Coventry	16.02	14.31
9	T Gage	Mid Thames	16.03	14.51
10	B Gray	Mid Thames	16.04	14.51
11	C Wells	South Manchester	16.05	14.52
12	J Drakeley	Slade	14.54	16.09
13	P Clark	Torbay	14.56	16.12
14	D Newman	Northampton	14.34	16.12
15	P Tyler	Mid Thames	14.56	16.12
16	J Hall	Ripon	14.45	16.12
17	M Standon	Mid Thames	13.57	16.18
18	P Lisle	Mid Thames	16.24	15.19
19	B Pechey	Mid Thames	16.26	15.29
20	R Goodeart	Mid Thames	14.33	-
21	A Lisle	Mid Thames	16.05	-

A. Mead and C. Plummer qualify for the National Final.

TORBAY QUALIFYING EVENT

Despite more than an inch of rain, twelve courageous teams took part in this 160m competition. Two good signals were received at 'windy corner' by all teams, including two local entrants taking part for the first time in a national qualifier.

Special thanks must go to the brave transmitter crews who had to grin and bear the worst of the weather all afternoon with little or no protection to provide the awkward hides to 'entertain' the visiting teams.

Even with the elements in our favour and with all the guile, dummy antennas, long run-ins and local geography, both hidden stations were still found in less than two and a half hours by the winner. Others had more trouble and many explanations were to be heard at tea.

Pos	Name	Club	Time at Tx A	Time at Tx B
1	D Brocks	Chelmsford	14.44	15.59
2	B Bristow	Mid Thames	14.43	16.28
3	D Newman	Northampton	14.45	16.29
4	B Gray	Mid Thames	14.35	-
5	T Gage	Mid Thames	14.41	-
6	A Collett	Colchester	15.21	-
7	B Pechey	Mid Thames	15.29	-
8	G Nicholls	Banbury	15.30	-
9	A Stafford	Torbay	15.59	-
10	G Foster	Mid Thames	-	16.30
*	G Whenham	Coventry	14.44	-

* George unfortunately did not arrive at the start until well after the end of the first transmissions and is therefore unplaced.

One competitor failed to find either transmitter.

MID THAMES QUALIFYING EVENT

This was hotly contested, with temperatures in the 80s and a mile run into both transmitter sites from the nearest road.

Tx A, G3UJO, was located in dense scrub in Odell Great Wood, 11km NW of Bedford and 22km from the start where the high, lengthy aerial produced a very strong signal. The well-hidden operator proved hard to find for the first few contestants.

Tx B, G3NCL, was located at the tip of a triangle of woodland on the Beds/Cambs border nr Hinxworth. This proved slightly easier to find, and five of the teams clocked in within a few minutes of each other here, ending up just seconds apart at the A station, with Chris Plummer of the South Manchester club just beating Brian Bristow to first place.

Pos	Name	Club	Time at Tx A	Time at Tx B
1	C Plummer	South Manchester	15.36.30	14.33
2	B Bristow	Mid Thames	15.36.50	14.30
3	B Gray	Mid Thames	15.37	14.31
4	M Standen	Mid Thames	15.37.10	14.30
5	G Whenham	Coventry	15.37.20	14.32
6	G Foster	Mid Thames	15.39	14.32
7	M Williams		15.41	14.33
8	A Collett	Colchester	15.57	14.32
9	C Wells	South Manchester	14.44	16.07
10	D Holland	South Manchester	14.45	16.12
11	T Gage	Mid Thames	16.20	15.15
12	D Gething		15.07	16.26
13	A Mead	Colchester	15.09	16.27
14	B Pechey	Mid Thames	15.36	16.28
15	J Hall	Ripon	15.36	16.29
16	P Tyler	Mid Thames	16.30	15.16
17	R Goodeart	Mid Thames	-	15.19
18	D Newman	Northampton	-	15.20
19	M Mallinson	Banbury	15.37	-

M Standen and G Foster qualify for the national final.

RESULTS OF SLADE QUALIFYING EVENT

Hartlebury Common on the Kidderminster and Wyre Forest map was the chosen start for the Slade Qualifying round, a good venue marred only by a cool breeze, showers and radio interference from the Droitwich transmitter, which caused difficulty with some competitors in sense determination.

Twenty teams lined up on the starting grid and with good signals heard from both transmitting stations; only one competitor was left at the start by 1332, two minutes after the permitted departure time.

Tx A, G3SRS/P, was located 7 miles south west of the start, hidden in thorn bushes next to a hillside quarry at Penny Hill, NGR 725618. The transmitter was on a public footpath, which was difficult to define from the undergrowth.

Tx B, G4FGF/P, was some 16 miles north from the start at Bridgenorth, NGR 729927, hidden beneath a fallen tree, near to power lines, with a long aerial for competitors to follow.

The decision as to which station to find first was evenly divided between the competitors but at the end of the contest only 11 teams had found both transmitters in the allocated time.

52 people sat down to tea at Kinlet Parish Hall to hear the results of the contest.

Dick Brocks and Brian Bristow qualified for the 1991 National Final which is being organised by the Northampton Radio Club at the end of September.

RESULTS

Pos	Name	Club	Time at Tx 'A'	Time at Tx 'B'
1	M. Hawkins	Chelmsford	14.32	15.37
2	R. Brocks	Chelmsford	14.31	15.57
3	P. Lisle	Mid Thames	14.39	16.03
4	T. Gage	Mid Thames	16.05	15.04
5	B. Bristow	Mid Thames	14.30	16.06
6	G. Whenham	Coventry	16.07	15.11
7	C. Plummer	South Manchester	16.09	14.50
8	G. Blomley	South Manchester	16.21	14.58
9	R. Grey	Mid Thames	16.22	15.36
10	C. Metcalf	South Manchester	16.28	15.02
11	R. Goodeart	Mid Thames	16.29	15.22
12	A. Collett	Chelmsford	14.47	-
13	C. Merry	Dartford Heath	15.19	-
14	G. Nicholls	Banbury	15.33	-
15	G. Foster	Mid Thames	15.45	-
16	P. Tyler	Mid Thames	16.02	-
17	D. Newman	Slade	16.08	-
18	M. Standon	Mid Thames	-	16.11
19	I. Mackie	South Manchester	16.13	-

One competitor failed to find either transmitter.

18	M. Standon	Mid Thames		

DOES YOUR CLUB DO DIRECTION FINDING?

The RSGB's ARDF Committee is compiling a directory of radio clubs which run direction finding competitions or 'foxhunts'. They would like to hear from you if your club stages such events, whether on top band, two metres or anywhere else. Write as soon as possible please to the Chairman: RSGB ARDF Committee,

PHOTOGRAPH: GEORGE WHENHAM

Derrick Newman G4AKL (holding DF receiver) celebrated his 75th birthday at the Banbury 160m ARDF qualifying event in July (see above).

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DRAKE SSR-1 communications Rx, vgc, used very little. All good offers considered. Buyer collects. Phone Jim (evenings) (London) 071 727 2141.

EDDYSTONE 1650/2 professional quality HF RX in mint cond with man. 6 Xtal filters and cathodean frequency standard fitted: £1700. Marconi 2540 HF RX in unused cond. 4 Xtal filters, freq standard and RF tuner fitted. FSK and AFC options and full documentation

supplied. Built to exact mod spec. Contact Michael O'Beirne 081 686 5000(day) 0372 462268(eve).

EQUIPMENT of the late G3AO - Kenwood TS830S plus Shure mic model 444D: £525. (Whaley Bridge). 0663 732005.

FC 102 ATU 0-1200W, new coupler and peak hold circuit boards, recently renewed. All bands covered: £145 plus p&p or collect. (Tarvin) 0829 40020.

FT101 Mk 2 12v/240v, fan, WARC bands, new PAs, gwo: £250. KDK2025 2m 25W mobile, gwo: £100. FR50B/FL50B, need TLC: £90 pair. Buyers inspect and collect. G3TZL QTHR (Petersfield) 0730 821667.

FT101EE FL2100B Both VGC: £650. Liner 2 2m SSB VGC: £75. FT708 Base charger 3 Nicads spkr mic: £125. Dymar lynx FM 70.450, 70.425: £60. Pye pocketfone 70, 70.450: £45. would PX for 23cm handie. Peter G8EUX. (Towcester) 0327 53522.

FT101Z desk mic, fan, some WARC bands fitted VGC: £350 ono; Heathkit variable high voltage PSU. £20ono. (Portsmouth) 0705 596874.

FT102 with AM FM narrow CW SSB filters amplified desk mic. FTV-901R with 2,4,6m and Sat. Tokyo Hy-Power HC 2000 ATU: £950. (Bristol) 0272 649257.

FT23R 2m FM h/held tcvr 2.5W output, virtually unused, incl rechargeable bttries and chrgr. G6ITY (Abington, Cambs) 0223 891 997.

FT290R scruffy but works well Nicads charger case mobile mount 2 ants boxed: £185. AEA PK232 boxed manual: £180. SONY ICF200ID boxed: £185. Collins 75SI 110v H/book: £175. WD 2FDD+2HDD 16 bit card: £25. Western PM2000 PEP Wattmeter 2KW: £35. (Peterborough) 0733 79079.

FT727R dual band h/held, 5W output, VOX, sp/mic, nicad and charger, 5/8 tele whip and case: £240. P/ex for 70cm linear? (Lutterworth) 0455 552449.

FT747: £350, FP700 20amp PSU: £130, SP767 spkr: £30, Nevada TM1000 2KW ATU, all inputs: £130, ERA BP34 audio filter ex quality: £60. All ono. Paul GJ0KYZ QTHR. (Jersey) 0534 71233.

FT77 with matching ATU pwr pack, sml rack. Mint cond. G2CYN (London) 071 935 7119 (days) also QTHR w/e.

G2DAF HF linear 80-10m incl sep PSU. Large and heavy units: £150. Prefer buyer collects. G3LOU QTHR. (Essex) 0376 23429.

HEATHKIT HW100 with mic and HB PP: £100. Solartron CD1014-3 scope: £45. Daiwa CN520 PWR/SWR meter: £30. Philips 12in green monitor: £30. SOAR FC841 counter: £25. SSM Europa trnsvtr 28/144: £25. Microwave modules convtrs 144/28: £10. 432/28: £10. (Cheltenham) 0242 528431.

HEATHKIT HW101 tcvr PS23 power supply HB1410 electronic keyer YD148 dual impedance mic, 8 yrs old, one owner, ex condx: £300. (Hereford) 0432 269953.

HF5B Butterfly antenna 5 band 2-el beam with manual. Buyer collects: £198 or pay postage. 2m Jaypole: £6. G3DHH QTHR. (Near Yeovil) 0935 881365.

HI-GAIN TH2 + Balun. Good cond: £120. 10ft section ham tower: £40. 8 element 2m J beam: £10. KW77RX: £90. 28McFM+Linear: £40. (Mold) 0244 815989.

HOMEBREW 6 band G3 TSO design with LCD and peak notch filter: £125. 14AVQ, new: £50. 25A 13.8v switching PSU: £25. Microwave modules, ASCII to Morse converter: £25. Wanted TS130s. G4ILA not QTHR. (Walkden) 061 790 2338.

IBM-XT compatible computer - G4OK, 20MB-H/D, 3.5 & 5.25 floppy drives, mono monitor MSDOS 3.3 Microsoft Word etc, gd condx: £400. G5LP QTHR (Wellingborough) 0933 279539.

ICOM 290D 2m 25W m/mode: £300. BNOS 12/10E power supply: £75. Both ex condx. 9-ele crossed Tonna free if both above purchased. Ideal starter stn for new licensee. Datong Morse Tutor: £35. (Hitchin) 0462 814827.

ICOM 71E gen cov FM board, mint cond: £550. Lowe HF-225 keypad, almost new: £335. Yaesu FRG7700 FRT 7700 VHF, ex cond: £350. (Southall) 081-571 5759.

ICOM 720A: £550. AT500: £395, PS20: £100, FT727 2m/70cm handie with accessories: £295, DATONG D70 Morse tutor: £45. Marconi marine Morse key £80, SEM QRM Eliminator: £35. SEM noise bridge: £28. All little used, bxd in ex cond. G0OPG. (Wilmslow) 0625 531154.

ICOM 735 with CW filter 40A power pack Tokyo high power ATU, going QRT: £850. Buyer collects. (Mullion, Cornwall) 0326 241044.

ICOM IC-740. FM board IC-SP3 spkr, both mint and bxd: £495. Microwave Modules 435MHz TV Tx and separate Rx module: £100. Daiwa auto ATU cross pointer SWR/power, 200W: £75. HF 3-band vertical aerial: £30. 70cm 48-el m/beam: £25. Megger Wheatstone bridge yellow case: £40. May P/X anything for pro video equip. Paul G6DQK (Stalybridge) 0457 833577.

ICOM IC47IE 70cm base station: £500. DAIWA automatic ATU 500W pep: £70. Jaybeam TBI: £90. Dressler 70cm masthead pre-amp: £95. Offers. (Leamington Spa) 0926 452085.

ICOM IC551 50MHz 10W M/mode with PBT and INTL PSU. Bxd with desk and hand mics and full Svce MAN: £395. Peter G8BCG. (Amersham) 0494 727445.

ICOM IC71E HF Rx: £500. Kenwood TR75IE All modes mobile Tx/Rx: £425. Daiwa PS120M 13v PU: £45. Yaesu 2700RH mobile 144/432MHz dual band Tx/RX: £250. Yaesu FRG880 HF Rx: £450. Trio TR2500 plus nicads charger: £150. All orig cond. G0PJI. (Plymouth) 0752 775375.

ICOM IC735 incl matching PS55, HM12 mic. Boxes h/book. No split, No offers, Immac cond: £795. G3RHM QTHR. (W London) 081 423 2329.

ICS PC-FAX system: £50. CAPCO receive loop RMA-2 10-30MHz: £45. 50+ orig 5.25in Shareware disks: £25. G8SEE QTHR (Camborne) 0209 716526.

JAYBEAM 88-ele 70cm Yagi: £50. 10/15m compact 3-ele Yagi: £70. Wanted, complete HF quad (not gem) TH3 Tribander. Driv-ele for Tonna 21-ele 70cm Yagi. .Combined 2/70cm Yagi for satellite. Yaesu FAS-1-4R antenna switch. Mike (Horsham) 0403 732851.

JRC Rx NRD 525 90KHz to 34MHz RTTY CW SSB AM FM Fax, bxd as new, hardly used, selling due to ill health. Bargain at: £695ono. Dressler ARA30 active antenna: £25. Trio 215E h/held, some accessories: £210ono. G7GMZ (Bournemouth) 0202 593129.

KENWOOD 215E Almost new with 3 power packs, case, charger etc: £165ono. G0KIE QTHR (Greenford) 081 575 2671.

KENWOOD 751E all mode 25W, 2m tcvr, little used, mint cond: £425. FT101ZD MkIII with FM (FT277ZD) all band FM, DC/DC cnvtr for 12v working etc, mint cond: £425. (Tunbridge Wells) 0892 32095.

KENWOOD TH-26E h/held plus spkr mic, headset, car lead. 1 year old, little use, as new: £250 or will consider IC-25E/T exchange. Stuart G7IJP (Langport) 0458 250124.

KENWOOD TS140S all band HF tcvr: £600. YAESU FT736R 70, 2, 6m: £900. BNOS 100w amp + preamp: £150. Much more. G0LFF QTHR. (Burgess Hill) 0444 248423.

KENWOOD TS140s: £650ono, YAESU FP107 power supply, built in spkr: £85, AT120 ATU: £65. The lot for £750. G4YGA QTHR (Norwich) 0603 406234.

KENWOOD TS530S Mint: £475. Collins 5 Line 7551, 3251, 516F-2: £475. HeathKit SB102 + SB600: £175. Datong RF Speech clipper: £25. G4LW QTHR. (Trowbridge) 0225 753166.

KENWOOD TS940S May 1990, ex condx, with auto tuner: £1300. G5KJ QTHR (Liss) 0420 472105.

KW500 linear amplifier. Uses one 813 valve. 500W PEP. Built-in PSU. 21.5x14.5x11in, 75lb, plus extras: £65. G3WCY SSTV cnvrtr with PSU RadCom Feb 83: £35. 8in b/w monitor, tatty but gwo: £5. G4ENA SSTV Tx parts: £15. G4IYI (Chorley) 0257 273976.

LARKSPUR C12 with ATU, J1, PSU for 24v, some other bits, cables offers or PX for 2m 100W linear. G7COU. (Knaresborough) 0423 860367.

LINEAR KW600: £230, plus £5 p&p. Antenna rotator KR600 with spare ring gear: £100. ED4EIP QTHR. (Isle of Man) 0624 801 353.

MOSLEY TA33 trap master 3ele HF tribander 10/15/20m. Good SWR. All bands: £95. Nigel G0BNR QTHR. (Ramsey) 073129 388.

OLD BOOKS 1920s on handbooks RSGB, ARRL, encyclopaedias, DATA, servicing oscilloscope 1950s predictor. Offers. G1KPU (Eastbourne) 0323 38345 (after 6pm wkdays).

PC COMPATIBLE computer, 286-12 processor, 45MB hard drive, VGA monitor, 5.25, 3.5 drives, mouse, s/ware etc, 8 months old: £650ono. Includes new printer. Datong FL3 filter: £70. Icom SM8 desk mic: £45. Icom IC3220H 45/35W dual bander, 6 months old: £400. (Wigan) 0942 521210.

PHILIPS PM3400 sampling scope 200ps RiseTime:£45, Televideo Dumb RS232 terminal: £20, Pye Cambridge on 4m AM: £30. G4LUN QTHR. (New Milton) 0425 611084.

PK232 MBX: £230. FT790R/1: £230. FT690/1: £230. FT290R/1: £230. FT290R/2: £300. FT726/R with 2.70cm modules: £650. Heath HW8: £100. Alinco DJ160: £165 u/gart. Wanted FT736/R CW all modules 50 to 1296 + sat. mod. Satellite ant system. (Maesteg) 0656 738353.

QRT sale ICOM IC735: £750. YAESU F757GX II: £750. Daiwa PS313 II PSU: £90. DIAMOND Sx200 SWRmtr AMComm ATU: £50 each. All ex cond. (Isleworth) 081 560 0522.

R206 + PSU + LF adaptor: £120. National HRO + PSU + coils: £65. RAI7L: £125. 22 set + PSU etc: £120. 19 sets Mk 2/3 British, American, Canadian + PSU etc: £60 - £100. 18 set: £75. YAESU FT200 + PSU tcvr: £150. Taylor valve tester CT45: £35, Marconi Atalanta Rx: £100. Everything original. Pre-post war valves, New s/hand. Dave (Eastbourne) 0323 38345 (after 6pm w/days).

SECOND Edition amateur radio handbook 1943: £315 ovno. Also RadCom 1964 to 1990 with binders, 87-88 incomplete. Sensible offers only. (Blandford) 0725516394.

SHACK clearance. Yaesu FTDX401. Modified CB for 10. KW E-ZEE match HY-GAIN power and SWR meter. Datong universal speech clipper. RadCom 1983-1990. Heathkit RF power and SWR meter. Valves incl 6146 and 6KD6 light rotator. Coax cable. Many more items too numerous to list. Can be viewed and offers invited. Buyers to collect. Near junction 25 M25. G3WMO QTHR. (Enfield) 081 363 5814.

SIX Metre rig FT69011 with homebrew 15w linear, vy little used: £300ono. G4JQY QTHR (Stockport) 061 432 7310.

STRUMECH versatower BP30 30ft mini tower complete with top bearing, little used. Ideal for small gardens. Buyer collects: £270. G0BHX (Cannock) 0543 574564.

TEN-TECH Century 22 Tx-Rx, mint: £250. AOR2002 scanning Rx, mint: £250. BNOS LPM 144-3-100 linear amp: £100. Kenpro RC400 rotator: £80. Ham Concorde II converted 28-29.8MHz DTI approved: £100. Yaesu FT290R Mk I, mint: £250. (Pontypool) 0495 757221.

TH-47E latest Kenwood 70cm h/held, mint. List £275 - will accept £225 or exchange HF-QRP Rig/Kit - TS120V/FT7 preferred. 70cm 2x5/8 magmount colinear: £25ono. 6amp PSU: £10. Garry G4IZL. (Tamworth) 0827 282607 or 021 328 5455 ext 3496 (work)

TOWER 3x10ft sections, 15in sides. Sensible offers. G8HVS (Bristol) 0272 512719.

TOWER BP30 complete, unused. HF5B beam. 8-ele Jaybeam. HD rotator. HF linear 400W. Wanted G3TSO part-built. Circuit diagram Cossar 1049 MkIII. (Warminster) 09856 301.

TR9130 2m Mutimode. Immac: £395. (Swansea) 0792 299342.

TRIO JR599 HF amateur bands (not WARC) Rx. With all modes and narrow filters. Good cond with matching SP599 spkr. Complete with instr and service mans. Analogue dial: £160ono. Richard G8ITB (Bromley) 0689 852177.

TRIO Kenwood TS700G 2m all mode base stn with Mutek pre-amp fitted 8 repeater xtals and external digital frequency display: £230. G4BRX QTHR (Cheltenham) 0242 675321 or 673150.

TRIO R2000 receiver: £370. (Swansea) 0792 299342.

TRIO TR2300 2m FM TCVR with matching VB2300 linear amp. Both boxed and excellent cond: £115. G4MLI (Cornwall) 0840 770344 (after 6.30pm

TRIO TR9130 2m m/mode VGC. Complete mobile set-up and base station equipment incl OSCAR 2NE 7/8 WAVE mobile antenna. KENWOOD SWR/PWR Mtr base. DIAWA CD45 rotator complete 2m OMNI direction antenna: £400ono. Graham G6FYP (Glossop) 0457 864144.

TRIO TS4000A 2/70 FM tcvr. Mint condn. Bxd: £375ovno, carriage at cost. G4UEN QTHR. (Southampton) 0703 433837.

TRIO TS520: £275, Trio TS700G: £260, YAESU FRG 7000: £175. Trio 70cm TR3200: £95. All GWO ono. G3BWI. (Preston) 0772 743098.

TRIO TS930S auto antenna tuner 500Hz and 6KH xtal filters fitted, h/book, bxd, gd cond, gwo: £899 with free Datong auto Woodpecker blanker in mint cond. Daiwa CNW-919 2m antenna tuner with crossed needle SWR and power meter. Will handle 300W CW, mint, bxd, h/bk: £90. Kenwood PS30 power supply, 20amp 13.8 VDC, bxd, mint, h/bk, bargain: £90. G3HSW QTHR (Wylam) 0661 853676.

TRIO TS930S. Internal auto antenna tuner, good cond, gwo, fitted extra 500KHz and 6KHz Xtal filters. Handbook, boxed, Free, mint cond Datong auto woodpecker blanker with handbook: £899. Gd cond Palomar VLF cvtr, h/book: £20. Two meters DAIWA antenna tuner, 300W crossed needle SWR and power meter. Mint, boxed, h/book: £90. Mint four way antenna switch: £10. G3HSW QTHR.

TS4405 2-4 1.8 filters voice synth auto ATU matching spkr: £885. MFJ 1278 TNC: £150. PXWWII radios WHY. G4WZU QTHR (Grantham) 0476 7614047.

TS440S with ATU, as new: £850. PK232MBX: £240. 286 computer colour monitor 40MBHD 1.44 1.2 drives: £650. all as new. (Norwich) 0603 624573.

TS8305 HF tcvr as new: £750. (Swansea) 0792 299342.

TS8305 with both 500Hz filters, VFO 120 and MC50 mic: £800. Yaesu FL2100Z little used: £550. Mr P Hicks G4DVP (Weston-Super-Mare) 0934 516605.

TS930S YG455C, YK88C, MC60A service manual, 5XXXX Serial No, no mods, recent Lowe check: £975. Steve G4EDG. (Exeter) 0392 216579.

TWO recording potentiometers, one needing attention. 10in charts, heavy. Buyer collects. Offers. Also 2 manual potentiometers 0-2V to 1 microvolt. Believed in good order. Offers. G8DPS QTHR (Surbiton) 081 399 8787.

VALVE SALE. 1200 types. battery, miniature, octal, loctal, VHF transmitting etc. First class sae for list. G3MDQ QTHR. (Birmingham) 021 354 9972.

VIBROPLEX Iambic chrome paddle, perfect cond: £70. AEA micropatch M P 1 plus s/ware leads CW RTTY amtor: £60. G4CJY QTHR. (High Wycombe) 0494 530018.

WG16 circulators: £25. WG16 WG18 wavemeters: £15. Solid state amplifiers 2.5-3.5 GHz 5mW o/p 21dB gain: £15. Waveguide bits G3XMB QTHR. (Essex)

YAESU FT-73R 70cm handheld, CTCSS, service man. Nicads, boxed: £160. PYE PF2UB 2m handheld, Xtalled: £7. QM70 70cm PA, 2C39, blower: £15. MASCOM computer, cased, wking: £15. TEKTRONIx RM-45 oscilloscope, plug-in valves, working: £15. 6U, 19in steel cabinet: £3. PYE AM25T low band: £1. Buyer to collect. (Birmingham) 021 747 2438 (7-10pm).

YAESU FT101 Mk 2 with mic fan and CW filter. One owner from new: £265. Buyer to collect. G3NEZ QTHR (Hull) 0482 802624.

YAESU FT200 power supply spkr mic: £150. Yaesu FC902 ATU: £65. QSO test by appointment Eddison rcvr: £25. (Portsmoth) 0705 256969.

YAESU FT23R 2m H/H, Mint cond four mths old plus quarter wave mobile limpit antenna: £190. G3WGF. (Doncaster) 0709 588398.

YAESU FT77 fitted FM/CW filters. FC700 ATU. FTV707 tvtr 144Mc/s. FV707DM memory unit. Mic MHIB. Table mounting frame. Datong processor perfect order: £950. Samson keyer ETM 5c, perfect: £55. DRAE 3 way ant switch: £15. Micronta power SWR meter: £10. AEC power SWR meter: £10. SEM VHF converter: £45. Sinclair spectrum printer: £15. Smiths Spectrum recorder: £15. All items VGC. G3OAZ QTHR. (Basingstoke).

YAESU FT780R 70cm. M/mode tcvr, 10W, good cond with accessories compatible with satellite use: £255. G3UKV QTHR. (Telford) 0952 255416.

YAESU FT901DM TX/RX All extras fitted, mic, manual, and orig box: £475 inc p&p or swap WHY. Anything considered. Andy GD7JQI (Isle of Man) 0624 626080.

YAESU FT902DM mic h/phones, gd cond, with man: £530. Carr incl. John G4YDM QTHR (Washington) 091 4162606.

YAESU FTDX401 TCVR matching ext VFO matching speaker: £250. M/M432/28 TVTR: £75. M/M432/144 TVTR: £45. PW meow 6m/144: £30. wanted 6m TCVR swap?. (Southend) 0702 617708.

YAESU/SOMMERCAMP FT690R bxd rarely used: £225. Sun KG209 7/8whip c/w mobile mount: £10. DeeComm 5 ele 6m beam sealed, never opened, as new 9dBD gain: £25. Dave G1SYZ QTHR. (Plymouth) 0752 344685.

YD148 desk mic unsuitable for own rig would suit FT101EK. (Workington) 0900 67226.

YEASU FT301 7-band HF tcvr 100W, gwo: £250. FT207R h/h, charger: £80. Buyers inspect and collect. G4WWG QTHR. (Skelmersdale) 0695 28740.

ZENITH 32MB hard disk, mono cga, DOS 3.3plus, lots of software: only £285 for quick sale. G4UHM not QTHR (Brentwood) 0277 355731.

ZENITH Trans - Oceanic valved portable SW Rx, collectors item, needs some realignment. Offers? (N Devon) 0409 28 366.

WANTED

AUSTRALIAN Auto Morse Bug Key in good cond. G3JPC. (Kent) 0474 872743.

URGENTLY wanted Icom IC700PS power supply or would consider complete IC700T/R plus power supply get-up. Cash waiting. G0MZO QTHR. (Lincoln) 0522 538842.

1154 amp meter; DF meter; J switch; plugs; Jones plugs, 8 pin. Also R109 larkspur equip C13, B47, B48, ATU No 10. Will buy or PX amateur equip. Len G4WZU QTHR 0476 74047.

22SET required by collector. Also WS19 High Power Amp, WS68, ZC1, CDN 52, WS76, R107. Is there one in your garage, loft or shed? Copy of Royal Signals pocket book, Radio data 1956 also sought. Loan or purchase. Martin G4NCE QTHR. (Birmingham) 021 357 6139.

MEMBERS' ADS

ALL BAND HF TX AM/SSB/CW C/W PSU mic straight key also headphones for EDDYSTONE model 730/1. G3MEG QTHR. (Welling, Kent) 081 312 0639.

AMT1 with s/ware for BBC or IBM PC. (Manchester) 061 439 4952.

BOOKS - ANTENNAS vol I&II by Roubine & Bolomey Pub: Kogan Page; The practical aerial handbook by G King; TV and other receiving antennas by A Bailey, Pub: John Rider USA; Antenna tests and measurements by Hooton, Pub: R&E W; Any other books on antenans, propagation, telecomms etc. G3REP QTHR.

CIRCUITS and Alignment details of h/helds Pye Pocketphone P5001 and Pocketphone 70. Expenses paid. G8ALM QTHR.

FOR Nat Wireless Museum - 1082/83, Pilot radio, Lissen valves, old wireless books, mags, catalogues, mics. G3KPO/GB3WM QTHR (Ryde IoW) 0983 67665.

FT401 for Open University radio club G0OUR. selling: IC751A plus extras. Offers. Kenwood MC50 Mic £35. (Northampton) 0604 766325.

FT680 or FT140, also Trio 120v. Also any QRP gear. Transistors or valved. G2CYN (London) 071 935 7119 (days) also QTHR w/e.

FT726 70cm module. Also ICOM IC1271 or IC1275 or other 23cm m/mode. Peter, G8EUX. (Towcester) 0327 53522.

HANDBOOK/Circuit diagram for Labgear LG50 AM/CW HF TX. Also old style maroon coloured RadCom and SWM Easibinders. (Nottingham) 0602 604563.

KENWOOD digital VFO type VFO230. G3IRM. (Bury St Edmonds) 0284 754318.

KENWOOD SWC-1 and SWC-2, 1.8mc-150mc and 150mc-450mc. External couplers for SWR200 SWR and power meter. (Warrington) 0925 756472.

RCA AR99D Rx, must be in superb cond with no mods. Well above average price for correct item, or various clandestine sets in excellent cond offered in exchange or P/E. Also various Collins items offered for sale or exchange. KWM2A, DM2, Sline, TxRx, power unit, power meter. WHY. G4LBY QTHR. (Mansfield) 0623 29473 (eve or w/e).

ROTATOR/Control Unit for 4-el Yagi, cash awaiting. Buyer collects.G3JLB QTHR 0474 634694.

SP230 Trio speaker. Must be in mint cond. (Leicester) 0533 741234 (day) 0533 768034 (eve).

STILL required: UX valves 10 or 210, 50 or 250, 81 or 281, etc. Good price paid or excellent alternatives for exchange if necessary. Bernard Litherland G4IMT QTHR (Chippenham) 0225 891254.

TOWER crank-up 40/60ft head unit with or without rotator etc. G0MPH QTHR (Bristol) 0272 862059.

TRIO grid dip oscillator model DM801. Must be complete and gwo. Des G0JCF QTHR. (Ruislip) 0895 633118.

WANTED Daiwa CS401 antenna switch, Altron AQ620 beam antenna, DL1000 dummy load trio SP120 Spkr, MC35 mic TS2300 2m. Dave (Norwich) 0603 745512.

YAESU FC767 or FC700 matching ATU for FT707 also FP707, fair price paid, also instruction manual. Dave G0BSM QTHR. (Walsall) 0543 372958.

YAESU FL101 HF TX as companion for my FR101 RX also TAIT mobiles for 4m and 2m and mains PSUs for same. G3HTC QTHR. (Sunbury-on-Thames) 0932 784422.

YAESU FT7 preferably within 30 mile radius Manchester, Buyer will inspect/collect. David G4IPW not QTHR. (Oldham) 061 652 0330.

EXCHANGE

FT101E C/W new valves, C.W. filter handbook exchange for HF/VHF mobile m/mode tcvr or QRO linear! or WHY. G4ZOW (Harpenden) 0582 461952.

MY TAIT T199 Low band PMR for T198 high band or similar also have several cleartone BC - 2C portable bttry chrgrs WHY? Wanted bird plug-in elements. (March) 0354 741168.

YAESU FT726, SP102 spkr, pristine cond, exchange for model glider and/or radio control gear (35MHz): £475. G4YIP (Northants) 0604 701634.

SONY Handycam camcorder CCD TR45E, mint cond. Wanted HF tcvr Yaesu, must be vgc or a FT690R11 with linear or £450. All accessories for above Camcorder. (Birtley) 091 4100305.

YAESU FT101E, vgc, for any of following with cash adjustment: QRO HF Linear, FT707/S, TS120/S or WHY. G4ZOW (Harpenden) 0582 461952.

YOUR T198 for my Tait T199 low band PMR or WHY. Cleartone BC 2C chrgr: £5. (March, Cambs) 0354 741168.

HELP LINES

MINIMITTER

John Haliburton, GM4AQO, has acquired a Minimitter Transistor TR7 receiver which covers 1.8-2MHz. He would be grateful if anyone could supply a circuit diagram for this and, also, where he may obtain an aerial coil. John's address is 32 Glenbervie Road, Kirkcaldy, Fife, KY2 6LQ.

HEATHKIT HW101

Dennis Hoult, G4OO is looking for a handbook/circuit diagram for the Heathkit HW101 transceiver for photocopying. All expenses paid of course. Tel: 0775 750382.

ALLWELD ENGINEERING

Mr J Wright, RS86730, is trying to locate Allweld Engineering, formerly of Selsdon Road, South Croydon. Letters sent to this address are being returned by the Post Office. If you know of their ultimate destination please let Mr Wright know on 0256 468649.

CIRCUIT DIAGRAMS

Jim Dowdall, GW8HDH, is looking for a copy of the circuit diagram/service manual for a Trio R300. Any expenses refunded. Please contact him on 0792 202287.

Mr A McCann, G3AZI, is trying to get circuit diagrams etc for the Commodore 8250 or 8050 Dual Disk Drive, the Apple Lisa 2, and the Sanyo MBC 1000 Creative Computer. He would also like to obtain a coaxial switch type 78A AM ref: 10FB/366. He can be contacted on 0772 37815.

John Hunt, G7IJA, is trying to obtain circuit diagrams for War Department Set No.1547 ref: 10D/2190 covering 2-60MHz, and the stereo unit of a Russian Regonda Symphony Radiophonograph. Any costs involved will be reimbursed. You can contact John on 0207 281405.

Abilio Soares, CT1ASE, is trying to obtain a circuit diagram for his Transmitter output analyser model TG2400, made by Green-Electronic Communication Equipment in London. Any costs will be refunded. Abilio's address is Box 31, S Yoas Estoril, 2768 Estoril Codex, Portugal.

Jeffrey Willy, G3CLL, needs a manual/circuit diagram for an Aiwa RX20K. Photocopying costs would be reimbursed. Please ring him on 0275 372193 if you help.

Has anyone got instructions for the OSKER 200 SWR meter made by the Osker Block Electronic Eng Co, Tokyo. If so, Francis Cloke, G0EON, would like to hear from you at The Homestead, Smith Lane, Mouldsworth, Chester, CH3 8AR

Mr M Pavely, G3GWD, is in the process of refurbishing his Cossor Receiver 'Melody Maker' model 524, c.1957/8, and is trying to find a circuit diagram. Photocopies would be paid for. Please contact him on 081 650 3163.

Dennis Hosking, G4TDJ, has an Icom transceiver (735) which has an auxiliary output terminal at which different DC voltages appear as the band-switching changes. He wishes to use these band-dependent voltages to actuate the switching of 50Ω coax fed antennas, each dedicated to a particular band, and is looking for circuitry of a unit which would do this. Has anyone devised such a unit? Is there a commercial device? Mr Hosking lives at 'Malinmore', West Bay, Maenporth, Falmouth, Cornwall, TR11 5HP.

Helplines is designed to help put people in touch with each other. If you have a problem, it's more likely there's someone out there who has the solution; if you are looking for an old colleague or amateur friend, there could be a reader who has some news of their whereabouts; if you have solved a particular problem, write and tell the rest of us. 'Helplines' is there to help you and to give you the opportunity of helping others. Write to us marking your envelope 'Helplines' and we'll do what we can to get the message out.

ANTENNA HELP

17-year old William Stoner, RS92693, is trying to find out how to build a directional FM broadcast antenna (87.5-108MHz) with a large enough gain to receive London broadcasts from his home QTH in Tetbury, Gloucestershire. The circuit diagrams/instructions in books are too complicated - can anyone recommend easy-to-follow instructions. All costs will be refunded. His address is 52A Long Street, Tetbury, Glos, GL8 8AQ.

GOVERNMENT SURPLUS BCC40

Bob Whetton, G4XKL, is trying to obtain information on the crystal frequencies and multiplier chains for his Government Surplus BCC40 hand portable transceiver. The original frequency was in the region of 84MHz, but no crystals are fitted. Bob's phone number is 0283 68895.

BITS AND PIECES

Nick Dean, G4JHM, is trying to find the following: a) a serial port for the Spectrum. He has several 8251s which he could use, but has no information or software; b) information on the Superwinch 2010 dish positioner controller and, c) a polar-rotar working or not to use for some experimental receiver interfacing work. If you can help please contact Nick on tel: 0522 791114.

TRIO TR9000

Does anyone know if it is possible to increase the receiver tuning span of the Trio TR9000 multimode 2M transceiver. If so could you please send details to Mr J Cronk, GW3MEO, 2 Mostyn Avenue, Prestatyn, N Wales, LL19 9NF.

THE WOBULATOR

Philip Racher, G6MQJ, is trying to reconstruct a scanning unit type 4 for AI MkVIII (ARI 5093A) as fitted to nightfighter Mosquitos and Beaufighters, nicknamed the 'wobulator'. 30 inch dish(?), giving helical scan driven by hydraulic motor, entered service during 1942. Any ex-RAF fitters etc who remember any sizes and details of this unit please contact Phil at 160 Worplesdon Road, Guildford, Surrey, GU2 6RX, or tel: 0483 572653.

COMPACT PRINTER

Mr Fixter, G0DIC, is having problems with a fault on his Serial 8056 compact printer as, when data is sent to the printer for printing from a Sinclair QL, '£' signs only are printed. Using the printer manual test procedure, the full alphabet and other characters are printed OK. Any costs incurred will be refunded. G0DIC's address is 18 Linley Drive, Boston, Lincs, PE21 7EJ.

BRISTOL ANTENNA EXPERTS

John Phillips, G3VWE, a blind operator from Bristol, is desperately seeking someone to assemble, erect and tune up his new antenna. Until this is done he cannot use any of his equipment at all. If there is anyone who can help him ring 0272 656783.

SONY REQUEST

Stephen Harding, G4JGS, has made a request on behalf of the Sony Broadcast Amateur Radio Training Group, who are trying to modify some surplus equipment to amateur frequencies. They are having trouble finding information on an MR405, manufactured by ERD. The radio has four switchable channels, although the circuit board has provision for six, and from the legend 'Lima' on the control panel, they assume it is for low band working. The mic is missing, although it was probably originally wired into the front of the unit. The rig was possibly an AM set, subsequently modified to FM as on two transformers there are small preset potentiometers soldered directly to the transformer terminals. They want to convert the radio into the four metre band and would like to hear from anyone who can help with circuit diagrams, original specs, etc, in fact anything! Please write to Stephen, Sony Broadcast Amateur Radio Training Group, Sony Broadcast and Communications, Jays Close, Basingstoke, Hants, RG22 4SB.

HELPLINE BOUQUETS

Hugues De Laistre Banting, F6GPA, wrote to thank us for the fantastic results following his request on Westminster PMRs. Everyone who replied gave him additional information or advice with the result that he has now acquired a mass of details. "The next time I encounter some deliberate bad behaviour on the air I shall remember that the majority of our community is quite different".

ITHE

If you are planning a vacation abroad you may not be aware of the ARRL's International Travel Host Exchange (ITHE) programme. This consists of several hundred amateurs in some several dozen countries who offer free accommodation to visiting amateurs and their families. Also, if you have a spare bedroom in your home, you may wish to participate. This is really a great way to meet interesting people and promote international understanding. For further information please contact the ARRL, 225 Main St, Newington, CT 06111, USA.

G7 AND G9 CALLSIGNS

Andy Emmerson, G8PTH, is compiling a list of callsigns in the G7 + two letters (maritime colleges), G9 + two letters (quasi-amateur) and G9 + three letters (Test and Development) series. Official records of the first two have been destroyed, so any recollection from readrs will be most useful. Please write to him QTHR: All information received will be acknowledged and will be shared with anyone sending an SAE.

ZX SPECTRUM

Mr EH Smith, G4PEZ, has a U80 Microline Printer which he wants to connect up to a ZX Spectrum, but he is unable to find the right plug to fit the printer, and any help with plugs or leads would be appreciated. Please write to him at 1 Nursery Gardens, Arkley Road, Louth, Lincs, LN11 9DB.

FRONTIER 2M AMP

Mervyn Rogers has a Frontier Electronic Corporation 2M Linear Amplifier but urgently requires a manual and HT transformer. If you can help please ring him on tel: 0307 68055.

SOLARTRON A223

Mike Anthony, G4THN, is looking for a circuit diagram and service manual for his Solartron A223 digital voltmeter. He can be contacted on tel: 0734 774042.

CLUB NEWS

DEADLINE - Items for inclusion in the December 1991 issue must be sent to HQ marked "Club News - DIARY", to be received by 15 October 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

SOUTH BRISTOL ARC - 02, computer and audio bring & buy evening; 9, ATV activity evening; 16, homebrew 1st evening for Terry Dunsford Trophy; 23, beginners' guide to weather satellites; 30, talk 'Conquering TVI'; Nov 6, bring & buy/junk sale; 13, talk 'Simple Computer Programming' Details Whitchurch 832222 on a Wednesday evening.

WESTON-SUPER-MARE ARS - ***NEW SECRETARY*** Mr L Berridge, G1PEI, 33 Wesley Drive, Worle, Weston-S-Mare BS22 0TJ.

BEDFORDSHIRE

BEDFORD & DARS - 15, annual general meeting. Details 02343 266443.

BERKSHIRE

BRACKNELL ARC - 9, talk 'RSGB'; Nov 13, members' talk. Details 0344 57329.

MAIDENHEAD & DARC - 3, junk sale. Details 0628 25952

READING & DARC - 24, talk 'Satellite Communications' by Brian Taylor, G3AKF.

BUCKINGHAMSHIRE

CHESHAM & DARS - 9, technical topic; 30, talk 'Hot-air Balloons and Aero-Communications' by robert, G1DDG. Details 0923 283911.

MILTON KEYNES & DARS - 14, annual general meeting; Nov 11, junk sale. Details 0908 501310 or 0908 315435.

CAMBRIDGESHIRE

CAMBRIDGE & DARC - 4, talk 'Filters' by Chris, G3RSE; 11, talk 'Industrial Uses of RF' by Martin, G4YIL; 18, talk 'Intruder Watch (IARUMS) by Martin Atherton, G3ZAY; 25, talk 'Power Supplies' by Tony Botrill, G1RTV. Details 0763 243570.

CHESHIRE

CHESTER & DARS - 9, talk 'Propagation' by Gordon Adams, G3LEQ; 22, surplus equipment sale; 29, talk 'QRP' by Rev George Dobbs. Details 051-608 3229.

MID CHESHIRE ARS - 30, talk and demonstration by Derek Pearson, G3ZOM of Jandek. Details Iain Martin, G6DQO, QTHR or G6DQO @ GB7NWP.

CLWYD

DELYN RC - 9, demonstration of wares by a major radio equipment manufacturer; 23, cheese and wine evening; Nov 6, Packet Radio User Group demonstration by G8MMM and Co. Details 0745 336939.

WREXHAM ARS - 1, rig testing evening; 15 talk and film 'Japanese Amateur Radio' by Taizo, JA3AER and GW0/N2ATT. Details 0978 266887.

CORNWALL

CORNISH RAC - 8, activities night; 14, computer section; Nov 8, bring & buy. Details 0209 820836.

DEVON.

EXETER ARS - 14, annual general meeting. Details 0392 78710.

TAUNTON & DARC - 4, talk 'Robots in Boat Building' by Doug Hall OBE, Chairman; 18, annual general meeting. Details 0823 680778.

TORBAY ARS - 18, talk 'Solomon Islands DXpedition. Details 0803 526762.

DORSET

SOUTH DORSET RS - 1, construction demonstrations; Nov 5, talk 'Space Communications' by Andy, G3VMC. Details 0305 781164.

EAST SUSSEX

SOUTHDOWN ARS - 7, A Grand Sale to be held at Chaseley, Bolsover Road, Eastbourne. All are welcome. Details 0825 763022.

ESSEX

BRAINTREE & DARS - 7, junk sale with bring & buy; 21, talk 'Computers in Amateur Radio' by Dave, G0DEC; Nov 4, QTH reports. Details 0376 27431.

CHELMSFORD ARS - 1, annual general meeting; Nov 5, junk sale. Details 0245 260831.

LOUGHTON & DARS - 4, The DJAY QSO Logging Program explained by John Short, G1DJI; 18, audio visual night; Nov 1, talk 'Home Brew (Beer *NOT Radios)*' by Mike Pilsbury, G4KCK.

FIFE

DUNDEE ARC - 1, talk 'Bugs and Debugging' by S L Poletyllo, President of the Society of British Investigators; 8 construction evening; 15, talk 'Power Supply Construction' by Alf Low, GM4UZP; 22, construction evening; 29, talk 'Frequency Measurement and Licensing Conditions' by George Syme, GM3EFH.

DUNFERMLINE RS - 3, annual general meeting in the City Hotel; 12/13, hobbies exhibition, Glen Pavilion; 19, Jamboree on the Air. Details 031 331 4340.

GLOUCESTERSHIRE

GLOUCESTER ARS - 2; homebrew equipment demonstration evening; 9, packet self-help group; 12, jumble sale; 16, construction group; 30 construction group. Details Mrs J Beckingham, c/o 7B The Courtyard, Lysons Avenue, Gloucester GL1 5QE.

GRAMPIAN

ABERDEEN ARS - 4, junk sale; 11, demonstration Mk 123 Radio by Ty Nicholson, GM0LNQ; 18, talk 'North Pole DXpedition' by Laurence Howell; 25, call my bluff; Nov 1, junk sale. Details 0224 780519.

GREATER LONDON

ACTON, BRENTFORD & CHISWICK ARC - 15, 'My Favourite Key' - discussion and demonstration by all members. Details 071-938 2561.

BROMLEY & DARS - 15, talk 'Valves' by G6ODE. Details 081-462 2689.

CLIFTON ARS - ***CHANGE OF VENUE*** Earl of Derby Public House, Dennett's Road, New Cross, London SE14.

CRAY VALLEY - 3, surplus sale; 17, Cray Valley memorabilia - BRS32525/G8JNZ; Nov 7, visit by RSGB RLO G3NFV.Details 081-850 1386.

CRYSTAL PALACE & DRC - 19, talk 'DF on Top Band' by G7GBH/G4NPD; Nov 16, junk sale. Details 081-699 6940

EDGWARE & DRS - 10, talk 'His Masters Voice' Sound Recording by Sean Davies at the Watling Centre; 24, talk 'Simply Simple Aerials' - discussion led by G3SJE at the Watling Centre. Details 081-205 1023.

HAVERING & DARC - 16, talk 'The Number 16 Bus' by Steve Fairweather, G6BEL; 30, junk sale; Nov 13, talk 'Water' by Andy, G4VIW and Kevin. Details 04022 23310.

KINGSTON & DARS - 16, RSGB Novice video and discussion. Details 081 360 2847.

SOUTHGATE ARC - 10, special junk auction; 24, vintage radio evening; Nov 14 construction judging for G6QM Trophy and Brains Trust evening. Details 081-360 2453.

SUTTON & CHEAM RS - 17, junk sale. Details 081 644 9945 (H).

WIMBLEDON & DARS - 11, talk 'Radio in Modern Aircraft' by Chris Volney, G0IPD; 25, annual general meeting; Nov 8, desert island radio. Details 081 397 0427.

GREATER MANCHESTER

ECCLES & DARS - 1, talk 'The Acorn Electron' by G4UOT; Nov 5, talk 'Getting Your PPL' by G0KFP. Details 061-773 7899.

GWYNEDD

DRAGON ARC - 7, annual general meeting; 21, surplus equipment sale. Details 0248 600963.

HAMPSHIRE

FAREHAM & DARC - 9, talk 'The GDO' by Ron, G3XP; 23, talk 'The World Above 1GHz' by Bob, G8VOI; Nov 6, talk 'Coding' by Peter. Details 0705 321411/2 (daytime).

FARNBOROUGH & DARS - ***CHANGE OF VENUE*** Farnborough Community Centre, Pinehurst Avenue, Farnborough. Meetings every 2nd and 4th Wednesday.

HORNDEAN & DARS - 3, annual general meeting. Details 0705 472846.

ITCHEN VALLEY RC - 11, talk 'RNLI Radio Communications' by Colin Beeston; 18/20 JOTA Fair Oaks Scouts. Details 0703 736784.

THREE COUNTIES ARC - 9, talk 'Communications on the Battlefield, with Ptarmigan' by Royal Corps of Signals; 23, talk 'The Development of British Windmills' by Stanley Knight; Nov 6, talk 'Best Buys in Amateur Radio Equipment' by SMC Ltd. Details 0420 83091.

WINCHESTER ARC - 20, talk "Marine Radio" by Rod Burnet, G0EUO.

HEREFORD & WORCESTER

BROMSGROVE ARS - 9, constructors fair; 23, talk 'Microphones' by Jack Cluley, G4YIG; Nov 13, talk 'Baluns' by Dave Edwards, G4ZWR.Details 0527 503024.

HEREFORD ARS - 18, talk 'EMC' by Philip Martin. Details 0432 355297.G4MET.

KIDDERMINSTER & DARS - 1, RLO and Novice Instructor. Details 02993 79229.

HERTFORDSHIRE

CHESHUNT & DARC - 2, talk 'Filters' by John Armstrong, G8MVH from AKD Filters; 16, darts match; 19/20 JOTA - Hoddesdon Girl Guides. Details 0992 464795.

STEVENAGE & DARS - 1, talk 'Bio Engineering' by Richard Hartley; 8, practical test equipment usage; 15, visit to Baldock Radio (provisional); 19/20, JOTA from Weston Park near Baldock; 22, practical component testing; 29, talk ' Know your HF Data Tones' by Peter, G0GTE; Nov 5, practical rig testing; 12, talk 'HF Data Tones' Part 2 by Peter, G0GTE. Details Stevenage 724991.

HIGHLAND

INVERNESS ARC - 2, construction night; 23, talk 'Better Operating' by Les Davidson, GM4XKG; Nov 6, construction night. Details 0349 61783.

HUMBERSIDE

GOOLE R&ES - 4, news night; 18, junk sale; Nov 1, construction evening; 8, repeater report. Details 0405 769968.

NORTH FERRIBY UNITED ARS - 4, topic of the day with Tony, G4KHT; 11, RSGB video - Frank, G3YCC; 25, talk 'Basic Test Gear' by Tony, G3TEU; Nov 1, talk 'Satellites' Part 2 by Frank, G3EFR. Details 0482 650410.

RAF WADDINGTON ARC - meets every Thursday at Newland House, RAF Waddington, at 7pm. RAE and Morse classes - 24, talk 'Posting a Sentry' by Andy, G0MTG. Details G0NPB, 69 Ferry Road, Fiskerton, Lincoln.

ISLE OF WIGHT

BINSTEAD ARS - 7, surplus equipment auction. Details from G0ISB QTHR.

KENT

DARENTH VALLEY RS - 23, video from RSGB Library (TBA). Details 0689 876733.

DARTFORD HEATH DFC - 1, pre Hunt meeting; 6, Foxhunt (2m, 145.325), 11am start, The Car Park, Heath Lane Upper, Dartford Heath. Details 0689 854089.

EAST KENT RS - 3, annual general meeting. Details 022745 2678.

MAIDSTONE YMCA ARS - 11, operator and log keeping training; 25, construction competition; Nov 8, junk sale. Details from C L Roberts, BRS93262.

SEVENOAKS & DARS - 21; open for members' suggestions. Details from Council Offices, Argyle Road, Sevenoaks, Kent TN13 1HG.

WEST KENT ARS - 18, Fox Hunt (if wet Video at Club HQ); Nov 15, open evening

LANCASHIRE

FYLDE ARS - 24, equipment browse sale. Details 0772 635464.

PRESTON ARS - 3, talk 'The Golden Road to Samarkand' by Mr Yearsley; 17, talk 'A Pageant of Lancaster Priory' by Ms Tomlinson; 31, talk 'The Packet Boat' by Mr Moore; Nov 14, talk 'An Australian Miscellany' by Mr Langton. Details 0772 733975.

THORNTON CLEVELEYS ARS - 7, talk 'Air Bearings in Dentistry' by G1TXV; 14, annual general meeting; 28, quiz. Details from G4BFH.

LEICESTERSHIRE

LEICESTER RS - 21, final preparations for Leicester AR Exhibition; 28, talk 'KISS' by Jack, G3PVG. Details Leicester 762241.

LOUGHBOROUGH & DARC - 1, annual general meeting - all welcome; 8, 'nostalgia night'; 15, talk 'BATC' by B Senior; 29, video evening. Details Lobro 218259.

LINCOLNSHIRE

SPALDING & DARS - 11, talk 'Designing and Building Homebrew Equipment by David Johnson, G4DHF; Nov 8, construction contest. Details 0778 425367.

LOTHIAN

LOTHIANS RS - 9, talk 'Radio from the Munros' by David Gentles; 23, talk 'Practicalities' by Mel Evans, GM6JAG; Nov 13, junk sale. Details from P.J. Dick QTHR.

MERSEYSIDE

LIVERPOOL & DARS - 1, annual general meeting; 8, talk by G0IFK; 15, quiz night; 29, surplus sale. Details from G4VYR.

NORFOLK

RC OF FAKENHAM - ***CHANGE OF VENUE*** Trinity Church Room, Hempton, first Tuesday of every month. - 1, video 'Amateur Radio's Newest Frontier'; Nov 5, video of Amateur Radio and Lifestyle on the Pitcairn Isle. Details 0485 528633.

NORFOLK ARC - 2, talk "Oscillators" by Dick Bacon, G3WRJ; 9, talk "Castle Mall Archaeological Excavation" by Brian Ayres; 16, talk 'Vintage Radio - Hear it Like it Was! - by Mike Lemin, G4UUB; 26, club outing to the Leicester Show; 30, talk 'Introduction to Microwaves' by Sam Jewell, G4DDK; Nov 6, 'Real Radio' evening; 13, talk 'Satellite TV' by Steve Sewell, G4VCE.

NORTHAMPTONSHIRE

KETTERING ARS - 22, talk '1990 Expedition to Ben Nevis' by John Linford, G3WGV. Details 0536 514544.

NORTH YORKSHIRE

HAMBLETON ARS - 7, talk 'Raynet'; 28, talk 'Electronics Production' by Pieter Smit, G0LIY; Nov 4, talk 'My First Project' by Rodney Richardson. Details 0609 776608.

SCARBOROUGH ARS - 7, surplus equipment sale; 14, discussion '1992 Silver Jubilee of G4BP'. Details 0723 514767.

NOTTINGHAMSHIRE

AMATEUR RADIO CLUB OF NOTTINGHAM - 10. talk 'Kit Construction' by Derek, G3ZOM of Jandek; 17, 70cm Foxhunt on foot; 31, construction evening. Details 0602 733740.

OXFORDSHIRE

OXFORD & DARS - 19/20; JOTA weekend at Wheatley GB4WDS. Details 0865 58785.

Jandek (kits will be on sale). Details from Terry, G0LUQ.

POWYS

SOUTH POWYS ARC - 1, talk 'Magnetic Loop Aerials' by GW3LJP; Nov 5, AGM. Details 0874 84266.

SHROPSHIRE

SALOP ARS - 3, talk 'Electronic Archaeology' by Eryl Davies; 10, annual general meeting; 24, talk 'Amateur Radio and Planning Permission' by John McFall; Nov 7, annual dinner at the Lion & Pheasant. Details 0743 790457.

TELFORD & DARS 9, talk 'Amateur Operating Practices' by G3IMP; 23, junk sale - Br Legion Club; 30, contests past and coming. Details Bridgnorth 761203.

SOUTH GLAMORGAN

CARDIFF RSGBG - 14, annual general meeting Details 0446 773212.

SUFFOLK

FELIXSTOWE & DARS - 14, construction contest; 26/27, JOTA 1st Kirton Sea Scouts, Kirton. Details 0473 642595 (daytime).

ISPWICH RC - 9, 21/28MHz contest planning, 10, Morse test at Ipswich - details from RSGB; 13, 21/28MHz contest (station G4IRC/P at Otley); 19, Ipswich Museum Open Day ('Radio Rhino'); 30, talk 'Construction with Surface Mounted Components' by G1WCK; Nov 13, junk sale. Details 0473 742072.

SURREY

DORKING & DISTRICT RS - 22, talk and demonstration 'Digital Audio Broadcasting by Satellite' by D R Graham Mytton of BBC World Service - Friends Meeting House, 7.30pm. Details 0306 77 236.

ECHELFORD ARS - 14, talk 'Basic Test Equipment for Construction' by G3MCK. Details 0344 843472.

REIGATE ARS -15, talk 'Poor Man's 23cm' by Eric Letts, G3RXJ. Details 0293 775278.

WARWICKSHIRE

MID WARWICKSHIRE ARS - 8, technical topics; talk 'DX From the Arctic' by Paul, G0KPH; Nov 12, programme discussion for 1992. Details 0455 552449.

STRATFORD-UPON-AVON RS - 14, talk "Jandek Kits" by Derek Pearson, G3ZOM; 28, talk 'Oscilloscopes for the Beginner' by Terry Downing, G3MXH; Nov 11, talk 'Amateur Radio Observation Service' by Geoff Griffiths, G3STG. Details 060 882 495.

WEST GLAMORGAN

SWANSEA ARS - 17, final preparations for JOTA; 26, The club is running a 53-seater coach to the Leicester AM Radio Show (Contact Roger Williams, GW4HSH on 0792 404422). Details 0792 818100.

WEST MIDLANDS

COVENTRY - 4, annual general meeting; talk (provisional) and rig test; Nov 1, bangers & mash (meal and social). Details 0203 523629.

DUDLEY ARC - 28, annual general meeting. Details 0384 250018.

MIDLAND ARS - 15, annual general meeting. Details 021 742 8712.

SOLIHULL ARS - 17, annual general meeting. Details 021-783 2996.

STOURBRIDGE & DARS - 21, talk 'American Adventure' by G3CAQ. Details from Dennis Body, G0HTJ, 53 Grove Road, Wollescote, Stourbridge, West Midlands DY9 9AE.

WORDSLEY RC - 24, talk 'Computers and

Mencap Applications by Mr S Varnam, G6TKK. Details 0384 873666.

WEST SUSSEX

CHICHESTER & DARC - 15, junk sale; 19, JOTA SES GB2CHI at 12th Chichester Scout HQ, Sherborne Road, Chichester
HORSHAM ARC - 3, surplus equipment sale. Details 073784 2150.

WEST YORKSHIRE.

BARNSLEY & DARC - 28, talk 'Planning' by G J Bond, G4GJB; Nov 4, discussion on bring & buy at the Barnsley rally. Details 0226 716339.
BRADFORD ARS - 10, junk sale; 19/20 SES JOTA GB0CDS; 24, discussion evening '1992'. Details 0274 494694.
DENBY DALE & DARS - 2, constructors competition; 16, surplus sale, Nov 6, annual general meeting. Details 0484 532371.
HALIFAX & DARS - 15, talk 'E L F' by Ron Binns, G3OTE. Details Halifax 202306.
KEIGHLEY ARS - 31, junk sale. Details 0274 496222.
NORTHERN HEIGHTS AR&ES - 2, talk "Electronics and Radio in the Fire Service," by Geoff Barber; 16, visit to Fire Station; Nov 6, club project update. Details 0274 673116.
TODMORDEN & DARS - 7, surplus equipment/junk sale; 21, international evening; Nov 4, talk 'Drink/Driving' by G1DWA. Details Halifax 882038.
WAKEFIELD & DRS - 1, debate "The Future for Construction"; 22, construction project; Nov 5, pea & pie supper. Details 0924 260048.
WHITE ROSE ARS - 2, refurbished shack opening and open night; 16, talk. Details John Hart, G3ZGA, 146 Street Lane, Leeds LS8 2AD.

WILTSHIRE

DEVIZES & DARC - 18, talk 'How to Make Printed Circuit Boards (UV Process). Details 0380 724533.
TROWBRIDGE & DARC - 2, talk 'Cellular Radio Networks' by G0BBL. Details 0380 830383 (evenings).
SALISBURY R&ES - 1, talk by Ray Baldwin, G3WZ on his world travels and exotic DX; 22, talk and demonstration 'Test Equipment' (Postponed from earlier in the year). Details G7GWF QTHR, tel: 0722 330971 (wkends/eves).

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'.

6 OCTOBER

BLACKWOOD AR Rally - Oakdale Community College. Details from B. Matthews, GW0JWF, 25 Manor Park, Newbridge, Gwent.
GREAT LUMLEY Radio Rally - The Community Centre, Great Lumley, Nr Chester-Le-Street, Co Durham. Opens 10.30am for disabled visitors and 11am for other visitors. Varied trade stands; refreshments; bring & buy (value limit £200). Entrance fee 50p, children under 14 accompanied by an adult free. Details from Barry, G1JDP, tel: 091 388 5936.
HORNCASTLE AR Electronics & Computer Fair - Horncastle Youth Centre, adjacent to the A128 Lincoln/Skegness main road. Opens 10.30am ((10am for disabled visitors); admission £1 per person (negotiated discounts for organised groups). Range of computer, radio and electronic components plus second hand and surplus equipment sale; flea market/car boot sale in the outside sports area. Louth & DARS will be running a bring & buy stall. Details - sae to Tony Nightingale, G6CZV, Horncastle Youth Centre, Cagthorpe Building, Willow Row, Horncastle, Lincs LN9 6HW.

13 OCTOBER

ARMAGH & DUNGANNON Rally - Gosford House Hotel, Markethill, Co Armagh. Details from T.E. Hall, GI0MSJ, QTHR GI6UMR, tel: 0861 523454.
BLACKMORE VALE ARS - Annual Rally - Wincanton Racecourse, Somerset. Indoor event with unlimited free parking. Doors open 10am. Entrance 50p. Talk-in on S22. Details from Norman, G4YXX, tel: 0749-85432.
HORNSEA Rally (ELHOEX Electronic Hobbies Exhibition) - The Floral Hall, Hornsea, East Yorkshire. Doors open 11am, 10.30 for disabled visitors. Details from Jeff, G4IGY, tel: 0964 533331.
SOUTH DEVON RC Computer and Radio Rally - Hillhead Campsite, Dartmouth Road, Brixham, South Devon. Doors open 10am. Trade stands; bring & buy; raffle; refreshments; unlimited parking; overnight camping; car boot sale (weather permitting). Talk-in on S22.Details from W.T. Trezise, G6ZRM, tel: 0803 522216.

19 OCTOBER

G-QRP CLUB Mini-Convention. Details from G3RJV.

20 OCTOBER

WIRRAL RADIO & COMPUTING FAYRE - Masonic Hall, Manor Road, Liscard, nr Birkenhead, Merseyside. Details from D.G. Clifford, G0NVF, tel: 051-6395922 or Darren Roberts, tel: 061-476 3076.

25/26 OCTOBER

LEICESTER ARS Show - See supplement.

2/3 NOVEMBER

NORTH WALES 5th Radio & Electronics Show - Aberconwy Conference Centre, Llandudno. Opens 10am both days. Entrance fee £1 adults, 50p OAPs, children under 14 free. Details from N.B. Mee, GW7EXH, tel: 0745 591704.

3 NOVEMBER

ELEVENTH NORTH DEVON RALLY - Holsworthy Memorial Hall. Opens 10.30. Bring & Buy stand etc. Talk-in on 2m (S22). Details from K>J> Nicholls, G8MXI QTHR.
TYNE & WEAR REPEATER GROUP Auction - Fencehouses Community Centre, Fencehouses, nr Chester-le-St, Co Durham. Doors open at 11am for booking in goods. Auction starts at 12.30pm. Details from Ian, G4OCQ QTHR, tel: 091-3840827.

10 NOVEMBER

BARNSLEY & DARC Rally - Willowgarth Senior High School, Brierley Road, Grimethorpe, Barnsley. Details from Ernie, G4LUE, QTHR. 0226 716339 (6pm to 8pm please).
MARS/STOCKLAND Mobile Radio Rally - Stockland Green Leisure Centre, Slade Road, Erdington, Birmingham. Trade stands; bring & buy; free parking; admission 50p. Details from Norman, G8BHE, 021-422 9787 or Michael, G4OMP, 021-382 3606.

17 NOVEMBER

FERRIBY RC Radio and Computer Rally - Staff House, Hull University, Cottingham Road, Hull. Entrance fee 50p, refreshments, club stalls, talk-in. Details Mrs A Knight, 100 Church Street, Gainsborough, Lincs; 0427 611299.

24 NOVEMBER

WEST MANCHESTER RC Winter Rally - Bolton Sports & Exhibition Centre, Silverwell St, Bolton. Usual trade stands, societies, bring & buy etc. All at pavement level, with facilities for the disabled. Refreshments available all day, plus bar. Details from Dave, G1IOO, 0204 24104 (evenings only).

1 DECEMBER

BISHOP AUCKLAND Radio & Computer Fair - Sunnydale Leisure Centre, Shildon, nr Bishop Auckland, co Durham. Easy access from A1(M). Doors open 11 (10.30 for disabled visitors). Trade stands, Bring & Buy, car parking, refreshments. Details from Ernie, G4TYF, 64 Gurney Valley, Bishop Auckland DL14 8RW; 0388 607500.

8 DECEMBER

LEEDS & DARS Christmas Rally - The Pudsey Civic Centre, Dawsons Corner, Pudsey (at jnct of the Leeds Ring Road with Bradford Road - DO NOT follow signs for Pudsey). doors open 10.45. Usual facilities. Details from G Stubbs, 0532 585801.
VERULAM Christmas Rally. Details from G0NDB

19 JANUARY 1992

OLDHAM ARC Rally - Queen Elizabeth Hall, Civic Centre, Oldham. Doors open 11am, free parking, catering and bar facilities. Morse test available. Details from Mrs K. Catlow, 137 Haven Lane, Moorside, Oldham OL4 2QQ, 061-624-7354 (daytime) 061-652 8617 (evening), fax: 061-633 0550.

26 JANUARY

LANCASTRIAN Rally - University of Lancaster. Doors open 11 (10.30 for disabled visitors). Details from Sue, G1OHH, 0524 64239.

2 FEBRUARY 1992

SOUTH ESSEX ARS Radio Rally. Details from Dave Speechley, G4UVJ, 0268 697978.

9 FEBRUARY 1992

CAMBRIDGE & DARC Mobile Rally & Boot Sale. Details 0763/243570.

22 FEBRUARY 1992

KIDDERMINSTER & DARS Rally 1992. Details from G4HFP, 16 Marlborough Drive, Stourport-on-Severn, Worcs. DY13 0JH.

23 FEBRUARY 1992

EAST COAST AR & Computer Rally. Details from Terry, G7DNS, 0255 222207 or Tony, G0MBA, tel: 0255 422843.
WAKEFIELD & DARS Northern Cross Rally. Details from Bob Firth, G3WWF, 0532 378207 (daytime).

29 FEBRUARY 1992

BREDHURST R&TS - Rainham Radio Rally. Details from G0LKE, 0634 362154.

1 MARCH 1992

TRAFFORD Rally. Details from Graham Oldfield, G1IJK, 061-748 9804.

7 MARCH 1992

TYNESIDE ARS Annual Rally - Temple Park Leisure Centre, South Shields. Details from Jack, G0DZG, 091 265 1718.

14 MARCH 1992

VHF CONVENTION - Sandown Park Exhibition Centre. *Please note this is being held on a Saturday this year.* - Stand booking to Les Hawkyard, G5HD, tel: 040-928 342. Details from Geoff Stone, G3FZL, 081- 699 6940.

15 MARCH 1992

NORBRECK ARE&C Exhibition. Details from Peter Denton, G6CGF, 051-630 5790.

22 MARCH 1992

PONTEFRACT & DARS Components Fair. Details from Colin Mills, G0AAO, 0977 643101.

5 APRIL 1992

25TH WHITE ROSE Rally. Details from Tony, G4DXA, PO Box 73, Leeds LS1 5AR.

10 MAY 1992

MARS/DRAYTON MANOR Radio Rally. Details from Peter, G6DRN, 021-443 1189. Trade stand bookings - Norman, tel: 021-422 9787.

14 JUNE 1992

ELVASTON CASTLE Mobile Rally. Details from John, G4PZY, 0332 767994; trade enquiries Peter, G3WFU, 0332 700265 (evenings).
RNARS Annual Mobile Rally. Details 0703 557469.

21 JUNE 1992

DENBY DALE Annual Mobile Rally - Salendine Nook High School, Huddersfield. Details from Philip G4FSQ, 0484 644827.

28 JUNE 1992

LONGLEAT AR Rally. Details from Shaun, G8VPG, QTHR, tel: 0225 873 098.

25/26 JULY 1992

NORFOLK ARC & HEWETT SCHOOL Rally - Hewett School, Norwich. Details M J Cooke, 4 Geddes Way, Mattishall, Norfolk NR20 3RE.

GB CALLS

The list below shows all special event stations licensed for operation during this month and up to 8 August. It was taken from the HQ computer on 6 June. These callsigns are valid for use from the date given but the period of operation may vary from 1-28 days.

28 SEPTEMBER

GB4RJC	Rangers Jubilee Camp
GB6SJA	St Johns Ambulance

1 OCTOBER

GB0CDX	Coastal Defence X
GB0CSR	Civil Service Radio
GB2CI	Coquet Island
GB2CIL	Coquet Island Lighthouse
GB2FMC	Fenland Men Cap
GB8RRS	Red Rose Silver

2 OCTOBER

GB50ATC	Air Training Corps

3 OCTOBER

GB2RCC	Radio Caravan Camping

4 OCTOBER

GB6HF	Houghton Feast

5 OCTOBER

GB0CDA	Coastal Defence 'A'

6 OCTOBER

GB2BUS	Bus Museum

9 OCTOBER

GB50ACT	Air Training Corps
GB8MR	Mull Rally

11 OCTOBER

GB0RRS	Rosemary Road Scouts
GB2MOD	Scottish National Mod
GB4DHX	Dunfermline Hobbies Exhibition

13 OCTOBER

GB4CPU	Computercations
GB50ATC	Air Training Corps

14 OCTOBER

GB4XXX	'X' Nett DX-Pedition

16 OCTOBER

GB2SFB	Strathclyde Fire Brigade

18 OCTOBER

GB2IRC	Ipswich Radio Club

19 OCTOBER

GB2DEA	Duke of Edinburgh Award

20 OCTOBER

GB50ATC	Air Training Corps
GBSAT	51 SQ,ATC

24 OCTOBER

GB2UBB	Ulster Boys Brigade

27 OCTOBER

GB50ATC	Air Training Corps

JOTA

This year's Jamboree on the Air is being held over the weekend 19 and 20 October, but we are unable to list all the JOTA stations in *RadCom*. The RSGB will be sending publicity packs to participants from information held here of GB callsigns requested.

However, if a JOTA station is planning to use a club callsign, please inform RSGB HQ as soon as possible in order to be included on the list. Please send details of the club callsign to be used, name of the scout or guide group involved and the nearest large town, together with a self-addressed label.

Any non-participating amateurs who would like a complete list of JOTA stations taking part in this event, please send in a SASE marked 'JOTA LIST' to Fiorina Sinapi, RSGB, Lambda House, Cranborne Road, Potters Bar, EN6 3JE.

The Last Word

RADIO RECOVERY

My sincere thanks go to amateurs in the North of England and to Esde Tyler, G0AEC, who went to great lengths to publicise details of my stolen radio. As a result of the speed with which these details were circulated, it was recovered by Richard Halgate, G6XTT, when an individual thinking he had bought a CB from a local market, brought it to him for repair! The baddies don't always win.

Ken Grahame G1VEM

SURFACE TO AIR MISSIVE

I wonder how many of your readers have noticed that recently new IRCs have been issued. They look exactly the same as the old ones with exception that the word 'surface' has been changed to 'airmail'. This I noticed quite by accident, but it creates a problem when cashing them in for stamps. Here there are three grades of postage for air: Africa, Europe and the rest of the world. If the airmail IRC does not have a reasonable franking of the issuing office then I only get minimum air postage which does not take a letter outside Africa. Perhaps countries should print their names on these IRCs like West Germany and a few others do.

Is this 'airmail IRC' a substitute for the 'surface' one and do they cost different amounts? I can't buy the airmail ones here. Perhaps someone over there should take this up with the Universal Postal Union.

R Macfarlane B.E.M. 7Q7RM

OUT OF THE FRYING PAN?

I have heard many complaints over the last few months on the 'unfairness' of the £25 repeater charge levied to groups. In my opinion what groups appear not to have realised is that as each repeater costs the Society an average £80 per year, it is still subsidising each one by over 60%. Also if the money for this service cannot be raised this way, surely the RSGB will have to consider other means of reducing cost. It may well decide to discontinue repeater administration altogether and, as a result, this job would be taken on by the Radiocommunications Agency of the DTI. I am sure they would pass on the full cost of this service, which may be £100+ and, unlike the RSGB, the RA will not hesitate to close down repeaters where groups are unwilling to pay (the same applies if we do not pay our individual licence fee)

Therefore I suggest that all groups should think of the consequences of these actions, as I think that they might find the alternative could be a lot worse.

David Drizen G8UUO

REGIONAL BLOCK VOTES?

I agree with the comments (*RadCom*, August), that the main problems befalling the RSGB are apathy and frustration. The only times that I have any contact with the Society is when I am asked to pay my subscription or I am asked to vote for someone whom I have never met.

I think the answer is to hold zonal meetings which could be chaired by my member of council. Votes could then be taken on any matter and the block votes taken to the Council and used 'for' or 'against'. This would give members a voice in running the Society. I wrote to my zonal member on this matter but even though I enclosed an SASE, I received no reply. What do other members think?

A J Duck GW0DQT

LOOSE TALK

I am delighted to see the Novice Licence being issued. I have no doubt that this will lift the quality of our operators out of the gutter, and produce a more serious and higher standard of operation.

I was listening on 2 metres recently and inside a very short space of time I heard the following comments - I will put what I think they meant in brackets.

1) I am going to "cut loose"; (go QRT)
2) All the big numbers; (73)
3) I am receiving you at the "back of the box"; (your signal is weak)

I was a SWL on the amateur bands for some years before I got my licence so I already knew the Q codes and proper procedure. I suppose you could say it was my Novice training. I wonder where the above mentioned operators were listening?

Mark McIntyre GI3YDH

[A good point, but isn't saying 'QRT'(I am closing down) and '73' (best wishes) on phone almost as bad as this CB-jargon? - Ed]

HOLIDAY SWAP

We would like to exchange houses with a UK amateur for a period of three weeks during the summer of 1992. While we would prefer a location in the south-east of England, we are certainly open to other offers.

Our own home is a four bedroom house on a half-acre lot in Aylmer, Quebec. Aylmer is located in south-western Quebec, 10km from Ottawa, Canada's capital city, and within easy driving distance of Montreal (2 hours), Toronto (4.5 hours) and the United States border (1.5 hours).

Aylmer is a community of 32,000, about evenly divided between English and French speaking people. It is a suburb of Ottawa, and offers a wide variety of outdoor activities, including sailing, swimming, rock climbing and bicycling.

My station is quite well equipped for the HF bands, including a Kenwood TS-850SAT, an amplifier, 20m tall tower, with yagis for 10, 15 and 20m, and wires for the other bands. I am also set up on packet, and have access to a Packet Cluster node.

Our family includes my wife, our daughter (age 7), an infant whose arrival is anticipated in March 1992 and me. The house has four bedrooms and will comfortably accommodate five people, or more in a stretch.

We would love to hear from a UK amateur who might be interested in a swap. Please contact me at: 15 Oval, Aylmer, Quebec, J9H 1T9, Canada

Dave Goodwin, VE2ZP

ORDNANCE SURVEY BICENTENNIAL AWARDS

Between 19 and 21 July scout stations celebrated the 200th anniversary of the Ordnance Survey by operating several special event stations. Associated with this was an award.

The issue of award certificates to HF claimants is well under way, but for VHF/UHF operators and SWLs the issue has been less clear. There were six scout stations situated along the Greenwich Meridian Line, from Yorkshire to Sussex; GB0YM, GB0CM, GB2GP, GB0LON, G2FQZ and GB0SM. To qualify for the award it was necessary to work GB0LON (Old Royal Observatory, Greenwich) plus any three others.

Not all Meridian stations were active on VHF/UHF and due to geographical considerations it may not have been possible to work any more than two or three stations at most. Consequently any VHF/UHF operators who would like to obtain the award need only provide evidence of having worked two or more Meridian stations. Similarly SWLs can qualify if they heard four or more stations.

Applications to John Hughes, G4KGT, QTHR, should include log extracts and large SAE (12 x 9).

John Hughes G4KGT
National Adviser For Amateur Radio To The Scout Association.

Please note that the views expressed in 'Last Word' are not necessarily those of the RSGB.

We reserve the right to edit letters and regret that we can no longer acknowledge them individually but will pass them on to the relevant department.

QSL REPLIES AGAIN

For many years, as G6ZY, I felt very grateful first to G2MI and then to G3DRN, for the wonderful, work they put in on the RSGB QSL Bureau.

But I think that G3DRN is quite right when he says that nowadays there will have to be some measure to cut down the huge numbers of useless and wasted cards which every Bureau has to handle. A charge, based on the number of outgoing and incoming cards is reasonable and could surely help all amateur radio societies.

I do not collect cards any more but as I know that EA6 is needed by some I try to send in CW "QSL CBA", or on SSB "If you need my card please QSL direct only, my QTH is OK in the Callbook". If this (which I have heard from very few other stations) could be more publicised and popularised it could save an awful lot of time, trouble and expense.

Stanley Ingram EA6ZY

FREE RECEIVING

I was interested to read the comment from Mr King, G3DCC, (*The Last Word*, September). However, the fact is that for a considerable period there has been an agreement between IARU member societies to deliver cards *received* for non-members. The RSGB therefore does this upon receipt of the necessary SASEs, though I am aware that many other societies do not.

Although I sympathise in many ways with G3DCC's feelings, I cannot help thinking that any attempt to obtain payment would be counter-productive and only add yet another operation to an already overworked Society.

After all, it takes no more time, money or effort to place cards into an envelope than it does to consign them to the WPB. I have no means of knowing how many non-members are aware of this facility, or even if they are interested in QSLing, but this aspect must be the least of our worries at this crucial period in the Society's history.

E G Allen G3DRN

WELCOMING MUSEUM

Can we, the Dunstable Downs Radio Club take the opportunity through your pages to express our thanks to Douglas Byrne, G3KPO, the Curator of the Communications and Electronics Museum on the Isle of Wight, for the time and trouble he took to make us feel welcome, and for explaining the various radios and other equipment found in the museum. He made our day a very enjoyable one. Anybody who is interested in vintage radio and electronic equipment would find a visit to this museum very worthwhile. Thank you.

Wendy Jefferson (Secretary)

ROOM FOR ALL

I note that the editor is apologising to G6MEN because of his complaint about a cartoon (*The Last Word*, September). It seems to me that, collectively speaking, amateurs are taking themselves far too seriously. It is after all a hobby and there is room for everyone to do their own thing without criticism from others whose interests may be different.

Don Chaney G4ZGA (shortly to be GM4ZGA)

[I am quite sure that Paul, G6MEN, had his tongue very firmly in his cheek when he penned his rebuke. As creator of the recently axed RF Byrne he would doubtless agree with you entirely - Ed]

DIT DAH DITTY

What *The Last Word* needs is a bit of light-hearted relief as a break from all that stuff about band-planning and the need for Morse. Like the following for example:

A very keen amateur swore
He'd contact a Ham in Lahore
He used miles of wire,
All the power he could fire,
But only got Radio 4.

or

"I use the F layers on high
And find a far contact thereby,"
He loftily said
As his Morse quickly sped.
But he seldom could read the reply.

G MacNeill GM0DLZ

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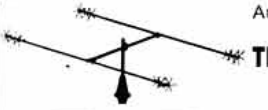

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muTek limited

LINEAR POWER AMPLIFIERS — This is a new range of products for 1991, and the range presented will expand to cover several new models as they are developed and proved. The range starts with a 150W amplifier for 2m band, and this will be followed by a 300W HF band amplifier. These amplifiers are based on power MOS FET technology, representing the most efficient method of obtaining linear high power amplifiers that are robust and simple to use. These amplifiers will be designed to operate with the muTek range of transverters, giving ALC and SWR protection facilities.

LAVF 144/150 — This is the first in the range of high power linear amplifiers from muTek. It has a gain of 13dB, and excellent intermodulation performance. It has been designed to work with the TVVF 144a, but can be driven from any transceiver with an output power of up to 8W PEP. The unit is similar in size to the range of transverters, but is about 2.75" high. The amplifier is fan cooled with a silent running fan when the unit is cool. The linear amplifier is internally sequenced and an output is available to drive the muTek masthead amplifier. Price **£275 + £10 p+p.**

Power output	150W PEP.
Frequency	144-148 MHz.
Gain	13 dB typ.
Harmonics	-35 dBc.
Power supply	50V dc @ 6A 12V dc @ 0.5A.

POWER SUPPLIES — A range of power supplies are available to power the ranges of transverters and linear amplifiers. These are styled to match the linear amplifiers and are designed to power both the linear and a masthead preamplifier. The power supply for the LAVF 144/150 is the PSU 50/6 and costs £220.

MODULES — The 150W linear amplifier for 2m is available as a module, built and tested for £175.

Full details from:-

muTek limited — the rf technology company
Dept. RC. P.O. Box 24. Long Eaton. Nottingham NG10 4NQ 0602 729467

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NEXT COPY DATE

The display advertisement copy date for our December Christmas issue will be

14th October 1991

New advertisers should contact **Victor Brand, G3JNB** on **0953 788473** for assistance and information.

VERSATILITY AND SOPHISTICATION

THE ICOM IC-R7100 WIDEBAND RECEIVER

• Continuous coverage from 25 to 2000 MHz
The IC-R7100 allows you to receive signals on VHF or UHF including amateur, air, marine, citizens and utility bands plus FM and TV broadcasts.

• All mode capability
The IC-R7100 includes SSB (USB, LSB), AM (Normal, Wide), FM (Normal, Narrow) and WFM (Wide FM) modes to catch a wide range of signals. Using an optional TV-R7100, you can view TV broadcasts on your CRT monitor and listen to FM broadcasts in stereo.

• 5 basic scans
These search for signals over a wide range and skip undesired frequencies and unmodulated signals.

• Window scan
To select and specify the frequency, memory channel, mode, and more, the IC-R7100 is equipped with a 2-window system, a technological breakthrough. Window scan can select one window and then another alternately on the function display for a programmed duty cycle.

• Dual scan
Combines a basic scan with the window scan function. Each basic scan appears in its window and two can be combined to operate alternately. with over 40 possible combinations; only Icom's high-speed scanning can realise dual scan operation

• 900 memory channels
A total of 900 memory channels store frequencies, modes and tuning steps. Memory channels are grouped in 9 memory banks for ease of handling and editing

• 20 scan edge memory channels
The IC-R7100 features an additional 20 scan edge memory channels to store 10 sets of frequencies for programmed scan.

Additional outstanding features

- High sensitivity and reliable frequency stability
- 0.1, 1, 5, 10, 12.5, 20, 25, 100 kHz and 1 MHz tuning steps available.
- Built-in 24-hour system clock with 5 ON/OFF timers.
- Automatic recording so important programmes can be caught when away from receiver.
- Noise blanker circuit for eliminating pulse type noise.
- Effective 20dB attenuator for strong signals.
- Noise squelch and S-meter squelch
- CI-V system for computer control through an optional CT-17.
- Frequency announcement in English with an optional UT-36.
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When you're talking Yaesu handhelds, power takes on many meanings.

Like maximum RF output. Sophisticated microprocessor control. Deceptively simple operation. Even cost savings—as most accessories are interchangeable throughout the line.

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FT-470. DUAL-BAND OPERATION PERFECTED.

2 metre and 430-440 MHz 42 memories. Simultaneous receive of both bands. Dual VFOs each band. Paging feature. DTMF autodialer (10 memories, 15 digits each). Auto repeater shift. Scanning features. Auto power-off. Battery saver. Audible command verification. Keypad and rotary-dial frequency entry. Battery packs available from 2.3 to 5 watts. More.

FT-411 SERIES. MAXIMUM SINGLEBAND PERFORMANCE.

2 metre FT-411 and 430 MHz FT-811. 49 memories. Dual VFOs DTMF autodialer (10 memories, 15 digits each). Auto repeater shift. Scanning features. Auto power-off. Battery saver. Audible command verification. Key-pad and rotary-dial frequency entry. Many battery packs available, from 2.3 to 5 watts. More.

FT-23R SERIES. SMALL, SMART, RUGGED.

2 metre FT-23R, and 430 MHz FT-73R. 10 memories (7 store odd splits). Memory scan at 2 frequencies per second. High/low power switch. LCD power output and "S"-meter display. Auto-battery saver. Alluminium-alloy case. Water-resistant seals. Many battery packs available, from 2 to 5 watts. More.

Want more information? Call **(0703) 255111**

Or call into your local authorised Yaesu dealer and ask about the FT-470, FT-411 and FT-23R Series handhelds. The power in handheld performance.

South Midlands Communications Ltd, S M House, School Close, Chandlers Ford Industrial Estate, Eastleigh, Hampshire, SO5 3BY. Telephone (0703) 255111, Fax (0703) 263507, Telex 477351 SMCOMMG.

YAESU

Prices and specifications subject to change without notice.

The
Leicester Show Guide
1991

Leicester Amateur Radio and Electronics Exhibition

Granby Halls, Aylestone Road, Leicester

Friday 25 October – 10 am to 6 pm
Saturday 26 October – 10 am to 5 pm

WATERS & STANTON

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SUPER DEALS ON STAND No. S15 AT LEICESTER

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TS-940S	1995.00	FT-757GX2	969.00
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£229!
2M 25W
AM Airband Receiver

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TM-441E	325.00	IC-449E	359.00
TM-531E	415.00	IC-475E	1210.00
TM-741E	729.00	IC-475H	1275.00
TM-731E	675.00	IC-3220E	510.00
TM-702E	455.00	IC-3220H	575.00
FT-290R2	429.00	IC-2410E	659.00
FT-690R2	429.00	IC-2410H	695.00
FT-790R2	499.00	IC-2500E	689.00
FT-5200	639.00		

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Rx option: 137-180/400-520MHz

- Full; Duplex
- 6.5 Watts Max
- Full DTMF
- CTSS Tone Squelch
- 40 Memories
- 700mAh pack

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DJ-F1E	239.00	FT-911	329.00
DJ-460E	249.00	IC-2SRE	425.00
DJ-560E	359.00	IC-2GE	269.00
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TH-27E	254.00	IC-2SET	299.00
TH-47E	275.00	IC-4SE	304.00
FT-26	245.00	IC-4SET	316.00
FT-76	259.00	IC-4SRE	445.00
FT-23R	209.00	IC-4GE	289.00
FT-73R	229.00	IC-W2E NEW	395.00
FT-411	225.00	IC-24ET	325.00

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Models for 80/40/20M SSB/CW
10 Watt linears single band 129.00
10 Watt dual band linears 199.00

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PRH-145	2M 500 Watt 18db gain — 0.9db NF 109.00
PR-430	70cms 100 Watt 15db gain — 1.2db NF 85.00

MICROSET POWER SUPPLIES

PT-107	7Amp 13.5V fully protected (non meter) ... 49.00
PT-110	10Amp 13.5V fully protected (non meter) 69.00
PC-110	10Amp 13.5V fully protected with meter ... 89.00
PT-120	20Amp 13.5V fully protected (non meter) 119.00
PC-120	20Amp 13.5V fully protected with meter 149.00
PT-135	30Amp 13.5V fully protected (non meter) 149.00

AMPLIFIERS (with GaAsFET Pre-amps)

R-25	2m 1-4W in 30W max out SSB/FM 79.00
RV-45	2m 3-15W in 45W max out SSB/FM 99.00
R-50	2m 1-7W in 50W max out SSB/FM 99.00
SR-100	2m 4-25W in 100W max out SSB/M 159.00
SR-200	2m 10-50W in 200W max out SSB/FM ... 289.00
VUR-30	2m/70cms 1-6W in 20/30W max FM 229.00
RU-20	70cms 0.8-3in 15-20W max out SSB/FM 119.00
R-432-90	70cms 6-12in 80-90W max out SSB/FM 389.00

Send SAE for full colour Microset catalogue

RECEIVERS GALORE!

NRD-535 SPECIAL SHOW OFFER

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Kenwood R5000 hf ssb/cw/am 24ov vhf option	895.00
Yaesu FRG8800 hf ssb/cw/am 240v vhf option	649.00
Icom IC-R7100 25MHz-2GHz superb base scanner	1050.00
Icom IC-R72E hf ssb/cw/am compact budget rx	650.00
Icom IC-R100 1-1800MHz AM/FM	510.00
Icom IC-R1 handheld scanner	369.00
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Yupiteru MVT-7000 hand scanner THE BEST!	289.00
Sony ICF-SW77 New hf ANOTHER WINNER!	T.B.A.
Sony ICF-SW55 New portable BEAUTIFUL	T.B.A.
LOWE HF-150 ssb/cw/am JUST RELEASED	299.00

DIAMOND

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SX-200	1.8-200 MHz, 5.20-200 watts 69.00
SX-400	140-525 MHz, 5-20-200 watts 79.00
SX-600	1.8-525 MHz, 5.20-200 watts 125.00
SX-1000	1.8-1300 MHz, 5-20-200 watts 165.00
SX-2000	1.8-200 MHz, 5-20-200 watts AUTO 95.00
SX-9000	1.8-160 & 430-1300 MHz, AUTO 190.00

BASE STATION ANTENNAS

CP-4	10-15-20-40m vertical with radials 149.00
CP-5	10-15-20-40-80m vertical with radials ... 195.00
CP-6	6-10-15-20-40-80M vertical with radials 209.00
D-130N	Discone 25-1300 MHz. 50 FT cable 82.95
CP-22J	2m 2 X 5/8 6.5dB gain omni-directional 52.00
D-707	Active rx. 1.5-1300 MHz 12V 99.00

FIBREGLASS VERTICALS

X-50	2m/70cms 4.5/7.2db gain 1.7m long 59.95
X-300	2m/70cms 6.5/9db gain 3.1m long 95.00
X-500	2m/70cms 8.3/11.7db gain 5.2m long ... 119.00
X-700	2m/70cms 9.3/13db gain 7.2m long 219.00
V-2000	6m/2m/70cms 2.15dbi/6.2db/8.4db 2.5m.. 95.00
X-5000	2m/70cms/23cms 4.5/8.3/1.7 db 1.8m 109.00

MOBILE ANTENNAS AND MOUNTS

NR-2000M	23cms/70cms/2m mobile whip PL259 .... 49.95
D-505	Active rx. antenna 1.5-1300MHz 12v 69.00
NR-770R	2m/70cms whip PL-259 ..... 35.00
NR-790	2m/70cms 4.5/7.2 dB gain 100 Watts 48.00
SG-7900	2m/70cms whip 5.0/7.5 db supergainer 68.00
DP-2HE	2m 1/4 wave whip PL259 ..... 6.95
M-285	2m 5/8th whip PL259 ..... 15.95
EL-2E	2m 7/8th deluxe whip PL259 ..... 33.95
NR-07C	70cms mobile whip P1259 ..... 25.00
AM-L	Gutter mount fold over type 12.95
EC-H	PL259/SO239 cable kit for DP-GL 9.95
SP-M	Heavy duty magnetic mount with cable 25.95

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SO239 + EARTH POSITION

£49

DC-500MHz

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G4HKS

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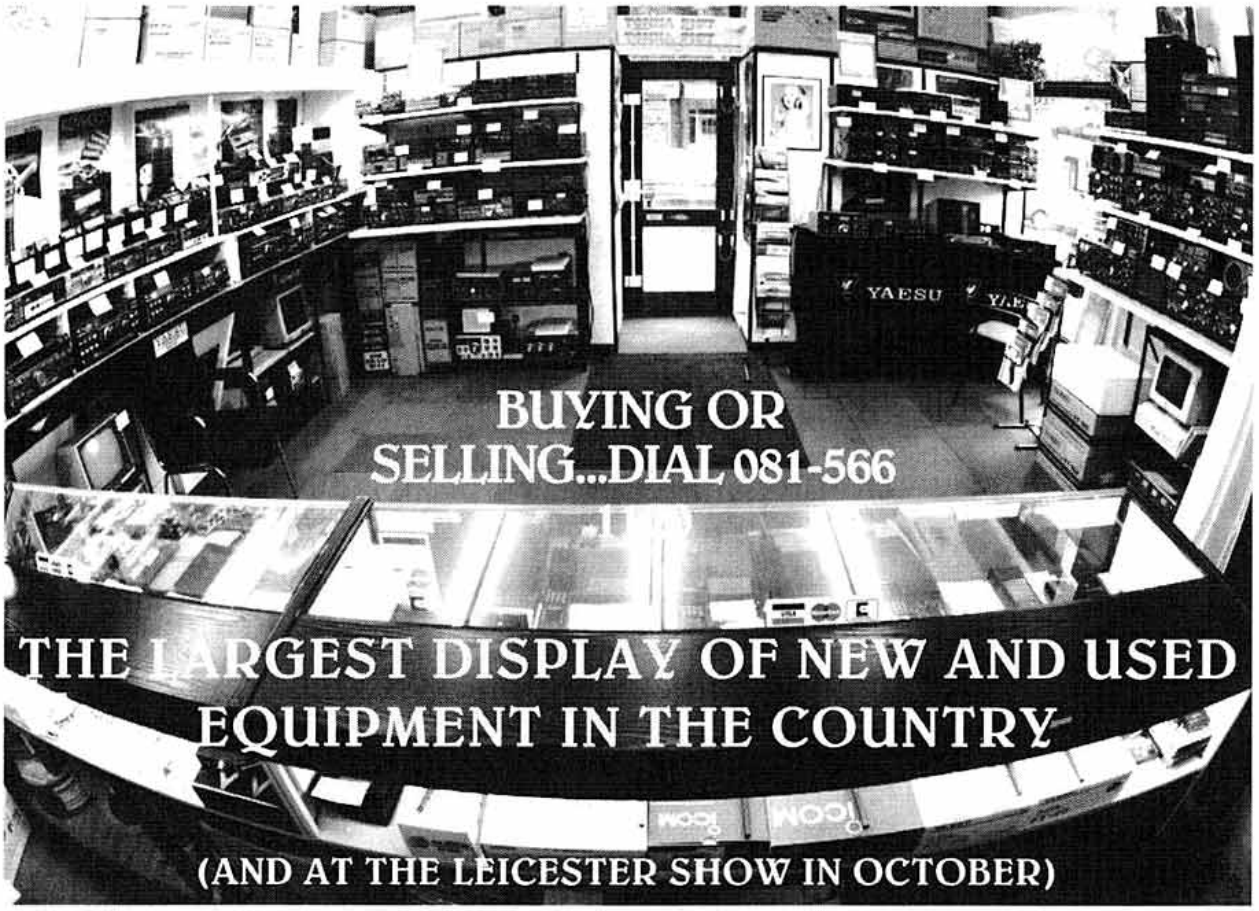


Imagine an ever changing display of new and used equipment, ALL on display for you to see and feel without the pressure of buying. In fact the only area you might get bothered about is the coffee. (but there again I must maintain the tradition). Imagine a used equipment stock list which changes so often, that it is computer generated at least twice a day - not every week or month like most other retailers. Better still I don't request "SAEs" for the privilege of my listings. When was the last time you asked for your free copy?

For those of you who have not visited MARTIN LYNCH (a year gone by and you haven't visited me already?) we really are easy to get to. My shop is just across the road from NORTHFIELDS UNDERGROUND on the Piccadilly Line. It's the closest store to HEATHROW by tube, 5 minutes from the M4/40/25 motorway, and about 20 minutes from the M1. If customers can visit the busiest Exchange Centre from as far as Australia, Canada, Sri Lanka and Marlow Bottom, surely you can make it to sunny Northfields. (Where is Marlow Bottom?)

Oh yes - what have we in stock? If it wasn't for the fact that this excellent magazine charges a fortune to advertise, I could probably fill it all! All the makes, all backed by the UK importers including YAESU, KENWOOD, ICOM, STANDARD, AOR, ALINCO, YUPITERU, TONNA, TEN-TEC AND MANY MORE, are now available, along with masses of clean, guaranteed, used equipment.

Knowledgeable staff and back-up second to none, completes your peace of mind package. For those of you who prefer to mail order, give me a try! I have many letters thanking my staff for the help and service they have received. The repeat business and recommendations tells me we are doing it right. Give it a go!

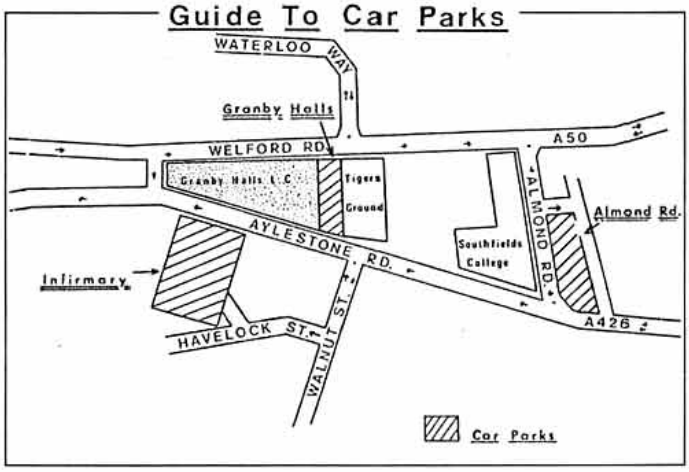
Final word, yes of course I take part exchange and yes I do want to buy your unwanted equipment. (It amazes me how often I get asked that, it's like asking a barber if he cuts hair). Where do you think all the stock comes from? So if you have an FT101ZD and want a new FT990, or own a TS830S and want the latest ICOM, give me a call TODAY. Don't wait just ring.

73 Martin G4HKS

LATEST MODELS IN STOCK: YAESU FT990, FT1000, FT5200, FT26/76, KENWOOD TS850S, TS450S, TS690S, TM741E, ICOM ICR7100, IC2SRE, IC4SRE, ICW2E.
STOP PRESS!! LONDON'S ONLY APPOINTED TEN-TEC DEALER -
the fabulous new Argonaut II in stock!
TONNA ANTENNAS NOW AVAILABLE FROM STOCK.
SEND FOR OUR LATEST SECOND HAND LIST - FREE!!

Welcome to the 20th Leicester Amateur Radio & Electronics Exhibition

THE LEICESTER RADIO SHOW COMMITTEE has pleasure in presenting this event for the twentieth year running. The venue will be the Granby Halls, Leicester, as usual and takes place on Friday 25 and Saturday 26 October. Times of opening 10am to 6pm (Friday), 10am to 5pm (Saturday), disabled 9.30am. Admission price, £1.50, disabled and youngsters £1.00. Discount for block bookings.



This year parking should be a little easier as both football teams are playing away.

- **Extensive trade exhibition**
- **RSGB book and information stand**
- **Bring and buy**
- **Raffle**
- **Talk-in by GB2GH on S22 and SU22**

Bring and buy will be run as usual by the Leicester Radio Society – very big, very popular.
The raffle will be organised by the Leicestershire Repeater Group.

SPECIAL HOTEL ARRANGEMENTS

If you would like to stay in Leicester for the duration of the show, then arrangements have been made with the following hotels for block bookings to be available.

Grand Hotel, Granby Street, £35.00 per person per night. Telephone: 0533 555599

Alexandra Hotel, London Road, £28.00 per night for a single room and £40.00 per night for a double or twin room including. English breakfast. Telephone: 0553 703056 (G6HSF Andy)

Post House, Braunstone Lane, £20.50 per person, per night for a twin or double room, £29.00 for a single room, price includes breakfast, VAT etc. Telephone: 0533 630500.

Belmont Hotel, De Montfort Street where a special show price per person has been negotiated for two nights. Bath, bed, breakfast and dinner for £82.00. Telephone: 0533 544773.

Please remember to mention when booking that it is part of the Granby Halls Amateur Radio Show block booking to qualify for these concessionary prices.

LEICESTER SHOW PRODUCT NEWS

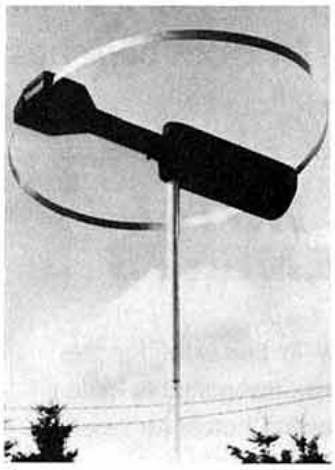
We asked exhibitors to tell us what products would be launched or featured at Leicester. Here are their replies . . . .

The information below is compiled from information sent in by the manufacturers and distributors concerned. Details are published in good faith but the RSGB cannot be held responsible for false or exaggerated claims made in the source material.

ICS ELECTRONICS LTD
Stand E7

ONE OF BRITAIN'S MOST innovative electronics organisations that has long supported the amateur market, ICS will be fascinating us as usual at the show. From an amazing selection of product information sheets, we have selected just a few to whet your appetite.

PCB-88: A new packet radio TNC on a plug in card for the IBM PC.



Isoloop 10-30: A new loop antenna from AEA with improved weather proofing, wider frequency range and no need to disassemble for transport.

ICS-FAX 11: A new version of this excellent IBM PC based grey-scale facsimile software. Available are colour facsimile, RTTY, FEC and Navtex, as well as remote control for ICOM radios.

Fax-2: Although designed mainly for the marine market, this compact and quiet unit is capable of printing weather maps, Navtex, RTTY, FEC and Marine Page on its built in printer. It should be of interest to the discerning short-wave listener. For unattended operation it has a built-in timer

AMT-3: A *world first*! ICS's own low cost AMTOR/RTTY unit. Now with upper and lower case AMTOR. **DSP-2232**: The latest version of this leading edge Digital Signal Processing technology will be on show. The first firmware upgrade should have been issued to existing users by the show date.

AKD Launches Dedicated 4m Rig

SYON TRADING Stand S30

RADIO COMMUNICATION is delighted to see that the British company AKD is now manufacturing a 4 metre version of their popular 'entry level' 2m FM tranceiver. To be premiered at Leicester, this low cost, no frills rig may well provide us all with the opportunity to populate the relatively underused 70MHz band. Offering 25W output on FM channels, we note that it is also considered ideal for packet. See it on the Syon Trading stand.

SEM
Stand S55

SEM'S LATEST product is the Cosmic Keyer. This is a CMOS microprocessor four-memory iambic keyer that's different! Instead of a mass of switches, knobs or push buttons it has only 4 buttons to select the memories. All other functions (there are over 20) are selected by talking to the keyer with the key! For example, send '? S' on the key and it will tell you its present speed setting, whilst 'S 20' will set its speed at 20WPM.

Just some of its features are: Four messages of 48 characters. Each message can trigger any other message at a touch of the key.

Time delays can be programmed in for listening, or not to form a continuous loop. The message can stop for you to insert paddle text and will continue when you stop.

Automatic contest serial numbers - press two of the memory buttons to drop the number if a repeat is required.

Adjustable 'weight' and 'compensation' which increases key-down time and decreases the off-time by your choice of milliseconds. This allows you to compensate for the keying time changes which exist in the transmitter, and the key will produce perfectly spaced Morse at any speed (the normal 'weight ' control is only correct at one speed). And, of course, iambic keying with dot and dash memories.

The New IC-R7100 is Top of the Range

ICOM (UK) LTD Stand E2

AS FAR AS the new receivers are concerned, it seems that 'la creme de la creme' will be ICOM's latest wideband VHF and UHF communications model - the IC-R7100. Continuous coverage from 25 to 2000MHz with SSB, AM (normal, wide), FM (normal, narrow) and wideband FM, this beautifully designed receiver offers nine-hundred memory channels, each of which can be numbered, a 24-hour clock system with five on/off times and a variety of scanning modes. Options include computer control and frequency announcements in English.

A brand new pair of handhelds, the ICOM 144MHz IC-25RA and the 430MHz IC-45RE, introduces us to the fascinating concept of a 5 watt 'handi' that has a wideband scanner built in, covering 25-950MHz on AM and FM!

Simultaneous reception of two signals on the same band is straightforward and listening on, say, the local UHF repeater whilst staying in touch on 2m is a snip! Whatever will they think of next?

WATERS & STANTON Stand S15

ALINCO WILL BE making a special effort to promote their products this year and will be sending over technical staff from the Japanese factory to meet their UK customers at Leicester. Sources close to the factory say that there are some exciting new and innovative models to be announced. Visitors to this stand can be assured that the very latest models will be on display, direct from Tokyo. One model that will certainly be displayed is the new DJ-F1E, a combined 2m handheld and airband/marine monitor and, hopefully, the new DJ-F5 dual bander. They will also have a limited supply of the Alinco DJ-S1E compact 2m handhelds specially modified to give airband and marine reception at an attractive price.

Waters and Stanton is pleased to be appointed as sole distributor for the Microset range of amplifiers and power supplies, all of which will be on display, and for Tonna VHF/UHF beam aerials. Good stocks will be at Leicester as well as free colour technical catalogues. Of particular interest to QRP enthusiasts will be the first appearance in the UK of the Argonaut Mk II.

The company has also been appointed distributor for MFJ and Ameritron products. The former include a wide range of low cost ATUs, filters, measuring equipment etc. Ameritron manufacture HF linears, and some budget-priced ones should be on display. A special offer will be made by Azden of their PCS6000 25W 2m mobile plus airband monitor and the full range of Diamond products will be on display including the new 6m/2m/70cm and 2m/70cm/23cm base aerials.

ARROW RADIO Stand S33

ARROW RADIO LIMITED has announced that the brand new ICOM IC-R7100E which is only just on the market, will be available through them with full coverage of the HF spectrum. The IC-R7100E, which in normal version covers 26-2000MHz, will directly read the HF frequency.

Also on show will be the new TELEX Amateur Radio Contester Handset. The headset is specially designed for use with tranceivers, having a dynamic noise cancelling microphone of 300Ω impedance and a frequency response of 100 - 8000Hz +/- 5dB. The dynamic headphones have 50 - 15000Hz response and a sensitivity of 103dB SPL +/- 3dB at 1kHz.

Almost the full range of DAIWA equipment will be on display including the excellent range of Aerial tuners. DAIWA is one of the few manufacturers offering tuners covering the 50MHz band - the CNW319 provides facilities for tuning Top band through to 54MHz.

The excellent CMW419 covers 1.8 - 30MHz continuous. The CNW727 is a unique tuner for 2m and 70cm and, like the other DAIWA tuners, includes the famous cross-needle meter for SWR/Power.

Arrow will be showing the unique CODEBREAKER - Code 3, the world's most advanced computer program for decoding and analysis of HF data communications. The Code 3 software and FSK converter will work with all PCs and printers that are genuinely 100% IBM compatible. Code 3 will decode almost all known data systems including error-correcting modes.

A full range of DAIWA meters, power supplies and switches will also be shown. Additionally, visitors will find the latest models for COMET ANTENNA and the world famous BUTTERNUT range.

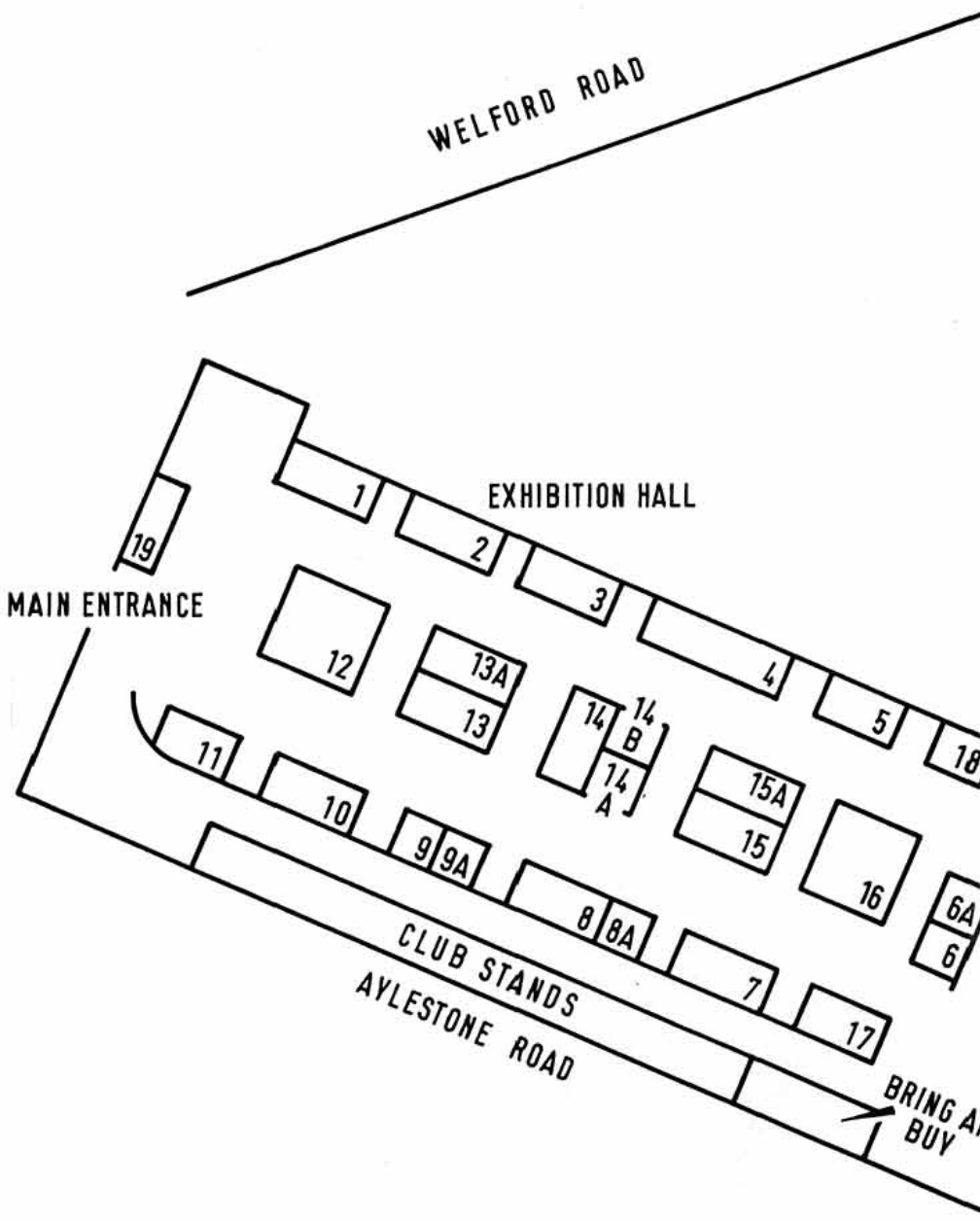
continued on page x

LEICESTER SHOW

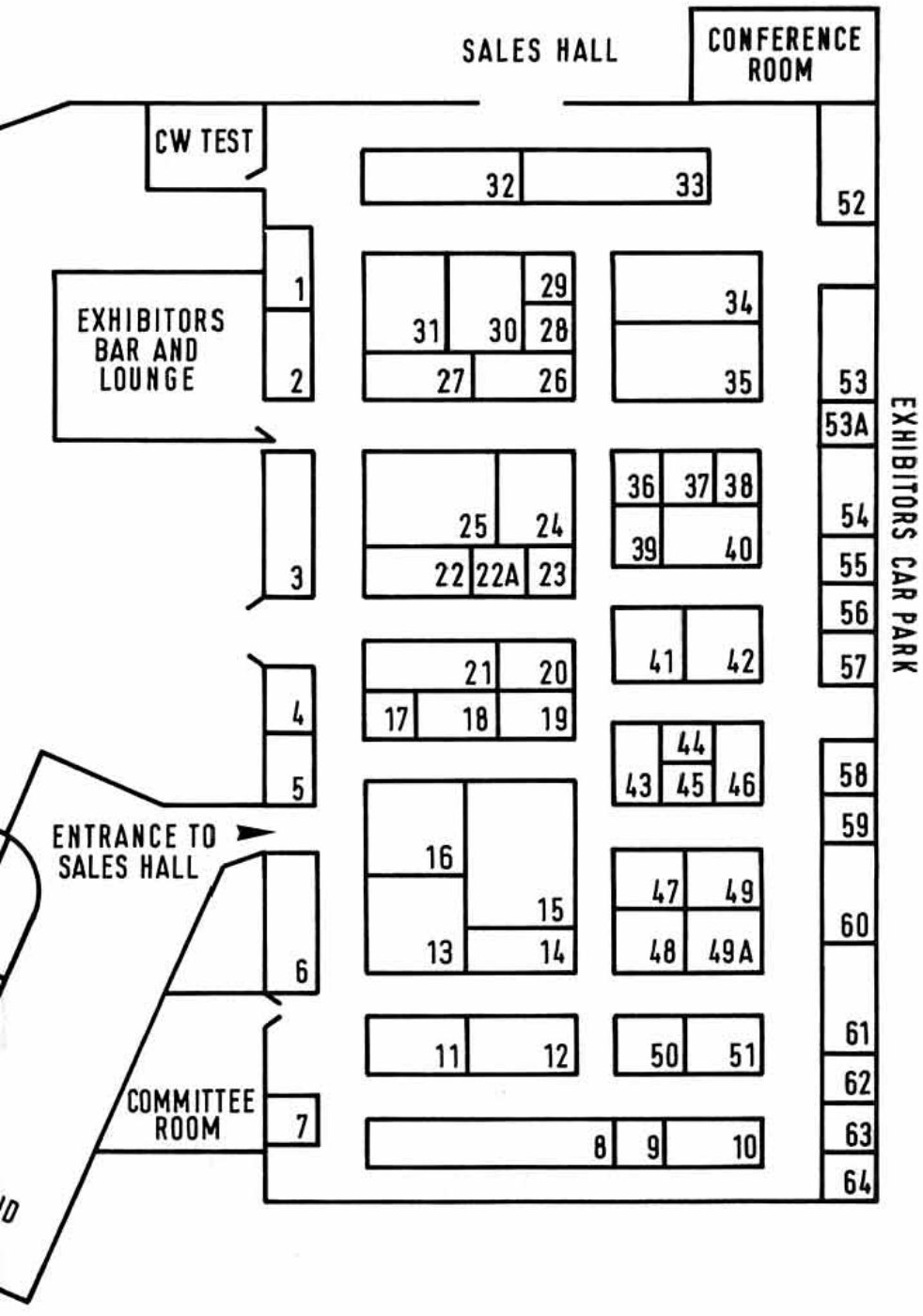
The 1991 Leicester Amateur Radio Show will take place on Friday 25 and Saturday 26 October, at the Granby Halls, Aylestone Road, Leicester (just off Junction 21 of the M1). The usual talk-in will be available on S22 and SU22 using the Leicester Show callsign, GB2GH. Refreshments will be available from the cafeteria and bar, and there are excellent facilities for the disabled.

Exhibition Hall

EXHIBITOR	STAND
RSGB	1
Icom	2
Practical Wireless/SWM	3
Martin Lynch	4
Sandpiper Comms	5
2J Sound	6
R&D Electronics	6a
ICS Electronics	7
Merlin Systems	8
Poole Logic	8a
Jandek	9
Howes Comms	9a
Ham Radio Today	10
Alan Kelly Comms	11
Lowe Electronics	12
Rich Electronics	13
TW Wraith	13a
A1 Electronics	14
RA Kent	14a
Technical Software	14b
Amdat	15
Tennamast	15a
Dataphone	16
Siskin	17
Mainline Electronics	17a
Wilson Valves	18



FLOOR PLAN AND EXHIBITORS



SALES HALL

EXHIBITOR	STAND NO
Gemini Electronics	1/2
Taurus Elec.	3
Dewsbury Electronics	4
Greens Telecom	5
Elliott Electronics	6
Lake Electronics	6a
KM Publications	7
South Midlands Comms.	8
JPE Computers	9
Amateur Radio Comms.	10
Weirmead	12
Display Electronics	13
Strumech Eng.	14
Waters & Stanton	15
JMG Electronics	16
Mutek	17
Dressler Comms.	18/19
Trident Systems	20
KW Communications	21
Eastern Comms.	22
Castle Electronics	22a
H Morgan Smith	23
UMF	24
Anchor Surplus	25
Barenco	26
J Birkett	27
RJ Holderness	28/29
Syon Trading	30
CapCo	31
Heatherlite Comms	32
Arrow Radio	33
Marco Trading	34
SGS Electronics	35
Raycom Comms	36
JAB Electronics	37
J & P Electronics	38
Stevens Electrical	39
M & B Radio	40
ARE Comms.	41
Nevada Comms.	42
Brial Services	43
AS Paddon	44
Astley Videos	45
Procomm	46
RAS (Nottingham)	47
Computer Junk Shop	48
Oasis Computers	49
Giacomelli	49a
Westlake	50
Radiotronics	51
New Cross Radio	52
Lee Electronics	53
Strikalite	53a
TAR Communications	54
SEM	55
Rollertec	56
Badger Boards	57
RN Electronics	58
Micro-Magic	59
Dee Comm.	60
Radio Shack	61
Loutronics	62
Rollertec	63
Bonex	64

TABLES

Qualitas Radio
MFM Supplies
Newton Engraving
G4ZPY Paddle Keys
Quartslab
B.J. Antennas
RF Engineering
Kanga Products
PTV Electrical

LEICESTER SHOW PRODUCT NEWS

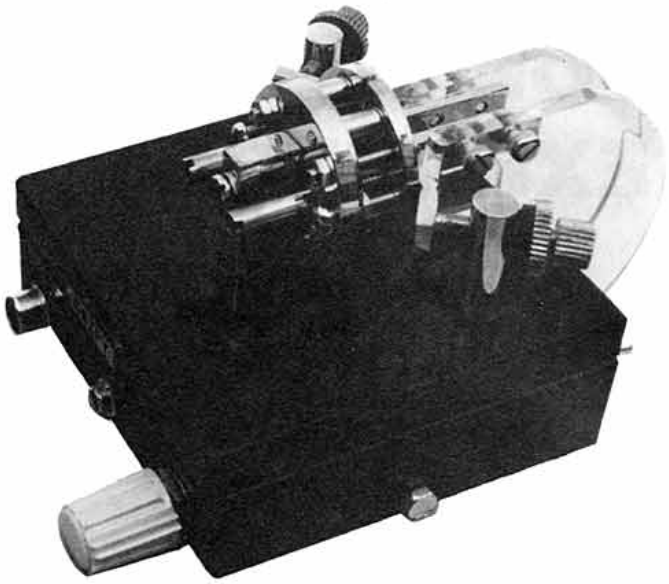
continued from page vii

G4ZPY PADDLE KEYS INTERNATIONAL

Stand TBA

A BRAND NEW miniature iambic keyer will be unveiled at Leicester by Gordon Crowhurst, G4ZPY. Measuring just three-and-a-quarter by three-and-a-quarter by three-quarters inches, the unit is RF proof and will key up to 150V and 500mA at speeds of up to 60 words per minute and beyond!

This model is precision engineered and designed round a new microprocessor programmed to the exhibitor's own specification.



NEVADA
Stand S42

SHOWING FOR the first time at the exhibition will be the latest in a new line of low-cost handhelds by Kenpro.

The KT220 is a 2 metre rig featuring key pad entry, DTMF facilities, a sub-audible tone encoder, 10 memories and various scan modes. Output power is selectable at 3.5 and 0.5 watts.

AMDAT *Stand E15*

AMDAT WILL BE showing two new and completely different products at the show. The first is the latest high-specification communications controller based on Digital Signal Processing (DSP) techniques. The DSP-12 is probably the most versatile communications controller ever available to the radio amateur. It provides HF and VHF packet, 1200 PSK & 9600 FSK for terrestrial and satellite packet together with RTTY and ASCII at variable speeds and shifts. The expandability of the unit is one its strongest features as it allows new modes to be downloaded into RAM when they become available allowing upgrades without opening the unit. Additional modes such as CW and AMTOR will be available soon with very low upgrade costs. The second new product is a superb addition to the range of radio controlled clocks and watches made by Junghans. They have achieved the impossible and produced an analogue watch which receives the time signals and provides amazing accuracy. This watch will complement the extensive range of digital, mantel and wall clocks on display.

JANDEK
Stand E9

SINCE THEIR establishment in 1987, the policy of Jandek has been to promote construction in the hobby, mainly via QRP projects.

Their range of kit modules can be used to construct direct conversion receivers, CW transmitters and transceivers, or utilised within the constructor's own projects.

A number of new kits have been included in the line-up, one of the most recent being the JD020 audio frequency notch filter, based upon the excellent design by Dr Paul Stewart, G7EAH, which was published in the January 1991 edition of *Radio Communication*. Coupled with the JD001 audio amplifier kit and appropriate hardware, it offers a high performance filter for under £30.

Newly licensed and prospective Novices will be catered for with a range of components and projects at prices designed not to hurt the pocket!

RN ELECTRONICS
Stand S58

A BRAND-NEW 23cm transverter will be launched at the show, the latest product in this professionally designed range of equipment for the Amateur.

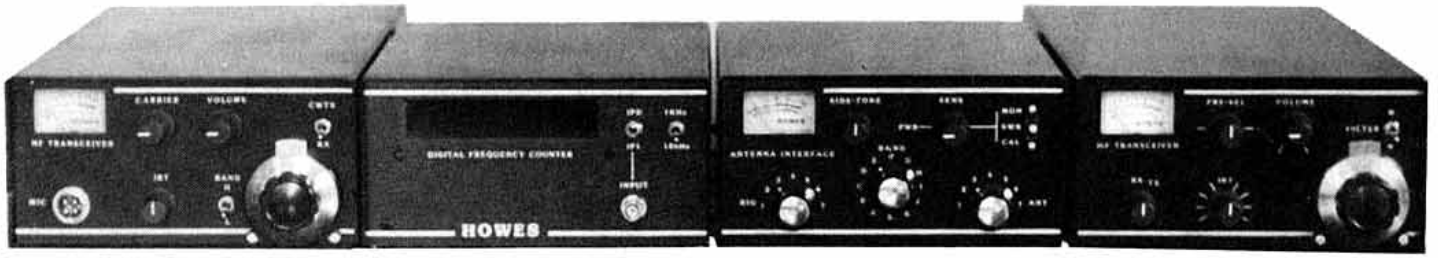
Also on show will be an increased range of Minffordd Engineering cases and boxes and a selection of popular iron dust and ferrite products from Amidon Associates of America.

LAKE ELECTRONICS
Stand S6A

THE LATEST versions of the popular QRP transceivers from Lake will be on show both in kit form and as ready-built units, together with a range of essential QRP accessories. Lake report that demand for the 40m 2W rig is high and that there must be an awful lot of QRO licensees now savouring the delights of QRP DX!

MARTIN LYNCH
Stand No E4

THE LONG-AWAITED arrival of the TEN TEC Argonaut II is guaranteed to send ardent QRP operators into raptures with its superb performance, dual VFO's and a general coverage receiver. See it in pride of place on this stand, where you may also find a veritable treasure-trove of used equipment at tempting prices. The firm is inviting everyone who hankers after a new rig or receiver to bring along their trade-in for a 'no quibble' part-exchange deal right there at the show.



ARE COMMUNICATIONS *Stand S41*

LEADING THEIR comprehensive display of all the latest equipment will be the new ICOM R-7100 VHF/UHF receiver carrying ARE's own HF conversion. This modification is fitted internally and in no way degrades the VHF/UHF performance, whilst allowing the R-7100 to tune from 100KHz to 2GHz without gaps. The modification will also allow 10Hz tuning on SSB.

C M HOWES COMMUNICATIONS *Stand E9A*

C M HOWES COMMUNICATIONS will be showing a new range of custom-made matching cases and 'hardware' to complement their very popular range of kits. The cases feature a ready-punched and anodised aluminium front panel which enables the home constructor to achieve a professional looking project. This is an important development for the company with investment in new in-house sheet metalwork facilities. Hardware packages for transceivers, frequency counter and aerial tuning unit will be on display and available at the Show.

Also new on the Howes stand will be a broad-band pre-amplifier covering 4 to 1300MHz. The pre-amp is designed for mast-head or shack use with scanning receivers. Designated the HOWES SPA4, the kit will be available at Leicester.

RF ENGINEERING *Stand TBA*

ON THIS STAND will be found the Barker and Williamson AR-25 vertical antenna, fully erected. This antenna covers 80, 40, 30, 20, 15 and 10 metres and has no traps. It is extremely robustly made using compression fittings to connect the various sections together instead of the usual pipe or worm thread clamps, and stands 25ft high. The VSWR curves for the six bands are very acceptable, and the feed is by 50ohm coax.

New at the show will be Electro-Magnetic Static and Pulse Shunts from Signal Systems and from Communication Devices a range of 10 different baluns for various applications. Also from Communication Devices, the start of a range of wide-spaced variable capacitors for transmitters and ATUs. These are of ceramic and metal construction, and the first unit to be stocked is 245pf with a spacing sufficient to be rated at 6000v.

SISKIN ELECTRONICS *Stand E17*

SISKIN ELECTRONICS will be concentrating on the EPROM update scene at Leicester with portable packet TNC EPROM updating facilities actually on the stand. Here is your chance to upgrade to the latest revision on the spot! Simply bring along your existing EPROM and Siskin will erase and re-program it there and then, including appropriate paperwork, at a nominal charge.

Latest firmware revisions available will include: **PK-232MBX update** which sports an AMTOR personal mailbox plus the new 'Packet Lite' HF protocol (and lots more goodies). A much-**enhanced PK-88 firmware** again including 'Packet Lite' Version 4.00 for the Kantronics KAM (which allows simultaneous RTTY/AMTOR and Packet modes when used in conjunction with HOSTMASTER PC software). Plus all the latest updates for PacComm and Kantronics regular TNCs and a wide range of custom leads for just about any computer/TNC/radio combination. If you are not already on packet, Siskin will be offering everything from a simple TNC to a complete packet station including the computer, the radio and even the leads!

DEECOM *Stand S60*

DEECOM IS expected to show the 3-element 20m monobander constructed by them for the World Student Games station GB91WSG.

A brand new 6m end-fed half-wave antenna will be presented and a range of new tuners purpose made for short-wave listeners using long or random wires.

CAP CO *Stand S31*

THE CAP CO ECONO-LOOP is a budget-priced magnetic loop antenna, similar in performance to the well known AMA series but at less than half the price. To achieve these savings in the ECONO-LOOP the Faraday coupling loop has been replaced with a gamma match, and a simplified capacitor and tuning control unit have been specified.

In its basic form the ECONO-LOOP will tune between 24.7MHz and 30.0MHz only, but with the addition of individual fixed capacitors bolted on externally the frequency range can be extended down to 7MHz. By the selection of suitable capacitors any frequency in the range 7 - 30MHz can now be achieved. Despite these modifications the ECONO-LOOP still offers all the features found only in magnetic loop antennas:

- Only needs to be mounted a few feet off the ground
- Omnidirectional Radiation Pattern when working DX
- No broadcast interference
- No television interference
- Up to 200 watts output
- Needs no tower or rotator
- Indoor or outdoor use
- Needs no aerial tuning unit

R A KENT (ENGINEERS) *Stand E14A*

THE NEW MORSE tutor from R A Kent (Engineers) is a small, battery-powered microprocessor-based training aid.

The Morse tutor provides six user-selectable random-character programs for producing letters, numbers and mixed letters-and-numbers in groups of five, or random-length groups of one to eight characters.

The speed is variable from 5 to 40 words per minute and a delay can be introduced up to a maximum of four seconds between characters to give extra thinking time - ideal for the Novice test.

The low power consumption and portability of the tutor. together with the earphone facility, enables users to practice anywhere, anytime.

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  increase your knowledge, subscribe at the Show. Sample copies of all newsletters available

* ***Special offers***
  clocks, badges, pens and books at special prices

* ***Novice Information***
  all you need to know to join a Novice Course or become an Instructor

* ***D-i-Y Radio***
  see the latest edition of the RSGB's full-colour magazine for beginners of all ages

* BOOKS * BOOKS * BOOKS *

New RSGB books at counter prices:

* ***The HF Antenna Collection***
  by Erwin David, G4LQI: £8.08; (non-members £9.50)

* ***Amateur Radio Techniques (7th edition reprint)***
  by Pat Hawker, G3VA: £6.38; (non-members £7.51)

Also newly in stock the 16th edition of The ARRL Antenna Book at the special price of £14 to RSGB members.

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All modes of FAX and colour/mono SSTV. Review in July '91 RADCOM. BBC only. Complete system only £99 or £119 with FAX direct printing option.

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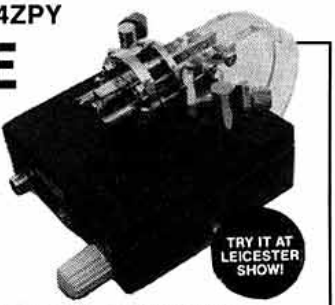

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