radio communication

April 1974

GUGLIELMO MARCONI 1874-1937

Centenary year of birth of "Father of Wireless"

Marconi, the first "amateur", photographed in London in 1896 with the apparatus brought by him from Italy, including the original "black box"

A Marconi photograph

journal of the Radio Society of Great Britain

radio communication

Volume 50 No 4 **April 1974** Price 40p

CONTENTS

Radio Communication **is published by The Radio Society of Great Britain as its official journal on the first Tuesday of each month and is sent free and post paid to all members of the Society**

ABC
MEMBER OF THE AUDIT BUREAU OF CIRCULATIONS

17,513 copies per issue average circulation in 1973

Contributions and all correspondence concerning the **content** of *Radio Communication* should be addressed to: The Editor, *Radio Communication*, 35 Doughty Street, London WC1N 2AE. Tel 01-837 8688. (**Circulation** queries should be addressed to: The General Manager, RSGB.)

Closing date for contributions unless otherwise notified: 4th of month preceding month of publication.

Advertising, other than Members' Ads, should be sent to the above address marked for the attention of Mr C. C. Lindsay. Tel 01-837 8688 (or 01-686 5839, advertising only).

BURNS
ELECTRONICS

CRYSTAL CALIBRATOR CC-10
Price **£25.60**

High stability crystal oscillator and dividers generate 1MHz-500-100-50-10-5kHz and harmonics to above 600MHz. Heterodyne wavemeter and modulation monitor (AM) facilities. Battery operated.

WAVEMETER TC-101 Price **£18.30**

Absorption wavemeter covering 0·8-480MHz in six ranges with meter indication and insulated probe.

The above two instruments are designed to meet the requirements of the UK amateur transmitting licence for frequency measurements up to 500MHz.

FREQUENCY STANDARD SD-11
Basic **£78.00** Inhibit **£5.00** extra.

Battery operated, phase locked to Droitwich on 200kHz, with O/Ps of 1MHz and 10MHz. Optional low signal inhibit facility. Internal or external aerial.

FET CONVERTERS

FS2/4 **£18.00**

MOSFET RF stage + Schottky diode ring mixer for low noise and strong signal handling 9 volt supply. Any IF from 2-30-MHz.

FC70 **£18.50**

Bipolar RF stages + MOSFET mixer for low noise and reasonable gain. 9 volt supply. Any IF from 2-30MHz.

MULTIVERTER MC-3 Basic frame **£6.50** Mains PSU **£3.00** 1-3 converters may be fitted. Separate RF I/Ps with common IF O/P and "thro" position. External DC supply socket. Only supplied with minimum of one of our converters.

COMMUNICATION MODULES—KITS or MADE AND TESTED

NEW

SPEECH PROCESSOR SP-1
Kit £5.70. M & T £7.00.

AF I/P 0·5mV (min.) O/P 1 volt RMS at low Z. Contains preamp, limiter, amplifier and active L.P. filter. Suitable for AM, FM, SSB, AFSK etc. May be used with PM-1.

PHASE MODULATOR PM-1
Kit £5.00. M & T £6.20.

Generates NBFM by audio corrected phase modulation. Use on 70MHz and above. Contains crystal oscillator, phase modulator and AF filter. Insert between existing TX crystal and oscillator. State crystal frequency.

NBFM Generator FMT-1 = SP-1 plus PM-1. (add prices.

POWER SUPPLY MODULE PSM-1
Kit **£3.20** M & T **£3.80**

Regulated PSU for driving modules and converters etc. Fixed O/P in steps from 5.0v to 14.3v, at up to 100mA basic or 500mA with an extra power transistor. Contains rectifier (half or full wave, bridge or doubler), smoothing, zener and current amplifier. Short circuit protection. State o/pV.

FM DETECTOR FMD-1
Kit **£6.70** M & T **£8.20**

IC limiter, discriminator and AF amplifier provide 100mV O/P RMS at 3kHz deviation for an I/P of 300μV min. State frequency in range 350kHz to 1MHz (1·6MHz to special order). 6-9 volt supply.

TONE BURST GENERATOR TBG-1
Kit **£4.70** M & T **£5.70**

Generates access tone for UK/European repeater systems. Range of frequencies. Easily fitted to mobile or home station. 8-12 volt supply.

WE'VE MOVED

At last Burns Electronics are installed in their new and larger premises. Our apologies for any inconvenience or delay this may have caused to our customers.

The new works are located just off the Brighton Road (A23) at Coulsdon. Easy access via Southern Region (3 stations) or bus routes 166, 190, 405, 414 and 709.

Shortly to be announced are our first three agents who will be available at evenings and weekends to answer any enquiries.

Again we will be at the VHF Convention on 6th and 7th April with our display of equipment and components.

COMPONENTS

Some examples of components from our issue 4 catalogue are as follows:

Resistors ¼ & ½W 10ohms to 1Meg (E12) **1½p** ea, Polystyrene capacitors 10pF to 4700pF from **3½p**, Disc ceramics 1pF to 10,000pF **2½p**, Polyester capacitors 0·01μF to 2·2μF from **3p**, Miniature electrolytics from **7p**.

3 gang 17pF variable capacitor **£1.10**, special VFO capacitor with built in reduction drive **£3.22.**

BC108 **11p**, BFR90 (ft 5GHz typ) **£3.48**, 2N3819 **29p**, 2N5245 **42p**, 40673 **56p**, 2N3866 **80p**, 2N4427 **85p**, BLY33 **£1.49**, HP2835 (schottky diode) **49p**, HP3080 **£1.45**, 1N4148 **5p**, 1N4001 **5p**.

Send cash with order or **15p** for catalogues detailing these and other products. Export and trade enquiries welcomed.

VAT Reg. No. 218 4215 82. Please add 10% VAT on all orders including post and packing charges

Equipment and kit prices include carriage. Minimum component order 50p. P&P 15p, free over £5 excl VAT

43a CHIPSTEAD VALLEY ROAD, COULSDON, SURREY, CR3 2RB **Tel: 01-668 7766**

Out now! Free

the New Heathkit Catalogue

Here's the book of Short Wave Receivers and Amateur Radio gear for you. Handcrafted electronics plus kit form savings. We have hundreds of models to choose from, including: Calculators, Metal Detectors, Burglar Alarm, Battery Charger, Intercoms, Instruments, Hi-Fi etc. All available as kits.
Choose payment by cash or our Monthly Budget Plans—we offer terms to suit your pocket.
Want to know more? Simply post the coupon today for a FREE copy of the Heathkit Catalogue, without obligation.

Electronic kit catalogue

offers something for everyone.

Send for your copy today.

VISIT THE HEATHKIT CENTRES

LONDON
233 Tottenham Court Road.

GLOUCESTER (Factory & Showroom)
Bristol Road, Gloucester.

Free Please send me the FREE Heathkit Catalogue & details of Monthly budget plans.

NAME _____

ADDRESS _____

_____

HEATH
Schlumberger

HEATH (GLOS.) LTD. DEPT. RC/04/74
Bristol Road,
Gloucester GL2-6EE

Western

YAESU

We regret that due to cost increases, Yaesu have increased prices and these are now as follows: (EXC VAT).

YAESU PRICES (inc. free delivery by Securicor):

TRANSCEIVERS

*FT-75	£138.00
FT-101	£280.00
FT-101B	£330.00
*FT-200	£170.00
FT-401	£310.00
*FT-501	£375.00

*Power supply required.

POWER SUPPLIES

FP-75	£32.00
DC-75	£39.00
FP-200	£45.00
FP-501	£53.00

TRANSMITTERS

FL-50B	£79.00
FL-400	£193.00

RECEIVER

FR-50B	£67.00
FR-400DX	£155.00
FR-400SDX	£210.00

LINEAR AMPLIFIERS

FL-2000B	£195.00
FL-2100	£165.00
FL-2100B	£195.00
FL-2500	£130.00

until stocks exhausted

REMOTE VFO's

FV-50B for FL-50B	£34.00
FV-50C for FT-75	£34.00
FV-101 for FT-101	£42.00
FV-101B for FT-101B	£48.00
FV-200 for FT-200	£48.00

SPEAKERS

SP-101	£11.00
SP-101B	£13.00
SP-101P	£26.00
SP-101PB	£29.00
SP-400/401	£13.00

VHF EQUIPMENT

FT-2 AUTO	£157.00
FT-2FB	£115.00
FP-2AC	£38.00
FP-2AC/B	£71.00
SIGMASIZER 200	£196.00
FT-220	£264.00
FT-620	£170.00

ACCESSORIES

YD-844 Table Mic.	£14.75
YD-846 Hand Mic.	£5.75
Fan, FT-101	£9.00
FF 50DX L.P. Filter	£12.25
Crystals FT2F/B pr.	£3.50

FREQUENCY COUNTERS

YC-355 AC only	£99.00
YC-355 AC/DC	£110.00
YC-355D AC/DC	£127.00

NEW! Coming shortly YO-100 MONITOR SCOPE Price £93

455kHz or 9MHz £2.50 extra.

Keep a watchful eye on your transmitter's output or use it to tune-up for maximum p.e.p! Can be connected to your receiver also to monitor incoming signals.

BATTERY CLOCK (£6.82 inc. V.A.T.)

This operates for about 6 months on one battery (provided). Available in red, blue, orange, ivory and brown; list your choice in order of preference.

OSKER POWER METER (Ex Stock)

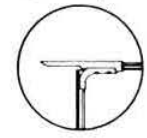
Features: Switchable for 52 or 75 ohm systems. Each instrument is individually calibrated. Four ranges: 0-2, 0-20, 0-200 and 0-2kW, 3-200MHz. Excellent Styling.
Price £19.75 VAT extra

Attention H.F. mobile operators!

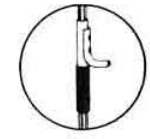
Fed-up with having to disconnect resonators/whips before garaging? Fed-up with having to go slow due to inadequate mounting? Then here's the answer . . . the "HUSTLER."

Hustler and only Hustler gives you 12 years of proven performance, mechanically and electrically superior to all others. You get exceptional reports on every band, lowest SWR and broadcast bandwidth. Matching devices are not required. Use any convenient length of 52 ohm feed line. Convenience of fold-over mast for rapid band change or easy garaging, optimized performance on each band and a time proven concept in mobile communications, a concept verified by the overwhelming majority of amateurs, are yours only with the Hustler!

MO2 MAST FOLDS OVER
Rotates 360° in horizontal plane



The original hinge and sleeve clutch mechanism.



NEWTRONICS HUSTLER MOBILE ANTENNAS

Carr. 75p
VAT extra

BM1 Bumper mount	£5.05	RM10	£5.00	RM20	£6.65
MO2 Mast	£7.50	RM15	£5.55	RM40	£7.50
RM75	£8.10				
Ball Mount	£2.00				
Stainless steel spring	£5.45				
Resonator spring	£2.65				

Carr. 50p.

W.E. QUAD 10-20m. "boomless" type. Cast aluminium centre, bamboos, etc **£30.00** (Carr. pd).

W.E. Trapped dipoles for 10-80m. All are fitted with resin encapsulated traps and a high quality commercial grade centre assembly with cable strain relief.

Type S.500 watts, **£16.** Type HP for 1kW p.e.p., **£17.25.** Type P with a special copper/terylene braid element for ease of coiling up. Supplied with winding spools and 70' co-ax, **£19.50.**

PRICE LIST. Our latest (March) list is available f.o.c. upon receipt of a foolscap S.A.E.

CATALOGUE of Tower, Marts, Antennas, Rotors and Communications Equipment is available at 20p (No S.A.E. required).

All advertised prices exclude VAT and are subject to manufacturers and currency fluctuations.

50p SMALL ORDER SURCHARGE
Due to the increased costs of handling and processing, all orders under **£2.00** will bear this surcharge.

Electronics (UK) Ltd

Punch a hole in the band! with

WILSON QUALITY MONO & DUO-BANDS BEAMS

New Reinforced wide spaced 40, 20, 15 and 10 metre beams
All W7CVA beam elements are constructed of the finest aluminium available, 6063T832 and 6061-T6 both top quality alloys.
All Wilson Electronics beams have a 3" O.D. boom made of top grade aluminium 6063-T6.
All our beams come complete with adjustable reactance tuned gamma match network which can handle 4kW plus a CW and SSB.
Prices include carriage (exclude VAT). All models are ex-stock at the time of going to press and all 20 and 40m models have re-inforcing kits for maximum strength.

WILSON MONO BAND BEAMS VAT extra

Model No.	
M340, 3 ELE. 40 metre beam Gain 8·5dB	£282.00
M240, 2 ele. 40 metre beam, Gain 5·5dB	£140.00
M720, 3 ele. 20 metre beam, Gain 14dB	£259.00
M620, 6 ele. 20 metre beam, Gain 13 dB	£199.00
M520, 5 ele. 20 metre beam, Gain 12 dB	£107.00
M320, 3 ele. 20 metre beam, Gain 8·5dB	£58.00
M715, 7 ele. 15 metre beam, Gain 14dB	£99.00
M615, 6 ele. 15 metre beam, Gain 11dB	£83.00
M415, 4 ele. 15 metre beam, Gain 10dB	£54.00
M810, 8 ele. 10 metre beam, Gain 14·5dB	£107.00
M510, 5 ele. 10 metre beam, Gain 12dB	£54.00

WILSON DUO BAND BEAMS

DB62—6 ELE. 20 and 2 ELE. 40 INTERLACED BEAM. Gain 13 dB-20 5·5 dB-40. Boom length 50 ft.
DB52—E ELE. 20 and 2 ELE. 40 INTERLACED BEAM. Gain 13 dB-20 5·5dB-40. Boom length 40 ft.
DB54—5 ELE. 20 and 4 ELE. 15 INTERLACED BEAM. Gain 12 dB-20 10 dB-15. Boom length 40 ft.
DB43—4 ELE. 20 and 3 ELE. 15 INTERLACED BEAM. Gain 10 dB-20 8·5 dB-15. Boom length 30 ft.
DB32—3 ELE. 20 and 2 ELE. 15 INTERLACED BEAM. Gain 8·5 dB-20 6 dB-15. Boom length 20ft.
DB76—7 ELE. 15 and 6 ELE. 10 INTERLACED BEAM. Gain 14 dB-15 13 dB-10. Boom length 40 ft.
DB65—6 ELE. 15 and 5 ELE. 10 INTERLACED BEAM. Gain 13 dB-15 12 dB-10. Boom length 32 ft.
DB 44—4 ELE. 15 and 3 ELE. 10 INTERLACED BEAM. Gain 10 dB-15 8.5 dB-10. Boom length 20 ft.
DB67—7 ELE. 20 and 6 ELE. 15 INTERLACED BEAM. Gain 14 dB-20. 13 dB-15.

BANTEX FIBREGLASS MOBILE ANTENNAS

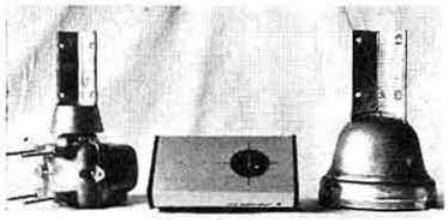
(Carr. 75p) VAT extra

70/¼ 70MHz, ¼ wave	£3.00	BGA, 144MHz, ¼ wave	£6.15
144/¼ 144MHz, ¼ wave	£2.75	B5, 144MHz, ⅝ wave	£4.45
Magnetic Mount	£6.15	Note. Deduct 50p from price of aerial if base is not required.	

All aerials complete with base

The NEW SILENT CDE ANTENNA ROTORS ARE ex-stock. These supersede the previous "Clunk-click" models

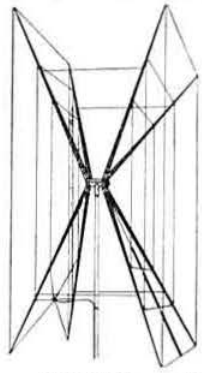
CDE ROTOR PRICES
AR20, £23. AR30, £25
AR40, £30. TR44, £52
HAM-M £79.



AR30, £25 AR50, £30.

It's Spring Time! Antenna Time

For the most comprehensive service and advice we hope that you will feel free to consult us for advice upon your requirements



FROM CANADA

GEM QUAD
£72.00
VAT extra
for 10, 15 & 20m

★Weighs only 21lbs.
★Withstands 100 m.p.h. winds.
★Forward gain up to 8dB.
★Balun included.
★Converts to 3 or 4 element quad.
★Fibreglass tri-dectic spreaders.
★Front/back ratio 25 dB.
★Low angle radiation.

FROM THE U.S.A.

HY-GAIN VAT extra

Hy-gain 18AVT/WB the great new wide band vertical self supporting for 10-80m (ex-stock). Take the wide band, omnidirectional performance of Hy-Gains famous 14AVQ/WB add 80 mtrs. plus extra heavy duty construction and you have the new 18AVT/WB * True ¼-wave resonance on all bands * 52 1/P * SWR of 2: 1 or less at band edges * 1kW (AM) * Radiation pattern has an outstandingly low angle * Roof or ground mounting.

HY-GAIN (Carr. Pd)	
Hy-Tower, 10-80m. Self supporting tower	£132.00
18V, 10-80m. Vertical self supporting	£15.50
12AVQ, 10-20m. Vertical self supporting	£20.00
14AVQ, 10-40m. Vertical self supporting	£29.50
LC-80-Q, Loading coil for AVQ, 80m.	£9.30
18AVT/WB, 10-80m. Vertical self supporting	£42.50
TH6DX, 10-20m. 6 element beam	£117.00
TH3 Mk. 3, 10-20m. 3 element beam	£90.50
TH3 Jnr. 10-20m. 3 element 600W, beam	£62.00
TH2 Mk. 3, 10-20m. 2 element beam	£62.00
Hy-Quad, 10-20m. 2 element quad	£90.00
DB10-15A, 10 & 15m. 3 element beam	£69.00
DB 24B, 3 element 20m., 2 element 40m.	£129.00
402BA, 40m. 2 element	£109.00
261, ¼ Wave 108-470MHz, co-ax & roof mount.	£4.80
262, ¼ wave mag mount, 18' co-ax	£10.45
263, ¼ wave 130-174MHz and Boot lip mount and 16' co-ax	£13.20
265, 3dB Gain 144-174 Stainless steel whip and magnetic mount and 12' co-ax.	£15.00
204BA, 20m. 4 element beam	£96.00
203BA, 20m. 3 element beam	£87.00
153BA, 15m. 3 element beam	£44.00
103BA, 10m. 3 element beam	£35.00
LA-1, Lightning arrestor	£17.50
LA-2, Lightning arrestor	£3.00
12RMQ, Roof mounting kit	£11.00
14RMQ, Roof mounting kit	£13.00
Type 499, Body mount	£5.80
Type S11, Spring, Heavy duty	£5.80
Type 417, Spring	£4.00
E1, End insulator, per pair	£1.80
400, Rotor	£139.00
EN86, Balun	£9.50

SOUTH MIDLANDS CONSTRUCTION LTD. including

Western Electronics (UK) Ltd

(TRADING DIVISION)

Agents: G3PRR Chesham (02405) 4143 G3ZUL Droitwich (09057) 4510

OSBORNE ROAD TOTTON SOUTHAMPTON SO4 4DN
TELEPHONE: TOTTON (04216) 4930 ar 2785
CABLES: 'AERIAL, SOUTHAMPTON'

Hours of business: 9-5.30; 9-12.30 (*Saturdays*)

BAGINTON ELECTRONICS (G3TFC)

MARKET CORNER, BAGINTON, COVENTRY, WARKS. CV8 3AP

Phone Coventry (0203) 302668 **Also at COVENTRY AIRPORT, Phone (0203) 302449**

CRYSTALS TYPE HG6U & 4039 £2 each. 25% discount 10 or more.
2179 2189 2222 2753 2760 2764 2802 2805 2840 2854 2868 2875 2889 2938 2948 2951 2952 2954 2957 2966 2985 3023 3232 3319 3333 3354 3375 3389 3396 3403 3404 3410 3411 3417 3419 3431 3432 3438 3445 3473 3481 3488 3854 3868 3869 3876 3883 3889 3897 3904 3911 3918 3924 3925 3932 3938 3939 3946 3952 3966 3973 4002 4318 4320 4365 4404 4432 4467 4481 4654 4668 4674 4688 4709 4730 4744 4751 4758 4765 4786 4800 4807 4814 4821 4828 4843 4952 5000 5010 5012 5025 5092 5119 5133 5140 5147 5154 5161 5224 5231 5238 5252 5259 5266 5273 5280 5287 5294 5301 5320 5324 5328 5332 5337 5341 5345 5349 5354 5362 5366 5375 5379 5383 5388 5461 5465 5499 5506 5521 5524 5551 5589 5611 5619 5649 5668 5680 5910 5920 5934 5952 5956 5964 5971 5984 5985 5986 6084 6089 6091 6093 6106 6110 6121 6125 6132 6136 6143 6145 6165 6171 6182 6187 6198 6210 6221 6332 6337 6376 6387 6410 6415 6432 6480 6488 6495 6498 6499 6502 6506 6509 6516 6521 6532 6552 6554 6559 6567 6589 6598 6604 6607 6611 6619 6627 6632 6649 6657 6662 6677 6686 6721 6732 6743 6820 6937 6994 7129 7157 7167 7171 7177 7210 7270 7311 7319 7326 7341 7356 7364 7371 7379 7386 7394 7401 7409 7424 7431 7439 7446 7461 7491 7500 7529 7533 7542 7550 7552 7557 7562 7566 7567 7572 7577 7582 7583 7587 7600 7616 7633 7650 7664 7666 7683 7685 7700 7716 7733 7766 7850 7866 7883 7900 7916 7933 7950 8116 8133 8183 8150 8166 8200 8216 8223 8250 8266 8333 8350 8349 8357 8360 8366 8387 8402 8409 8410 8417 8432 8447 8454 8484 8516 8845 8854 8862 8871 8930 8953 9096 9266 9285 9293 9302 9310 9319 9327 9336 9344 9353 9361 9370 9378 9395 9404 9412 9413 9421 9432 9453 9461 9487 9519 9781 9815 9837 9845 9863 9868 9871 9873 9883 9893 9937 9962 kHz.
10021 10037 10062 10087 10112 10137 10158 10162 10187 10212 10237 10262 10287 10437 10465 10486 10513 10549 10908 11250 11500 11550 11859 12250 12287 12312 12337 12362 12387 12412 12437 12412 12487 12500 12512 12537 12562 12587 12612 12637 12687 12712 12737 12750 12762 12787 12837 12900 13062 13075 13087 13112 13137 13162 13187 13212 13222 13227 13229 13237 13250 13262 13272 13275 13304 13312 13337 13350 13387 13412 13425 13437 13462 13487 13500 13540 13590 13640 13690 13729 13739 13740 13747 13749 13750 13769 13779 13789 13790 13799 13809 13840 13890 13940 13972 13990 14112 14250 14408 14416 14500 14750 14762 14787 14812 14848 14887 14898 14912 14937 14948 14962 14987 14998 15000 15012 15037 15048 15062 15087 15098 15112 15137 15148 15162 15187 15198 15212 15237 15248 15250 15262 15287 15294 15298 15311 15337 15344 15377 15500 15511 15512 15537 15544 15561 15562 15577 15587 15594 15611 15612 15637 15662 15686 15712 15725 15737 15762 15772 15837 15887 15912 15937 15962 15987 16837 17906 17916 17926 17946 17966 18247 18250 18372 18431 18497 18662 18747 18872 18997 19122 19247 19372 19497 19622 19747 19872 23620 23720 23820 24420 24620 24720 24820 24920 25020 28000 31200 31225 31250 31275 31300 31325 31350 31375 31400 31425 31450 31475 31500 31525 31550 31575 31600 31625 31650 31675 kHz.

HC6U X 24 FOR 144-146 MHz. 6001 6021 6024 6031 6039 6046 6068 6069 6075 6076

HC6U FOR HF BANDS. 1820 1930 7032 7047 7054 7077 7092 7099 14112

CRYSTALS TYPE B7G £2 ea. 25% discount 10 or more.
2854 2868 2889 2910 2938 2945 2987 3023 3404 3411 3432 3446 3467 3481 4220 4575 4654 4668 4703 5491 5499 5506 5551 5581 5584 5599 5604 5611 5649 5654 5659 5671 5680 5691 5692 5695 5697 6510 6537 6540 6552 6557 6567 6590 6612 6627 6640 6642 6652 6657 6662 6664 6667 6677 6679 6672 8841 8842 8845 8854 8862 8871 8879 8896 8930 8932 8916 8947 8967 8973 8983

CRYSTALS TYPE 10XJ £2 each. 25% discount 10 or more.
X 24 for 144-146MHz. 6010 6021 6026 6032 6043 6051 6054 6065 6076 6082 X188007 & 100's more every few kHz to 6998kHz.

MARCONI TX PA UNIT up to 160 watts output from a pair of 829B's in parallel into 50 ohms for 10 volts RF drive into 6AQ5 driver 829B buffer. Power requirement 600-750 volts HT, 300 volts MT 24 volts heaters, −50 volts bias, with circuit. Size 8 × 10 × 16. .. .. **£8**

COLLINS TX PA UNIT up to 200 watts output from 3 6159's (sim. 6146) in parallel into 50 ohm lead. Pi tank with roller coil and capacitor turret 2-25MHz, aerial c/o relay inc. Power requirement 600-750 volts HT, 250 volts MT, −60 volts bias, 24 volts heaters. With circuit, Size 6 × 6 × 12. .. .. **£15**

COLLINS MODULATOR UNIT up to 130 watts AF from push pull 6159's (sim. 6146) driven by 250mV into 5751 and 5814 amps and 5726 clipper 300-3000 6dB filter. Power required, 600-750 volts HT, 250 volts MT, 24 volts heaters − 60 volts bias. With circuit. Size 5 × 3 × 6. .. .. **£12**

RX RF UNITS 2-24, MHz 4 BANDS. 6AK5 RF 6BE6 MIX 6AU6 xtal osc. 1·82MHz IF out also includes TX drive balanced modulator (2)6AU6 & oscl. 82MHz 6AU6. 6AU6 & 6AQ5 drivers. All inductive tuning with 5 tuned circuits at signal frequency. With circuit **£8**

RX IF UNITS 1·82MHz input, 110kHz 2nd IF, AF output with BFO. 6BA6 1·82MHz amp, 6BE6 mix, 6AU6 1·93MHz osc, 2 6BA6 IF 110kHz, 6BA6 BFO, 6AL6 det AGC, 12AT7 AF CV448 NL, OA2 Stabilizer. **£10**

MARCONI 1616 RECEIVERS 2-18·5 MHz, single superhet, crystal controlled, fine tuning + or —9kHz, 2 RF, 2IF, BFO, CW filter, 2μV for 10dB S/N, 8 × 8 × 13" with MAKER'S MANUAL. **£20**

MARCONI ATU UNITS: Roller coils 30 turns, 3 inch dia. 20 turns. 2 inch dia., capacitor turret FR voltage and current sensing elements, Size 62 × 11 × 16. **WITH CIRCUIT** **£8**

MARCONI MODULATORS. 90 watts output, transformer to match 2,000 ohms and screen winding speech clipper audio AGC, switched metering for PA grid, Buffer grid, PA anode, Mod anodes and screens, 500 and 1,000 volts HT. Valves 12AX7, 12AT7, 6AL5, 6AU6, 12AX7, push pull pair 829Bs, 6AQ5, 6AU6. OA2 etc. HT required, 600 volts, 275 volts DC. 250 volts AC, room for PSU inside case, Size 7 × 12 × 16. **WITH CIRCUIT.** Weight 32lbs. **£10**

FM19/2 TWO METRE TX RX 10 watt output, QQV03-10 PA, transistor IF, AF & 6 or 12 volt + or — PSU. Deviation, adjustable up to 5kHz. Fitted one channel, up to eight may be fitted. Circuit of tone unit and connections. Boot mount complete with mic. control, speaker and cables. Power requirement, one amp RX, six amps TX. Size 4 × 10 × 13, weight 15lbs. **£30**

FM39/4 FOUR METRE VERSION **£30**

FM13/2 TWO METRE TX/RX 10 watt output, QQV03-10 PA, transistor 12 or 24 volt + or — PSU. Deviation adjustable up to 5kHz. Fitted one channel, up to six may be fitted. Boot mount, complete with mic, control, speaker and cables. Power requirement 3·5 amp RX, 8·7 amp TX. Size 6 + 10 + 18. Weight 30lb. **£20**

FM33/4 FOUR METRE VERSION 12 volt only **£20**

CRYSTAL PARCELS 100 crystals, mixed types & frequencies, our choice. **£5**

VALVE PARCELS 50 valves, our selection. **£5**

½CWT PARCELS chassis, units etc. **£5**

ALL PRICES INCLUDE CARRIAGE ENGLAND. SAE ALL ENQUIRIES.

Fine British equipment from KW

- ★ KW 202 Receiver
- ★ KW 204 Transmitter
- ★ KW 107 Supermatch
- ★ KW 101 SWR Meter
- ★ KW 103 SWR/Power Meter
- ★ KW 100 Linear Amplifier
- ★ KW E-Z Match

- ★ KW Traps (the original and best).
- ★ KW Low Pass Filters
- ★ KW Balun
- ★ KW Antenna Switch
- ★ KW Dummy Load
- ★ KW 108 Monitorscope

The KW 2000 E Transceiver

A COMPLETE RANGE OF EQUIPMENT FOR THE RADIO AMATEUR—SEND FOR CATALOGUE AND ASK FOR DETAILS OF THE NEW KW109 HIGH-POWER SUPERMATCH AND THE NEW KW160 ANTENNA TUNING UNIT

K W Electronic Equipment now available exclusively through K W Communications Limited.

K W Communications Limited has joined the Decca Group, it is company policy to continue manufacturing the finest equipment for the Radio Amateur—British made equipment backed by a servicing facility with available spares—the best in the country.

BY BRITISH—BUY DECCA—KW

THIS COMPANY CONTINUES UNDER THE DIRECTORSHIP OF G8KW

Write or 'phone for catalogue

K W COMMUNICATIONS LTD.

1 Heath Street, Dartford, Kent
Tel.: Dartford 25574/21919

EASY TERMS ON EQUIPMENT AVAILABLE OVER 12, 18 OR 24 MONTHS

RADIO SOCIETY OF GREAT BRITAIN

35 DOUGHTY STREET, LONDON WC1N 2AE

FOUNDED 1913
INCORPORATED 1926

MEMBER SOCIETY
INTERNATIONAL AMATEUR RADIO UNION

PATRON: HRH THE PRINCE PHILIP, DUKE OF EDINBURGH, KG

COUNCIL 1974

PRESIDENT	G. R. Jessop, CEng, MIERE, G6JP
EXECUTIVE VICE-PRESIDENT	C. H. Parsons, GW8NP
IMMEDIATE PAST-PRESIDENT	J. A. Saxton, CBE, DSc, PhD, CEng, FIEE, FInstP
HONORARY TREASURER	J. O. Brown, LLB, FCA, G3DVV

MEMBERS

E. J. Allaway, MB, ChB, MRCS, LRCP, G3FKM; R. J. Baker, G3USB; P. Balestrini, G3BPT; D. Byrne, G3KPO; R. W. Fisher, G3PWJ; W. J. Green, G3FBA; W. F. McGonigle, GI3GXP; L. E. Newnham, BSc, G6NZ; J. R. Petty, G4JW; W. A. Scarr, MA, FBIS, G2WS; A. W. Smith, GM3AEL; R. F. Stevens, G2BVN; G. M. C. Stone, CEng, MIEE, MIERE, G3FZL; F. C. Ward, G2CVV.

GENERAL MANAGER AND SECRETARY

D. A. Findlay, FCA, G3BZG

EDITOR

A. W. Hutchinson

REGIONAL REPRESENTATIVES

Region 1 —North-Western	B. O'Brien, G2AMV, "Tanglewood", Anthony's Way, Heswall, Wirral, Cheshire.
Region 2 —North-Eastern	J. E. Agar, G8AZA, 291 Overdale, Southwold, Cayton, Scarborough, Yorks.
Region 3 —West Midlands	B. Kennedy, G3ZUL, 10 Pilgrim Road, Droitwich, Worcs.
Region 4 —East Midlands	T. Darn, G3FGY, "Sandham Lodge", Sandham Lane, Ripley, Derbyshire.
Region 5 —Eastern	P. J. Simpson, G3GGK, The Beagles, Caldecote Highfield, near Cambridge.
Region 6 —South Central	L. W. Lewis, G8ML, 34 Cleevelands Avenue, Cheltenham, Glos.
Region 7 —London	R. S. Hewes, G3TDR, 24 Brightside Avenue, Laleham-on-Thames, Middx.
Region 8 —South-Eastern	D. N. T. Williams, G3MDO, "Seletar", New House Lane, Thanington, Canterbury, Kent.
Region 9 —South-Western	H. W. Leonard, G4UZ, 4 Start Bay Park, Strete, Nr Dartmouth, S Devon.
Region 10—South Wales	D. M. Thomas, GW3RWX, 88 Cefn Graig, Rhiwbina, Cardiff CF4 6JZ.
Region 11—North Wales	P. H. Hudson, GW3IEQ, "Silhill", Dinas Dinlle, Llandwrog, Caernarvon.
Region 12—North-East Scotland	A. J. Oliphant, GM3SFH, 17 Rockwell Crescent, Thurso, Caithness.
Region 13—South-East Scotland	V. W. Stewart, GM8OWU, 9 Juniper Avenue, Juniper Green, Midlothian EH14 5EG.
Region 14—West Scotland	M. A. Comrie, GM3YRK, 57 Dungoyne Drive, Bearsden, Glasgow.
Region 15—Northern Ireland	J. Thompson, GI3ILV, "Albany", Newry Road, Armagh, N Ireland.
Region 16—East Anglia	E. T. Jacobs, BRS32513, 26 Pondfield Road, Colchester, Essex.
Region 17—Southern	L. N. G. Hawkyard, G5HD, 100 Shirley High Street, Southampton, Hants.

HONORARY OFFICERS

Awards Manager (hf)	C. R. Emary, G5GH, Westbury End, Finmere, Buckingham.
Awards Manager (vhf)	Jack Hum, G5UM, 27 Ingarsby Lane, Houghton-on-the-Hill, Leicester LE7 9JJ
Intruder Watch Organizer	C. J. Thomas, G3PSM, 73 Mexborough Avenue, Leeds LS7 3ED.
QSL Bureau Manager	A. O. Milne, G2MI, 29 Kechill Gardens, Bromley, Kent BR2 7NH.
Slow Morse Practice Transmissions Organizer	M. A. C. MacBrayne, G3KGU, 25 Purlieu Way, Theydon Bois, Essex.
Society Historian	L. E. Newnham, G6NZ, 17 Washington Road, Emsworth, Hants.
Taped Lecture Library Curator	G. Milne, G3UMI, 23 Linacre Road, Eccleshall, Stafford.
VHF Manager	G. M. C. Stone, G3FZL, 11 Liphook Crescent, Forest Hill, London SE23.

Membership rates: UK—£5 plus 50p VAT per year (Unlicensed members under 18 years of age—£2). Overseas—£5 (USA $12). Members are asked to notify changes of address without delay.

QTC AMATEUR RADIO NEWS

Half year finances

The unaudited accounts of the Society for the first six months, to 31 December 1973, of the current financial year show a surplus of £1,918.

G3DVV, Hon Treasurer

New RSGB Group in GI

A new RSGB Group is being formed in Northern GI. Any interested RSGB members or prospective members should contact any of the following for further details: GI3KVD, GI3UHL, GI3ZSC or GI8AYZ, all QTHR.

Tone blips

The RSGB has been engaged in discussions with the Ministry of Posts and Telecommunications concerning the use of "tone blips" at the beginning and end of transmissions. The Society has pointed out to the Ministry the technical reasons for the use of this form of identification (usually associated with mobile operation). However, the Ministry has monitoring reports showing the abuse of these tones and has therefore decided that in future they shall not be permitted. This ruling does not apply to access tones for repeaters.

Once again it seems that the majority of radio amateurs are suffering for the irresponsibility of a thoughtless minority.

Mobile interference suppression

The Mobile & Exhibition Committee is gathering material for a proposed publication dealing with interference suppression in mobile radio installations. Information on techniques, specific cars and/or equipment would be appreciated by G3GJW, QTHR.

Transformer for the G2DAF Mk2 receiver

Difficulty has been experienced in obtaining "one off" mains transformers for this equipment but the author advises that Electronic Developments (Burnley) Ltd, Scar Top Works, off Church Street, Burnley, Lancashire (Tel: Burnley 29261) is prepared to accept individual orders and supply a mains transformer to specification.

Telecom 75

Following the decision of the recent ITU Plenipotentiary Conference and at the proposal of the President of the Swiss Confederation, the second World Telecommunication Exhibition, Telecom 75, will be held in Geneva from 2 to 8 October 1975 during the second session of the regional lf/mf broadcasting conference. Information may be obtained from ITU headquarters and from the Telecom 75 secretariat: Orgexpo, Case Postale, CH 1211 Geneva 4, Switzerland.

REF change of address

The French national society, Reseau des Emetteurs Francais, has moved its headquarters offices and QSL service to: 2 Square Trudaine, 75009 Paris, France. The telephone number is now 878 14 49.

USA reciprocal licences

It has been reported from several sources that long delays are being experienced with the processing of reciprocal licence applications filed with the FCC in Washington. Members intending to operate while in the USA are advised to submit their application as far in advance as possible.

International Amateur Radio Club

The next meeting of the IARC will immediately follow the 13th Plenary Assembly of the CCIR and will be held on 27-28 July 1974 at the ITU Headquarters Building in Geneva, 2 Rue de Varembe.

The Technical Panel set up on this occasion will have as its main theme: "CCIR Studies and the Radio Amateur".

The President of the IARC, Dr M. Joachim, OK1WI, will be glad to hear from persons who plan to participate in the meeting and the names of those who would be willing to give a talk at the session of the Technical Panel. The address of the IARC is: Box 6, 1211 Geneva 20, Switzerland.

Radio Amateur Old Timers' Association

Membership of RAOTA is open to all persons who have held a UK amateur transmitting licence for a period of not less than 25 years. Details can be obtained from the hon secretary, Miss M. Gadsden, 79 New River Crescent, London N13 5RQ. Tel: 01-882 1272.

Members are asked to note that the next reunion will be held on Friday 17 May 1974, at the Bonnington Hotel, Southampton Row, London WC1.

"hr report"

From the publishers of *Ham Radio Magazine* comes a newsletter despatched twice monthly by air mail. This contains late news from ARRL, industry and overseas sources, with up-to-the-minute information on dx, propagation and contests. In the event of a special story a copy of *hr report* will be mailed within 24 hours. A great deal of the content is obviously slanted towards USA radio amateurs but many of the news items will be of interest to operators in other areas, particularly in view of the long surface mail delivery times of most USA magazines. The annual subscription to *hr report* is $15.00 worldwide.

Oscar 6 predictions

An AMSAT-Oscar 6 orbital predictions book is now available from *Ham Radio Magazine*, Greenville, NH 03048, USA, for $2.50 (or 16 IRCs) post paid. This book contains equatorial crossing times and longitudes for all 4,183 passes of Oscar 6 between 1 February and 31 December 1974, with an accuracy estimated at better than 10s in time. For air mail delivery overseas 22 IRCs should be sent.

"Space science involvement"

This is the title of a 63-page book developed at the Talcott Mountain Science Centre, and published by the American Radio Relay League, providing a curriculum supplement for the classroom use of an active communications satellite. Methods of explaining the characteristics of satellites are suggested and the general principles are then applied specifically to Oscar 6. The book will be of particular interest to radio amateurs engaged in the teaching profession. Enquiries should be directed to the ARRL, Newington, Conn 06111, USA.

WARC/MM

The World Administrative Radio Conference for Maritime Telecommunications opens in Geneva on 22 April 1974. This is a conference at which the 146 member nations of the International Telecommunication Union will examine the existing maritime radio regulations and make provision for the developments of the next decade.

It is not anticipated that the two amateur bands shared with the maritime stations, eg 160 and 80m, will come under scrutiny but this cannot be taken for granted. Accordingly the IARU Region 1 Division is sending representatives to the conference to closely study the proceedings in relation to the amateur service.

The IARU is an international organization entitled to participate in the conferences of the ITU without cost: this is a valuable privilege accorded to a limited number of organizations. It should be noted that the IARU is not only able to observe but may submit papers to the conferences and participate in the meetings of the various committees that are formed.

In addition to the IARU team, radio amateurs may be found in a number of national delegations. The IARU delegation comprises HB9AJU, SP5FM and G2BVN. It is hoped that VE3CJ, the new IARU President-designate, will visit Geneva during the conference.

The activities of the IARU Region 1 are possible only with the support of the 41 member societies of the division. Support for your national society is therefore one way in which you, the member, can help to safeguard and expand the amateur service.

RSGB Region 15 ORM

Saturday 11 May 1974

Windsor Hotel, Knocknagoney,
Holywood, Co Down

PROGRAMME

2pm Official Regional Meeting commences. Representing the RSGB will be the President, G. R. Jessop, G6JP; the zonal manager, W. F. McGonigle, GI3GXP; and the general manager, D. A. Findlay, G3BZG.

For the ladies A tour of places of interest during the afternoon will be arranged.

Trade display

7pm for 7.30pm Dinner.

Tickets for the dinner cost £2.50 per person and may be obtained from J. Thompson, GI3ILV, "Albany", Newry Road, Armagh; and H. J. Campbell, GI8FOK, 26 Kilcoole Park, Belfast BT14 8LB.

1974 BARTG Convention

The 1974 British Amateur Radio Teleprinter Group Convention will be held at the Village Hall, Meopham, Kent, on Saturday 18 May, from 11am to 6pm. The village hall is located on the east side of the A227, to the south of Meopham village centre. Transport will meet trains from London at Meopham station until 1pm.

Attractions will include: trade stands; a live station operating rtty on the 14MHz band under the BARTG call G4ATG; lectures on "Getting started on rtty" and "Advanced terminal unit design"; bring and buy stand; technical advice corner.

Food and refreshments will be available, and there is ample car parking space.

Further details may be obtained from the secretary of BARTG, Mr D. F. Beattie, G3OZF, "Mayerin", Churchway, Stone, Aylesbury, Bucks. Tel: 0296-74-354.

Northern Radio Societies Association

Annual Convention

Belle Vue, Manchester

Sunday 12 May 1974

Commencing at 11am

Trade stands **Club display stands**

Inter-club quiz **Grand raffle**

BATC and sstv demonstration

Construction contest

Club stand trophy

The entrance to the Exhibition Hall is at the rear of Belle Vue, opposite the main car park (off Hyde Road A57). Admission free.

Conversion of Storno Viscount vhf radiotelephones for amateur service

by T. R. WILTSHIRE, AMISTC, G8AKA*

FIXED-CHANNEL fm operation, especially from mobiles, in the vhf amateur bands is growing rapidly in popularity, partly through the introduction of the GB3PI repeater experiment but particularly because of the introduction to this country of solid-state transceivers such as the Yaesu Musen FT-2F and Inoue IC-2F. Coincident with this, the changeover to 12·5kHz channel spacing for business radio has resulted in many relatively modern (in amateur terms) mobile fm transceivers and associated base stations designed for 50 or 25kHz channel spacing finding their way to the surplus market at prices between £10 and £30, as against around £100 for a new Japanese "black box". The conversion and re-alignment of this comparatively cheap but nevertheless excellent equipment to the amateur frequencies is quite feasible.

One such equipment is the Storno Viscount and the following conversion details are intended for use in conjunction with the manufacturer's relevant circuit information relating to particular units, and circuit references are those used on the relevant circuit diagrams. Each conversion described has been performed on several similar units, thus ensuring repeatability. The help, ideas and constructive criticism contributed by members of the UK FM Group (London) and UK FM Group (Southern) is gratefully acknowledged, as is the considerable co-operation of Storno Ltd who made circuit information available.

Table 1. Control cable wiring list

Connector pin	Wire colour	Function
a4	Violet	Channel 1 and 5 select
a5	Orange	Channel 2 and 6 select
a6	Green-white	Channel 3 and 7 select
a7	Blue-white	Channel 4 and 8 select
a8	Blue-yellow	Channel select group shift
a9	Red	PTT line
a0	Yellow-white	Call button O/P
b5	Grey-yellow	Squelch relay
b6	Brown	Squelch
b7	Brown-yellow	AF to transceiver
b8	Yellow-green	AF to transceiver
b9	Green	AF from transceiver
b0	Yellow	AF from transceiver
c4	Green-blue	Chassis
c5	White	TX heaters } Pre-heat control
c6	Grey	TX heaters }
c7	Blue	—12V transmitter
c8	Blue-grey	—12V
c9	Blue-brown	Chassis
c0	Black	Chassis

* 2 Orchard Road, Mortimer, Reading, Berks RG7 3QN.

Interconnection details

The Viscount installation consists of a separate hybrid transceiver unit and associated control box. The microphone assembly (containing a single-stage af pre-amplifier) is wired directly to the control box. Heavy gauge dc supply leads are used and are necessary to prevent excess voltage drop from supply to transceiver. An external junction box contains a fuse which is absolutely necessary—10A fuse wire will do. Positive or negative earth (car dc supply polarity) is determined by adjustable links soldered in place within the multi-way control cable connector. Interconnection of the equipment is as follows:

First, connect the multi-way connector to the control cable (see Table 1), ensuring that the correct links for positive or negative earth are fitted and soldered. Connect a heavy-gauge pair of leads to these linked pins (for dc supply via the control box). The polarity links are connected as follows:

For positive earth: Link a1, a2, a3, b4, c3 to negative supply lead.
Link b3, b2, b1, c1, c2 to earth supply lead.

For negative earth: Link a2, a1, b1, b2, b3 to positive supply lead.
Link c1, c2, c3, b4, a3 to earth supply lead.

Wire the dc supply cables according to Fig 1, and attach the multi-way connector to the transceiver.

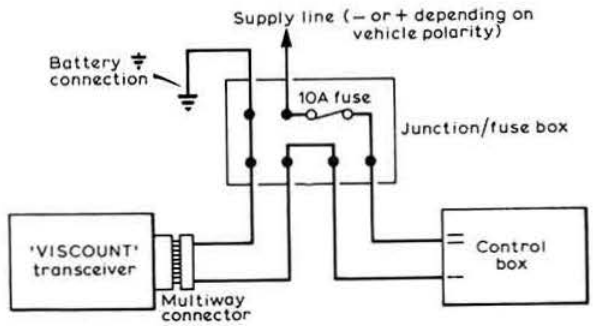


Fig 1. DC supply cabling diagram for the Storno Viscount

After checking the wiring, supply polarity and fuse rating, connect up to a supply and rotate the channel knob on control box to position 1. The power supply unit should emit a whine and the valve heaters should activate. If the fuse

immediately blows, check the supply reversal protection diode on the power supply unit tagstrip at the connector end of the transceiver, which may be short circuited. Replace it if necessary and re-check the supply polarity by metering the dc output voltage on the multi-way connector. (As a quick check, pin b1 is positive and b4 is negative).

Having got the equipment working dc-wise, check the operation of all controls, ie squelch, volume, transmitter pre-heat, channel selector (if crystal-shift unit present) and, *using a good dummy load*, the ptt button.

General notes

Before attempting conversion, it is strongly advised that the equipment be tested in conjunction with a signal generator (for receiver) and a *good dummy load* (for transmitter) to ensure that everything works as it should. If the original crystals are still in the transceiver unit, this is quite simple. In many cases, however, crystals will have been removed to prevent unauthorized use on the business radio frequencies and in these cases some ingenuity will be necessary to simulate the original crystals.

Output from a second signal generator (at the crystal frequency) into the appropriate crystal socket sometimes produces the desired result, but the simplest way is to examine the label on the transceiver to ascertain the original frequencies, and work out the relevant crystal frequency equations to arrive at the value of the original crystals utilized. The junk box may then reveal a crystal somewhere near the value required. In any event, if suitable crystals are not available the operation of the power supply and the presence of correct ht and lt voltages will give a fair indication of the unit's electrical condition. If the unit appears faulty, effect repairs before conversion.

Remember never to transmit on a frequency other than one of those authorized by the amateur licence. Obvious, perhaps, but it is all too easy to press the transmit button inadvertently while still channelled-up for the original frequency.

Details follow of conversion of two different models of the Viscount—the CQM 19-25/50 (high band) and the CQM 39-25/50 (low band) which are suitable for the 2m and 4m bands respectively. Since the conversion and alignment of both models is essentially similar, only the modification details for the receiver front-end and transmitter rf strip will be described under each heading.

CQM 19-25/50 (high band) for 2m use

This unit is capable of giving 10W rf output and is designed primarily for use in a 600kHz segment (transmitter and receiver independent) of the 152-174MHz frequency range, with a receiver sensitivity quoted as 1μV at 12dB signal-to-noise ratio. Some units were manufactured for 136-156MHz but these are seldom encountered. Single channel is usual, although up to eight channels may be incorporated by the addition of a relay-operated shift unit. Maximum specified current consumption on 12V is 6A under *transmit* conditions, and as low as 1A on *receive/standby*.

Receiver front-end conversion

Disconnect the power connector and remove the top and bottom covers. Working on the copper side of the printed circuit boards, first remove C3 (5·6pF) and replace it with a 10pF ceramic capacitor.

Fit a 5·6pF capacitor (the one that was C3 can be used) in parallel with the secondary of T1; a 5pF ceramic in parallel with L2; a 5pF ceramic in parallel with L3; and a 5pF ceramic in parallel with L4.

To determine the receiver crystal frequency, the following formula applies:

$$f_x = \frac{f_s - 0{\cdot}455}{14} \text{MHz}$$

eg for 145·500MHz:

$$f_x = \frac{145{\cdot}500 - 0{\cdot}455}{14}$$

$$= \frac{145{\cdot}045}{14}$$

$$= 10{\cdot}3604$$

Hence the receiver crystal frequency is **10·3604MHz.**

Transmitter rf strip conversion

Disconnect the power connector, and first work on the copper side of the printed circuit boards, moving the oscillator coil (L2) wire link to the 136-156MHz (XZ on separate transmitter diagram) position for 145MHz band operation.

On the component side of printed circuit boards, fit a 5pF ceramic capacitor in parallel with the stators of C32. *Alternatively*, replace L7 with a similar coil with one extra turn.

To determine the transmit frequency, the following formula applies:

$$f_x = \frac{f_s}{18} \text{MHz}$$

eg for 145·500 MHz:

$$f_x = \frac{145{\cdot}500}{18} = 8{\cdot}08333$$

Hence the transmit crystal frequency is **8·08333MHz.**

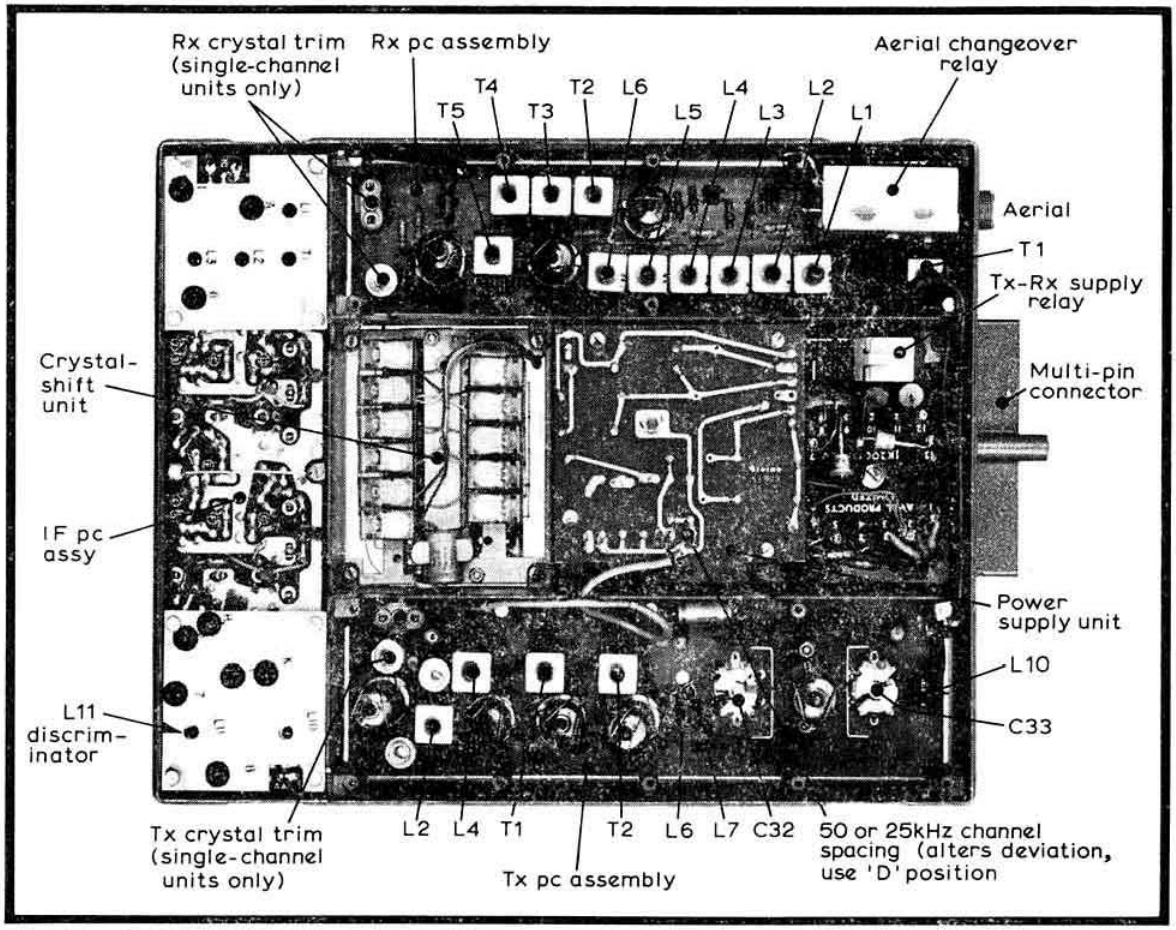
CQM 39-25/50 (low band) for 4m use

Although the unit is described by the manufacturer as being suitable for use in the frequency range 68-88MHz, there are certain modifications to be made to the majority of units encountered if operation on 4m is required. These modifications are quite simple but are not detailed in the handbook, since the equipment is lined up during manufacture and generally does not require large frequency changes while in service.

The unit is capable of 10W rf output and is designed for use, with certain internal modifications, in a 600kHz segment (transmit and receive independent) of the 68 to 88MHz range. Receiver sensitivity is quoted as 0·8μV for 12dB signal-to-noise ratio; other details are the same for the high-band unit previously described.

Receiver front-end conversion

Disconnect the power connector and remove the top and bottom covers. Locate and remove the wire links, if present, (on the copper side of the printed circuit board) which are



Interior of the Storno Viscount, viewed from the component side, showing the principal components concerned in the modifications

connected across a portion of each of the rf transformers T1, L1, L2, L3, L4, L5 and L6.

To determine the receiver crystal frequency, the following formula applies:

$$f_x = \frac{f_s + 0{\cdot}455}{7} \text{MHz}$$

eg for 70·48MHz: $f_x = \frac{70{\cdot}48 + 0{\cdot}455}{7}$

$$= \frac{70{\cdot}935}{7}$$

$$= 10{\cdot}1336$$

Hence the receiver crystal frequency is **10·1336MHz**.

Transmitter rf strip conversion

Move the wire link located on the copper side of the printed circuit board immediately under the oscillator coil L2, so that points X and Z are connected together.

To determine the transmitter crystal frequency, the following formula applies:

$$f_x = \frac{f_s}{18} \text{MHz}$$

eg for 70·48MHz: $f_x = \frac{70{\cdot}48}{18} = 3{\cdot}9155$

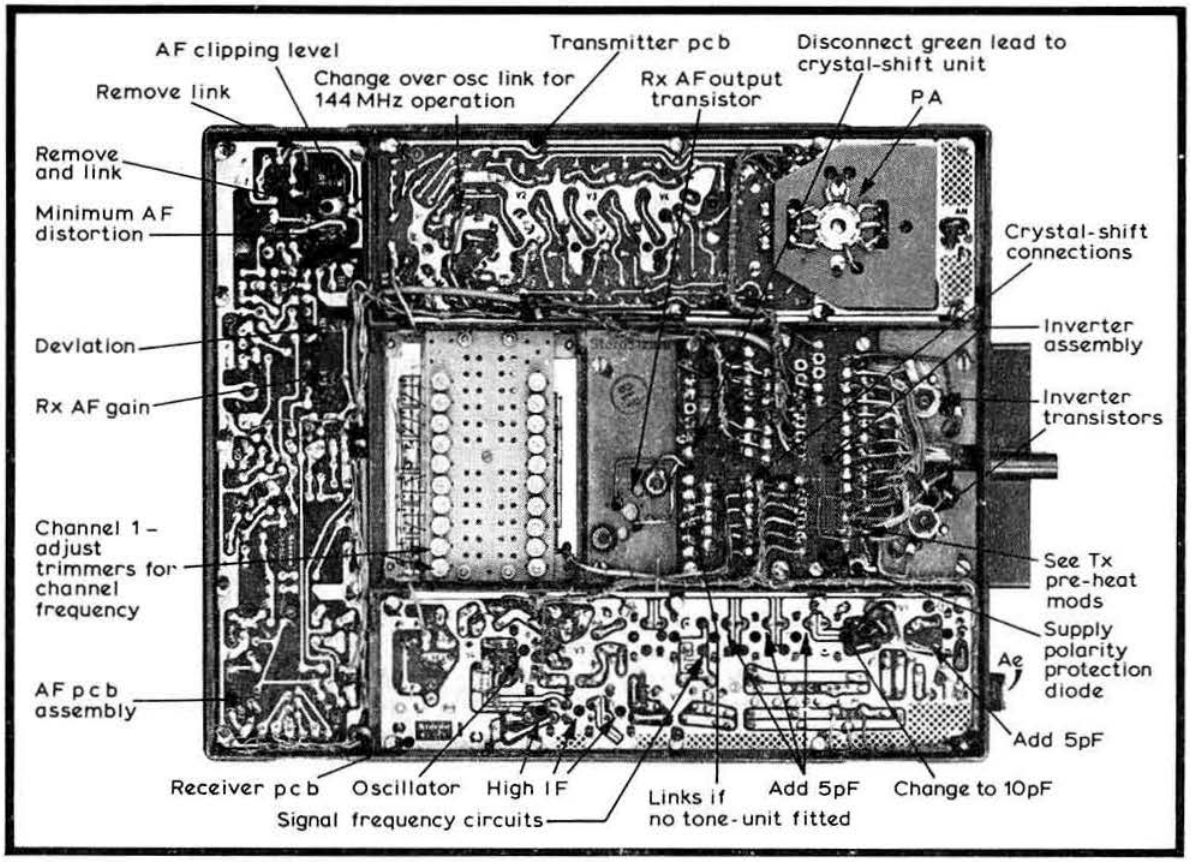
Hence the transmitter crystal frequency is **3·9155MHz**.

Alignment

Since the alignment of both 2m and 4m sets is essentially similar, the alignment instructions are detailed for 2m equipment, with frequencies etc relating to 4m equipment given in brackets. The 455kHz i.f. strip alignment should not be altered. The manufacturer's alignment information is naturally more comprehensive, but bearing in mind the limited amount of test gear at the average amateur's disposal, the following procedure will suffice, and results will be similar.

Receiver front-end and high i.f.

The following test equipment will be required: a 50-0-50μA meter (a sensitive test meter will do), and an rf signal generator with modulation facilities. The alignment steps must be performed in the order given.



Interior of the Storno Viscount from the pcb side, showing the components and links affected by the modifications

OSCILLATOR. Switch on and allow the set to warm up. Locate the test points on the underside of the receiver front-end printed circuit board, and check the reading between test point 4 and chassis. The meter should deflect, showing receiver crystal activity.

MULTIPLIER. Connect the meter between test point 3 and chassis, and tune T5 top and bottom cores for maximum reading. The top core must be adjusted for resonance between the windings (ie nearest the printed circuit board) and the bottom core for resonance when furthest out.

Connect the meter between test point 2 and chassis, and tune L5 and L6 for maximum reading: Adjusting L4 also for maximum reading may help in this respect.

HIGH I.F. Open the squelch, disconnect the test meter, and apply the output of the signal generator at high i.f. frequency to pin 4 of T3. This frequency is derived as follows and *must be accurate*:

High i.f. = f_x – 0·455MHz, ie for f_s of 145·500MHz, the high i.f. will be 9·9053MHz (for f_s of 70·48MHz, the high i.f. will be 9·6786MHz).

Adjust the modulated signal generator output until a response is heard in the loudspeaker, and then adjust T4 to resonance (core furthest away from the pcb), decreasing the signal generator output below the receiver limiting threshold as resonance is approached. This is essential, or alignment by this method is impossible. Next, connect the signal generator output to pin 4 of T3, and adjust T3 cores to resonance. The top core resonant point should be between the windings, the bottom core resonant point furthest out. Decrease the signal generator output below limiting threshold as before.

Connect the signal generator to pin 1 of V2, and after checking T3 top core resonant point, adjust T2 cores to resonance, with the top core between windings and bottom core furthest out. Decrease the signal generator output below threshold limiting. Check and finally adjust T2, T3 and T4, using minimum signal generator output for usable af response.

SIGNAL FREQUENCY CIRCUITS. Connect the signal generator output to the aerial input connector and adjust the signal generator frequency to give an *accurate* modulated output on the signal frequency required, eg 145·500MHz (70·48MHz). Adjust the rf output level from the generator until the signal is forced through and is audible in the loudspeaker (initial adjustment of T1 may help in this respect). Next, adjust T1, L1, L2, L3 and L4 in descending order, decreasing the rf output from the signal generator so that the

receiver limiting threshold is not reached. Use the minimum signal necessary for usable af output. It may be necessary to disconnect the signal generator altogether and just use strong rf coupling when circuits reach the final adjustment stage.

Connect the meter to test point 2, and finally adjust L5 and L6 for maximum reading. Disconnect the test gear, connect the aerial, and finally "tweak" the signal frequency and high i.f. circuits for maximum response. The signal must not cause the receiver to limit, so it must be *very weak* and must be *exactly* on channel frequency, eg 145·500MHz (70·48MHz). This step is not absolutely necessary but as it is frequently done it might as well be done correctly. If the receiver has been aligned correctly, the sensitivity should now be 1μV for 12dB quieting (0·8μV for 12dB in the case of the 4m version).

Transmitter rf strip

The transmitter must not be keyed for long periods under misaligned conditions or without a dummy load connected, and the "transmit" button should be released between measurements. Test equipment required will be: a 50-0-50μA meter (or sensitive test meter will do); a 50Ω 15W dummy load; and a 50Ω Thru-line or Termaline power meter, if available.

OSCILLATOR. Locate the test points on the transmitter rf strip, connect the dummy load to the aerial output, and connect the test meter between test point 1 and chassis. Key the transmitter and check that the meter deflects to about 20μA, verifying crystal activity. Next, connect the meter to test point 2 and adjust L2 and L4 for maximum reading.

MULTIPLIERS. Connect the meter to: (1) test point 3 and adjust T1 (top and bottom cores) for maximum reading; (2) to test point 4 and adjust T2 (top and bottom cores) for maximum reading; and (3) to test point 5 and adjust L6, L7 and C32 for maximum reading.

PA. Connect the power meter to the aerial output and adjust C33 and the aerial coupling link on the pa for maximum rf output. If all is well and the dc supply input is correct, 10-12W output should be obtained. If low rf output results, check the QQV03-10 valve, pin voltages and pa screen resistor value. (On some sets the screen resistors are high in value to limit the output to 6W. If so, change to the correct values—R19 to 1·8kΩ and R23 to 100Ω).

455kHz i.f. amplifier and af circuits

In the vast majority of cases these circuits will already be adequately aligned and will not need adjustment. In the case of the i.f. strip in particular, do not adjust coils etc unless full alignment instruments (wobbulator, valve voltmeter and oscilloscope) plus complete alignment information are available. If the i.f. is adjusted unnecessarily there is a considerable chance that the circuits will break into oscillation.

Discriminator

Note that this adjustment is only necessary if the discriminator alignment is suspect. The test equipment required is a 50-0-50μA meter and an rf signal generator.

First inject 455kHz at test point H on the i.f. board via a blocking capacitor. The 455kHz should be within 200Hz of the nominal frequency. Connect the meter to test point 8 on the i.f. board and chassis and adjust L11 for zero reading. The core resonant point nearest the pcb is correct. Adjust L10 for the best balance and sensitivity within ±5kHz of 455kHz, the core resonant point nearest the pcb being correct.

Setting transmitter deviation

Few amateurs have the proper test gear for this. Have a look at the top pc board of the power supply unit though—the screened audio lead should have its centre conductor attached to point D. If it is connected to point C, move it to D. This sets the deviation circuitry for 25kHz channel spacing. The deviation should be kept down to ±3kHz from nominal centre frequency, as more than this is unsociable from a bandwidth occupancy point of view.

As a guide to control functions, the potentiometer accessible through the small hole in the back of the control box sets the microphone af amplifier gain. On the af pcb, R12 sets deviation, R1 adjusts the af clipping level, and R3 is adjusted for minimum af distortion. R13 sets the receiver af gain.

A simple method of adjusting for minimum transmitted audio distortion is to display the audio waveform appearing at the output of the audio processing board. The easiest connection point to use is the screened lead termination on top of the power supply unit, marked *D* for 25kHz channel spacing and *C* for 50kHz channel spacing. This point will provide not only a display of processed audio waveform delivered to the transmitter but also that of the received audio when in the *receive* condition.

To set up, run the transceiver into a dummy load, key the transmitter and whistle a steady note, if possible, into the microphone. Adjust R1, R12 and R3 (plus the audio level control on the back of the control box for adequate gain) for a sinusoidal waveform. Deviation checks are more difficult, but "on-the-air" tests are satisfactory if no deviation measuring equipment is available. If the resultant transmission is reasonably undistorted when received on a receiver fitted with an nbfm discriminator, and with its selectivity control adjusted to approximately 7·5kHz bandwidth, then over-deviation is unlikely.

In cases where insufficient deviation or audio depth is obtainable, the centre conductor of the screened lead mentioned above may be transferred from point *D* to point *C*, although it is very easy to over-deviate in these circumstances.

Modulation quality—4m Viscount only

It is an odd quirk of the low-band Viscount that the setting up of the phase modulator (inductors L2 and L4 on the transmitter rf strip) is particularly critical if reasonable speech quality is to be transmitted. While monitoring test point 2 on the transmitter rf strip, using a 50-0-50μA meter or sensitive test meter, carefully tune L2 to resonance. If necessary, load a third dust-iron slug into the coil to increase the inductance of L2 until peak resonance (maximum meter reading) is reached. These three slugs should be carefully screwed down, one on top of another, final tuning being made by adjustment of the top slug. Similarly, monitoring test point 2, L4 should be loaded with three slugs if necessary.

Leaving the test meter connected to test point 2, carefully adjust the capacitance of CPR1 until a reading of not more or less than 20μA is reached.

Note: This capacitor is formed by two adjacent conductors on the copper side of the pcb. CPR1 is recognized by the presence of a 0·4pF capacitor wired in parallel on the

copper side of the pcb. Adjustment of CPR1 is performed by reducing/increasing the length of one of the conductors forming the capacitor. More capacitance gives a higher reading at test point 2, and vice-versa.

Additional notes

Crystals

Crystals operating in the fundamental mode, and suitable for use in the Viscount and many similar equipments, are available to order from several British manufacturers. However, amateurs do not really need the tight specifications required by commercial users—the occasional re-tune is tolerable, and by relaxing crystal specifications a considerable cash saving can be made. Incidentally, several manufacturers now operate a minimum order charge, so it is advisable to buy more than one crystal at a time: at least two will be needed.

Suggested specifications to be quoted to crystal manufacturer

Crystal style	HC6U (or HC25U if miniature crystals are used in crystal shift unit).
Frequency	As required, quote to six decimal places of megahertz (eg 8·083333 MHz for 145·500MHz transmitter crystal) to define nominal frequency.
Mode	Fundamental.
Parallel capacitance	30pF.
Tolerance	0·003 per cent.
Temperature range	0°C to +60°C.

This specification is not particularly tight by commercial standards but is adequate for amateur purposes in the 4m and 2m fixed-channel fm mode. Crystals are "made-to-measure" and thus delivery time can often be eight weeks or more.

Adding more channels

If the equipment does not contain a crystal shift unit, it is possible to manufacture one to fit the square hole in the centre of the unit. It should be wired up according to the diagram in Fig 2, but there is no point in trying for more than four channels if normal-type miniature relays are used. This is because the increased capacitance introduced by the relay contacts and leaves will lower the crystal oscillating frequency and in extreme cases stop oscillation altogether. So not more than four relays, ie four channels. Note that the necessary switched control lines already exist from the control box and are brought out to tagstrip XS on the power supply unit within the transceiver.

A shift unit can be connected in the following manner: First remove the wire link connecting the pcb mounted crystal socket on both receiver front end and transmitter rf strip oscillators. The link is located on the copper side of the pcb next to the crystal socket in both cases and is denoted "XS". Connect the respective output leads of the crystal-shift unit to point XS on the receiver and transmitter PCBs, *using short leads*, not over 1in long. Connect the relay supply leads to terminal strip XS on the power supply unit as follows:

Channel 1 relay to tag 1
Channel 2 relay to tag 2
Channel 3 relay to tag 3
Channel 4 relay to tag 4
Common relay supply to tag 6

If a proper unit with eight channels has been obtained, the group shift relay connection, ie the relay that selects output from a group of four of the eight other relays, goes to tag 5.

When switched on, rotation of the channel knob on the control unit should cause, in the case of four-channel crystal shift, the relays to energize in corresponding channel sequence through channels 1-4 again through channels 5-8. In the case of eight-channel units, relays 1-4 and 5-8 will energize two at a time, the group shift relay energizing on channels 5-8 only. This relay selects output from one of the two energized shift relays.

Adjustment of each channel frequency is now carried out by rotating the associated trimmers for each channel on the crystal shift unit. The crystal sockets and associated channel trimmers on the receiver and transmitter PCBs are no longer used. A frequency counter is useful at this stage, and should be loosely coupled to the output (anode) of the transmitter and

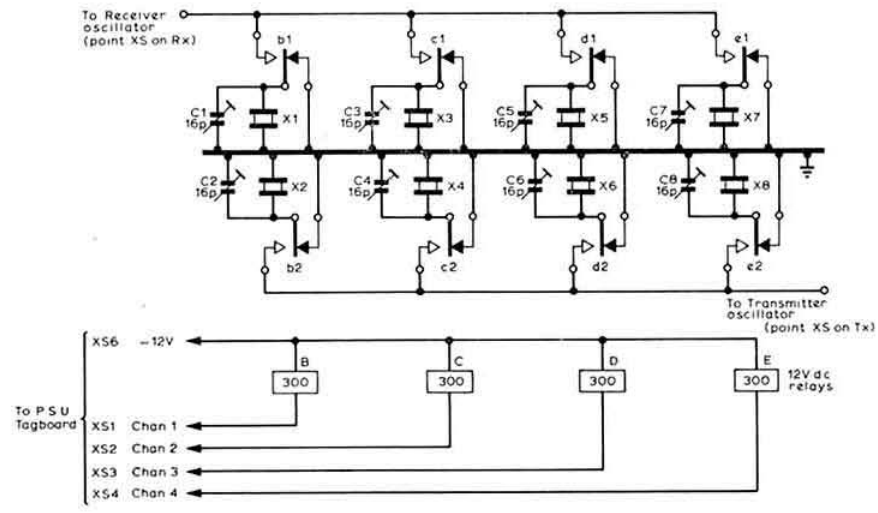


Fig 2. If a crystal shift unit is to be fitted, it should be wired up according to this circuit

receiver oscillators in turn, via a 1,000pF blocking capacitor, and the correct oscillator frequency set up by adjusting the appropriate channel trimmers.

"Special" equipments

"Specials", although seldom encountered, have one or two modifications made for some extraordinary application. These equipments need the special modifications removed for amateur service, and the following special modifications are known to exist in some equipments.

Transmitter pre-heat disconnected

This results in the non-operation of the standby button, ie transmitter heaters always *on*. To reinstate to original condition, first remove the wire link on the psu input (front) tag panel between tags 4 and 5, and then locate the disconnected grey/red wire (pushed back into the loom) and connect it to the tag 5. Ensure that the green wire that was attached to the wire link is connected to tag 4.

This will result in the transmitter heaters being switched off when the right-hand button on the control unit is pressed in, so conserving current under receive standby conditions.

10-channel crystal-shift unit present

Since the standard Viscount control box will only cope with eight-channels, it is necessary to disconnect the green crystal shift supply lead from tag 12 of tag strip TQ on the power supply unit. If this is not done the two extra, but now unused, relays in the crystal shift unit will be permanently energized (except when the centre button on the control unit is pressed) and the resultant additional capacitance inserted in the oscillator grid circuits will pull the transmit and receive oscillators low in frequency. The green lead is now unused and may therefore be cut off and pushed back into the loom. The eight channel positions remaining active in the crystal shift unit are unaffected and may be used normally, although HC25U style crystals are required in this unit.

AF pc board modified

The removal of this special modification (purpose unknown) is accomplished as follows. Remove the 3,300pF capacitor situated on the copper side of the af board adjacent to R1 and MC, and replace it with a wire link. At the same end of the board, in the centre, will be found an insulated wire link, one side of which is connected to the earthy copper conductor. Remove this link entirely.

Selective calling equipment present

This audio tone transmit/receive equipment takes up the space which may be required for a crystal shift unit or something similar. It is of no use in its present form, even for repeater access, since two tones are generated simultaneously. By ingenious modification involving the inhibition of one af oscillator, the af tone transmitter can be modified to emit a single 1,700Hz tone for GB3PI, but this has not been tried.

To remove the unit, disconnect the interconnecting leads from tagstrip TQ and unbolt. Wire links must now be fitted to the tagstrip TQ (on the power supply unit) to bypass the unit removed as follows:

Link TQ3 to TQ4; Link TQ 5 to TQ 6; Link TQ 7 to TQ8.

Making the transmitter tunable

This cannot be done using an internal vfo; due to temperature changes within the set, the frequency will drift so much as to make the equipment useless.

Making the receiver tunable

This is not recommended, but for those amateurs who wish to experiment, remember that the Viscount's receiver bandwidth is only 600kHz, and that beyond ±300kHz of centre frequency the receiver gain falls away rapidly. Front-end stagger-tuning works to some extent but, again, a lack of receiver gain is apparent. The construction of a simple vfo tuned by a varactor is a solution which should not prove too difficult as the discriminator sense voltage at test point 8 on the i.f. board could be used for afc. The vfo assembly could be mounted in the centre hole of the Viscount (where the crystal shift unit might otherwise be) with its rf output fed to point FS on the receiver front-end board. The main trouble likely to be encountered is, of course, oscillator drift. This is because of the relatively high temperature present within the transceiver since it is almost hermetically sealed when the covers are on. Thus good temperature compensation within the oscillator is a must.

Improving front-end sensitivity

Generally speaking, the 4m version possesses adequate gain and no further amplification is necessary. However, the 2m version can use a single-stage fet pre-amplifier to advantage.

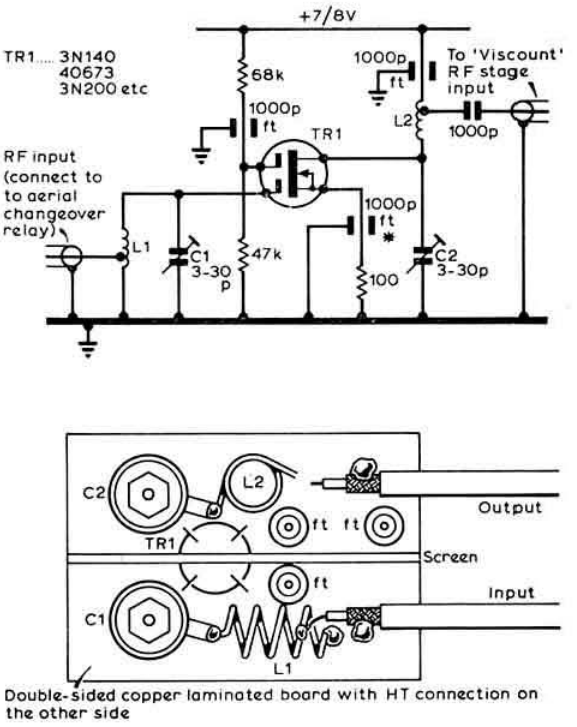


Fig 3. A simple single-stage fet pre-amplifier which can be used to advantage with the 2m Viscount to improve sensitivity. L1 consists of four turns of 18swg wire wound to ¼in dia, air space, and tapped one turn up; L2 is made up the same, but tapped one turn down. Lengths of both coils should be adjusted for best performance. The 100Ω resistor in the drain of TR1 is soldered to the feedthrough on the ht side of the board, and the other end comes back through a clearance hole in the board and is soldered to the earth plane

and a suitable circuit is shown in Fig 3. Power for this stage can be taken from the receiver ht rail via a dropping resistor and zener diode network. The pre-amplifier assembly will fit in the area above the rf amplifier end of the front-end pcb.

Aerials

A $\frac{1}{4}\lambda$ vertical whip works satisfactorily, but (especially on 2m) a $\frac{5}{8}\lambda$ or $\frac{1}{2}\lambda$ vertical loaded whip will show a vast improvement. Note that fm fixed-channel operators tend to favour vertical polarization, so halos are not really adequate for this application. The rf input/output impedance of the Viscount is 50Ω.

Supply circuit protection

Note that the supply fuse for the Viscount is contained within an external junction box. Thus, if the box is not included with the equipment a suitably rated supply fuse must be provided. If no fuse is fitted, and the supply polarity accidentally reversed, considerable circuit damage can result, including destruction of the inverter transistors and af output stage. As a safeguard, a diode of suitable rating can be connected in one supply lead.

Conclusion

The successful conversion of a Viscount for amateur vhf fm mobile use will provide a few hours fun with the soldering iron and test gear, and will pay off by way of the number of comparatively noise-free, easy mobile contacts to be had on the fm fixed channels now so popular. Additionally, there will be the great satisfaction of having converted the equipment and saved anything up to 80 per cent of the cash required for a Japanese rig intended for the same purpose.

Circuit diagrams

A 10-page set of diagrams giving the circuit information necessary for the conversions described in this article are available from: The Editor, RSGB, 35 Doughty St, London WC1N 2AE, at a cost of 40p inc p & p.

These diagrams have been reproduced from selected pages of the Viscount handbook by kind permission of Storno Ltd, who no longer have handbooks for the equipment.

Using the Heathkit SB610 scope with the Drake line

by R. S. PACE, G3SOI*

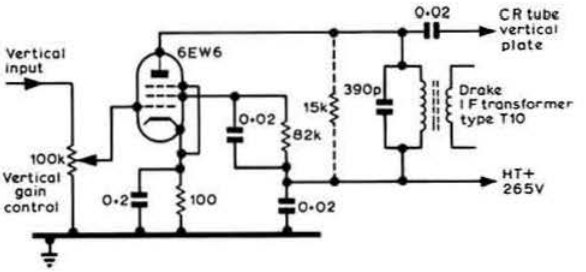
THIS scope is an excellent unit for monitoring a transmitted signal, but many operators also use it to monitor the received signal. For this purpose Heathkit provide three input circuits for use with receivers having final i.f. frequencies falling within the bands 1–150kHz, 455–2,475kHz and 3,000–6,000kHz. The input sensitivity of the SB610 varies widely over these ranges.

The Heathkit circuit for 50kHz is shown, as this is the frequency used by Drake. When the author built this scope the main receiver in use was a Drake 2B, and the plate of V5 (the 6BA6 final i.f. amplifier) was connected to the vertical input socket of the scope via a capacitor of 56pF; this large value gave a maximum deflection of about 1in and caused no de-tuning of the i.f. stage.

When the 2B was changed for a Drake R4B, problems arose, as Drake advised that a coupling capacitor of not more than 20pF should be used, and they also suggested that the avc be switched off when receiver monitoring was required as the deflection with avc in use would be too small. In practice this was unsatisfactory and it was decided to increase the input sensitivity of the SB610.

Heathkit do not make a coil for 50kHz as they do for the other two frequency ranges, so an i.f. transformer type T10, as used in the last i.f. stage of the R4B, was obtained and the primary winding connected as shown. On the R4B there is provision for a spare phone socket on the chassis rear, and a screened connection was made from this via a 22pF silver mica capacitor to the plate of V5 (12BA6), the last i.f. amplifier. Receiver and scope were switched on and

*22 The Drive, Shotley Bridge, Consett, Co Durham



The 15kΩ 1W resistor in the original circuit is removed (shown by dotted lines) and the primary winding of the T10, tuned by 390pF capacitor, is substituted. The secondary winding is left open circuit

the core of the T10 peaked for maximum deflection using a weak signal with the receiver avc off. No de-tuning occurred and the deflection obtained was 1½in on full vertical gain using avc.

The R4B has now been changed for an R4C and by using a 12·5pF capacitor from the plate of V5 (6BA6) this time, a slightly greater deflection was obtained. There is no provision for a spare socket on the R4C but a phone socket can be fitted through the large hole next to the earthing post, strangely called line amp, anchoring it by a bolt through the small hole above and by a solder tag to the nearest bolt on the multi-phone socket strip on the left below. It is not necessary to drill any holes.

Again, drilling is not necessary when fitting the Drake T10 can assembly to the scope, as the mounting clip on the can, although different from that used by Heathkit, fits perfectly well in the cut-out on the chassis.

The author has never used a Drake R4 or R4A, but as the voltage swing on the last i.f. amplifier in these receivers is similar, the same result should be obtained.

Building blocks for the novice

by SVEN WEBER, G8ACC*

The article which follows is the first part of a series, which is itself one of a proposed series covering various topics for those who are starting amateur radio and who want to know a bit more about some of the building blocks that are used. The intention is to make them practical, to describe some experiments and to be as non-mathematical as possible, although some arithmetic may be necessary. There may be some rock-climbing later on but, to start with, the articles should be fairly simple.

They are not in any way going to encroach on G3VA's Technical Topics *ground nor, obviously, will every subject be discussed or even mentioned. Some are bound to be omitted but it is hoped to deal with all the important everyday points. It is assumed that readers will have basic knowledge of dc and ac, resistance, capacitance and inductance. The author would be pleased to answer any correspondence on special points or general issues on receipt of a stamped addressed envelope.*

The first series is about diodes, mainly semiconductors; following which there will be series on FETs and other active elements if the first series is well received.

Diodes, diodes and diodes — and some experiments with them

(Part 1)

Semiconductor diodes, rather than valve types, have been chosen because they differ so much from each other in characteristics and there would hardly be time to discuss both. They are also easier to work with and are cheaper to buy. Some experiments will be described, and to carry out those in the first four parts of the series, eight to ten 1N4001 diodes (available from 5p each) and a couple of meters with full scale deflections of from 1 to 250V dc and ac (a vvm would be useful), and from 1mA to 1A, will be needed. A mains transformer with two outputs each of 10 to 15Vrms (2A), a few 1·5V batteries (U2 or equivalent), a few potentiometers ranging in value from 100Ω(ww) to 10kΩ, and one or two resistors will be needed as well.

Fig 1. IN4001 diode

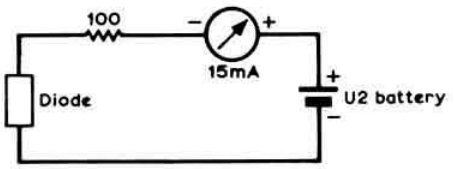


Fig 2. Diode continuity circuit

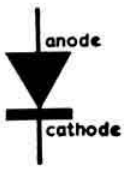


Fig 3. Diode circuit representation

What is a diode? The generally accepted answer to this question is something with two electrodes that passes current more easily in one direction than the other. This answer is sufficient for present purposes and one can think of them as black boxes with two wires protruding, and marked in such a way that certain effects can be reproduced. What goes on inside can be disregarded for the time being.

The IN4001 is a modern low power rectifier diode, silicon junction type, rated at 1A at 50piv, that can be bought for a few pence (Fig 1). Join a lead of one of these (it does not matter which lead) to a 100Ω ½W resistor and connect the other end of the resistor to the negative terminal of a meter set to 15mA. Then connect the meter positive terminal to the positive terminal of a U2 battery and the negative terminal of the battery to the other end of the diode (Fig 2). There are only two possible states in this circuit: either the meter needle has moved away from zero or it has not, but whatever has happened disconnect the diode and replace it the other way round. Assuming it is a good one, the circuit should now be in the other or opposite state.

Taking the state where current was passed, the wire coming out of the diode connected to the negative terminal of the U2 is called the cathode and the other lead the anode—terms which really refer to valve types but which are so ingrained that they are used here as well. As a circuit element, a diode

* 132 Murray Road, Rugby, Warwickshire.

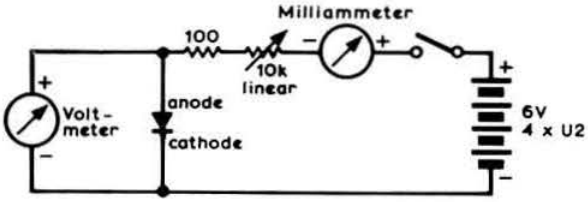


Fig 4. Circuit for determining voltage across the diode for varying currents

is drawn as a straight line (cathode) with a triangle pointing up or down into it (anode) (Fig 3). Now, almost invariably, the cathode is the terminal that is marked on semiconductor diodes with a band, often red and marked positive—which seems somewhat strange, but more about this later.

With the anode going to the negative battery terminal, not a flicker should be seen on the current meter, which, for present purposes, means that it is open circuit (germanium diodes are not quite so good in this respect). The other way round, the indicated current is not quite the expected value, taking the meter resistance into consideration and applying Ohms Law. So the diode has some dc resistance, and this can be plotted on graph paper.

Altering the circuit somewhat for a new experiment, more voltage is needed: four U2s making 6V, then a 10kΩ variable resistor and a voltmeter across the diode set at 1V fsd. It might be advisable to have a switch as well (Fig 4). This

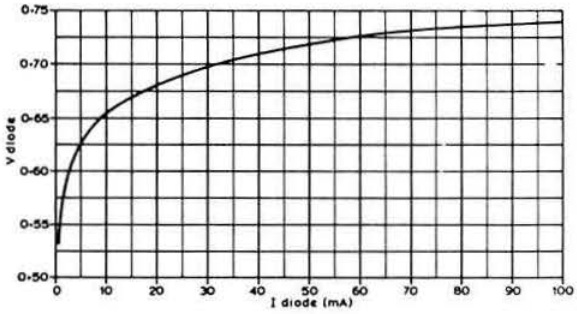


Fig 5. Diode voltage against current on a linear graph

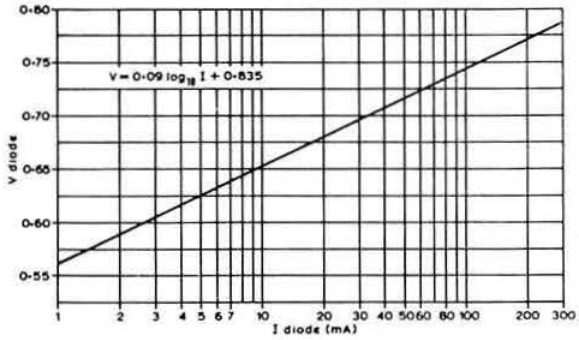


Fig 6. Diode voltage on a semi-log graph

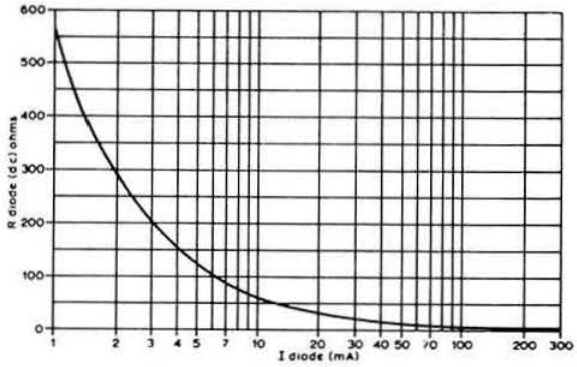


Fig 7. Static resistance of a diode against current on a semi-log graph

circuit arrangement saves current, and although it cannot go through the zero voltage point it is good enough for present purposes. Set the variable resistor to maximum and switch on. If things go as they should, the voltmeter should have a half-scale deflection. Alter the potentiometer until 1mA is flowing and read off the voltage across the diode. Now set the current successively to 2mA then 3, 5, 8 and 10mA noting down the voltage values. Change the potentiometer from 10kΩ to 500Ωww and the fixed resistor to 10Ω and note down the voltages for currents of 20, 30, 50, 80, 100, 200 and 300mA. Plot these points on linear 1in by $\frac{1}{10}$in graph paper, current on the horizontal scale, say 1mA per $\frac{1}{10}$in, and the voltage on the vertical scale going up by 0·05V/in starting at 0·5V. Join the points together and the result should be something like Fig 5.

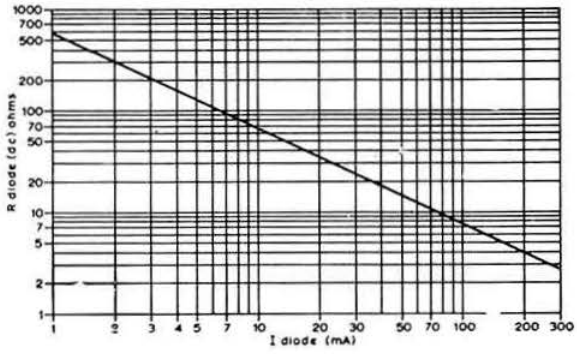


Fig 8. Static resistance of a diode on a log-log graph

Taking the same points, plot them on logarithmic graph paper (log-linear or semi-log paper is available from most good stationers or it can be made by taking a decade as 10cm and going from log tables for values of 2,3,4,5,6,7 and 8). This time the graph should be pretty well a straight line (Fig 6). A little bit of arithmetic will now calculate the dc resistance of the diode at these points and these values can be plotted on log-linear or log-log paper (Figs 7 and 8) against current.

These results will be considered in part 2 of this series.

TECHNICAL TOPICS

by PAT HAWKER, G3VA

"AMATEURISM is despised . . . my solution would be the setting up of an Amateur Radio Institute with graded membership based on examinations", so suggests P. G. Wood, G8EQA, as a debating point (*Your Opinion*, March). Am I now hopelessly old-fashioned in putting in a plea for "amateurism", for "self-training", for a genuine mixture of professional and amateur engineers and operators, and for the belief that many worthwhile ideas and innovations still come from those whose thinking has not been channelized by formal examination-conscious technical courses? But then one is brought back to earth by finding in the February issue (*FMD*) the view that "most amateurs are *singularly non-technical*". So it is no wonder that some people are starting to wonder just where the hobby is heading!

Versatile active filter

Some time ago Des Shepherd, G3LCS, mentioned that he had adapted the ideas used in the Beckman Helipot Model 881 universal active filter to provide a "superb" cw filter, using standard 741 ic operational amplifiers and conventional components instead of the rather special components of the Beckman filter. We have been meaning to include in *TT* an account of his work on this filter. Now, however, H-J Pietsch, DJ6HP, provides in *CQ-DL* (February 1974) full details of an active filter along basically similar lines but with the addition of a notch facility and continuously variable frequency and Q factor: see Fig 1. This versatile filter can be tuned over 450 to 2,700Hz and the Q varied over a range of 5 to 1 without affecting the resonant frequency. DJ6HP suggests that this type of inductor-less filter is not only useful to cw enthusiasts but, with its notch mode, also to phone operators; further, should the 100-baud rtty rate be established the teleprinter gang should also find the design useful. It will cope with incoming signals up to about 4V, maximum input impedance of 20kΩ and output impedance is about 500Ω. G3LCS (using the Beckman arrangement to provide a fixed 468Hz filter) found his original $Q = 50$ arrangement was too sharp and settled for $Q = 20$, adding the comment that on a crowded band switching the filter out often meant that one could not hear the signal being copied.

Receiver performance and wide-range mixers

It is now some months since the topic of mixers of extemely wide dynamic range for hf or vhf has been aired in *TT*, and there are clearly several loose ends that require tidying up. For anyone who still doubts that this is a subject well worth pursuing, I would refer to a penetrating analysis of "HF receiver reception failure factor" by B. M. Sosin, Chief Scientist of the Radio Division of The Marconi Company, in *Point-to-Point Communication* (Vol 18, No 1, January 1974).

This new article (with its associated very detailed table of the parameters and performance of 20 modern high-grade professional receivers that cost from about £300 up to about £5,000) stresses that the "performance of most of the receivers falls short of that desired—a rather staggering finding in view of the large number of years the hf medium has been used for communications . . . *it should be obvious that a less expensive receiver as good as the ICS3 or H2900 is now a challenge to future designers*" (my italics).

The ICS3 refers to the receiver part of the sophisticated communications system now being produced for the Royal Navy, and which draws heavily on the techniques used in the Marconi H2900 receiver (see *TT* February 1970). Its cost would appear to be in the region of £3,500. The 20 receivers analysed include nine named Marconi/Eddystone models (the Eddystone 1830/6, the lowest cost receiver covered, is shown to have a remarkably good performance in the concept of this analysis). The other 11 receivers appear to be those of other British, European and American firms and are designated only by letters from A to L, but the details listed will allow many readers to put their own labels

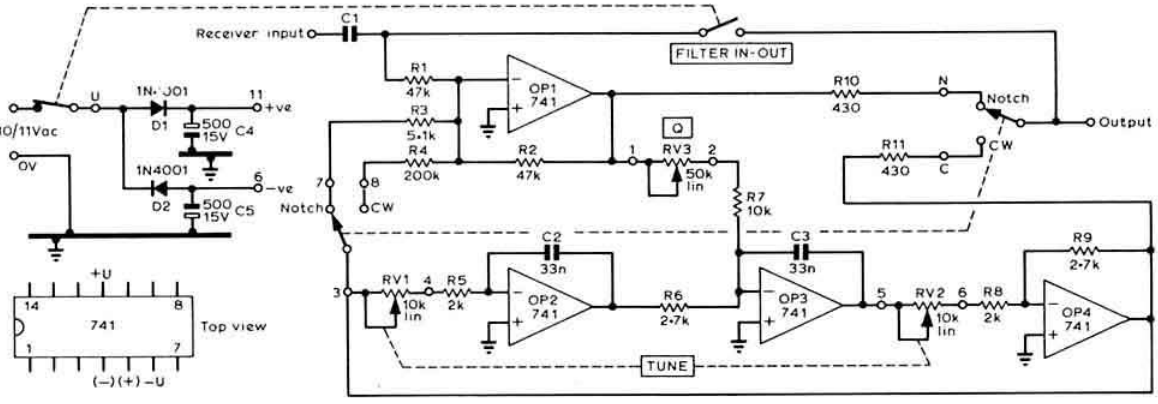


Fig 1. The versatile active af filter for peak and notch application as described by DJ6HP

on them (I reckon that I have identified about seven of the 11).

The article shows once again the practical significance of front-end linearity and reciprocal mixing but stresses that "the ability to receive clearly a weak signal in the presence of interference is one of the most important properties of a receiver . . . after all, this is why the receiver is there in the first place . . . looking at various parameters independently, such as quality of i.f. filters, input circuits, reciprocal mixing, intermodulation and image and spurious responses, does not give the system designer any clear indication how the receiver will perform . . . *all these effects must be taken together* . . . it is also necessary to look at the actual conditions under which a receiver will operate before a comparison can be made."

To do this in practical terms, Sosin puts forward the concept of a "reception failure factor" (rff) which he defines as an average value of input signal level in decibels between 2 and 25MHz by which the receiver is worse than the atmospheric limit curve. He stresses that "contrary to general belief that poor atmospheric etc conditions are the main causes of unreliability and poor reception on hf, the fact of the matter is that *receivers themselves are in large measure to blame for failing to receive*". He is of course talking of receivers used for traffic reception and his paper, like many others, draws on a well-known Swiss analysis of likely signal strengths to be encountered at different frequencies (an analysis which personally I think needs to be extended if one is to obtain a more realistic picture of signals over a longer period).

In Sosin's detailed table, the ICS3 achieves a "reception failure factor" of only 0·4dB, compared to the 35dB of a valve receiver of 1961 (and which appears to be the RA17L), 10·3dB of the Eddystone 1830/6, 13·1dB of the very high-cost MST point-to-point receiver etc. One intriguing feature of his table is that one current receiver (let me be rash and say it appears to be one of the current Racal RA1772 series) which by its specification should achieve an rff rating of 9dB was found in tested samples to warrant only a 17dB rating. Now one awaits with interest a Racal or Plessey or Collins or ITT paper commenting on the performance of Marconi receivers!

In this connection it may be recalled that in describing these current Racal receivers (*TT*, October 1973) we queried how the wide dynamic range was achieved and gave one possible answer. I am now convinced that I was wrong and that in fact these receivers are using a Rafuse-type double-balanced fet passive switching mixer in a configuration akin to that given in *TT* (March 1973). The Racal mixer uses a fairly standard type of fet device (four BSV81 switching mosfets). Some confusion has arisen over two types of fet double-balanced mixers—passive switched mixers and active mixers. The mixer developed by Ed Oxner of Siliconix (*TT*, March 1973) using "super FETS" is an *active* type and does not require especially high local oscillator power. The Rafuse passive types need a lot of drive power and are rather difficult to make as wideband vhf mixers, although they can provide a very wide dynamic range.

This confusion was further confounded recently by a claim in *Electronic Design* that Fort Monmouth had developed a vhf military receiver of extreme dynamic range using a fet passive double-balanced mixer with the whole receiver drawing just 50mW battery power. Since the mixer used in this equipment is in fact a Rafuse-type, one can only suppose that an odd 0 or so got left off the battery consumption!

Incidentally a factor that emerges from Sosin's detailed table of receivers is the continuing value (whatever some manufacturers may claim) of good, sharp pre-mixer selectivity when compared with wideband, half- and sub-octave rf filters. Another is that generally the noise factor of an hf receiver is of relatively little practical importance (except possibly at 28 and 21MHz); these high-cost receivers vary from about 5dB to 17dB (and the ICS3 is one of the 17dB models). To quote Sosin: "the only good reason for a good noise factor in a receiver operating at 9MHz is to allow an operator to insert a high attenuator and so improve intermodulation products."

Home-built coaxial relay

N. M. Digby, ZL3TGD, has described in *Break-in* (October 1973) a useful-looking coaxial relay based on the design in the *RSGB VHF/UHF Manual* but using "easily obtainable, cheap material and requiring the minimum of tools".

He describes the construction as follows: "The relay uses SO239 sockets as connectors. The main body is made of 1in square aluminium which is easy to work with and cheaper than brass. The main hole down the centre can be drilled using an electric drill in a home workshop stand; the bore is cleaned using fine emery paper. The moveable arm inside the relay is made from shim brass and because of the small total movement it does not fracture and break where it is joined to the end socket. Instead of a special solenoid the coil and core of a 12V relay are used and this eliminates a lot of hard metalwork. The changeover contacts are salvaged from 3000-type relays."

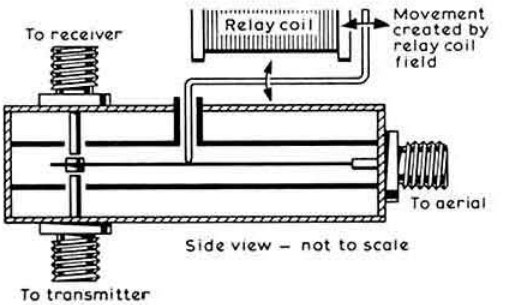


Fig 2. The home-built coaxial relay developed by ZL3TGD based on the "VHF/UHF Manual" design

Fig 2 shows the details and ZL3TGD states that the insertion loss and crossover levels were measured for vhf applications by the Post Office and were as good as those specified for the unit in the *VHF/UHF Manual*.

Plant your own aerial

It is said that 1973 was "Plant a tree year" and that 1974 is "Plant one more". Fort Monmouth, that centre of novel (if sometimes overstated) ideas, has come up with a solid reason for amateurs to participate in the tree growing campaign. Trees can make good aerials (yes I wrote *aerials* not aerial supports).

According to an item in *Electronic Design* (20 December 1973)—which caught both my eye and that of D. R. Vizard, G3UKS—the US Army Electronics Command is waxing enthusiastically about a new aerial matching device "Hemac" which can couple the 50Ω output of a transmitter into almost

any tree or metal pole or what-have-you that forms part of the landscape. It reminds me of the time when living in central London I made several attempts (unsuccessfully) to couple my transmitter into a drainpipe that ran up to the top of the building.

According to the article, the use of a tree rather than a short whip aerial can improve signals from pack-sets by up to 22dB (mind you, I am sure this figure applies only when the whip is used in a damp and dense jungle where whips are notoriously useless). Apparently by using several trees it is possible to make a directional array. Rather more practical, I would guess, is the use of metal poles etc.

Hemac, it is stated, is a leaky rf transformer in the form of a flexible toroid-shaped hybrid electromagnetic coupler which can sense and generate magnetic or low-impedance fields and electric or high-impedance fields. Judging by the photograph the main part of the coupler consists of a number of large flexible turns of wire which are strapped around the tree or pole so that this forms an rf current transformer in association with a variable tuning and matching circuit which is similarly strapped on the tree.

It is also pointed out that metal-frame buildings, window frames etc all form potential aerials although they require different coupling techniques. Finally they have also been trying to assess how good an aerial can be formed from the human body (ie the old effect of sticking your finger on the aerial socket) for transmitters of up to 1W rating. Fat, heavy people, it is claimed, are better aerials than slim, small ones! Generally the efficiency of the body corresponds to that of a matched, centre loaded whip 1·2m long at 4·2MHz. Apparently you cannot couple a transmitter to the belly but only to "other parts of the body".

At least it was the Christmas issue not that of 1 April. So stand up all fat, heavy readers and try to make your own dxcc!

Travelling ionospheric disturbances

A number of papers on hf and vhf propagation were among the many interesting contributions to the 1973 Australian IREE Conference at Melbourne, to judge by the conference publication. For example, one paper analysed large numbers of 50MHz contacts between Australian and Japanese amateurs to discover some interesting new facts about the difference between transequatorial propagation (tep) in the afternoon and late evening (in the afternoon there were better paths to the northern than southern regions of Japan, with the opposite in the evening). Other papers reviewed recent work linking tep with equatorial spread F and the special type of regular "sporadic E" that occurs in equatorial regions.

Yet another explained recent thinking on *travelling ionospheric disturbances* (TIDS) which are now believed to have considerable influence on fading and other effects on short-haul hf paths, including Doppler frequency shifts of up to 20Hz. These fast-moving disturbances in the ionosphere (they move at between 1 and 10 km/min) are mainly a daytime occurrence inversely correlated with solar activity. It is now thought that they are associated with atmospheric acoustic gravity waves which arise either naturally in connection with thunderstorms, the jet stream, bow waves over mountains and auroral events, or alternatively can be man-made by supersonic aircraft and nuclear explosions. The resulting time-varying tilts in the ionospheric layer can lead to focusing and defocusing of signals resulting in fading ranges in excess of 10dB. This concept of travelling ionospheric disturbances is not one that has so far attracted much attention from hf amateurs, but clearly they can have a very significant effect on communication with stations up to about 1,000km away.

Another interesting survey paper was one concerned with the development in Australia over the past 16 years of a new system of hf direction finding in which the location of an unknown transmitter can be determined from a single location, rather than the usual systems which need at least two receiving sites to provide triangulation. In effect the Australian single-station location system (ssl df) obtains part of its information by measuring the vertical angle of arrival of the signals while determining the height of the reflecting layer. In other words the co-ordinates of the unknown transmitter can be obtained from the vertical and horizontal direction angles, the height of the reflection zone and the known position of the receiver. As many readers will know, direction finding at hf has always been subject to considerable errors, although a considerable advance was made with the development by the Germans of the Wullenweber wide-aperture ring aerial technique but which requires an enormously large and complex aerial. The Australian paper suggests that some work on ssl has been carried out in the United States but that no British systems have yet been described—though I remember a very interesting paper in *Proc IEE* on vertical angle measurements made by a GCHQ team which could conceivably have been part of an investigation into ssl df. While the Australian paper claims that ssl has many advantages over conventional df, it is a bit vague when it comes to actual results.

Morse code generators

For beacons and also for general use in home stations, an automatic code generator with electronic memory has many uses. Several units have been described in *Radio Communication*, the most recent being the one by P. W. Bacon, G3ZSS, in the February issue; if I remember correctly all have been based on the use of diode matrices. There are, it is worth remembering, other ways in which a suitable electronic memory can be assembled, including: (1) ex-computer magnetic cores; (2) the use of logic gates; and (3) the programmable "rom" (read only memory) integrated circuits.

An all-gate system has been described by E. Barnes, ZL2TAX, (*Break-in*, October 1973) and is used for the ZL2UHF beacon. The heart of this unit is SN74150 data multiplexers, the 16 inputs of which can be scanned sequentially. Five 74150 devices provide 80 bits of memory, sufficient for the callsign ZL2UHF, with six spare bits and an 80th bit used as an "rf fail" bit. The scanning system consists of a 7490/7442 pair, and the clock rate is determined by counting down from 50Hz mains supply. The small power unit provides a regulated 5V line by means of an LM309K three-terminal ic regulator.

But the most elegant technique is almost certainly now the programmable "rom" (often called a "prom") with single devices capable of storing many hundreds of "bits" of information. Recently a "cw memory for rtty identification" unit (which is basically a 256-bit morse generator with many uses apart from providing cw identification on rtty transmissions) has been described by Howard L. Nurse, W6LLO, in *Ham Radio* (January 1974). This provides a useful introduction to the programmable rom and how the memory is programmed by burning out (fusing) microscopic

wires inside the device so that it provides any desired pattern of logic "1's". Clearly this is a process which calls for care since you only get one chance to make a mistake or get it right; but for the faint of heart you can buy one programmed to your instructions for an extra $5 or so. The whole of W6LLO's unit, with one Signetics 8223 prom plus half-a-dozen other ICs and a couple of transistors etc (for clock, divider, data selector and end-of-message sense) fits quite comfortably on a small 4¾ by 3¾in printed circuit board. In the USA the 8223 can be purchased (unprogrammed) for about $8 and provides 256 bits of memory which is enough to cope with, say, "CQ de . . ." for even the longest call-signs; the W6LLO unit emits "de W6LLO Palo Alto, Ca" (including the comma!).

Observing sunspots

Alan Taylor, G3DME, was recently guided by Tom Short, ZE1AN, to use a pair of binoculars to observe sunspots (or their absence which can be as informative). Not, he hastens to add, by looking directly at the sun (highly dangerous) but by using them to focus an image of the sun on to a piece of white card or something similar, using the focusing adjustment to sharpen up the image and putting a mask around the binoculars to throw a shadow on to the card to produce maximum contrast. This can be done with a second piece of card with an appropriate pair of holes cut in it. The most difficult problem is to keep the whole thing steady, and it would be more elegant (but in practice not absolutely necessary) to provide a stand. A telescope will, of course, do instead of binoculars.

Actually I remember reading an article in the old *RSGB Bulletin* describing a similar process for observing sunspots, but there must be many who have not tried this technique. As G3DME puts it, it may get many of the boys more interested in geo-magnetic manifestations. Though at the present stage of the sunspot cycle do not expect to see too many spots!

Wien bridge audio oscillator

The ubiquitous 741 ic op-amp turns up again as the heart of a simple Wien bridge audio oscillator which D. S. Jones, GW3XYW, finds useful: Fig 3. This covers about 30Hz to 40kHz in four ranges with a sine wave output of about 3V p-p which remains substantially constant over the entire range. He has built his unit to fit a 6 by 4 by 2in die-cast box. The off-set null connections on the 741 are not used. Last time we included an R53 thermistor in a circuit diagram we had some enquiries from readers who thought this was a component reference number—it is actually the component type number.

The nature of directional hearing

Some further notes on the fundamental nature of stereo and directional effects have been brought to my notice by ex-G3DYK. This was the description of the precedence effect in the "Percival stereo radio system". This system developed by EMI was one of a number of stereo broadcasting systems proposed in the 'fifties and resulted in a series of field trials in the USA before the FCC came out in favour of the pilot tone system.

This gives a particularly good description of the effect of time lag, or what it terms the precedence effect, as the following extracts show:

"A stereo signal differs from a monaural signal in that additional information is provided as to direction. By considering the number of independent directions which can be resolved per second and the accuracy with which the direction of any one of these sources can be estimated, it will be clear that the number of units of directional information is far less than that required for the audio content. If therefore the directional information could be separated at the transmitter and re-inserted at the receiver, the bandwidth and power required for this information should be very small compared with that required for the audio information.

"If there were only a single moving source it would be sufficient to transmit an auxiliary signal indicating the position of this source at any instant. The same would apply even if there were a number of sources, provided that these were operative successively and not simultaneously. In practice some degree of interleaving does occur, but this is insufficient to enable satisfactory stereo reproduction to be obtained. Nevertheless, by taking advantage of certain characteristics of binaural hearing a much higher degree of effective interleaving of sounds is possible.

"If similar audio signals are produced by a pair of spaced loudspeakers, and if one of the signals is delayed by a few milliseconds with respect to the other, the sound will appear to emanate from the direction of the earlier of the two

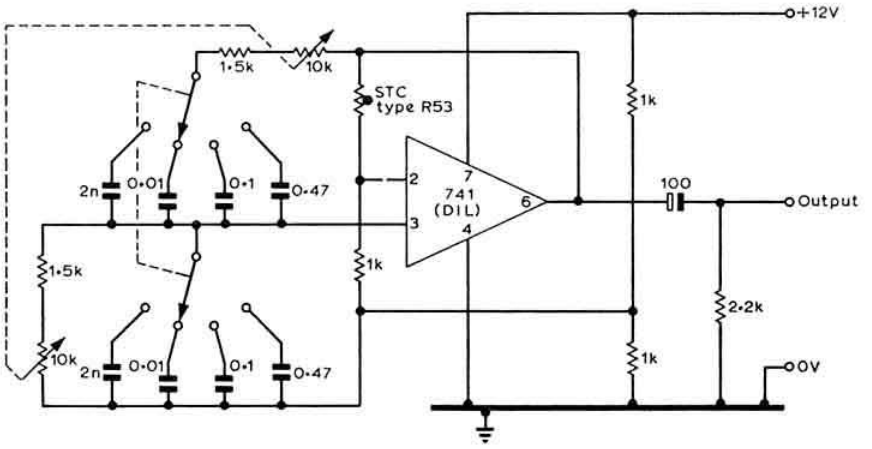


Fig 3. GW3XYW's simple Wien bridge audio oscillator

signals. This effect can be studied with the aid of pulsed tones.

"Thus if a pulsed tone is applied to one loudspeaker for about 10ms, and is then caused to die away on this speaker while increasing in intensity on a second loudspeaker so that the total intensity remains constant, then, provided that the total duration is not too great, the sound will appear to emanate from the first loudspeaker. Hence the precedence effect causes the first part of a pure tone to determine the apparent direction of the remainder of the tone which may be of much greater duration. Moreover it has been found that the effect is not confined to pure tones.

"It follows that, if the auxiliary signal is caused to determine the direction of the initial part of a sound, what happens to the later part of the sound is of much less importance . . . it follows that the directional signal should be derived in such a way that overriding importance is attached to the initial parts of sounds. . . .

"The first step in deriving the directional signal is to modify the frequency spectrum by passing each signal through a network giving a response rising rapidly with frequency. The next step is to rectify the two signals, thereby obtaining the envelopes of the left and right signals . . . . It is now required to weight the directional information in favour of those sounds which are most important in determining direction as perceived by the listener. It has been found that the beginnings of sounds are more important than the relatively steady sounds which follow; moreover the more rapid the rate of rise the more clearly is direction perceived and the more control is exercised over the apparent direction of the sound which follows. . . ."

These comments thus cross the t's and dot the i's of the points made by G6CJ last autumn but are important in understanding both genuine and pseudo-stereo.

One-off printed circuit boards

Over the years many different techniques have been thought up to simplify the fabrication of one-off printed circuit boards—but now G. K. Olesen, GM3MQO, provides a useful reminder. Recently he wanted to produce a couple of small boards but achieved rather indifferent results with several of the usual methods. Then he thought of trying Letraset Dry Print, not only to form the pattern but also as the "resist". Now he makes PCBs as follows:

First he takes the copper-clad fibreboard or paxolin board, cleans it thoroughly (normally using Vim), drys it, and then having worked out the basic pattern on paper, puts the required pattern directly on to the copper-clad board using Letraset Dry Print. He makes sure the print is well bonded before putting the board directly into the etching bath (he uses ferric pichloride). With a reasonably fresh solution and frequent but gentle agitation, the etching process is completed in about 20 to 30min.

GM3MQO finds this technique most successful and straightforward, especially compared with other methods he has tried. The most useful Letraset sheets are Numbers 2454 (dots and squares) and 558 (line rules). He hopes to try Letrafilm at some time in the future. Since this material can be cut out as required, it could be invaluable for covering large areas and producing non-standard shapes.

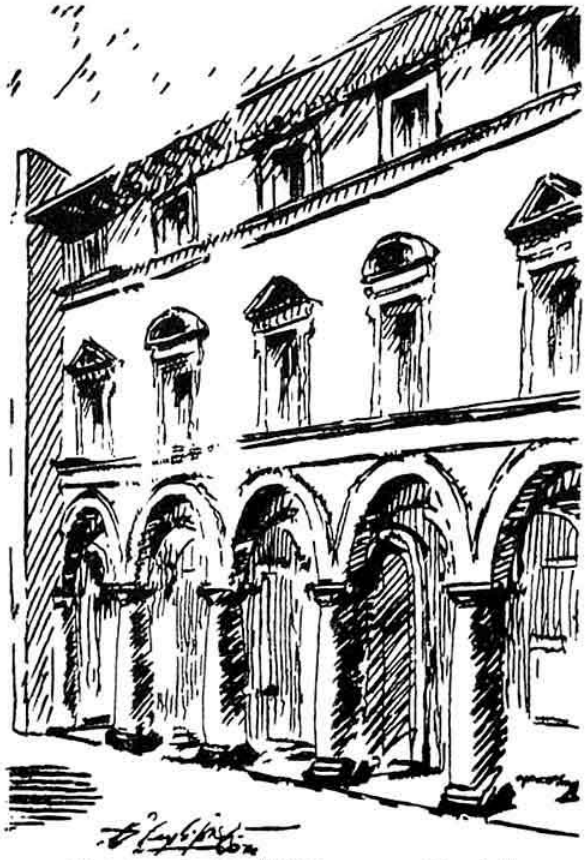
Fax for amateurs?

Several years ago (April 1970) a short item was included in *TT* pointing out that despite the then growing interest in slow-scan television very few amateurs were actively pursuing fascimile techniques which seemed in some ways a better system for long-distance transmission of graphical images, producing fine resolution "hard-copy" from a fairly rugged type of signal. It was then noted that the British licence appears to limit fax (A4 or F4) to the uhf bands. Since then we have not heard of any change in the official position, but since the MPT are now prepared to permit the use of hf sstv we can see no logical reason why they should not do the same for fax.

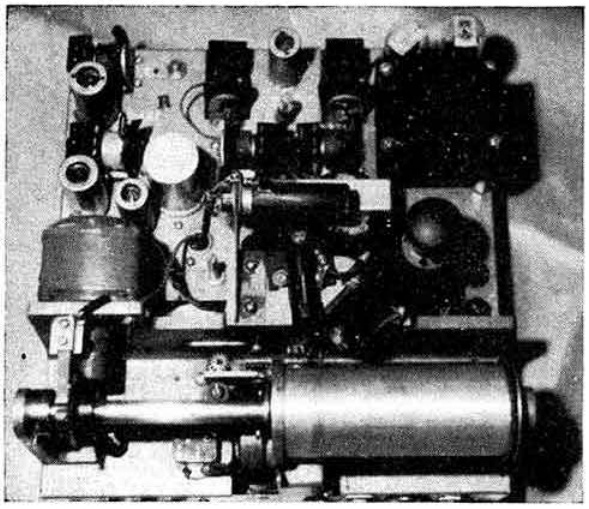
C. Grant Dixon, G6AEC/T, has recently let me see a letter from Franco Fanti, I1LCF, of Bologna, Italy, well known for his interest in sstv, but now actively trying to promote more interest in fascimile among the local amateurs. He has brought into Italy a number of Creed Deskfax machines from the UK, and Western Union machines from the USA. A machine already widely available in Germany and Italy is the Siemens KF108.

He notes that several different standards are in use by amateurs and is trying to introduce the commercial standard to make possible international contacts. By providing gearing for the Creed and WU machines these can be made suitable both for two-way contacts and for receiving APT cloud-cover pictures from the weather satellites.

Having recently been making use of commercial fascimile facilities operated over telephone lines I am considerably impressed with this type of communication—my only



Sketch received by I1LCF by means of facsimile



The facsimile equipment used by I1LCF, Bologna

criticism is the most unpleasant smell of the fax copies when first received, but presumably that is not an essential part of the fax system but of the chemicals used in the particular copier!

Crystal-controlled tone-burst generator

C. J. Douglas, G3SZY, suggests this item should be headed "Yet another tone-burst generator" but since this is the first complete unit to appear in *TT* that hardly seems appropriate.

His very elegant approach (Fig 4) to providing 1,700 or 1,750Hz tone bursts is to use a crystal oscillator at about 3·5MHz driving a 14-stage cmos counter type CD4020. With a 3·4816MHz crystal and taking the output from the eleventh stage an output at 1,700Hz is obtained ($3{\cdot}4816 \times 10^6/2048$). For a 1,750Hz tone burst the crystal frequency should be 3·5840MHz.

G3SZY writes: "The timing for the burst is obtained by using the reset line which very conveniently is buffered twice within the integrated circuitry thus squaring up a slow rising voltage applied to it. The pressel is operated at the start of the transmission and the output from the unit is 1,700Hz. When the 1μF capacitor has charged through the 470kΩ resistor to about half the supply voltage, the ic resets and therefore mutes the tone automatically. The time constant provides a tone burst lasting about 330ms. The diode and 100kΩ resistor provide a fast discharge path for the timing capacitor.

"I use this with my Westminster equipment where the pressel switches the negative line, but the positive line could be switched just as easily. Need it be said that with this type of tone generator the tone does *not* drift with temperature?"

Backyard aerial farm

Don McVicar, VE2WW/VP7DX, recently sent along a leaflet giving details of an "aerial farm which fits in your own backyard" (see also *Ham Radio*, January 1974, page 71). His system, developed over a number of years, consists of two or more inverted-V dipoles with the same mast as the apex for each. In operation one set of sloping inverted-Vs is made to act as the driven element of the beam in the desired direction; at the same time other elements of the system are activated as parasitic reflectors or directors by the inclusion of additional inductance or capacitance. The key component is a special rotary rf switch which has a low torque and has been designed for mounting at the apex; various forms of this switch are being marketed by World Wide Antennas, Box 467, Miami Springs, Florida 33166, USA, in both kit and assembled form. It is claimed that the system can thus provide multi-frequency wire aerials providing good gain at low radiation angles and with some versions capable of being directed by means of the switch in up to eight different directions at 45° intervals to give all round coverage, and fed from 52Ω coaxial cable. Price of the special switch, in kit form, varies from $14.50 for the Mk1 up to $75 for the Mk 8 which selects any of eight ¼λ elements. It sounds a little like a new shortened version of the relatively little-known sloping-V aerial with multiple feeders, such as the one at Cove Radio near Farnborough.

Here and there

Maurice McFadden, GI3VCI, read with interest G3VVT's January item about neutralizing grounded-source fet amplifiers. He points out that this problem arises when the supply voltage is removed because the pinch effect in the channel caused by the gate-to-source bias voltage disappears: the fet then behaves like a low resistance (100Ω or so) from drain to source. Thus apart from the complete alteration of the feedback path, the tuned circuit is effectively short-circuited! For the same reason it is also impossible to find the resonance frequency of the drain tuned circuit by using a gdo when the supply voltage is switched off. G3VVT's suggestions would thus seem an answer to a real problem.

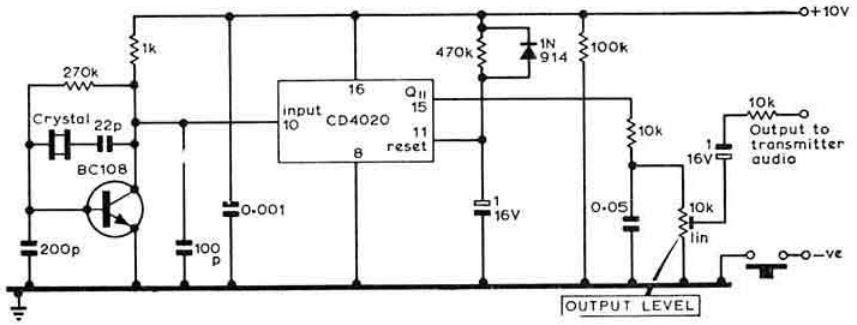


Fig 4. G3SZY's high-stability crystal-controlled tone burst generator suitable for activating fm repeaters, etc. Crystal is 3·4816MHz for 1,700Hz or 3·5840MHz for 1,750Hz

MICROWAVES—1,000MHz and up....

by DAIN EVANS, G3RPE*

Propagation tests at 10GHz

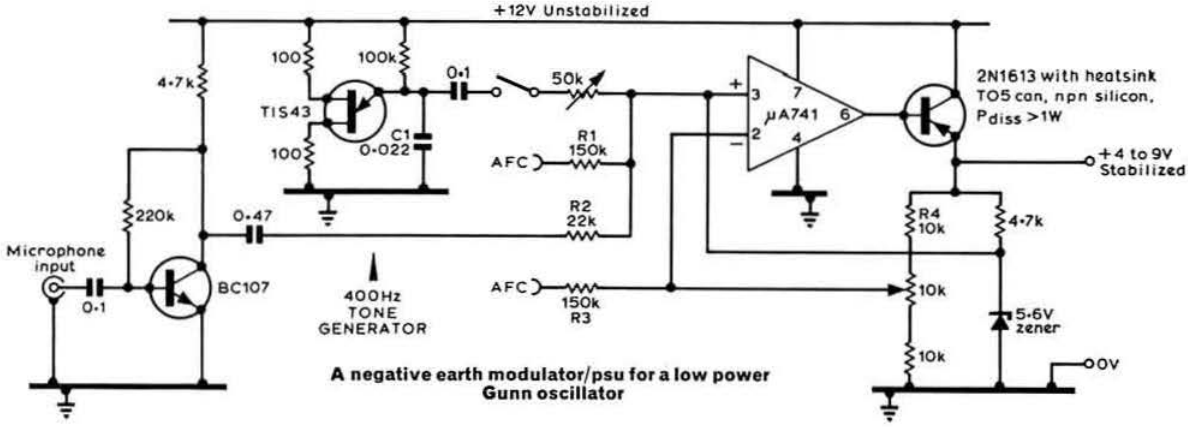
Until now there has been little systematic study by amateurs of non-optical paths, an area in which amateurs could make a very worthwhile contribution. So we are pleased to hear that a start has been made by two groups on what could prove to be a most interesting study. G8DEK (Winchester) and G3JHM (Fourmarks) have established a 10GHz link between their *home* stations. The 20km path is near optical but is obstructed by a line of trees at some distance from both stations. At present, an afc system is being fitted, and we look forward to further results when this has been done.

GW8AMV (Cardiff) and GW3PPF have recently been transmitting over paths which involve a knife-edge diffraction: more details when they become available. Their best dx over optical paths now is 103km.

In other journals

Interesting converters for 23 and 13cm by W2CQH appear in the January 1974 issue of *QST*. Their main feature is the use of an interdigital type filter as front end, with an HP5082-2877 Schottky diode as the mixer. The i.f. preamplifier is a 40673 (3N140) dual gate mosfet at 28MHz for the 23cm converter, and at 144MHz for the 13cm converter. The final oscillator multiplier stages consist of a 2N3866 driving an HP5082-2811 Schottky diode as a quadrupler. Noise figures at 1,296 and 2,304MHz are 5·5 and 6·5dB respectively.

The design for a 13cm converter which uses a BFR90 as the mixer appeared in *REF* August/September 1972.



A negative earth modulator/psu for a low power Gunn oscillator

A Gunn diode modulator/psu

A stabilized modulator/psu by G8CGN, intended for negative earth systems, is shown in the figure. It was derived from the circuit given in *TT* June 1973. It is similar in form to the positive earth unit developed by G3ZGO (this column, March 1972), but it uses an ic in the stabilizer circuitry. Inputs for either positive- or negative-going afc voltages are available, but note that these are floating at 5·6V. The afc gain can be altered by changing R1 and R3, and the deviation on speech by adjusting the value of R2. The output voltage can be increased slightly by reducing the value R4, and the tone frequency raised to the standard 1kHz by decreasing C1 to 0·01μF.

As noted in the past, it is good practice to check that any psu is free from parasitic oscillations and to fit a suppressor consisting typically of a 10Ω resistor in series with a 0·01μF capacitor, and also a zener diode rated at approximately 0·5V above the maximum working voltage of the Gunn diode, at the dc input to the oscillator.

Problem corner

In a field as wide as microwaves, inevitably a large number of problems crop up all the time. Some of these have been handled in the column and in articles, some privately and some simply by putting interested parties in touch with one another. However, there is a growing list of "things that need to be done" and it would seem to be an appropriate time to publish them in the hope that solutions are already available for some. Could I ask people to write in with their particular microwave problems so that the list can be reasonably complete?

An example of the type of requirement is the design details for filters. There is a special need for ones for the 24GHz band, both because of the difficulty in generating this frequency and because it is our "top" band. If these can have the performance and tolerance in construction that the 10GHz filter published in the September 1973 column has, then so much the better. We, of course, could do with a set of filters for all the amateur bands. Can anyone help?

*4 Upper Sales, Chaulden, Hemel Hempstead, Herts.

The IARU vhf/uhf band plans

IN view of the comments expressed within RSGB Region 10 concerning the new IARU vhf/uhf band plans, the Zonal Manager, Cyril Parsons, GW8NP, decided to organize a meeting to permit discussion and explanation of the new arrangements. Doubtless there are members in other areas who would like clarification concerning certain aspects of the band plan and this brief account is published in the hope that it may be of interest to all vhf/uhf operators.

The meeting was held at University College, Cardiff, on 9 February when Geoff Stone, G3FZL, VHF Manager, and Roy Stevens, G2BVN, chairman of the MPT Liaison Committee and secretary, IARU Region 1, were present. The meeting was chaired by David Thomas, GW3RWX, Regional Representative, and Bob Barrett, GW8HEZ, deputy Regional Representative.

The meeting was opened by Roy Stevens who gave an account of the development of IARU from 1925 to the present day, and he left the audience in no doubt that it represented the only medium through which the amateur service could be protected against the increasing dangers which threaten. Unity within the IARU is essential and the band plans are an example of excellent international co-operation.

Geoff Stone then outlined the development of the 144MHz and 432MHz band plans, starting from the simple geographically based plans, originated in 1949, up to the present day. Both speakers then faced a barrage of questions and the following extracts have been considerably condensed.

(1) *Why were new plans necessary?*
New international plans were necessary to accommodate space communication, fm mobile, repeater channels and mode changes involved in the rapid expansion of ssb and vfo operation. There was considerable international discussion, and the final plans were a compromise between a number of different views. Germany has been inconvenienced most by the change, as all their repeater channels are now in the top half of the 2m band, a move which the DARC hopes to complete by the end of 1974.

(2) *What is the position in the case of the aircraft spot frequencies in the dx section of the band where* VFOs *and high power ssb are found and could possibly cause interference?*
The equipment using the spot frequencies is now obsolete and rarely encountered. The MPT has stated that reference to these frequencies in a band designated as "amateur exclusive" by the ITU Radio Regulations will be removed from the amateur sound licences as soon as possible.

In the meantime adequate care must be taken when operating in the vicinity of the channels.

(3) *Why the location of beacons in the dx section?*
It was agreed that the location of beacons in the dx portion of the bands could lead to interference problems for local amateurs operating near them. On the other hand this location would enable easier monitoring of band conditions. GB3VHF on 144·150MHz provides a useful marker between the cw and ssb modes. The plan provides for low-power local beacons to be located around 145MHz, and this could be a solution if a beacon at the low end caused unacceptable interference to nearby amateurs.

(4) *The notice of the change was very short.*
This is agreed and came about because of the wish throughout Europe to act quickly to minimize problems caused by operators continuing to purchase crystals or equipment not conforming to the new plans. If the implementation had been further delayed it would have been very difficult to obtain a voluntary agreement to make changes. The date chosen was a compromise between differing views. All RSGB groups and affiliated societies were advised in advance of the December issue of *Radio Communication* in order to spread the word as quickly as possible.

(5) *What is the position regarding crystals and new equipment?*
There is a world shortage of crystals at the present time but advertisers in the Society's journal and overseas firms can supply with acceptable delays. In any case the change must be progressive and cannot be implemented immediately. Suppliers of equipment throughout Europe and in Japan have been advised by the IARU of the new plans and a number have already stated that their new equipment will shortly contain the appropriate crystals.

It was noted that a number of groups and clubs had persuaded an individual member to attend on their behalf thus enabling factual information to be available at a subsequent local meeting. In closing the proceedings the Zonal Manager expressed the thanks of those present to Geoff Stone and Roy Stevens for their attendance and participation in a very worthwhile meeting. Scheduled to last two hours the meeting ended after three hours which, by agreement of those present, was time well spent.

New product

Multimeters

The Major multimeter is an instrument of Italian manufacture suitable for ac and dc voltage and current measurements, having six resistance ranges and provision for measuring power, frequency and capacity. The sensitivity on ac and dc voltage ranges is 40kΩ/V. Accuracy is stated to be ±2 per cent on dc voltage and ohms measurements. Power requirements are supplied by internal batteries or from the domestic ac mains.

The Major USI instrument incorporates a universal signal injector which runs off the internal batteries and supplies a modulated rf output with harmonics detectable up to 500MHz. The case is constructed of tough ABS plastic and there is protection against external magnetic fields.

The single quantity prices for the Major and Major USI are £21.10 and £25.50 respectively, inclusive of VAT. For further information contact Chinaglia UK Ltd, 19 Mulberry Walk, London SW3 6DZ. Tel: 01-352 1897.

FOUR METRES AND DOWN

by JACK HUM, G5UM*

Four months forward

No doubt the new metre-wave band plans will have earned their meed of attention at Whitton discussion groups (a report on the VHF Convention will appear next month), and to many operators this subject has moved beyond the discussion stage into the area of practical implementation. Now, four months after the announcement of the new plans (*Radio Communication* December 1973), settling into the new scheme of things seems, at least from the spot where we do our listening, to have progressed with notable smoothness.

Observation shows that a large number of a.m. operators on 2m, remaining in previous frequency areas, find no need to shed the habits formed during the geographical zones era of pointing beams at wanted regions and of tuning limited slices of the band related to them; yet one still hears people "..carefully (laboriously?) tuning from high to low for any possible call". What is also evident is some spreading out, initiated by operators wishing to withdraw nets and multiple contacts from segments of heavy interference—and there is plenty of that in urban areas. In other words, the new band plan is showing a welcome flexibility.

Big transmitting contests have always been a testing time for any band plan and the major contest at the beginning of March was the first to hit the whole of 2m since the new plan was introduced. There was notably a high level of A3J, much of it in the newly designated area from 144·2MHz upwards but plenty remaining on the traditional 145·41. As in past 2m contests, the ssb area expanded under the pressure to become a sub-band instead of a spot frequency; but it seems to us that while most sidebanders use rigs of limited frequency coverage it will be a long time before the "flexible upper limit" for A3J at 144·5MHz is reached. (Has anybody noticed that the 2m sideband area alone is wider than the whole of the 80m band?).

Sideband being (usually) synonymous with spot frequency, on now to..

"Co" and "split"

Our pleas for more inter-mode communication on 2m rightly receive a rough answer from those sideband users whose attempts to promote it evoke nothing but a blank silence.

To direct an A3J call to an a.m. or fm station, either co-channel or at the tactical "tuning from" point, is no guarantee of a contact if the called station possesses no bfo to resolve it. Users of ex-vehicle receiver strips who fail to effect the essential modification of fitting a bfo deny themselves cross-mode contacts with A3J men who want to talk to them —and by now there must be a thousand or two sidebanders on 2m, which goes to show the potential magnitude of "mode-apartheid", namely segregated packets of vhf operators who cannot inter-communicate, if cross-mode working is not encouraged.

So "fit a bfo" is "must" No 1. And getting into the habit of "listening this frequency first" is "must" No 2, for that is where an A3J caller is most likely to appear (assuming that his equipment is *not* of the aforementioned restricted coverage!)

Now here is a third "must" for the operator who wishes to widen the scope of his contacts on 2m: never allow "listening this frequency" to degenerate into listening on no other. In the case of mobile users with both hands on the wheel and neither on the radio this is understandable on grounds of safety, but it is quite inexplicable in the case of fixed stations —and another sure recipe for limiting the scope of one's contacts. Regrettably, the habit affects 70·26MHz as well as the 2m mobile spot, and a further penalty is exacted by the inflexibility of unmodified ex-vehicle receive-strips.

A Hertfordshire operator tells us that, with 16 switched crystals in his mobile transmitter and being fully tunable on "receive", he enjoys the freedom to move from heavy traffic frequencies (eg 145·0MHz) to designated channels where contact may be resumed in peace: an ideal arrangement difficult to emulate while crystal supply remains difficult but certainly one to aim for.

"Oscar Newsletter"

Already by its second issue the *Oscar Newsletter* started by G3IOR and G3WPO had grown to 20 pages, excluding the stitched-in AMSAT codestore report form.

For current Oscar 6 users the predictions table is invaluable. The operating schedule for Europe is Saturday, Monday and Thursday afternoons/evenings on ascending orbits and Sunday, Tuesday and Friday mornings/afternoons on descending orbits—and there are dire warnings about the ill-effects which come from hammering Oscar with too much power, for which some Europeans are to blame: 100W erp is enough.

Among other practical satellite info the newsletter carries a suggestion from W1FTX that some form of band planning will be desirable when Oscar 7 goes into orbit this summer. "Half the passband should be for phone with cw unrestricted," he says, in the interests of sustaining weak signal contacts which, in the case of Oscar 6, have all too often been "..rendered impossible by the present intermingling of modes."

The G3IOR/WPO team offer a limited QSL bureau service for through-satellite contacts. For further information about the *Oscar Newsletter* write (with sae) to Tony Bailey at 5 Erin Way, Burgess Hill, Sussex.

Lunar reflections

Joe Reisert, W6FZJ, received plenty of requests for his "432 EME Bulletins" but no SAEs or IRCs. He has now sent us a copy of each of the first three of his bulletins, and these we will loan to any e-m-e *aficionados* who send us an sae for them and promise to return them to G5UM after copying, so that they may be forwarded to the next applicant.

In Switzerland HB9QQ is ready for e-m-e with four 22-element Yagis and a 250W sender for 432MHz, and HB9MDC had a 120-element co-linear ready for the tests in March.

* Houghton-on-the-Hill, Leicester LE7 9JJ.

Here at home Peter Blair notched his 21st country worked on 70cm when G3LTF managed a two-way via the moon with VE7BBG.

More for "four"

If last month's correspondence between five well-known "four meteorites" and the chairman of the VHF Contests Committee does nothing else, it will have been valuable by emphasizing the need for more use of our 70MHz allocation. What it did not do was to suggest two major causes of low activity on this band. One of them is the tvi-potential that exists in the large part of the country served by Channels 3–5. The other is the absence of exotic outside-UK stations such as those in Gibraltar and Cyprus, which undoubtedly stimulated activity in the years when they appeared on 4m.

Remembering that statistics can be made to prove anything you like, one operator of averaging 4m activity has come up with the following ascending curve to counter the declining curve shown last month by G2HIF:

Number of QSOs per annum in the 70MHz band: 1968, **123**; 1969, **144**; 1970, **125** (but the man was in hospital for much of that year and could not get near the rig); 1971, **164**; 1972, **381**; and 1973, **493**—all from the fixed station home site.

Statistics aside, what is quite obvious is that if everybody who can use 4m came on the band between 1000–1300 every Sunday the situation could be transformed: as always, activity begets activity.

The burst of evening activity prompted by the closure of television at 1030pm was short lived. But there may be plenty of operators prepared to try 4m during tv hours confident that the swing to uhf viewing has reduced the dangers of Channel 3–5 tvi. If there are, and if they would like sked spots published here, we will be glad to hear from them.

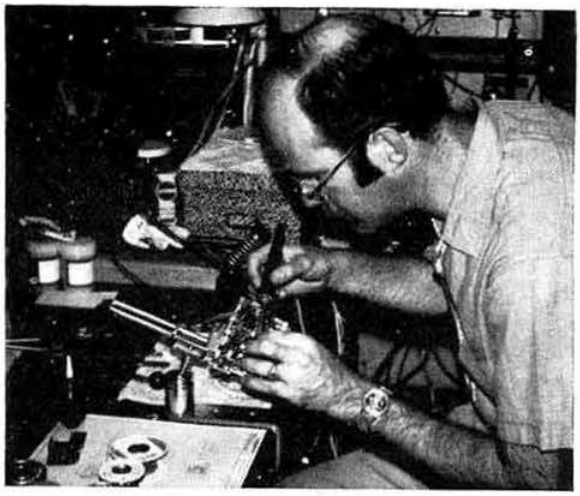
"Poor man's ssb"

Did you know that there is a standard design of 2m transmitter that is virtually tvi-proof, costs about £10 to build (less if you have enough parts in the shack), uses only three valves, and with an average site and aerial will guarantee you a coverage of 100-plus miles under ordinary conditions and much more than that under lift conditions?

Class B licensees need read no further unless they are contemplating taking the morse test, for it will be obvious that what is delineated in the above specification is a sender for cw only; and if you are wondering "Why £10 and only three valves?" the answer is ECF82-E180F-QQVO3/10, with 72MHz coming out of the second half of the ECF82 (which suggests that if you took 70MHz out of the second half of the ECF82 you could build in a few hours a 4m transmitter using only *two* valves).

Someone once said that cw is the poor man's ssb. What was meant was that A1 offers the dx potentiality of A3J without the cost or complexity of sideband. The statement may be rephrased to assert that sideband is the phone man's poor substitute for cw; for A3J is the only speech mode that can compete with it.

Class B licensees who *have* managed to stay with us this far will be inclined to offer the inevitable comment: "But you've got to learn the stuff first", in the sense that doing so is an awful chore, a hurdle to be left behind rather than a summit to be achieved. If it were possible to eliminate the *mystique* that morse is any more difficult to assimilate than, say, learning to drive a car, or use a typewriter, or perform any other automatic task in response to a mental stimulus, then there would be much greater occupancy of the bottom 100kHz of 2m than there is at present (probably using the above-mentioned three-valve sender!).



Dick Daniels, WA4DGU, constructing the AMSAT-OSCAR-B (Oscar 7) two-to-ten metre linear repeater flight unit. Input frequency range is 145.85 to 145.95MHz, and output is 29.40 to 29.50MHz, with a telemetry/Codestore beacon on 29.50MHz. Dick does not have a formal technical background; he prepares budgets at NASA headquarters. He built both this repeater and the Oscar 6 two-to-ten metre repeater in his basement

No unusual personal attributes are required to master any of these modest skills. Perhaps it does help, as G3NHE and others have suggested, to have some liking for music if you want to be able to continue to send decent morse code after you have passed out at "twelve per", for morse, like music, is ordered sound. The point is also made by G4BYK, one-time G8FNI, who writes:

"Unfortunately, I do not possess any sense of music and cannot immediately identify a morse character: my brain has to process the individual dots and dashes. How I envy the chap who can rattle off at 20wpm!" Even so, Don Ormston has determinedly set himself a programme to work up his receiving speed. Meanwhile, look for him at the low end of 2m any Monday-night-at-(telegraphy)-eight.

Another ex-Class B man, G4BMM, once G8DAW, concentrated on 4m when the new licence came through and soon won the FMD 70MHz Transmitting Award in spite of college examination preoccupations. Paul Knight tells *FMD*: "CW has been a *very* useful mode to winkle out the 70MHz dx and I am very pleased that I made the effort to take the test. I would recommend the mode to anybody now. It comes in useful on the other bands too: I crossed the 1,000km limit on 432MHz cw in the recent opening to SW Germany".

How to start? Buy a copy of the RSGB publication *Morse Code for the Radio Amateur*, excellent value at 25p. Study in particular pages 20.2 and 20.3 of the *Radio Communication Handbook*. Consider what material in the panel "Morse Instruction Aids" on the RSGB publications page in alternate issues of this journal will be of most benefit.

Then get pounding. Forget the *mystique*. Just remember that cw is no more than just another way of talking.

Contest commentary

Between now, the beginning of April, and the multi-band event at the start of July, that useful "dummy run" at which groups and clubs will exercise equipment intended for VHF NFD in September, there are "quantity two-off" contests on the 4m band and only one on the 70cm band (excluding the 70cm summer cumulatives, which tend to be favoured more by individual home operators rather than clubs or groups: interestingly enough, the 4m winter cumulatives had portables in first and second places).

In short, there is not much time left in which to finalize equipment for 70MHz and 432MHz where this still has to be done. We omit 2m from these observations: the big open contests of 2–3 March and 4–5 May will have disclosed any fault conditions in good time. It is on its flanking bands, where occupancy is lower and the availability of rigs scarcer, that forward planning should be in train *now*, and not hard upon the event.

And if this sounds like a statement of the obvious, we would simply add: Has *your* club or group air-tested (or does it plan to do so in the next three months) the receivers and transmitters to be used in the "Jubilee" and, then, in VHF NFD itself? Have steps been taken to ensure that all modes may be used at the touch of a switch, and in the special context of A3J have spectrum analyses and on-air tests been made to reduce spurii? You will wish the 200W p.e.p. portable on the next hill to be "clean": but are you?

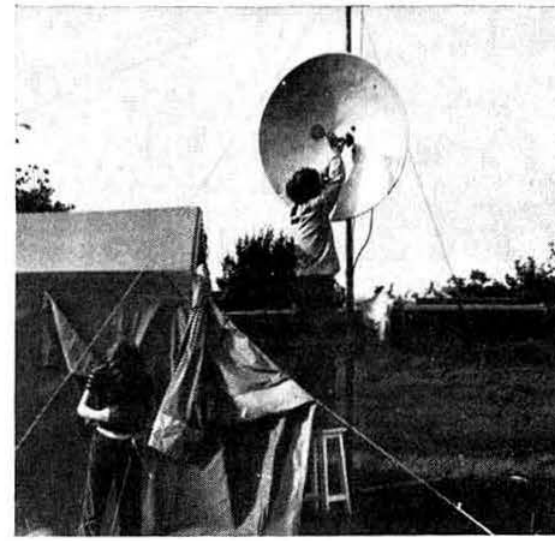
One prominent portable contestant in the 2–3 March event rated the proportion of A3J in the high and low sideband areas as being about eight to two. In other words, 145·41 was pulling them in fastest, at least under contest conditions. But operators in both A3J areas had to contend with an increasing nuisance: interference from fm users.

Occasionally a.m., too, tangles with sideband both at contest times and outside. One A3J man who was thus afflicted announced over the air that it was his intention to write to *FMD* complaining of the practice. "Since then I have had little trouble!" he adds. Splatter from a.m. stations that often extends to as much as 10kHz right on to the sideband channels can frustrate a sideband user's chances of resolving a wanted weak signal.

Harking back to the 2–3 March event on 144MHz, we have been asked to state that GW3FEC/P did not discover that they were wrongly using YM57E instead of YM75E until the contest was half-way through. To avoid confusion they stuck to YM57E until the end, even though it showed them well east of the Welsh border. Equipment to their 2,200ft snow-capped eyrie was towed up by sledge. At packing-up time the Honda E300 left a frozen hand, fell 700ft, was recovered battered but unbowed—and started again first pull!

Elsewhere this month appear the results of the first-ever 432MHz single sideband contest, made the more sensational by reason of the tremendous tropo opening that so conveniently coincided with it. Said Paul Widger, who won the event with G8AGU/P, "It was fantastic, the best opening for many years, QRM worse than on 20m!" Of his 86 contacts from N Devon, 55 were outside the UK, the majority on A3J, but because he had read the rules, several scoring points were earned from non-ssb stations (see Rule 9c).

The policy of the VHF Contests Committee to encourage the development of equipment and operating techniques paid off so successfully in this first 432MHz ssb event that a repeat is being planned for next autumn, once again involving Rule 9c to permit cross-mode contacts. Watch "Contests calendar" for the date.



Adjusting the feedpoint for the 23cm dish is John Hazell, G8ACE, on the northern Herts hills at Therfield, not far from GB3PI, during last year's VHF NFD

Parchment piece

Radio clubs located in urban areas which restrict their take-off on the vhf bands—and consequently their chance of ever getting an FMD parchment—can aspire to the award by going out portable to better sites than the one at home. A couple of months back we reported how this was done by the Belfast YMCA Radio Club with GI6YM/P. Now the City and County of Bristol RSGB Group, by putting G6YB/P out on the hills, have earned themselves the 144MHz Transmitting Award No 380. Other 144MHz Transmitting Awards issued lately are No 375 to G3TTV to add to the pair of 70cm parchments just earned by G3TTV and G3TTV/P; 376 to G8DLF; 377 to G8CXK; 378 to G8DYC; 379 to G8ECO; 381 to G3WPO with a big clutch of A3J contacts plus cw to winkle out two particular goodies in EA and GM; 382 to G8HSX of Northampton (Dick Phipps has already booked G4DIC).

Latest 432MHz Transmitting parchments to go out are those to Brum's G8AYY, No104, and to Dunstable's G8CPX, No 105.

We have been asking on this page "Where are the listeners' applications?" Quick answers were provided by D. Dhuglas, BRS32755, of Glasgow, and R. Phipps, A7680, of Northampton (yes, G8HSX above, as he now is). Now they have 144MHz Listener Awards, Nos 27 and 28 respectively, on their radio room walls.

As for "Seniors" two very well-known metre-wave men have succeeded in hoisting themselves on to this highest-but-one level. They are G8BCL, who receives 144MHz Senior Transmitting Certificate No 50, helped along by some very effective sideband A3J for several years past; and GD2HDZ

to whom goes 432MHz Senior Transmitting No 18, which may be some return to Arthur Breese for the pleasure he has given to so many 70 centimentalists by providing GD towards their FMD claims, backed up by meticulous QSLing.

Three of the month's clip of 4m applications were in respect of portable operation. To G3ZYS/P, G3ZLQ/P and G3OBD/P went parchments numbered 105, 106 and 107, while West Midlands man G4BPY gets 108 for home station operation.

In putting in his 70MHz claim for G3OBD/P, Phil Dutfield accompanied it with an application for a 23cm award also for G3OBD/P, which brings him 1,296MHz Transmitting Award No 4.

The highest award of all, the Supreme, is still held to date by only five operators. It will be remembered that to qualify for the Supreme a member must hold one 23cm Standard Award plus two Senior Awards for 4m, 2m or 70cm, or alternatively three Seniors, all this for fixed station operation only. The stipulation "fixed station only" for the Supreme may seem to be a bit hard on those operators—and G3OBD is one of many so placed—whose home sites are poor for 23cm propagation, but it *had* to be made in order to preserve the "supreme" character of the Supreme Award for recognition of single-handed home station operation. Its value would be debased if it were to be all too easily acquired over one weekend during the course of, say, a multi-operator portable event such as VHF National Field Day.

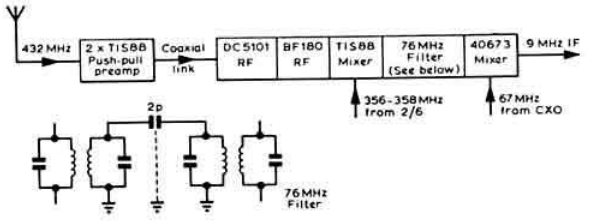
Finally two admin points relating to RSGB metre-wave awards. First, please do not send claims to headquarters but direct to G5UM, Hon VHF Certificates Manager. Already in 1974 at least half a dozen packets have come to us via the indirect route of 35 Doughty Street, involving unnecessary postage and delay. Secondly, if you want a claim form(s) apply to G5UM, enclosing sae.

Tech corner

From G8DCA, Mike Telkman, Basingstoke, Hants.

With the increasing interest in single sideband on the 70cm band, the following transceive layout may have some appeal to intending constructors. The block diagram shows the receive chain from the 432MHz aerial to the i.f. output, including a total of four rf stages. The third of these uses a DC5101 with 1Ω in the emitter lead and a ferrite bead over the collector. The following BF180 is run at 6mA to reduce gain (this device has a marked forward agc characteristic) and to retain stability.

The next stage, the TIS88 mixer, takes a sniff of rf from a QQVO2/6 anode circuit, and the resultant 76MHz product passes through a filter consisting of four parallel LC circuits disposed in two pairs as shown. The output passes to the 40673 mixer and is heterodyned with 67MHz from a crystal oscillator chain to give a 9MHz i.f. output (thence to 455kHz i.f. if desired).



The DC5101 is quoted as having a 5dB noise factor at 1,100MHz, though I am not quite sure what it was doing with itself in these circumstances, for on 70cm it is very good. Although it already has a lead going to earth I found it advantageous to wrap a sliver of wire round its case and take this to earth as well. This raised the gain and reduced the noise.

The two-TIS88 preamp was neutralized by feeding a signal into the *output* and connecting the *input* to the 70cm converter as suggested by G3VVT in *Technical Topics*, January 1974, a method which seems to me to be perfectly valid.

What they say

"The February cw contest much of a flop. Whoever thought of putting on an 8-hour daytime *cw* contest? Stick to four- or five-hour evening ones, or there will be long gaps towards the end with nothing happening, which spoils it for everyone"—G3YOZ.

"I wish people would stop saying (particularly on 2m) that low power a.m. or fm on 70cm is no use. My overall worked score with 2W from a 3/20A tripler and a Multibeam is 7-plus-28 without really trying that hard"—G3XJS.

"Further to 'Yagi aerials for 1,296MHz', March issue, I am now using four 24-element Yagis fed with a four-way power divider, and tests show an improvement over the 4ft dish during the 2230gmt nightly sked with G3JVL . . . the varactor tripler at 23cm gives an acceptable reproduction of the 70cm a.m."—G3OBD.

"A thank you to G3OHH and his wife G3TEY for allowing the use of their field and ac mains to the North Staffs Radio Society during the 2-3 March 2m contest. Thanks largely to this we worked 237 stations for 874 pts"—G4BEM (Stoke-on-Trent).

Here and there

Believed new world record for a tropo contact on 2,304MHz was established on 16 February by W6FZJ with WA6HXW over a path of 330 miles, cw both ways, 5W output and 1kW input respectively, and 6ft dish at each end.

Required for Pye base transmitter, one FT243 crystal between 12,105–12,119kHz. Offered: Cathodeon FT243-type 12,070·833 for 144·85MHz. G8HKC, 80 Wood Road, Heybridge, Maldon, Essex.

A welcome return on 433·5MHz was made by GB3SC the night before the 9 March cumulative contest. It was marginally preceded by GB3DM on 2m. By now, as power shortages ease, the other beacons should be back, with GB3VHF on the new designated frequency of 144·15MHz if the ordered crystal has arrived.

From Area Representative GM8BZX comes the news that the next Scottish VHF Convention will be on 28 September in the University of Dundee. Book the date now. Full information nearer the time.

25 YEARS BACK

"Vale! The five metre band, lost to the Amateur Service in the United Kingdom at midnight on March 31, 1949, went down with colours flying . . . culminated in a grand finale with so many stations taking part that it sounded like a well supported contest . . . calls unheard on five for months or even years suddenly appeared for a final fling"—G2UJ, *RSGB Bulletin*, April 1949

THE MONTH ON THE AIR

by JOHN ALLAWAY, G3FKM*

FOLLOWING remarks in recent *MOTAs* concerning the use of the 28MHz band for local contacts, G3RNV has pointed out that there is a "natter" net of amateurs in the Manchester area who operate most evenings after 2300 and that up to 50 different stations have been known to take part at different times. The existence of a Midlands net on 28,550kHz, and a Bristol net on 28,650kHz, as well as Manchester on 28,600kHz is also noted. Your scribe would be happy to receive details of any other similar activities on the band.

Top Band news

A summary of activity during the period 28 December 1973 to 26 January 1974 has been received from VK6HD. Only two mornings were missed (a commendable achievement as an 0430 local start was needed). Conditions have been poorer than last year and Mick mentions that signals from DHJ have not been of any use as a propagation guide, and that unlike last year signals from all over Europe were audible at the same time. In all, Europe was heard on 11 days but worked on only eight, contact was made with DK3BJ, EI8H, G3IGW (twice), G3LIQ (three times), G3XAP, G3YUV, G3ZEM, G3ZYY (twice), GM3IGW/A, GM3YCB (three times), GM4AGG, HB9CM, OK1ATP, OK1DOK, OK1FCW (three times) and OK1IDK/P. G3CXX, G3UNT, GM3WDF and G3YRO were heard.

PA0HIP will be visiting Guernsey and Jersey during April and hopes to be on the air on 160m. Activity from Cyprus in the form of 5B4AO has been reported but he has a transceiver and seems to favour 1,824·5kHz. 4S7GV has been quite active around 1,804kHz between 2330 and 0130 and has heard several UK stations.

News from overseas

VP8NO was on Adelaide Is in late February and using the base's equipment (Racal) as his own was still on the boat. Skeds are being kept with friends in Nottingham on 14,125kHz (approx) at 2000 on Tuesdays, Thursdays and Saturdays. QSLs should be sent via G4AFJ (see *QTH Corner*).

Keith Orchard, G3TTC, will re-activate his old ZD8KO call between 4 April and 10 July on 14, 21 and 28MHz. He will have a KW2000B and vertical aerial. QSLs should be sent to his home address (see *QTH Corner*) or by air mail only to: c/o BBC, Ascension Is, S Atlantic.

DX news

There will be a special station on the air from the Auckland Festival during the week ending 20 April. It will operate from the Art Gallery on all bands 3·5 to 144MHz on cw, ssb, rtty and sstv, from 0300 to 1000 daily using the callsign ZL1AA.

A7XA is on the air from Qatar and is to be found between 0900 and 1400 in the 14,220-14,225kHz area. He works from a list (usually taken by HZ1AB or JY3ZH some 5kHz away from his own frequency). Breakers are severely discouraged.

SM2DWH/S2 has been worked on 14MHz ssb recently, usually around 14,230kHz. His operating hours seem to be 1200 to 1600 and he asks for QSLs via the SM bureau. W1JFL has now received logs from A51PN for the whole period 18 August 1972 to 28 December 1973. F2MO, who was quoted as QSL manager by "3V8CM" says that he has never heard of such a station.

There are currently four stations in Portugese Guinea. These are CR3KD who operates on all bands and QSLs via WA3HUP, CR3WB (QSL via CT1BH), CR3CO who QSLs via the address in *QTH Corner*, and CR3AH who operates on 14MHz ssb only and now asks for cards via W4VPD. CR3KD may leave this July or stay until 1975, CR3CO and CR3WB are due to stay another year or 18 months.

VK0DM, Macquarie Is, is to be found on the air for two-week periods separated by one week of inactivity. He will be active from 24 March to 7 April and again from 14 to 28 April.

The CF3 prefix is being used in Brent County, Ontario, to celebrate the 100th anniversary of the invention of the telephone in Brentford, Ontario. The prefix block A8A-A8Z has been allocated to Liberia for amateur use. WY4TBS was a special station on the air from the Hebrew Temple Club, Miami Beach.

W4NJF no longer acts as QSL manager for 9E3USA/9F3USA/ET3USA as that station now has its own QSL address (see *QTH Corner*). FR7AI/G should be on Glorioso Is from the end of May for an indefinite period. ZK1MA has left Manihiki Is and is active as ZK1MA/ZK1 from Rarotonga. It is reported that CE0AE will shortly resume operations from Easter Is.

Those wishing to contact Yemen may like to know that 4W1CW (ex-YN1CW) will be there for two years and sometimes keeps a schedule with G2RO on 14,025kHz at 1500. Please wait until this is completed before calling.

Dxpeditions

WB2EXK and W0YVA are hoping to visit Palmyra Is (KP6) sometime during the forthcoming summer—probably between mid-July and mid-August. They intend to operate on all bands 3·5 to 28MHz, concentrating on the cw mode. Operation may also take place from Kingman Reef, 35 miles NW of Palmyra Is. There is some possibility that this may count as a new "country" in view of the fact that it is administered by the US Navy whereas KP6 is under the care of the US Dept of the Interior. Frequencies will be 3,505, 3,780, 7,005, 14,005, 14,205, 21,005, 21,255, 28,005 and 28,505kHz.

TR8SS will be in Equatorial Guinea during April and has applied for a 3C licence.

A second group of USA amateurs consisting of some of those who visited Tongareva last year (ZK1TA) is planning another Pacific expedition this summer. W6KNC, K6GUY, W6GQU and others are planning an all band, phone and cw

* 10 Knightlow Road, Birmingham B17 8QB

operation from Palmyra Is, Kingman Reef, Jarvis Is (KJ6) and Fanning Is (VR3), most likely in July. Calls to be used may be KP6MD and VR3AC.

QRP in a sunspot minimum year

Before the logs submitted by UK entrants in the recent very successful DLAG/CW QRP Contest were forwarded to Germany they were analysed by G8PG. Results show that, using powers between 3W and 9W, UK entrants contacted 23 different countries and three USA states. The transatlantic work included one QRP-to-QRP contact with 3W at the UK end and five at the other. A breakdown by bands shows three countries worked on 1·8MHz, 14 on 3·5MHz, three on 7MHz, 12 on 14MHz and two on 21MHz. A check on 150 contacts showed the average report received to be S6. The next contest will take place on 6/7 July.

Contests

The Polish DX Contest
1500 6 April to 2400 7 April.
CW only. 3·5 to 28MHz. Single-operator single- or multi-band and multi-operator. Contact as many SP stations as possible and send RST plus serial QSO number (from 001). Polish stations send RST and their *powiat* (ie county) code letters. Each contact counts three points and the multiplier is the number of powiats worked—each counts once only but stations may be contacted on each band for points. Certificates for top scorer in each country, second and third will also receive an award if participation justifies this. Use separate log sheet for each band and enclose separate summary sheet and signed declaration. Post before 1 May to PZK Contest Committee, PO Box 320, Warszawa 1, Poland. Note that contest contacts can be counted towards the PZK 100 Powiat Award in lieu of QSLs provided that they are verified in the logs of the SP stations. Make application at the same time as the contest log is submitted enclosing seven IRCs.

County Hunters SSB Contest
2200 12 April to 0500 15 April.
Fixed stations may only be worked once but mobiles who change counties may be contacted in each; if they are on a county boundary they count for one contact but two multipliers. Exchange RS, county and state (country). One point for QSO with fixed station, with a mobile station five points on 14MHz or higher and 10 if on 7MHz or lower. Final score is QSO points times number of different counties contacted. Logs should show time, call, report, county, state, band and QSO points. They should reach J. L. Willingham, K0ARS, Route 2, Bevier, Mo, 63532, USA, not later than 1 June.

The PACC Contest
1200 27 April to 1800 28 April.
1·8 to 28MHz, cw and phone but not cross mode. Each QSO counts three points, two being counted if only the number from the PA station is received. Exchange RS/T plus serial number (from 001). Netherlands stations indicate their province. Multiplier is number of provinces worked on each band added together (maximum 72). Logs should show date and time, callsign, province, if multiplier, number sent, number received, points. The usual signed declaration should be enclosed and posted before 30 June to Mr L. v. d. Nadort, PA0LOU, Contest manager, Bospolderstraat 15, Nieuwerkerk a/d IJssel, Netherlands.

The World Peace Day station, 9H3WPD, operated from the Pope John XXIII Peace Laboratory, Hal Far, Malta, on 1 January 1974. Shown in the picture is Jeff Griffiths, 9H5D (holding the microphone). The others are students of the Technical Institute ARC

The Helvetia 22 Contest
1500 27 April to 1700 28 April.
1·8 to 28MHz. Stations may be worked once on each band. Exchange RS/T and serial QSO number. Swiss stations indicate their canton. Contacts count three points and the score on each band is multiplied by the number of cantons worked on that band. Mail logs to HB9AAA, USKA Traffic Manager, Box 17, 2500 Bienne 4, Switzerland.

The WAB Contests
Please note that logs for this year's contests should be sent to Roly Senter, G4BFY, 10 Toll Bar Avenue, Bottesford, Notts NG13 0BB, and *not* to the address given in previous issues.

In the Nicolaus Copernicus **SP-DX Contest 1973** UK scores were as follows: **G3ESF** (multi-band) 33,456 points, **G3XWZ** (3·5MHz) 2,088 points, **G3OCA** (7MHz) 2,025 points, **G3NSY** 19,567, G5GH 10,500, G2WQ 3,360 and G4BWP 108 points (all 14MHz). **GW3INW** scored 29,040 points on 14MHz.

Results of the **1973 WAE Contests** have been received. In the cw section **GM3CFS** (90,725 points), **G3ESF** (61,824), G2AJB (5,418) and G8QZ (960 points) took part. Multi-operator entries were **G4BTJ** (173,237) and G4AMT (32,226 points). In the phone section there were no British entrants in the single-band category, but **G3FXB/P** (511,638), G3RVC (230,890), G4BUE (153,824) and **GW3ZIT** (50,204 points) were listed in the multi-operator class. Certificate winners are listed in bold type.

Awards

The H22 Award
For confirmed contacts with all 22 Swiss cantons since April 1948. Endorsements available for all cw, all phone or mixed modes. A list of QSLs showing callsigns, canton, signal reports and mode should be certified by the awards manager of a national society (UK applicants contact G5GH) and

QTH Corner

A7XA	via DJ9ZB (see 4W1CW).
A7XK	via I8KRV, R. Vollero, Via Mario Flore14, 80129 Naples, Italy.
CR3AH	via W4VPD, 8,254 SW 37th Street, Miami, Fla, 33155, USA.
CR3CO	Arthur Ferreira, SPM 2658, Portugal.
ET3USA	Kagnew Station ARC, Box 379, APO, NY, 09843, USA.
FL8CE	via F3IM, Lot Baticoop, Rue Du Lac, 57 Saint-Avoid, France.
HS3AJO	H. Williams, Box 2,288, APO, San Francisco, Cal, 06304, USA.
HZ1AB	via DJ9ZB (see 4W1CW).
KC6VE	via W7PHO, 18,549 Normandy Terrace SW, Seattle, Wash, 98166, USA.
KW6HF	via WA6BBI, 1,134 N Orchard, Burbank, Cal, 91506, USA.
P29FV, P29MC	via K6ZDL, N. V. Kock, Box 1351, Torrance, Cal, 90505, USA.
SM2DWH/S2	via SM Bureau.
TA2QR	via DJ0JO.
TE9RC, TE9VHF	via SM6CVX, Februargatan 9B, S-54300, Tibro, Sweden.
VK0DM	I. McLean, 568 St Kilda Rd, Melbourne, 3004, Vic, Australia.
VP2MHB	via W4WWG, 8,323 Wesleyan Street, Vienna, Va, 22180, USA.
VP8NO	via G. Dover, G4AFJ, 21 Greenwood Av, Nottingham, NG3 7FX.
VR1AR	PO Box 15, Bairiki, Tarawa, Gilbert & Ellis Is.
WY4TBS	WA4WTG, 445 NW 202nd Terrace, Miami, Fla, 33169, USA.
ZD8KO	K. Orchard, Devonshire House, Gold St, Stalbridge, Sturminster Newton, Dorset, DT10 2LN.
4W1CW	via DJ9ZB, Im Mellsig 7, 6000 Frankfurt Main 50, W. Germany.
5Z4OQ	T. Riley, Box 98640, Mombasa, Kenya.
9M8JP, 9M8SDA	via K6TWT, 643 Cedar St, Vallejo, Calif, 94593, USA.

RSGB QSL Bureau, G2MI, Bromley, Kent BR2 7NH.

---

sent to Walter Blattner, HB9ALF, Postbox 450, CH 6601 Locarno, Switzerland. There is no charge but it is suggested that two or three IRCs are enclosed to defray expenses for this most attractive certificate. The H22 Contest (see *Contests*) is an excellent opportunity to contact the rarer cantons where there are no resident amateurs.

The PACC Award

Confirmed contacts are needed with 100 or more PA/PI stations after 1 June 1945. Send confirmed list (by national awards manager) plus seven IRCs to Traffic Bureau VERON, c/o PA0AAC, Postbox 1166, Arnhem, Holland. Contacts in the PACC Contest may be claimed for credit without confirmation provided the log is submitted. Application should be made at this time if contest QSOs make up the 100 required and details of QSLs already held plus five IRCs sent with the logs.

A reminder that details of most of the world's major awards will be found in the Society's publication *Amateur Radio Awards*, available from HQ price £1.40 including postage.

Odds and ends

G4CIA reports that his callsign is being used by an unauthorized person on 3·5MHz ssb. He has no ssb equipment and is only active with cw and a.m. on the hf bands.

The callsign of G4CAR, the Chad RC of Lichfield, is also being used on 3·5MHz although the club's equipment has never been operated on that band.

GB3MKB will be active again over the Easter week-end, 13-15 April, from Ballycastle, and contacts/reports during this period will count towards the GI6YM Golden Jubilee and Marconi Kemp Anniversary Award in place of the July 1973 activity period. For details see page 414 June 1973 *Radio Communication* (but also note extension of closing date announced in March *MOTA*).

G4BWP has received a QSL from JA2IU for an alleged contact on 8 May 1973 on 14MHz cw. He would be pleased to hear from the card's real owner.

Band reports

West Coast DX Bulletin bears the good news that the Kitt Peak Observatory near Tucson has noted indications that the new sunspot cycle is on its way. There have been some spots in the high latitudes of the sun with opposite polarity to those of the present cycle, and also other indications of the sun's reversing magnetic fields. The new cycle is forecast to reach maximum in 1980. However, G6GH calls attention to *MOTA* of March 1952 which he says contains remarks which could well describe the present situation—"The month of February 1952 will long be remembered for some of the worst dx conditions experienced in recent years . . ."

Very many thanks to the following for information used in compiling the logs below: G2CDT, G2HKU, G3HB, G4RZ, G5JL, G6GH, G3GVV, GW4BLE, BRSs 17567, 17991, 25429, and 34507, ORS 31026, As 7056, 7511, 7785, 8313, 8538, 8564, and the listener in Shepshed who omitted his name!

Stations listed in italics were using cw, the rest ssb.

1·8MHz. 0600 *VX1KE, VX2AB, Ws 1HGT, 2LWI, 4BRB, 5RTQ.* **0700** *K5JVF, WA8IJI, K9YWO, YV4AGP.* **2300** *VO1KE.*

3·5MHz. 0000 AP2AD, MP4BEU, PJ2CW, TR8DG, 8P6AQ. **0100** CR3WB, W0AAW/VP2M. **0400** MP4BIN, *K6KOL.* **0600** *LU5HFI, VP7BA, YV1AD, ZLs.* **0700** KS6DH, W7CVD (Nevada), ZK1AA, ZK1CW, ZL1–ZL4, 5W1AU. **0800** XE1KB. **0900** ZL4KF. **1600** ZL4KF, 9M2CX. **1700** ZL4LM, 9K2DC. **1800** JY3ZH, ZLs, 5X5NK, 9M2CJ. **1900** EP2VJ, HZ1AB, VU2ABV. **2000** EA9EX, 5T5DY. **2100** PJ8HS, ZS5LB, 9G1DY. **2200** CT3AB, CR3WB, EL7H, FP8DH, M1FOC, OX3BH, W1–W4, ZB2CF, 4U1ITU. **2300** AP2KS, M1C, OJ0AM, MP4BJS, ST2SA, ZF1AK, 4W1AF, 9L1JT, 9M2DW.

7MHz. 0100 TR8DG. **0400** ZS6DW. **0500** 6W8DY. **0700** CE3ED, ZLs. **0800** KV4CI, VKs, 8R1AG. **0900** ZL4BO. **1700** 4W1AF. **2100** EL7D, *KV4CI, VQ9M.* **2200** CX, JA2EZD, JA4GUF, PY, TU2DF/EN, *VS6GO*, 9L1JP. **2300** *HK0BKX*, TR8s DG, VE.

14MHz. 0700 A51PN. **0800** HZ1AB, *YK1KAS*, ZL4KF/M, *9L1JM.* **0900** HL9VM, *JT1KAA*, KL7HMV, VKs, ZLs. **1000** A7XA, *KX6LA*, PZ0AA, VE4, VE8. **1200** AP2CQ, 8Q6AC. **1300** CE3FI. **1400** DU8CM, *UA0YD* (Zone 23), VK9XI, VS5LH, XV5AC, XW8s, YB0ABN, *5B4ES.* **1500** A6XB, XU1AA, VS9MB, 9M2s. **1600** *HV3SJ*, W7s, 3B6CF, 4W1GM. **1700** *JD1YAA*, KH6BB, *KH6IGA, TN8PB*, VQ9s BP, DC, R, 3D6AB. **1800** FY7AF, *KH6AIO.* **1900** CP1FG/6, TJ1AF, VE6s, 3B8AX. **2000** VP8FL, 5T5KG, 5U7AZ. **2100** VP8KL, VP8NO (Argentine Is). **2200** CX, TI, TU, 5V7GE. **2300** CX, TU, VE4.

21MHz. 0900 JAs, *KL7BJM*, VS6BE, *ZS2MI*, 5N2ESH. **1000** AP2KS, TR8SS, ZD7FT, ZSs. **1100** *FL8CE*, VK6s, VU2DK, 5R8CU (QSL to F8US). **1200** KV4AD, YB3DC. **1300** ZP9AK. **1400** HC2JN, HZ, YN, *ZD9GD*, 9X5JC. **1500** *XQ3ED* (Chile), 3B8DG. **1700** TI6CNH, VP8HZ. **1800** YS3FH, ZD8RW. **1900** LU, TR8SS.

28MHz. 1000 CR6AG, 4Z4LM. **1100** OD5BA. **1200** CR7FM, SV1BV, 9J2DT.

Many thanks to all correspondents, and especially to the authors of the following for items obtained from their publications: **DX News Sheet** (*Geoff Watts*), the **29 DX Club Newsletter** (*George Allen*), **World Radio News**, the **DX'ers Magazine** (*W4BPD*), **Long Skip** (*Nick Sawchuk*), the **West**

Coast DX Bulletin (*WA6AUD*), **DX'press** (*PA0INA/PA0TO*), and the **Ex-G Radio Club Bulletin** (*W3HQO*).

Please send all items for the **May** issue to reach G3FKM no later than **8 April**, and for **June** issue by **6 May**.

Propagation Predictions

The change from winter to summer conditions which occurs during April will lead to a worsening of already poor conditions on **21 MHz. 28MHz** will be of no possible use for dx. Only on favourable days (days with above average F2 MUFs) will there be chances of traffic with Africa (1200-1800gmt) and South America (1500-1900gmt). Only Africa and South America will be heard with certainty on **21 MHz.** During May short-skip conditions will liven up both **28** and **21 MHz** over distances of about 800-1,800km.

In contrast to 21MHz, **14MHz** will improve still further as the season advances. Shorter nights mean that the band will remain open longer than in previous months. On days without static the band will remain open until midnight, occasionally even longer, specially during the latter half of the month. The possibility of traffic via the indirect path on 14MHz will be rare during April. On days with well above average F2 MUFs there will be chances of contact with Hawaii between 1600-2130gmt.

Conditions for dx on **7MHz** will also worsen and as the season advances traffic will often be interrupted by static. Basically, conditions will be best for dx when the longest part of the path lies in darkness. Traffic with South America and South Africa will be better than during the winter months. Traffic with North America may be interrupted occasionally in the second half of the night because frequencies are too low. Local traffic will be affected by the dead zone. During May sporadic short-skip conditions will improve matters somewhat.

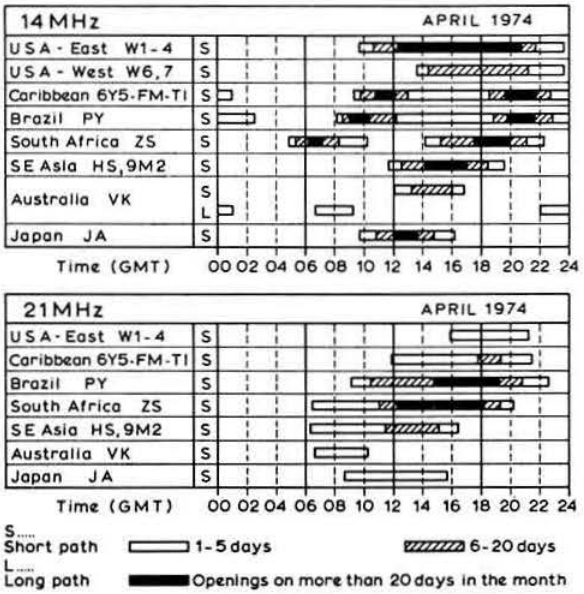
On 3·5MHz dx traffic will be possible if the whole of the path lies in darkness: this is even more important on this band than on 7MHz. The advancing summer and static will shorten the distances covered. Local traffic will seldom be interrupted by the dead zone.

The provisional sunspot number for February 1974 was 27·7, with the greatest amount of solar activity occurring during the second half of the month.

The definitive sunspot numbers for 1973 provided by the Swiss Federal Observatory are: Jan, 43·4; Feb, 42·9; March, 46·0; April, 57·7; May, 42·4; June, 39·5; July, 23·1; August, 25·6; Sept, 59·3; Oct, 30·7; Nov, 23·9; Dec, 23·3.

The yearly mean number for 1973 was 38·0.

The predicted smoothed sunspot numbers for June, July and August are 19, 18 and 17 respectively.



RAYNET

by S. W. LAW, G3PAZ*

Our comments in February on the subject of mobile operation during floods elicited some interesting letters, in particular a most informative set of notes from G4QK who rightly laments the lack of electrically-driven fans on the mass-produced cars of today and the superiority of the older thermo-syphon cooling system in flood conditions. Lack of space prevents us from enlarging on this subject but we thank those who sent comments, and G4QK in particular for his succinct data. Members with flood problems could learn much from this source.

Change of controllers

It is inevitable that members' private commitments result in changes of address and consequent severance from group activity, but it is heartening to note that there is generally another who comes along to take up the reins. In south Cumbria Roy Smalley has handed over control to R. M. Crossley, G8GPR, whose appointment will be confirmed by the time this is read. In Rugby, Alan Campden has left the district and has perforce had to hand back the re-organization of the seven-strong group to Bob Craxton, G3IKL. We have mentioned before that this group would welcome an increase in membership and we trust that applications in this area will soon be forthcoming. More news on these points next month.

The distaff side

Apart from the yls who are active in the radio sphere in a number of groups we wonder if the "backstage" activities of the ladies are sufficiently appreciated among the Raynet groups? We know of cases where "honorary membership" has been granted to lady associates of groups who have performed uncomplainingly for years such tasks as the provision of the all-important refreshment of participants in incidents and even exercises and meetings; we think this a nice gesture and well deserved. Many groups also hold the occasional little social function as a thanks offering for the background work put in by the members' families. Give the matter some thought—but do keep an ear open for a possible call-out!

Other modes?

It is of interest to note the appearance in the "pipeline" of a number of fm transceivers and the consequent acquisition of these for Raynet use. We can see nothing whatever against this nor the use of ssb within the framework of individual group activity, but we would remind members that the occasion may arise when it might become necessary to communicate or liaise with other groups in an adjacent area who may not be so equipped. So please keep one channel available for this purpose even if you find that the "new" mode serves your purpose better than a.m. for your local conditions.

While on the subject, what is the place of rtty in the framework of Raynet? We have seen some very fine layouts in the shape of mobile base stations, if that be the correct term to use. These, of course, are trailers or caravan type vehicles in the main, although we believe complete vans are in existence. In the past there have been fairly successful attempts at tv links from incident to base but not much has been heard on the subject of late. Comments would be welcome, however controversial.

Essex Raynet Group

The AGM of the Essex Raynet Group will be held on Thursday 18 April at Police Headquarters, Springfield, Chelmsford, commencing at 8pm. Members and all other interested persons will be welcome.

Hon Registrations Secretary; Mrs L. A. Crane, "Greta Woods", Bromley Road, Ardleigh, Colchester, Essex.

* 130 Alexandra Road, Croydon, Surrey CR0 6EW

MARCONI CENTENARY

ONE hundred years ago, on 25 April 1874, Guglielmo Marconi was born in Bologna, the younger son of a wealthy Italian landowner, Guiseppe Marconi, and his Irish wife, Annie, the daughter of Andrew Jameson.

To Guglielmo Marconi must go the credit for seeing the wider possibilities of wireless, of taking it out of the laboratory where pure science had shackled it, and developing practical systems for the benefit of mankind. In 1909 Marconi shared a Nobel Prize for Physics in recognition of his contribution to wireless telegraphy, and his work laid the foundations of the electronics industry as we know it today.

From an early age he was interested in science and by his late teens, at his home the Villa Grifone, the "ardent amateur of electricity", as he called himself, was experimenting with electro-magnetic waves as a communication medium. By the summer of 1895 he had succeeded in transmitting signals over a few yards of space and in August, using an earth and an elevated aerial at both transmitter and receiver, he was able to pass morse code over 1¾ miles.

In 1896 he came to England where he filed the world's first patent for a system of telegraphy using Hertzian waves, and a series of demonstrations culminated in 1897 in a record transmission across 8·7 miles of the Bristol Channel.

By the end of the century, wireless had been adopted by the British and the Italian Navies, it had spanned the English Channel, and it had proved its worth to the Merchant Navy as a life saver—one of Marconi's ambitions had been to use wireless as a means of ending the isolation of those at sea.

1901 was a vintage year for Marconi. Having achieved communication over 198 miles between the Isle of Wight and the Lizard, he embarked on his famous transatlantic experiment. After many vicissitudes he succeeded in receiving, through an earpiece, signals at St John's, Newfoundland, transmitted from Poldhu, Cornwall. Even at the moment of this, his greatest triumph, some said that he mistook atmospherics for the morse code "S". To those doubters it has been pointed out that for long-distance communication to have evolved from the system that pushed three faint dots across 2.000 miles is a marvel; had there been no dots, its evolution has been a miracle. Two months later, signals from Poldhu were recorded on ss *Philadelphia*—2,099 miles away—thus dispelling any doubt about his original claim.

The decade that preceded the first world war also saw the first use of wireless in the air, transmission initially being achieved from a captive balloon and then, in 1910, from an aeroplane flown by J. D. A. McCurdy.

In 1919 Marconi bought his yacht *Elettra*, which he equipped as a laboratory; a Marconi engineer made the first east to west transatlantic telephony transmission; the embryo of broadcasting took shape in Chelmsford, and in 1920, at Marconi's Works, Nellie Melba gave a song recital for Britain's first advertised public broadcast.

In the early 'thirties Marconi, who was in ill-health, was increasingly drawn to his home in Italy, from which he conducted microwave experiments, installing the first microwave telephone link in 1932, and in 1935 demonstrating principles of radar. However, his health was deteriorating rapidly and he died on 20 July 1937.

Of all the tributes that followed, the most impressive, the gesture that was unique, was the closing down for two minutes of wireless stations throughout the world. The "ether" was as quiet as it had been before Marconi.

"The Marconi Heritage"

On Thursday 25 April 1974 a one-day colloquium "The Marconi Heritage" will be held at the Institution of Electrical Engineers, Savoy Place, London WC2, to mark the Marconi Centenary.

Following an introduction by Sir Eric Eastwood, CBE, FRS, the morning will be devoted to the history of Marconi's life. Professor W. P. Jolly, a recent biographer of Marconi, will deliver a lecture "The making of the man", in which he will describe the circumstances of Marconi's early life that might be considered to have shaped his personality, and those events that led him towards his great achievements. The latter years of his life will be covered by Mr G. A. Isted, who was Marconi's personal assistant for a number of years in the 'twenties and early 'thirties, in a contribution "A turning point in radio communications".

The three lectures to be delivered after lunch, "Radio in global telecommunication" by Mr R. G. Halsey; "Maritime radio communications" by Mr G. J. McDonald; and "Scientists' reactions to Marconi's transatlantic radio experiment" by Mr J. A. Ratcliffe, will concentrate on modern technology and the developments in communications and navigational aids that have grown out of the original work of Marconi.

The colloquium is being organized jointly by the IEE and the IERE in association with the RSGB and will begin at 1030am. As usual, free registration and a copy of the colloquium digest are available to members of the IEE, IERE, and IMA, and on this occasion will be extended to members of the RSGB provided they have applied to the IEE on the appropriate forms. Further details and application forms are available from the Secretary, IEE, Savoy Place, London WC2R OBL, quoting reference LS(MA).

Also on 25 April the Marchesa Marconi, the widow of Marconi, will open an exhibition commemorating the centenary, which is to run for six months, at the Science Museum, London.

Stations GB2MT and II4FGM

From 25 to 28 April station GB2MT will operate from the house at 71 Hereford Road, Bayswater, London, where Marconi lived in 1896-7. The schedule is 1000-1300 and 1530-2200gmt, 80m (nominally 3,745kHz); 1300-1330gmt, 15m (nominally 21,310kHz); and 1330-1530gmt, 20m (nominally 14,195kHz), using the ssb mode.

II4FGM, at present active on Saturdays 1300-1600gmt between 14,180 and 14,240MHz, will also work all bands round the clock on 25 April.

For philatelists

The Marconi Philatelic Society is celebrating the event by the issue of a special cover with a one-day hand-stamp cancellation on 25 April. The souvenir cover, serviced with a 3½p stamp and bearing the special cachet "Posted at Marconi's Chelmsford Works" is available at 16p (or 20p under separate cover) and can be ordered from C. Rauch, 353 Baddow Road, Chelmsford, Essex CM2 7QF.

COUNCIL PROCEEDINGS

A brief report of the Council meeting held on 3 January 1974

Present: *Mr G. R. Jessop (President, in the Chair), Dr E. J. Allaway Messrs R. J. Baker, P. Balestrini, J. O. Brown, D. Byrne, R. W. Fisher, W. J. Green, W. F. McGonigle, L. E. Newham, C. H. Parsons, Dr J. A. Saxton, Messrs W. A. Scarr, R. F. Stevens, G. M. C. Stone, F. C. Ward, (members of Council); and D. A. Findlay (general manager).*

Apologies for absence had been received from Messrs J. R. Petty, A. W. Smith, and A. W. Hutchinson (editor).

New members

The President welcomed the members to the first meeting of 1974 and introduced the new members: Messrs R. J. Baker, G3USB; P. Balestrini, G3BPT; and D. Byrne, G3KPO. The president also congratulated Mr W. F. McGonigle, GI3GXP, on his re-election as member for Zone F, and Messrs R. W. Fisher, G3PWJ, (Zone B); C. H. Parsons, GW8NP, (Zone E); and A. W. Smith, GM3AEL, (Zone G), (who were unopposed in the election for 1974); and Mr R. F. Stevens, G2BVN, on his re-election.

Election of Executive Vice-President

In accordance with the Articles of Association, Council members were required to appoint one of their number to be Executive Vice-President for 1974, and Mr Stone proposed and Mr Newham seconded that Mr C. H. Parsons, GW8NP, be appointed Executive Vice-President for 1974.

The motion was carried unanimously.

Finance report

The Honorary Treasurer stated that it was too early to report on the financial results for the six months to 31 December 1973. The cash flow seemed satisfactory and it had been possible to place money temporarily on deposit with our bankers.

The outcome of the correspondence with the Department of Trade and Industry as to the Society being granted charitable status had not been successful, although the matter was still under active consideration. Mr Brown pointed out that under proposed legislation, a company would be allowed to alter its Memorandum of Association and it might be that the Society would be able to take advantage of these provisions in due course.

1973 President's Committee

The President explained that it had been decided last year that a further meeting of the (1973) President's ad hoc Committee should be held. In view of the Council wish that Dr Saxton should continue to be associated with the committee, the President felt that it should now be known as the 1973 President's Committee. Dr Saxton said that he would be pleased to continue the work of the committee and a further meeting would be called in the near future.

Membership

It was resolved:

(i) To approve the applications for membership, transfers and reinstatements for December and accordingly elect 83 members.
(ii) to accept reduced subscriptions from five members.
(iii) to waive the subscriptions of four members:

Dates for Council meetings

The following dates were agreed for 1974:

Monday 4 March, 3pm	Monday 16 September, 3pm
Monday 6 May, 3pm	Monday 21 October, 3pm
Monday 8 July, 3pm	Thursday 5 December, 6pm*

The Annual General Meeting would be held on Friday 6 December.

Reserve dates when Council meetings may be called if necessary: Monday 11 February, Monday 8 April; and Monday 3 June.

**(At its meeting on 4 March Council changed the date of this meeting to Monday 18 November at 6pm).*

Society news

Mr McGonigle, chairman of the Membership and Representation Committee, explained that the committee had considered ways of conveying more information on Society activities to the membership. It had been agreed that an informative short article should appear regularly in *Radio Communication*, as in most regions the only contact members had with the Society was through the journal.

Committees of Council

It was agreed to invite various members to serve on committees during 1974. *(Names of members accepting these invitations were published in the March issue of* "Radio Communication").

Diamond Jubilee Committee—Council formally disbanded this committee and thanked its members for serving during 1973.

Education Committee—It was suggested that as most of the members of this committee were resident in the Midlands, meetings should be held in the Midlands rather than in London.

Mobile and Exhibition Committee—The work of this committee was discussed at length. It was agreed that requests for the provision of bookstalls at rallies during 1973 had placed too much strain on the committee members, as had the Woburn Abbey Rally and the RSGB stand at the ARRA Exhibition at Leicester.

It was agreed that both the Regional Representatives and Zonal Managers should be asked to advise the committee of local members who would be prepared to organize and man bookstalls at local rallies.

Mr Balestrini would discuss the activities of the committee with the chairman and members, particularly with a view to ensuring that the work was more in an advisory capacity.

Honorary officers

Council agreed to invite the following honorary officers to continue with their services to the Society:

Awards Manager (HF)	C. R. Emary, G5GH
Awards Manager (VHF)	Jack Hum, G5UM
Intruder Watch Organizer	C. J. Thomas, G3PSM
QSL Bureau Manager	A. O. Milne, G2MI
Recorded Lecture Library Curator	G. Milne, G3UMI
Slow Morse Practice Transmissions Organizer	M. A. C. MacBrayne, G3KGU
Society Historian	L. E. Newham, G6NZ
VHF Manager	G. M. C. Stone, G3FZL

Representation on outside committees

Council agreed to invite the following members to continue to represent the Society on the committees named:

City and Guilds Radio Amateurs' Examination Advisory Committee: Messrs W. A. Scarr, G2WS; R. J. Hughes, G3GVV, (chairman); and L. E. Newham, G6NZ.

CCIR Study Groups 5 and 6:	R. G. Flavell, G3LTP
CCIR UK General Purposes Committee:	R. F. Stevens, G2BVN
BSI Tele 1/5 Terminology:	R. S. Roberts, G6NR
BSI Tele 1/30 Terminology:	R. S. Roberts, G6NR
BSI Tele 25/1 Receivers:	R. F. Stevens, G2BVN
BSI Tele 25/3 Transmitters:	D. A. S. Drybrough, G8HEV
BSI Tele 25/4 Aerials:	R. S. Roberts, G6NR
BSI Tele 25/6 Mobile Services:	D. A. S. Drybrough, G8HEV
BSI Tele 25/6 Domestic hi-fi equipment:	R. S. Roberts, G6NR
Frequency Advisory Committee:	D. A. Findlay, G3BZG

Use of electricity

In view of the restrictions on the use of electricity, Council decided that the following action should be taken.

(a) Beacons under control of the Society should be switched off until restrictions are lifted.
(b) GB2RS News Service bulletins would be abbreviated as much as possible.
(c) Repeater GB3PI would be switched off each day from 6pm until 9am on the following day.

Repeaters

Mr Stevens, chairman of the MPT Liaison Committee, explained that the MPT had expressed some concern at the proliferation of proposals for repeaters both from the Society and from outside sources.

A letter had been received from the MPT, dated 4 December 1973, suggesting that there was no justification for further licences. The

Society had replied that it was its considered view that repeaters correctly controlled and used were a feature of the amateur service that should be retained. This view had been accepted by the MPT.

Committee minutes and recommendations
Council received the minutes of the following committee meetings: Interference (26/10/73); HF Contests (1/11/73); MPT Liaison (22/11/73); VHF Contests (26/11/73); Membership and Representation (6/12/73); VHF (12/12/73); Technical and Publications (18/12/73).

Interference Committee—Council accepted the recommendation that the sum of £500 be set aside to cover possible legal expenses incurred in defending an amateur on an interference matter which is of vital importance to the amateur movement generally.

MPT Liaison Committee—24GHz band: the chairman reported that he understood that agreement had been reached on precautions against radiation hazards, but so far no official notification had been received by the Society.

Membership and Representation Committee—It was confirmed that the meeting on 20 March 1974 would be held at Bristol.

OBITUARIES

The Society records with regret the deaths of the following:

Mr A. E. Barnes, G2BYI
Ted Barnes died on 14 February at the age of 65. Interested in amateur radio from his youth, he was well known on 80m and the dx bands, often on the key or working ssb. Although not a mobile operator, he was frequently seen at rallies in the east Midlands.

Mr H. J. Crane, G2AVC
Harold Crane died on 8 February shortly before he was due to retire from London Transport. Previously he had served for 15 years in the RAF and it was during his pre-war service that he became interested in amateur radio. In addition to being a well-known cw dx operator, he was a prominent member of the Surrey Raynet Group.

W. J. P. Hayes, G3CJQ, PA9GF, ON8GC, FOIU
Bill Hayes, who died in the Turkish DC10 air disaster on 3 March, was well known throughout Europe as Senior Sales Representative for BBC TV Enterprises. He was probably better known by his European callsigns and /M than by his G call; his many duty tours leaving him all too little time for home operation.

He was a founder member of the BBC Ariel Radio Group and had been its president for the past three years. He also played an active part in the setting up of GB3BPH at Baden Powell House.

Mr R. Morris, VK2ATM, ex-GW3HJR
Roy Morris, who emigrated to Australia some three years ago, died at Lakemba, New South Wales, on 11 February. By profession a development engineer, he had until recent years built his own equipment to professional standards. His main interest was dx and contest operating and he was extremely popular in South Wales amateur circles.

Prof E. Williams, DEng, PhD, FIEE, FIERE
Emrys Williams, Professor of Electrical Engineering at the University College of Wales, Cardiff, since 1954, died on 13 February. Prior to 1954 he was Professor of Electrical Engineering at the University College of North Wales, Bangor, and while there wrote a text book *Thermionic Valve Circuits* which was a widely-accepted standard for many years. He was a Past-President of the Institution of Electronic & Radio Engineers.

Always interested in the affairs of RSGB Region 10, Professor Williams' regional lecture on "The Philosophy of Oscillators" is still remembered in the area. The Society was represented at the memorial service at University College, Cardiff, by its Executive Vice-President, GW8NP.

Mr J. Wright, G3EHX
Jim Wright, who died on 18 January, was for many years headmaster of Lower Peover School, Knutsford. Through him many of his students, colleagues and friends received an insight into the spirit of amateur radio.

We have also been advised of the deaths of:

Mr. H. E. Le Dain, GC4LI, of St Clement, Jersey, CI, on 24 January;
Mr W. Gearing-Sherralt, G5TZ, of Newport, IoW;
Mr R. A. Hosie, G8RI, licensed since 1934;
Mr B. Inskip, G3GXM, of Blyth, Northumberland, on 21 November 1973;
Mr J. R. Wordsworth, G3JGJ, of Paignton, Devon, on 8 February.

YOUR OPINION

The Editor
Radio Communication
Sir—I read with great interest Mr A. P. A. Ashton's article "160m dx from suburban sites" in your December 1973 issue.

I would like to confirm that during the June 1972 Trans-equatorial Tests, G3XAP was heard by myself on two occasions at RST 459 and although not, as he puts it, "competing with the big boys", it was certainly a readable signal.

A further point is that at the time I was QRV using a base loaded 16ft whip mounted 45ft above ground and over 1,000 feet of assorted radials (maximum length 100ft). Using this arrangement with 10W input, the first VK/ZS QSO took place and many Europeans heard plus all continents.

I request that stations monitor 1,932kHz 2100-2300gmt on Fridays and Saturdays since I frequently call CQ and listen 1,800-1,810 plus 1,825-30. DHJ is audible most evenings but our current summer season QRN dictates the operational evenings.

John Dunnington, ZS6ZE/G3LZQ

The Editor
Radio Communication
Sir—May I congratulate the G8AZU and G8CKT expeditions on their momentous achievement of raising the 3cm record to 212km. Many amateurs would be astounded by the years of preparation and experimentation that was spent beforehand.

This coupled with the increase in QRP working shown up during the lift of 20-21 January has shown that vhf/uhf operating has not become a yardstick of the size of cheque book.

T. P. Ellis, G8HIO

The Editor
Radio Communication
Sir—Like G4BHY (*Radio Communication* February 1974) I am uninterested in contests. There do, however, appear to be many amateurs who are not—and this, I suppose, I have to accept. On listening to those five-second contest QSOs, I too am struck by the utter pointlessness of it all (although even such contest QSOs are infinitely preferable to the considerably longer, but equally pointless, exchanges often heard *outside* contests).

My usual reaction on discovering a contest in full swing is either to change band/mode or, should this fail to bring relief, to switch off the rig entirely. Be that as it may (which it very often is), contests do frequently attain plague proportions. I should thus like to second G4BHY's suggestion that a portion of each band be excluded from contest use—preferably the larger portion, on the lines of the No Smoking allocation on the London Underground.

M. C. Phillips, G3RFX/DJ0EQ

The Editor
Radio Communication
Sir—On reading the letters to the editor in *Radio Communication* I think that many views expressed about the amateur radio hobby are grossly out of perspective, assuming of course that the correspondence represents the opinions of a cross-section of amateur radio enthusiasts. Ideas such as giving amateur radio a "professional, responsible reputation" by restructuring the RSGB along the lines of a professional institution, as suggested by P. G. Woods, are totally out of place. In any case they would not be acceptable to the CEI, and would probably degenerate into a superfluity used only by radio enthusiasts and on a par with dancing qualifications and the

tiddly-winks league. We already have two professional institutions orientated to the needs of chartered electrical engineers and it can be argued that this is one too many. In itself, the very proportion of amateur radio enthusiasts belonging to the IEE and IERE discounts the need for another academic institution.

Why not, instead, recognize what services are required of the RSGB and make these the Society's objectives. For those who have competitive spirit and prefer the Society to arrange contests so that they may indulge in 500 thirty-second exchanges in 24 hours, let it be. For those who want an RSGB certificate for talking continuously for one hour without letting the other party have a say, let it be. Meanwhile allow the Society to get on with the serious business of protecting the interests of our hobby.

Membership of the RSGB is entirely voluntary, and if most members do not attend meetings but continue to pay ever increasing subscriptions they must be reasonably satisfied with the services offered and the way in which the Society is run.

Dennis Willets, G3XXT

The Editor
Radio Communication

Sir—Reference H. Kleeman's letter in the February issue and his criticisms concerning contest operating, I can but quote and fully endorse the words of Don Miller, W9WNV, in the CQ Magazine publication *DX Handbook*:

"There is much to be said in favour of these events to justify their use of time and frequencies and the pandemonium they create. They not only provide the most practical means of developing and improving one's operating skills, but they also present an excellent test for performance and durability of one's station equipment. Besides providing enjoyable competition, dx contests encourage simultaneous activity from most countries of the world, enhancing goodwill and providing an excellent basis for propagation studies. In addition, most dx competition encourages use of all available hf bands, promoting more complete use of the amateur spectrum. Finally, at a time when the development of single sideband has tended to shift more activity to the phone bands, the cw contests help greatly in preserving and promoting the essential art of cw among amateurs."

To this I would add that contest participation from UK amateurs is minimal, with only some dozen or so calls heard consistently during the major contests. To say that "weekend-after-weekend the air is plagued with contestants" is just not on, admittedly on most weekends there is some sort of contest or other, but with only limited support; the major contest activity being during the CQ, ARRL, WAE variety which, when all is said and done, only amounts to some dozen or so weekends out of the 52 in the year.

To exclude contest operation from certain parts of the bands may be valid under certain circumstances and is recommended by some (such as the recent Sheffield and CHC contests), but things are certainly not as bad (or good ?) as G4BHY would have us believe.

By all means do your own "thing" but do not decry contests as pointless.

Stephen Cole, GW4BLE

Mobile Rallies Calendar

21 April—North Midlands MR, 1130am to 5pm, Drayton Manor Park, on A4091, near Tamworth, Staffs. AA signposted one mile from A5 linking M1 and M6. Fifteen miles from M5, 12 miles from M6. Zoo, amusements, full catering. Details from A. Walton, G3ZKQ, QTHR; tel 021-427 3088.

5 May—Spalding Tulip-time Rally, Surfleet, 4 miles N of Spalding on A16. Organized by Spalding & D ARS; details from R. Harrison, G3VPR, QTHR. Talk-in stations from 10am; G3VPR/P on 1,980kHz; G8HZF/P on 145MHz. G3XBS/P on 70·36MHz.

5 May—Stokes Bay, in connection with Charity Open Beach Festival organized by Gosport & D Angling Club. Talk-in stations G3NGT, G3JLT, G8DUB, G8BUJ, G4CJO on 160 and 2m and possibly 80m. Details from G3NGT, QTHR.

12 May—South Leicestershire MR, 11am, Westfield Activity Centre, Westfield Road, Hinkley, Leics. Organized by Hinkley ARC; details from G4CAJ, QTHR.

19 May—Northern MR, Victoria Park Hall, Keighley. Organized by Otley RS; details from G8BZY, QTHR.

26 May—Hull MR, East Riding College of Agriculture, Bishop Burton, near Beverley on A1079. Organized by Hull & DARS; details from G3AGX, QTHR.

9 June—Elveston Castle MR, Elveston Castle, Nr Derby.

23 June—Goole Humberside MR, Goole High School. Organized by Goole & D ARS. Talk-in 2m, 160m.

30 June—Upton MR, Organized by Worcester & D ARC; details from G8ASO, QTHR.

8 July—South Shields MR, Redwell School, Prince Edward Road, South Shields. Organized by SS & D ARC; details from G3SFL, QTHR.

14 July—Anglian MR, Stanway School, Colchester. Organized by Colchester Radio Amateurs; details from E. T. Jacobs, 26 Pondfield Road, Colchester, Essex.

21 July—Cornish Radio Amateur Club MR.

21 July—Wessex MR, Breamore House, near Fordingbridge, Hants. Organized by Wessex ARG; details from G3YWG, QTHR. Talk-in on 160, 4 and 2m.

21 July—Southdown MR (Polegate Steam Engine Rally. Details from G4BCO, QTHR.

11 August—Torbay MR, Newton Abbott Rugby Club ground. Organized by Torbay ARS; details from L. H. Webber, G3GDW, QTHR.

11 August—Derby MR.

18 August—Saltash MR, Saltash School, Wearde, Saltash. Organized by Saltash & D ARC; details from G3XWA, QTHR

NOTE: The ARMS rally which was scheduled to take place at RAF Cosford on 19 May has been cancelled.

Contests calendar

7 April	—80m Low Power
20-21 April	—Bermuda Contest (phone)
21 April	—70MHz Open (Rules in March issue)
27-28 April	—National Amateur Television (Rules in February issue)
27-28 April	—Florida QSO Party
28 April	—Chelmsford DF Qualifying (Rules in April issue)
4-5 May	—144MHz Open & SWL (Rules in April issue)
4-5 May	—Bermuda Contest (CW)
12 May	—Mid-Severn Valley Teleprinter (Rules in February issue)
19 May	—South Manchester DF Qualifying
25 May	—1,296MHz Open (Rules in April issue)
26 May	—432MHz Open (Rules in April issue)
8-9 June	—NFD (Rules in February issue)
9 June	—70MHz Portable
15-16 June	—Microwave Field Day (Rules in February issue)
15-16 June	—All Asian DX (phone)
16 June	—Slade DF Qualifying
22-23 June	—Summer 1·8MHz
25 June	—Start of 432MHz Summer Cumulative
30 June	—Derby DF Qualifying
6-7 July	—"Jubilee" VHF/UHF & SWL
13-14 July	—SSB Field Day (Rules in March issue)
21 July	—432MHz Open
21 July	—Stratford-on-Avon DF Qualifying
28 July	—70MHz Open
4 August	—Oxford DF Qualifying
18 August	—144MHz QRP
24-25 August	—All Asian DX (CW)
1 September	—Dartford Heath DF Qualifying
7-8 September	—VHF NFD & SWL (Rules in March issue)
15 September	—80m Field Day
22 September	—DF Final—Coventry and Rugby
5-6 October	—UHF NFD & SWL (Rules in April issue)
5-6 October	—VK/ZL/Oceania (phone)
12-13 October	—VK/ZL/Oceania (CW)
October	—Start of 70MHz Cumulative
October	—Start of 432MHz Cumulative
19-20 October	—7MHz CW
2-3 November	—7MHz Phone
2-3 November	—144MHz CW
9-10 November	—Second 1·8MHz
8 December	—144MHz Fixed

CONTEST NEWS

RSGB October UHF/SHF Contest rules

The RSGB October UHF/SHF Contest is open to both fixed and portable stations, and takes place at the same time as the IARU Region 1 contest. Since the rules are compatible, all entries for the RSGB event will be passed on to Region 1 for inclusion in the international listings.

The following General Rules, published in the January 1974 issue of *Radio Communication*, will apply unless superseded below.

1. **Date** 5/6 October. **Times** 1600–1600gmt.
2. All entries and checklogs to: VHF Contests Committee, c/o G2HIF, 20 Harcourt Rd, Wantage OX12 7DQ.
   After adjudication, all logs will be passed on to IARU Region 1 as entries for the International UHF/SHF Contest.
3. Unchanged.
4. Operation will be on any amateur band above 432MHz, using up to four callsigns. A station may not use more than one callsign per band. There will be two sections: Section F—fixed stations, Section P—portable and temporary stations.

5a. Scoring will be at one point/km.

5b. Separate logs and cover sheets must be made out for each band. Claimed scores should be multiplied by the following factors: 432MHz × 5; 1,296MHz × 25; 2·4GHz × 50; higher microwave bands × 100.

5c. After multiplication, the scores should be tabulated, *together with the callsign and name of group if applicable*, on a VHF/UHF Multiband Contest Summary Sheet (obtainable from any contest adjudicator on receipt of an sae).

6a, 7a. Unchanged

8. In each section awards will be made to the overall winner and to the band leaders.

9a. Unchanged (ie any mode), except that F2 may not be used on 432MHz.

10a, 11-26. Unchanged.

RSGB October UHF/SHF Listeners' Contest rules

Listeners' Contest General Rules 1–6, as published in the January 1974 issue of *Radio Communication*, will apply, and all entries will be forwarded to IARU Region 1. Any entry for this contest stands a good chance of being rewarded by an IARU Region 1 certificate.

144MHz Open and Listeners' Contest rules

Dates: 4/5 May.
Times: 1600–1600gmt.
All entries and checklogs to: VHF Contests Committee, c/o G3VPK, "Maple Leaf", Great Braxted, Witham, Essex CM8 3EJ.

The following General Rules, published in the January 1974 issue of *Radio Communication*, will apply: Transmitting Contest: 1, 2, 3, 4a, 5a, 6a, 7a, 8a, 9a, 10a, 11–26; Listeners' Contest: 1–6.

1,296MHz Open Contest rules

Date: 25May.
Times: 1800–2359gmt.
All entries and checklogs to: VHF Contests Committee, c/o G4CUT, 59 Harewood Road, Chelmsford, Essex CM1 3DH.

The following General Rules, published in the January 1974 issue of *Radio Communication*, will apply: 1, 2, 3, 4a, 5b, 6b, 7a, 8a, 9a, 10a, 11–26. Note on rule 7: Contacts may be prearranged by calling CQ on another band, but the exchange of contest information must take place on 1,296MHz only, without interruption by recourse to another band.

May 432MHz Open Contest rules

Date: 26 May.
Times: 0900–1200gmt.
All entries and checklogs to the same address as for the 1,296MHz Open Contest (see above).

The following General Rules, published in the January 1974 issue of *Radio Communication*, will apply: 1, 2, 3, 4a, 5a, 6a, 7a, 8a, 9a, 10a, 11–26.

DF Qualifying Round—Chelmsford

Date: 28 April 1974.
Map: OS Sheet 148, or new 1:50,000 series sheet 167.
Assembly: 1300bst for start at 1320bst.
Location: Three-quarters of a mile north of Great Dunmow on the A130, NGR 623230. Frequencies and callsigns will be announced at the start.

Intending competitors are asked to notify Mr M. Hawkins, 24 St Cyrus Road, Colchester, Essex, of the numbers in their parties requiring tea as soon as possible and not later than 20 April.

70MHz Fixed Station Contest results

The logs for the 70MHz Fixed Station Contest reflect a grim struggle against poor conditions and activity, in the aftermath of severe gales. G3JYP had to repair his feeder in situ, while G3NHE made do with a dipole, but neither weather nor conditions could prevent G3OHH from taking his accustomed place at the head of the results table. *G3SEK*

Posn	Callsign	Points	QSOs	Cnty	Best dx	km	Pwr
1	G3OHH	249	41	SD	G3DAH	295	50
2	G3NHE	215	35	YS	GM3WOJ/A	282	18
3	G5DF	146	35	BE	G3JYP	380	25
4	G3JYP	117	13	WD	G3VPK	382	40
	G3OQT	117	33	KT	G3OHH	280	40
6	G3TVW	109	33	EX	G3OHH	205	25
7	G3XBY	107	25	WK	G3JYP	245	10*
8	G3NPI	103	35	BE	G3JYP	355	50
9	G3RDQ	97	29	BS	G3NEO	190	50*
10	G3FIJ	88	20	EX	G3OHH	252	25
11	G3ZVK/A	85	23	—	G3OQT	230	10
12	G3SFG	72	38	MX	G3NHE	—	25*
13	G3YQW	42	21	SX	G4CPE	95	30
14	G4AGQ	8	4	YS	G3JYP	135	18
15	G3PGN	7	5	EX	G3DAH	65	0·2*
16	G3VPF	2	2	DT	G3VPS/A	13	10

* power output † ssb

21-28MHz Telephony Contest 1973 results

To be among the leaders of the contest a first-class aerial system combined with a good operating technique were essential. Add the ability to dig out the relatively few bonus-carrying stations on 28MHz and you were nearing the target.

P. J. Hart, G3SJX, had all these attributes and emerged the winner of the Whitworth Trophy, followed by John Graham, G3TR, and V. Lindgren, G4BYG, who was finally placed third after an extensive and involved checking and re-checking along with three other stations.

J. Dunnington, ZS6ZE, took advantage of 28MHz being open for south-north contacts to pile up nearly as many contacts on that band as on 21MHz to win the overseas section. His only rival was L. C. Snowden, 9HICH, who made many more contacts on 21MHz including 18 carrying bonus points.

The receiving section has been won again by J. Skidmore, BRS26431, nearly 1,800 points ahead of J. Fitzgerald, BRS33823. Like the leaders of the transmitting section he has good aerials and techniques especially for 28MHz.

Conditions for the event according to comments varied from "terrible" to "good at times". The first hour on 21MHz was virtually a blank, and 28MHz for the first four hours. Italian stations were popular on 28MHz with a few other Europeans. South American operators were heard spasmodically but no USA or Canadian nor JA or other Far Eastern areas. EP2TW reported hearing no G signals on 28MHz.

21MHz provided the bread and butter with a fair bit of Eastern Europe but little dx from the Far East. Only three Australian stations appeared in UK logs but nearly 450 USA callsigns were contacted by the leading five British stations but none were from W6 or W7. Even 21MHz was subject to strange conditions: on Sunday the late reappearance of I and YU at the same time as PY, CX etc, and the band closing almost as if it had been switched off.

The quality of logs received was good, very few requiring re-scoring, nor was there need for any undue eye-strain. A pity the UK entries (transmitting and receiving) were low in number. Where have all the receiving members gone?

Check logs were received from G3MTB, G3VFI, G5GH, LA5QK, UW6CV, UW6CW and are gratefully acknowledged.

UK TRANSMITTING

Posn	Callsign	21MHz QSOs	21MHz Bonus	28MHz QSOs	28MHz Bonus	Points
1	G3SJX†*	362	62	46	26	6,432
2	G3TR*	380	58	19	13	5,544
3	G4BYG*	270	52	19	14	4,667
4	GW3ZQH	289	46	18	16	4,630
5	G2QT	269	52	16	12	4,625
6	G4APL	318	46	19	13	4,582
7	G3YJI	245	39	17	13	3,907
8	G3SWX	143	45	13	11	3,580
9	G3WHK	245	40	6	5	3,502
10	G3YFZ	151	43	11	10	3,465
11	G3VMC	219	41	2	2	3,252
12	G4ALG	167	39	6	5	3,060
13	GW4BIQ	236	32	1	1	2,835
14	G2FNK	229	31	3	2	2,810
15	G3TVW	92	38	8	7	2,750
16	G3KWH	91	26	3	3	1,920
17	G4ATV	36	23	8	8	1,770
18	G3MSB/P	51	20	11	8	1,707
19	GC3YIZ	53	21	7	7	1,700
20	G8LY	45	24	—	—	1,425
21	G3WFT/A	58	20	2	2	1,390
22	G3DME	—	—	32	24	1,360
	G3ZDF	—	—	42	23	1,360
24	G2AJB	34	22	—	—	1,270
25	G8KU	41	20	—	—	1,202
26	G3JKY	18	12	11	9	1,195
27	G4ACQ	20	17	2	2	1,115
28	G3WDI	11	11	9	8	1,050
29	G3SZS	29	12	—	—	745
30	G3PLI	12	9	—	—	510
31	G3TGR	12	9	—	—	507

OVERSEAS TRANSMITTING

Posn	Callsign	21MHz QSOs	21MHz Bonus	28MHz QSOs	28MHz Bonus	Points
1	ZS6ZE*	145	13	110	10	2,416
2	9H1CH*	183	18	43	7	2,374
3	I5FLN*	148	14	—	—	1,434
4	W4WSF*	127	16	—	—	1,432
5	DL1YA	68	10	14	5	1,160
6	UA6HAC	121	11	—	—	1,155
7	W3USS	84	13	—	—	1,070
8	G3HLW/W3	82	13	—	—	1,060
9	PY4KL*	83	13	—	—	1,059
10	EP2TW*	80	13	—	—	1,050
11	PY7YS	37	11	11	5	1,040
12	HA3PG	81	11	1	1	1,010
13	W9LKI	76	12	—	—	980
14	EA3NA	39	7	26	6	972
15	MP4BJS	80	11	—	—	950
16	OK2BKR	77	11	—	—	935
17	UK5FAD	76	11	—	—	930
18	I0ZS	38	10	6	4	920
19	HA4XX	68	10	—	—	834
20	UK5VAA	65	10	—	—	825
21	WB8IOT	42	11	—	—	754
22	WA8VZO	36	11	—	—	727
23	PY1BDU	42	9	—	—	660
24	I2DMK	36	8	—	—	577
25	UG6GAG	34	8	—	—	570
26	CR5AJ	31	5	3	2	520
27	LU1BAR/W3	24	8	—	—	517
28	VE3FGU	20	8	—	—	497
29	PY6AMS	28	7	—	—	490
30	OK3WM	4	3	17	4	455
31	HB9UD	21	6	—	—	405
32	OK2ALC	30	5	—	—	397
33	W9WQM	13	6	—	—	365
34	SP9QS	19	5	—	—	345
35	W2FGY	16	5	—	—	327
36	YO8FZ	10	5	—	—	300
37	ZS2DC	9	5	—	—	295
38	WB0FTK	7	4	—	—	235
39	UA9AAK	11	3	—	—	205
40	PY1BOL	4	3	—	—	170
41	9M2CJ	9	2	—	—	145
42	OK1KZ	2	2	—	—	110

UK RECEIVING

Posn	BRS or A No	21MHz QSOs	21MHz Bonus	28MHz QSOs	28MHz Bonus	Points
1	BRS26431†*	169	49	27	17	4,274
2	BRS33823*	78	30	13	11	2,502
3	BRS28008*	74	30	10	8	2,308
4	BRS26407	78	29	9	7	2,199
5	A8374	87	30	5	3	2,101
6	A7790	29	25	12	12	2,046
7	BRS26870	86	29	2	2	1,990
8	BRS20249	73	26	2	2	1,775
9	BRS33915	68	24	1	1	1,595
10	A8306	29	16	13	10	1,510
11	A8482	48	20	1	1	1,292

† Trophy winner. * Certificate winner.

OVERSEAS RECEIVING

Posn	Identification	21MHz QSOs	21MHz Bonus	28MHz QSOs	28MHz Bonus	Points
1	UA3-151-18*	93	12	—	—	1,065
2	OK1-17825*	47	9	6	5	965
3	OK1-15835*	70	10	—	—	850
4	UA9-165-52*	59	11	—	—	845
5	UA9-154-565	60	11	—	—	832
6	UA4-156-234	62	9	—	—	760
7	LA-M5605	24	8	—	—	517
8	OK1-15689	12	6	—	—	360
9	SH-W4-122*	9	4	—	—	245
10	OK1-17358	16	2	—	—	180
11	SM5-2735	3	2	—	—	115

February 144MHz CW Contest results

Unfortunately conditions were poor for this contest but did not deter the cw enthusiasts who demonstrated their ability to work dx even when many would have thought this impossible. Two GM stations were responsible for the longest distance, both achieving over 500km. Several entrants also had GM3WOJ/A as their best "got away", lost due to very deep QSB. GM3OLK/P, who nobly submitted a scored check log, pleads for more stations in the south to look for GMs and quotes the following stations heard: G3DAH, G3NUE, G3HCW/A, G5DF, G6DP and GM3SZP. Very little activity appeared from the Continent, the few stations being local Fs.

Timing appeared to suit all contestants and a plea was made by several for more cw contests. The views of others would be welcomed by the VHF Contests Committee on this point. In general, operating practice came in for little criticism: one comment was that some operators were rather leisurely, and another concerned the use of "K" at the end of a CQ or QSO when inviting a general response and "KN" when contact has been established.

Certificates go to the winning station G3HCW/A and to the runner-up G3MOT. Those sending in check logs are thanked for their assistance.

G. M. C. S.

Posn	Callsign	Cnty	Points	QSOs	Best dx	km
1	G3HCW/A	YS	348	50	G3BHW	340
2	G3MOT	OX	315	57	GM3OLK/P	501
3	G3WSN	EX	282	50	GM3WOJ/A	524
4	G3NEO	YS	281	50	G3CHN	380
5	G3XBY	WK	280	57	GM3WOJ/A	385
6	G3NNG	BE	274	58	GM3WOJ/A	460
7	G3NHE	YS	270	51	G3CHN	380
8	GM3WOJ/A	AY	265	24	G3BHW	590
9*	G3WSC	SX	224	54	G3KMS	320
10	G3IMV	BS	223	57	G3HCW/A	200
11	G8GP	LD	203	55	G3NHE	232
12*	G4CTF	WK	199	47	G3DAH	250
13	G3DAO	SX	198	44	G3NHE	280
14	G4ANS	NM	197	38	G3DAO	240
15	G5UM	LR	195	45	GM3WOJ/A	320
16	G3AKF	OX	192	52	G3KMS	255
	G3TQZ	WR	192	40	G3BHW	263
18*	G3WZT	SX	188	44	G4CTF	310
19	G4BWG	LD	180	48	G3CHN	298
20	G3FYX	GR	167	35	G3DAH	255
21	G3KAC	GR	164	34	G3DAH	260
22	G3HZL	MX	146	44	G3HCW/A	270
23*	G3VCC/A	SD	136	30	G3BHW	257
24	G6XM	WE	118	32	G3KMS	225
25	G2WS	ST	111	25	G3NEO	252
26	G3LCH	LD	105	37	G3HCW/A	275
27	G3SHY	NM	99	23	GM3WOJ/A	348
28	G3XWZ	NM	91	21	GM3WOJ/A	315
29	G4BRO	SY	87	29	G3BOC	238
30	G3NUE	WR	74	20		
31	G3FZL	LN	55	17	G6PG	184
†*	GM3OLK/P	FE	53	9	G3MOT	501
32	G3WRA	HD	47	13	G3CHN	215
33	G3VPS	SX	44	18	G3IMV	137
34	G3SEK/A	LD	36	23	G3XBY	135
35	G3YYF	SX	22	10	G3IMV	150
36	G4ALG	BE	18	8	G3DAO	83

* Multi-operator

† Scored check log

Check logs received from G2HH, G3GC and G3RSD.

January 432MHz ssb Contest results

This contest was introduced to encourage the development of equipment and operating technique in a band that is being threatened by commercial interests. It was therefore most encouraging to receive a relatively large entry for such a novel contest, and hopefully a similar contest will be fitted into the calendar later in the

year. The only criticism of the contest was the lack of publicity given to Rule 9c which permitted ssb entrants to make cross-mode contacts. This particular contest will no doubt be remembered by the contestants for the excellent conditions. The winner, G8AGU, made 54 European contacts: five Dutch, four Belgian, eight French, two Swiss, 33 West German and two East German. The runner-up, GW3UCB/P, was claiming to hear DLs on a quarter-wave whip while G3WXI worked 1,090km with 50mW of rf after the contest and is claiming this as a record.

Posn	Callsign	Points	QSOs	Country	Best dx	Km
1	G8AGU/P	2,204	86	DN	DC7CW	1,180
2	GW3UCB/P	1,573	75	DB	DL6LM	1,224
3	G4BCQ	1,084	58		DL3ER	1,055
4	G3ZYC	907	51	DY	DL3ER	1,070
5	G8BCL	620		YS	DL3ER	1,130
6	GW8DAD/P	467	29	DB	DL6LM	1,287
7	G3BA	441	41	WK	DL7HR	1,030
8	G3KMS	397	37	LE	F2TU/M	910
9	G8EOP	391	29	YS	DC6WU	1,010
10	G4ABR/P	303	35	GR	F1QV	655
11	G3EHM	185	23		DL8GP/P	900
12	G3FEC/A	172	20	WE	F1QN	653
13	G3WXI/A	168	12	YS	F2TU/M	826
14	G8DCA	138	16	SX	G3KMS	329
15	G8FQM	101	11		F2TU/M	590
16	G8DKK	94	14	OX	F9FT	422

1973-4 70MHz Cumulative Contest results

Although not more than 20 stations out of the 130 or so callsigns recorded during the 70MHz Cumulatives submitted entries, the event can claim to have achieved a modest measure of success. Activity was stimulated even if only for a couple of hours each week, and many contestants thoroughly enjoyed a steady rate of working throughout the whole of each session.

The conditions were above average during October and early November, but fell away for the remainder of the contest. It was rather surprising, however, to find that this was not reflected very strongly in the average number of QSOs per session, even though several contestants complained bitterly that it was hardly worth switching on at all for the latter half of the event.

The VHF Contests Committee was pleased to note that comments regarding earlier 4m contests are not going unheeded. Many more stations are turning to solid-state converters as the first step to up-dating their equipment, and doubtless the improved noise factors contributed something to maintaining the rate of working. Three stations reported having ssb, but gave no statistics regarding the degree of success achieved.

C.S.

Posn	Callsign	Score	QSOs	Cnty	Best dx	Dist	Best sessions
1	GW4BUC/P	464	50	CV	G3DAH	428	2 3 5
2	G3VPF/P	314	56	DT	GW4BUC/P	300+	2 3 5
3	G3KSU/P	285	71	HE	GW4BUC/P	250+	2 3 5
4	G3ZMD	275	73	BD	GW4BUC/P	298	3 4 5
5	G5DF	260	50	BE	G3JYP	380	2 4 5
6	G3NHE	252	48	YS	G3VPS/P	270	2 3 5
7	G3VCV	241	56	HN	GW4BUC/P	315	1 2 3
8	G6HD	223	59	KT	GD2HDZ	438	2 3 5
9	G3PGN	217	89	EX	GW4BUC/P	315	2 3 4
10	G3VPS/P	213	67	SX	G3NHE	275	2 4 7
11	G3JYP	208	24	WD	G3DAH	430	3 5 7
12	G5UM	195	51	LR	GD2HDZ	265	1 2 3
13	G3WOS	178	56	NR	GD2HDZ	280	3 4 5
14	G4BEG	176	59	SY	GW4BUC/P	365	1 2 3
15	G3FIJ	163	31	EX	GW8U4C/P	387	1 2 3
16	G3LVP	144	55	EX	G3VPF/P	240	4 5 7
17	G3TVW	140	38	EX	GW4BUC/P	335	3 4 7
18	G3YQW	100	36	SX	G3VPR	186	2 3 5
19	G4AGQ	21	11	YS	G3JYP	135	1 3 7
20	G3TAL	18	8	HE	G6HD	120	2 4 5

Diamond Jubilee Contest certificates

It is regretted that, because of unforeseen difficulties in producing the artwork for these certificates, printing has been delayed. They will be despatched as soon as received, and in the meantime members awaiting them are asked to accept our apologies for the delay.

Affiliated Societies Contest 1974 results

The Affiliated Societies Contest attracted slightly fewer entries than last year (40 against 42) but there was the usual keen competition for the leading positions.

The Edgware Trophy was won by Swindon & District ARC.

The few comments made by contestants showed satisfaction with the rules but the suggestion was made that perhaps three hours each day would be enough owing to the lack of activity during the last hour.

With two exceptions log-keeping was reasonably good but there was continued confusion between club and non-club stations. This matter will be taken up in due course by the HF Contests Commitee.

Due to shortage of operators, two clubs sent in entries as check-logs as only one operator was available. One of these, Leyland Hundred ARG,G3GGS, deserves special mention as their checked score would have given them second place in this contest.

The committee gratefully acknowledges check logs from G3JKB, G4ATH/A and G4BUO.

Posn	Club	Callsign	QSOs	Points	Points claimed
1	Swindon & D ARC	G3FEC/A	151	1,316	1,466
2	Chiltern ARC	G3CAR/A	115	1,277	1,319
3	Wheatsheaf ARS (Grimsby	G4BTJ	129	1,259	1,389
4	Glenrothes & D ARC	GM3YOR/A	148	1,251	1,310
5	Crawley ARC "B"	G3TR	150	1,247	1,267
6	Thames Valley ARTS	G3TVS	135	1,240	1,295
7	Echelford ARS "A"	G3UES/A	129	1,215	1,330
8	University College of N Wales ARS	GW3UCB	135	1,208	1,367
9	Surrey Radio Contact Club	G3SRC	140	1,195	1,316
10	Sutton & Cheam RS "A"	G2DMR	129	1,194	1,402
11	Standard Radio Club	G3NIS	110	1,188	1,355
12	Addiscombe ARC	G4ALE/A	116	1,181	1,249
13	Edgware & D RS	G3ASR/A	111	1,179	1,287
14	Crawley ARC "A"	G3WSC	110	1,178	1,300
15	Mid-Sussex ARS	G3ZMS	113	1,176	1,274
16	North Staffs ARS	G4BEM	114	1,170	1,304
17	Kingston & DARS	G3KIN	115	1,145	1,271
18	Southgate RC	G3SFG/A	122	1,126	1,280
19	Cardiff RSGB Group	GW5BI	118	1,092	1,262
20	Sutton & Cheam RS "C"	G3DCZ	99	1,090	1,148
21	Mansfield ARS	G3GQC	104	1,067	1,196
22	Acton, Brentford & Chiswick RC	G3IIU	91	1,055	1,211
23	ARC of Nottingham	G3EKW	86	1,049	1,178
24	Worcester & D ARC	G3GJL	95	1,021	1,143
25	Wirral ARS	G3NWR	91	1,002	1,238
26	Queen's Own Cameron Highlanders Memorial Youth Club	GM3ZXH/A	96	975	1,144
27	Conway Valley ARC	GW6TM	101	957	1,175
28	Horsham ARC	G3TNO	76	912	983
29	Clifton ARS	G3GHN	87	901	1,118
30	Colchester Radio Amateurs	G4CRA/A	82	906	1,102
31	Easington AR & EC	G4APN	70	858	1,008
32	Bracknell ARC	G4BRA/A	83	854	1,016
33	Bangor & D ARS	GI3XRQ	87	788	849
34	Hereford ARS	G3YDD/A	66	780	878
35	Shefford & D RS	G3FJE/A	73	750	927
36	George Kent ARS	G4AGK/A	69	719	951
37	Echelford ARS "B"	G3JUL	60	668	731
38	Grimsby ARS	G3CNX/A	58	628	659
39	Sutton & Cheam RS "B"	G4ADM	42	451	515
40	Mid-Herts ARS	G3WGC	27	338	377

December 1973 144MHz Fixed Stn Contest results

The revival of this contest in the calendar was welcomed by 93 entrants, and despite average conditions the leading stations were approaching serial 200 by the end.

Comparison with the results of the 1970 event shows that activity has at least doubled in the last three years with the use of VFOs and ssb was now almost universal. Significantly, high power was used by the leading six stations, but the use of more than one operator is by no means essential for a good placing in a contest of this duration.

First place goes to the Manchester University team of G3XDY and G3ZSS operating G8FOT. The station operated by G8HBN, G8FQO and G8HCL was the runner-up and also recorded the best dx. In third place and leading single operator was G3NAS.

There were several uncorroborated reports received about poor signals. Contestants are strongly advised to abide by the Code of Practice published on p36 of the January issue of *Radio Communication* and to note General Rule 17. It should be recognized that all transmitters, commercial or otherwise, can be overdriven and do create spurious emissions. Every effort should be made to achieve local compatibility, preferably before the contest, especially if high power is to be used.

W. J. M.

Posn	Station	Opr	Score	QSOs	Cnty	Dx	Km
1	G8FOT*	M	1,086	166	LE	HW1BHL	480
2	G8HBN*	M	1,000	192	SY	GM8FFX	640
3	G3NAS*	S	947	173	SD	PA0JCW	448
4	G3MOT*	S	823	155	OX	GM6XW	470
5	G3FEC/A*	M	796	151	WE	G8GQY/P	353
6	G4CTF/A*	M	748	170	WK	HW1BHL	373
7	GD2HDZ	S	735	77	IM	G8CUT	420
8	G8GNE	S	731	130	CE	GM8DMZ	405
9	G3OUL	M	719	131	LE	G8AOB/P	355
10	G8BXC/A	M	694	150	EX	GD2HDZ	410
11	G3XBY*	S	677	143	WK	G3IUD	365
12	G3NHE	S	642	108	YS	G3CHN	380
13	G3OHC	S	589	120	WK	HW1AGY	385
14	GW3VKL	M	522	91	GN	G3DAH	309
15	G3NNG	S	512	112	BE	DA0JCW	428
16	G3USF	S	457	106	SD	GM8BDX	290
17	GW8FOL	S	451	63	AG	G8FUF	375
18	G3UER	M	449	96	YS	G8CSN/P	320
19	G4ANS	S	444	88	NM	G8BQX	255
20	G4BBR*	S	438	82	GR	GI8EWM	375
21	G8FXX*	M	437	118	HF	GD2HDZ	403
22	G8ERX	S	426	70	YS	G8CSN/P	350
23	G3CHN	S	401	47	DN	G3NHE	—
24	G3PHO	M	387	81	YS	G8FCY	325
25	G8GPR	S	375	75	LE	G8FUF	370
26	G3VCC/A	M	370	88	SD	GM8BDX	348
27	G4CAR/A	M	364	79	SD	G3BHW	263
28	G3PPG	M	320	74	WR	G3XCS	—
29	G3RAF	M	319	67	ST	G8DOU	290
30	G4AHG/A	M	314	68	GR	G8GUE/A	245
31	G4CJG	S	286	40	DH	G8CSN/P	440
32	G8HOH/A	S	260	60	EX	PA0DUO	352
33	G3KMI	M	256	59	HE	G8FOT	288
34	G8HQW	S	255	53	LE	G3FEC/A	245
35	G8ECO	S	247	73	SY	G3JFO/P	315
36	G8FMG	S	242	60	BD	GD2HDZ	355
37	G4BWH	S	239	83	KT	G3OUL	255
38	G3LCH	M	237	94	LD	G3OUL	—
39	G4ANP*	S	230	55	YS	G8CSN/P	276
40	G8GKA	S	229	75	EX	G8BCL	283
41	G8DOU	M	210	54	LE	G3YOL	265
42	G3HZL/A	S	198	58	MX	G8FOT	254
43	G4AJE	S	191	48	NR	GD2HDZ	320
44	G3WDH	M	181	54	LE	G3OBD	310
45	GI8HXY	S	180	26	DW	G8FUI	335
46	G5UM	S	178	40	LR	G3CHN	305
47	G8GHZ	S	173	55	NR	GD2HDZ	350
48	GI8EWM	S	168	26	AM	G4BBR	415
49	G8CTT	S	150	76	KT	G3UER	250
50	G3FIJ	S	147	35	EX	G8FOT	270
51	G3OHM	M	144	48	WK	G4CJG	240
	G8EYC	M	144	81	LN	G4CDC	—
	G8DHA	S	144	38	GR	G8GQY/P	255
54	G8IBB	S	138	22	YS	G4CQR	323
55	G3OUR	M	129	39	OX	G3JFO/P	262
56	G8GXE	S	128	58	BS	G3WWK	263
57	G4BWG	S	122	76	LD	GW3VKL	222
	G3YFF/A	M	122	54	MX	G8CSN/P	194
59	G4BYP	S	118	38	LE	G8CSN/P	270
60	G4AEZ	S	114	60	MX	G3CHN	300
61	G3NUE	S	113	25	WR	G3XDV	265
62	G8HSS	M	112	79	LD	G3PPG	135
63	G4COA/A	M	111	34	OX	G4CDC	170
64	G8GHD	S	110	62	SY	G8HSX	118
	G3SHY	S	110	34	NM	G8CSN/P	276
66	G3VPS	S	109	25	SX	G4ANS	248
67	G4ATH	M	101	45	LE	G8BXC/A	310
68	G8HRR	M	96	30	HE	GW4ALJ	225
69	G8HNI	S	93	33	BS	G3WWK	255
70	G8HQR	S	76	24	ST	GC3XQM/P	185
71	G3XFW	S	75	28	ST	G3GZJ/P	158
	G8BKR	S	75	29	GR	GC3XQM/P	245
73	GM8HEY	S	74	20	FE	G8FOT	280
74	G8GHR	M	72	24	HF	G8HPP	270
75	G8FXF	S	66	58	LD	G3IDC	75
76	G8BBP	S	64	22	WR	G3JFO/P	215
77	G8HSG	M	63	29	YS	GM8DMT/P	145
78	G4BKY	S	62	34	GR	G3CHN	—
79	G8CCH	S	58	24	HE	G3PPG	115
80	G4CIB	S	55	17	GR	G3CHN	210
81	G4BIN/A	M	50	18	DT	G4BTZ	268
82	G8FDL	S	49	29	LE	GW8DMJ/P	153
83	G8BRY	S	37	27	BE	G8GNE	130
	G3ROJ	S	37	15	KT	G3CHN	290
85	G8HBA	S	36	32	LD	G3YVR	55
	G8FFI	S	36	18	LE	G3CHN	201
87	G4BXL	S	32	14	LN	GW8DMJ/P	225
88	G8HNH	S	31	19	KT	G3NNG	124
89	G2AVC	S	27	19	MX	G3PPG	210
90	G8CXK	S	25	13	LE	GW8DMJ/P	115

* Used high power

Disqualified: GW3XOT, G8FUF—Rule 3; G8GVA—late entry.

Check Logs: G2HH, G4AXS, GW4BXE, G3JFO/P, GW8DMJ/P, A8306, A8324.

Verulam ARC RSGB Diamond Jubilee Contest results

Section 1—144MHz transmitting

Posn	Callsign	QTH	Cnty	QSOs	Pts	Cnties	Total
1	G3FEC/A	Highworth, Swindon	WE	42	50	22	1,100
2	G4BWQ/A	High Wycombe	BS	49	57	18	1,026
3	G8GVF/P	Clee Hill	SE	27	27	16	432
4	G8FSL	Southgate	LD	25	37	11	407
5	G3YLG	Hemel Hempstead	HF	29	37	10	370
6	G3YHY	Watford	HF	23	35	9	315
7	G8GHD	Tadworth	SY	26	38	8	304
8	G4AEZ	Enfield	MX	24	36	8	288
9	G3WFM	Potters Bar	HF	17	30	8	240
10	G3RVR	Borehamwood	HF	13	29	6	174
11	G3LXP	St Albans	HF	17	33	5	165
12	G8HBA	Lewisham	LD	7	19	5	95
13	G8EON	Harpenden	HF	11	19	4	76
14	GC2FZC	St Peter Port	GY	12	12	5	60
15	G8ETE	Watford	HF	7	15	3	45
16	GC3YIZ	Vale	GY	6	6	4	24
17	G4CIB	Gloucester	GR	3	3	2	6

Section 1—144MHz receiving

Posn	Number	QTH	Cnty	QSOs	Pts	Cnties	Total
1	BRS15822	Clapton	LD	31	43	11	473
2	BRS33794	Basingstoke	HE	10	17	5	85

Section 2—1.8MHz—transmitting

Posn	Callsign	QTH	Cnty	QSOs	Pts	Cnties	Total
1	G4BJM	Milton Keynes	BS	68	98	22	2,156
2	G3YLG	Hemel Hempstead	HF	71	100	17	1,700
3	G3FEC/A	Ashton Keynes	WE	61	83	20	1,660
4	G3VSQ	St Albans	HF	47	76	14	1,064
5	G3NOH	Watford	HF	54	88	12	1,056
6	G3TMA	Hatfield	HF	48	78	13	1,014
7	G4BXT	Dartford	KT	50	62	14	868
8	G3ZVW	London N13	LD	57	83	10	830
9	G4BGX	Reading	BE	40	59	14	826
10	G3LXP	St Albans	HF	45	75	11	825
11	G4BOU	Wheathampstead	HF	43	73	11	803
12	G3ZAM	St Albans	HF	43	73	10	730
	G3WFM/A	Potters Bar	HF	43	73	10	730
14	G4BWP	Henlow	BD	37	59	12	708
15	G4AEZ	Enfield	MX	44	70	10	700
16	G3RVR	Borehamwood	HF	43	73	9	657
17	G3YRZ	Burwell	CE	28	50	13	650
18	G3RSF	Harlow	EX	31	53	11	583
19	G2AIA	Watford	HF	37	67	8	536
20	G3VRG	London N11	LD	37	63	8	504
21	G4CNH	Watford	HF	36	70	7	490
22	G4BXY	Reading	BE	29	47	10	470
23	G4BIJ/P	Hemel Hempstead	HF	38	64	7	448
24	G4CQF	St Albans	HF	30	60	7	420
25	G3DOT	Luton	BD	26	44	9	396
26	G4AWM	Greenford	MX	23	57	6	342
27	GC3YIZ	Vale	GY	26	26	13	338
28	G3YHY	Watford	HF	29	55	6	330
29	G4BUO	Gravesend	KT	29	29	11	319
30	G4CQZ	St Albans	HF	27	61	5	305
31	G3LCH	London SW17	LD	23	27	11	297
32	G4AWS	Watford	HF	23	41	7	287
33	G4CQY	St Albans	HF	23	48	5	240
34	GW3UCB	Bangor	CV	15	15	12	180
35	G3ROK	Potters Bar	HF	10	28	3	84
36	G4CMY	Gloucester	GR	7	7	4	28
37	G3JKB	Watford	HF	6	14	1	14
	G3VER/A	VARC Club Station Watford	HF	41	57	9	513

Check log received from G3XOI

Section 2—1.8MHz receiving

Posn	Number / Name	QTH	Cnty	QSOs	Pnts	Cnties	Total
1	BRS15822	Clapton	LD	54	84	13	1,092
2	A8524	Harpenden	HF	37	67	9	603
3	BRS34523	Aylesbury	BS	32	58	9	522
4	A8306			27	45	11	495
5	BRS33794	Basingstoke	HE	26	48	10	480
6	A8211	Hornchurch	EX	27	35	9	315
7	A. Gray	St Albans	HF	24	50	6	300
8	BRS19682	Bromsgrove	WR	17	17	13	221
9	A8512	Aylesbury	BS	8	26	4	104
10	BRS32755	Glasgow	LK	3	17	3	51

MEMBERS' ADS

These low-cost flat-rate advertisements are accepted as a service to members of RSGB. They must be submitted on the Members' Ads order form printed on the last page of each issue of *Radio Communication*, or on a postcard similarly laid out. Each **must** be accompanied by a **recent** *Radio Communication* wrapper addressed to the advertiser, as proof of membership, and a remittance by postal order or cheque for 25p (stamps not accepted). They will not be acknowledged. Those not clearly worded or punctuated will be returned. No other correspondence concerning this service can be entered into.

The closing date for each issue is the 4th of the preceding month but no guarantee of inclusion in a specific issue can be given. Valid advertisements not published in the issue following receipt will be held over until the next issue.

Trade or business advertisements, even from members, will not be accepted for Members' Ads but should be submitted as classified or display advertisements in the usual way. The RSGB reserves the right to refuse advertisements, and accepts no responsibility for errors or omissions or for the quality of goods offered for sale.

Members are advised to enclose a stamped addressed envelope when replying to advertisements.

See the current order form on the last page for further details.

Post to : MEMBERS' ADS, "RADIO COMMUNICATION", 35 DOUGHTY STREET, LONDON WC1N 2AE

FOR SALE

For safety, 500W mains isolating transformer, £8. Two only. G3LBT, QTHR. Tel 0268 412177.

Tektronix 545A scope with D plug-in, £180. Rhode & Schwarz ZDU impedance meter, £450. Bird 82A 500W load, £35. Bird TS118 wattmeter, £8. P. A. Johnson, 18A High Street, Northwood, Middx. Tel Park Street 73074.

95ft multi-core cable comprising two 75Ω coaxial cable and surrounded by 24 small wires, 33p per yd. P. Clutterbuck, 32 Glos Rd, Rudgeway, Bristol. Tel Almondsbury 612256.

Well-built 50W a.m. tx 160-10 Imhof cabinet. Built-in monitor scope, Geloso, vfo, etc. Self-contained table topper. Suit beginner. £20. G3NXD, QTHR. Tel Kidderminster 850 570.

Heathkit DX40U and VFIU transmitter. Good cond, £17 ono. G4AQJ, QTHR. Tel 0682 68510.

National NC190 rx and hamgear preselector, £40 ono. *Wanted:* Cover for Creed 7B teleprinter. Purchase or loan for photocopy, manual or information on Hallicrafters SX42 or Mullard GFR520 rx. G3SJX, QTHR. Tel 01-656 9054.

Sentinel MF, 2m/medium wave converter, as new, £13. Sentinel X deluxe 2m converter, 28-30MHz i.f., integral psu, as new, £14. HC25U xtal 21·2525MHz, £1. J-Beam 2m 4-element extension, £1. Cockbain, Coplands, Dartington, Totnes, Devon. Tel Totnes 2484.

Hudson 4m fm base, QQVO6-40A pa, transistor rx crystalled 70·26MHz, £25. 50W vhf/fm tx strips, less QQVO6-40A, £6. Thornton log/log slide rule, £1.50. Storno 4m bases, £10-£17. 12V 1A stab psu, £3. G8AKA, QTHR. Tel Reading 332582.

Sentinel 2m con 28-30MHz i.f., £10. DJ6ZZ 28/144MHz transistorized transverter kit, complete unused, £12. 2m transistor tx a.m. 3·5W input with xtal, £15. G8HED, QTHR. Tel Darwen 71690 after 6.30pm.

Parmeko trans, 620-0-620 etc, exact for G2DAF txs, £4. Pair 866s matching Woden fil trans, £1. Thordardson 12h 175mA ch, £1 plus carr. G3ESB, QTHR. Tel Derby 671536.

Tektronix 513 scope dc to 18MHz. Working with handbook (will display 2m direct). Would prefer exchange for transistor vhf/uhf, tx/rx, cctv, rtty, equipment or why? All letters will be answered. G8FNA, QTHR.

Trio JR310, new plus spkr and phones, £50. AM10D 2m, £20. Buyer collects. G4BWE, QTHR. Tel Bristol 622574.

Offers for *Readers Digest Great World Atlas* (perfect cond) and single paddle "Ultimatic" valve keyer by G2BB, little used, postage extra. GM3IAA, QTHR. Tel Inverness 30459.

FT200, FP200 dynamic mic, mint, little used, original packing, £180. Genuine reason for sale. G3XXJ, QTHR. Tel 021-351 2370.

14in Peto-Scott tv monitor and 5in Pye monitor, £10 each ono. Carriage extra. G8CGK, QTHR.

Marconi Atalanta rx, 15kHz to 28MHz, 13 valves, 100Hz selectivity. Offers over £120. 78 Branch Rd, Mellor Brook, Nr Blackburn, Lancs. Tel Mellor 3182.

New valves, Mullard boxed EN91(10), E90CG(3), EN92(6), E90CC(4), 90CV(4), 1908(2), EA76(4), 50p each plus post. S. J. L. Bariler, 54 Billet Rd, Romford. Tel 01-590 0705.

Trio 9R-59-D, SP-5D speaker, 1MHz calibrator, Joystick and Joymatch. Ideal for new swl, club etc, £30 ono. Phone after 6pm. D. Harris, 139 Wildwood, Woodside, Telford. Tel Telford 585185.

Rotator channel master with alignment bearing, used but OK, £9. Cowl-gill motor unused, £4. J-Beam parts, aluminium mast 9ft × 2in, £1.50. 12ft × 2in, £2. 18in wall bracket, £1. Base plate, 50p. G4BWW, QTHR. Tel Southport 67397.

Valves, 6146s, 572Bs, KT88s, etc. Early KW2000 + ac and dc PSUs, £98. *Wanted:* Frequency counter to 150MHz, YC355D or similar. Also 2m Parabeam. G3NPZ, QTHR. Tel Titchfield 43894.

Panda Cub tx, good cond, £20 ono. Buyer collect or pay carriage. G3HWW, QTHR.

Valves. 3-813, two new, boxed. Number 807s. 4-KT66, two new, boxed. 2-832 double triodes. Two VCR 139. CRT one new, one used. Number 6B4s. Offers including postage. GM3BRF, QTHR.

Brand new fine quality portable radios. Nordmende Galaxy 4400 vhf/lw, mw/3sw, list £55, bargains £39 ono. Loewe Opta T76 uhf/lw, mw/2sw, list £47, bargains £34 ono. Mint Bush UTR178 air public band, £24. L. D. Ireland, Carnhell Green, Camborne, Cornwall. Tel Praze 236.

Hallicrafters HA1 electronic keyer, £27. Vibroplex electronic keyer paddle, £8. Vibroplex bug key, de luxe model, £8. All excellent cond. G3UEN, QTHR. Tel Flamborough 258.

Eddystone 840C receiver, good cond, ideal for beginner, £30 ono. John Diston, 15 Colletts Gdns, Broadway, Worcs WR12 7AX. Tel 038 681-2249.

2m converter 24·5-26·5MHz i.f., £5. 70cm double conversion conveter i.f. 4-6MHz, £8. Both in diecast box with battery. Two cowl-gill motors, stainless steel guy wire, strainers. Offers please. G8ACE, QTHR. Royston 0763 41164.

HX50 Hammarlund tx 160-10 ssb, a.m., cw. Overhauled by K.W. Excellent cond, £90 + inst manual. G3APH, QTHR. Tel York 29466.

2m a.m. tx, 10W rf, £10. Mosfet converter, £8. List 50 xtals, 4 × 150A base, £3. Valve a.m./fm, tuner/amp, £5. 14in tv monitor, £5. Honeywell thermometer/thermostat, £1.10. G8ABQ, QTHR. Tel Tony Glazier, evenings 452 6724, day 580 4468 ext 4092.

KW2000, alternative cw keying facility added, also psu, £100 ono pair. Also Drake 2B and 2BQ rx, £70 ono. Apply in writing. G3ZEM, QTHR.

FL2000B, excellent cond, reasonable offers. BC221 with calib charts, ac psu, £16. Philips 2022 cassette recorder, £14 ono. TF801B signal generator, offers. Reason for sale—just married. G3VIR, QTHR. Tel 02513-21473.

FT200, £160. HQ-1 minibeam, £30. FT2FB, £70. Solid-state mf converter, £15. Relay set interfaces FT2FB to mf, £5. 18AVT/WB, £20. Delivery will discuss. G3DPR, QTHR. Tel Hawkhurst, Kent 2063.

Katsumi EK9X electronic keyer, nearly new, £7·50. *Wanted:* Valves TT21, KT88 and information for circuit transmitter Tiger 100. Will buy or copy. G4BOI, QTHR.

Sommerkamp FL500, £110. FR500 with Microwave Modules 2m converter, fm detector, etc, £130. Both very good condition, buyer collects. G4AOK, QTHR.

Shure 444 mic, little used, £10. G4BXR, QTHR.

KW202 rx, £105. KW204 tx with vox, £115. KW107 aerial matching unit, £35. Eddystone 940 rx, £95. All in first-class condition. G3HEE, QTHR. Tel Stamford 4407.

Clearing gear late GC4LI. Viceroy MK3, linear, HRO, new valve voltmeter, Class D wavemeter, Weston test meter, old AVO, new RSGB logbook, mics, keys, *Bulletins, SW Mags, Practical Wireless,* valves, transformers, etc. What offers? GC4LI, QTHR. Tel 0534 24869 (evenings).

KW107 aerial tuning unit, £45. Asahi Echo-8G 10-40m vertical aerial complete with radials, insulators, over 40yd 52Ω coaxial, £22·50. 17yd 12-core screened cable, £2·50. 45yd 52Ω UR67 heavy duty coaxial, £9. G3WHK, QTHR. Tel 01-337 0117.

BC221 ac psu, charts, £14. *Wanted:* Heathkit SB10 ssb adapter, KW Eezematch, KW103 75Ω or KW107. G4CWB, QTHR. Tel Reading 666502.

House. Kidderminster, Worcs. 4 bedroom, detached, gas central heating, garage, modern, separate lounge and dining room, £12,650. G3MWQ, QTHR. Tel 55735.

DX40 plus transistorized vfo, fully overhauled, £15. 23 8MHz xtals for 146-148MHz. Offers. *Wanted:* 2·5kV 400mA psu, state price, G4COA. M. Bolton, 142 Oxford Rd, Banbury, Oxon.

Garex Twomobile a.m./fm MK1 including crystals, £75. 2 Trio 2200s, as new, £160 pair. ½-ton cargo trailer for Land Rover, £150. Ex-WD hf transceivers including headsets, £7 each. Sae with enquiries please. G8DNF, QTHR.

Coaxial c/o relay bodies (2), similar UHF/VHF Manual, brass, £5·20 each. G8FPT, QTHR. Tel 01-504 4942.

2m tx, a.m., 6W rf 12V, £12. Sentinel converter, 28-30 i.f., Sentinel preamp, £12. Homebrew rotator, £10. Cross dipole, £3. 80m G-whip, £6. HP 13A dc psu, £25. Twin meter power swr, £6. Carriage extra. G3ZZS, QTHR. Tel Plymouth 31707.

CR100, good condition, 6 SG7 rf stages plus many other modifications, £18 ono. PR30, £4. RQ10X, £5. Tiger 50 transmitter, offers? Callers only. R. Kell, 177 Main St, Seahouses, Northumberland. Tel Seahouses 463.

Save £100. FT401 fitted 160m plus 2·00/2·5MHz (shipping/MSF) with recorder output, £190. Mint condition Grundig TR600 receiver, mw plus 1·6/30MHz continuous bandspread, unused, £20. BFO unit, £4·50, would separate. G3IES, QTHR. Tel 0272 622544.

Heathkit Mohican receiver, immaculate, with handbook, £23. HRO 50F with psu, 9 coils including bandspread for 80-40-20m, good working condition, £15. G3SDH, QTHR. Tel 0934 25230 after 6pm.

AM25T converted 2m, 12·5kHz bandwidth, rx oscillator tuneable (will require stabilizer on oscillator), and control box with multiway cable and plugs, £18, or swap general coverage rx or power meter. G8DGM, QTHR. Tel Lye 4388 (038482).

EC10 MK2, £45. Sentinel 2m converter 4-6MHz i.f., £8. 2m fm + series-gate tx, 40W input, £20. 70cm tx, 25W input series-gate mod c/w separate psu, £25. Buyer collect or carriage extra. G8DHA QTHR.

KW Vanguard tx, 80-10m, in good condition, £25 ono. G4AVU, QTHR. Tel 01-778 9741.

HA600A rx with nbfm discriminator, £35; 2m 2N4416 fet convtr, 19·5-21·5MHz i.f., £5; 4m transistor rx super regen, £3; 72·875MHz HC18U extal, £1. Carriage extra. GM3ZVL, QTHR. Tel 031-667 3366.

Pye base station tx on 2m, £25. Buyer collects. 2-B44 tx/rx one mains on 4m, rx tuneable, £7 each. UHF tvi filters, £1. New 2m lines, £3·50 carr extra. Sae enquiries. G8FUI, QTHR.

Two new 813s with bases, £5. Sentinel dual gate mosfet, 2m conveter i.f. 28-30MHz, £6. Sentinel dual gate mosfet, 2m conveter i.f. 4-6MHz, £8. Both converters almost new. G4BBI, QTHR.

Yaesu FRDX400 160-2m in as new condition. Original packing, less speaker, £130 ono. GW8GKS, QTHR.

Japanese radio and tv magazines, yearbooks, wiring diagrams, etc. English language editions available. Send sae for list. Also two MCRI midget spy rxs with powerpacks and coils, the pair plus manual, £12·75 prepaid. Brian Smith, PO Box 4, Uckfield.

Marconi TF1152 power meter dc-500MHz, 25W, £32. Pye AM25B Vanguard complete with cable, c/box, speaker, mic, unmodified, £20. FM10B Cambridge, similar accessories, £28. Hewlett Packard 130B oscilloscope, £45. Marconi TF1289 vswr bridge, £15. B. S. Homer, 32 Iron Mill Lane, Crayford, Kent DA1 4RR. Tel Crayford 24625.

CX1257 Solatron scope amplifier twin beam, dc—24MHz, new and unused, £20 ono. G. B. Brierley, 33 Parsons Mead, Flax Bourton, Bristol. Tel Flax Bourton 3522.

Minimitter Topto7 tx (160/40m), £10. Labgear 160 twin tx, £12. Dcpp, £7. Acpp, £9. *Wanted:* Elbug paddle, gen cov rx. G3KAO, QTHR. Tel Wombourne 2288.

Loewe Opta portable vhf, lw, mw/2, sw/2, new sealed, list £47, bargain £34. Nordmende Galaxy portable vhf lw, mw, sw/3, new sealed, list £55, bargain £37. Bush, mint, £24. 5 band air psb. L. D. Ireland, Carnhell Green, Camborne, Cornwall. Tel Praze 236.

Unica UR-1A receiver, 550kHz-30MHz, good on lf bands, complete with atu. Little used, £20. John Lemay, 108 Slewins Lane, Hornchurch, Essex.

Avo valve voltmeter, £10. 100/1000Hz crystal with sockets, £1. 2 flexible drives, 30p. 2MHz transmitter with crystal, £12. 4MHz transmitter, £6. H. H. Seymour, 74 Harold Estate, Pages Walk, London SE1 4HW.

Trio JR500S receiver, 80-10m with SP5D, £40. Also Trio JR310 with narrow ssb filter and SP5D plus spare set of valves, £65. Both in excellent condition, in original cartons with manuals. G8FIH, QTHR. Tel 045282 3382.

KB105 trap vertical, works very well, but in used condition. Offers please. 22 Queensway, Wellingboro, Northants. Tel Wellingboro 3761.

DX100 + SB10U complete with spare new valves, £60 the pair. Taylor 45C valve tester, £10 ono. Heath GD1U GDO, new, £10. Heath CB-U R/cap bridge, £5. G2FFN, QTHR. Tel Billericay 52441.

BF245A FETS, 15 for £1. BB113 varicaps 3 by 100pF in one envelope, 20p each. TAA550 30V vcap stabilizer, 30p each. Til 209 LEDs, 10 for £1. BC107, 25 for £1. RCA 16561 117W silicon power transistors, 25p each. BC141 100V 4W silicon audio transistors, 20p each. All new. G3WZT, QTHR. Tel 0403 710565.

2m converter, mosfet, two xtals, output 28MHz or 4MHz. Homebrew from circuit in *VHF Manual*, component value only, £8. G8IBA. T. Hughes, 9 Nursery Gdns, Pangbourne, Berks. Tel Pangbourne 2119.

Hallicrafter SX130 receiver, 535kHz to 31-5MHz bandspread, aw/ssb/cw, £40 ono. Philips dictaphone complete, mic/speaker, headphones, footswitch, 3 cassettes with standard 3in tape, £10 ono. G3OUX, QTHR. Tel Crawley 23890.

HA600A ac/dc operation g/c, £32·50. SSB tx 160m only, £12·50. *Wanted:* 160m transistor tx or rx, why. Delivery free 50 miles radius or as agreed. Tel 01-858 1448 anytime.

Eimac 4CX300A power tetrodes with sockets. Also Eimac 4CX250K (coaxial version of 4CX250B). Several of each at £10 each (never used). G8CGA, QTHR. Tel Faulkland 432.

Indicator tubes, side viewing, wire ended, two sizes, 1in or 1½in high, (state preference): 50p each. Tested before despatch. G3WXZ, QTHR. Tel Needham Market (Suffolk) 720 422.

Cossor 1035 Mk 3 and manual, vgc. Wavemeter Class D No 2 and spares, as new. TR1936 vhf tx/rx, lacks some crystals. Suitable conversion circuit available. Sold as seen. Offers to H. L. Settle, 17 Beeches Ave, Carshalton, Surrey SM5 3LJ. Tel 647 7893.

Superb vhf/uhf location near Chelmsford, Essex. 4 bedroom, central heating, garage, shack, fitted carpets, large attractive garden. Aerial planning permission established, 1,000-mile tropo possible most seasons, £15,750. G3LTF, QTHR. Tel Chelmsford 58439.

Hartley model 13A double-beam scope in very good working cond with leads, lid and probe, 240V mains powered, £25. Buyer to collect. *Wanted:* Cheap pair Pye Pocketphones. What have you? G8GKZ, QTHR. Tel Chester 41956.

Complete clearance. 150W a.m. tx with psu, £10. R107 with spare front end, circuit, working but needs attention. 3-speed record player, needs amplifier and speaker. *Bulletins* 1965-73. Offers. Buyer collect. Rigg, 77 Prospect Mount Road, Scarborough.

Trio JR500SE, unmodified, excellent condition, original packing. Buyer collects, £35. 1/6hp 1480rpm 240V electric motor (unused), £6. Oscilloscope transformer and VCR139A tube, £3. G3TJC, QTHR. Tel Shipley 52781.

Pye Cambridge a.m. fm 6 channel tx S-meter, £35. J-Beam 2m 8-over-8, £4. *Wanted:* HW32A tx or HW-101. G3TEP, QTHR.

2m a.m. transistor tx, 7W input 12V operation, Vogad mic control and ic mixer vfo, size 10in by 4in by 8in, £25. G8FDJ. J. S. Roberts, 57 Farndale Rd, Newcastle-upon-Tyne 4.

CR100, fair but no bfo. HRO "M" comp with psu and six gen cov coil packs both with handbooks. Exch for Heath RAI or similar. Ham bands only rx. G3YUX, QTHR. Tel Tamworth 68829.

R206 Mk2 with psu, £15. Colour tv, i.f., tuner, cda decorder, crt base, £20. Will split. 500W auto tx, £5. Lucas 17ACR, £20. 16ACR, £18. H1 audio generator, £10. Megger ohmmeter, £3. G8DDM, QTHR. Tel Penn 4483.

AR88LF, working order, reasonable offers considered. BC221 with original charts and power supply, best offer over £15. Buyer to collect. Pigott, 73 Kingswood Firs, Grayshot, Hindhead, Sy. Tel Hindhead 5878.

4 Amphenol plugs—sockets + reducers, £2. Two 6WC4 with holders, £1. Cossor db scope 1071K, £5 Marconi LCR bridge TF373D, £5 Buyers collect. *Wanted:* BC221 with charts and psu, must be good. G. Thompson, 49 Widney Ave, Selly Oak, B'ham B29 6QE. Tel 472 4678

New surplus to requirements KW108 monitorscope, £52. Gotham 20m monoband aerial, £20. Katsumi MC-70 mic compressor, £8. Asahi swg meter, £4 G4CHP, QTHR. Tel Swainsthorpe 365

Philips EL3400 professional 1in vtr, £75. 21in Cintel multistandard monitor, £8. EMI 625L spg with psu, £15. Pulse and bar generator 625L, £10. Marconi monoscope with tube, £16. Pye 2691 tv pattern generator, £8. R. C. Whitbread, 32 Iron Mill Lane, Crayford, Kent DA1 4RR. Tel Crayford 24625.

HW32A, HP13A mains psu, Tavasu ant, mike-spkr etc, £90 ono. Heath Cotswold, £20. 2 Vanguard AM2SB, £15. G3LDI, QTHR. Tel Wymondham 3463.
FT2 auto with receiver, vfo switched wide-narrow filters, a.m. detector, all 8 channels with xtals including repeater. Bargain at £160. Homgear preselector PM2B, £5. G8GSZ, QTHR. Tel Northampton 37944.

WANTED

Strumech P40/P60 or similar telescopic tower, will collect, dismantle. Reasonable distance. State price, condition. G3ZWW, 18 Oak Road, Tiptree, Essex CO5 0LN. Tel Tiptree 815027.
360° gyro angling unit (Air Ministry torpedo director device). All letters answered. G3ABZ, QTHR. Tel Maidstone 26183.
Gash 1155, only the drive and dial need be in good order. G3AMF, QTHR. Tel 01 989 9224.
Cowl-gill motor in good working condition. G3VOB, QTHR.
For World War 2 radio museum: TR9, TR9B, TR9D, TR9F, TR1091, TR1148A, TR1150, TR1161, TR1133B, TR1304, R1082, R1084, R1100, R1129, AR77, RA1B, RA10DA or RA10DB. Fair prices paid. Dr G. E. Winbolt, 4 Castle Rd, Pucklechurch, Bristol. Tel Absow 2350.
70cm Multibeam, 50 or 75Ω feed. Also aerial rotator, pmo suitable, several vhf aerials, 70cm converter with 2m output, low loss 50Ω coax approx 30yd. EI5CD, QTHR.
Codar gen coverage rx CR70A or earlier model in good cond. State price. All letters answered. G4EDK. 6 Castle Rising Rd, South Wootton, King's Lynn, Norfolk.
SB10U adaptor for DX100 or DX40, would consider complete tx included. GM5PJ, QTHR.
Collector would like to purchase early wireless and test equipment, also pre-1930 domestic sets. Newman, 22 Tredington Rd, Glenfield, Leicester. Tel 0533-872525.
Rx type BC348 or BC342, reasonable condition and price, or would exchange for binoculars and pay carriage. K. Pearse, 12 The Ave, Wincanton, Som.
TA31Jr. State condition and price required. All offers answered. G3IZJ, QTHR.
Rotator with complete control gear (electrical operation), suitable for use with 70cm and 2m beams, full working order, fairly cheap. Ring after 7pm weekdays. K. Rawlings, 17 Buttondene Crescent, Broxbourne, Herts. Tel Hoddesdon 60194.
G3TDZ type 2m tx/rx or hi-band Pye AM10D Cambridge, fully modified for 2m. Up to £20 offered. External condition not important. G8GYN, QTHR.
Partridge C core output transformer for Mullard 5/20 amplifier needed to make pair for stereo. G3SGP, QTHR. Tel 061-748 2258.
One or two 813 valve holders. 10V 10A heater transformer. EHT transformer 2·2kV 350mA. G4AFK. B. P. Coldman, 19 Ryeish Green, Spencers Wood, Reading, Berks RG7 1ET. Tel Reading 882301.
SWL about to take RAE reqs brandspread coils 160, 80, 40, 20m for HRO National pse QSO. Doug Muir, 190 Blythway, Welwyn Gdn City, Herts AL7 1DU. Tel Wel Gdn 30241.
Handbook circuit for Trio scope CS1552. Buy or borrow. G8DFZ, QTHR.
KW2000 A/B in good cond with neg earth dc pu. Exchange for immaculate Trio JR500S speaker, three Solatron scopes, Hallicrafter tx HT-40 115V, Pye Ranger 2207 conv 2m tune rx; plus new meters, small crts, etc. G3ZDO, QTHR.
SSB 2m tx, battery or mains. G8FMZ, QTHR. Tel 01 894 9971
HC6/U xtals, new/secondhand for Cambridge AM10D; tx 8·77750 MHz, 8·78250MHz, 8·7969MHz; rx 29·750MHz, 29·780MHz, 29·8375MHz, to use AM10D on 70·2, 70·26, 70·375MHz. GI3RNY, QTHR. Tel 41468.
Beltek W5400 ser No 030188 stolen from car last Dec. Scratch top right, broken power socket. £10 for complete working recovery. G8FWJ, QTHR. Tel 01-253 0329.
Drake T4XB and AC4 psu, Heathkit HO-10E monitor scope. Good price paid for late models. G8HXL. R. J. Baker, 65 Crompton St, Chelmsford, Essex.
Multimobile 71 with If coils and multi-telescopic section. Details and price required to Mitchell, 56 Sandy Rd, Renfrew, Scotland.
Nova Pal rx. G3IFV, QTHR.
4CX250B and base; Telford TC9 or any 12V rx for use as 28-30MHz i.f.; rtty terminal unit. *For sale:* Pair 28·5MHz walk/talkies, £25 pair; Boot a.m. Cambridge rx a.m./fm tuning, auto/manual, £40. G8GHZ, QTHR. Tel Northampton 61794.
FR100B rx, also interested in FL200B tx. Please state condition and price. Junk components, etc, for school radio society. S. Widdett, 208 Hagley Rd, Hayley Green, Halesowen,Worcs. Tel 021-550 3484.
PSU for Pye 125T 12V type, for mobile use. Also valves TT21s and 7360s. G4BFO, QTHR. Tel Ringwood 2273.

Looking ahead

6-7 April 1974—VHF Convention. "Winning Post", Whitton, Twickenham, Middlesex.
11 May—Region 15 ORM, Windsor Hotel, Knocknagoney, Holywood, Co. Down.
12 May—NRSA Convention, Belle Vue, Manchester.
16 May—Radio Amateurs' Examination.
17 May—RAOTA reunion, Bonnington Hotel, Southampton Row, London WC1.
14-15 September—North-West Amateur Radio Convention, University of Lancaster, Bailrigg, Lancaster.
21 Sept—Scottish VHF Convention, Region 12 ORM and Zone G Conference, Dundee.
31 October-2 November—Midland National Amateur Radio Exhibition, Leicester.
25 November—RSGB lecture at the IEE.

INTERFERENCE PROBLEMS

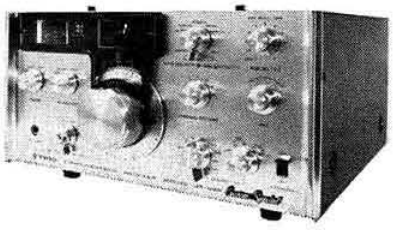
Members accused of causing interference or who suffer interference from external sources are invited to seek the assistance of the Interference Committee in solving their problems.

Enquiries should be addressed to: The Chairman, Interference Committee, RSGB, 35 Doughty Street, London WC1N 2AE.

WATERS & STANTON ELECTRONICS

TWO SUPER HF/VHF RECEIVERS FROM TRIO

JR 599 — FIXED OR PORTABLE
240V AC/12V DC 160—2 metres



When you buy Trio you buy equipment that is not only electrically superior but mechanically better than any other equipment of its class.

SPECIFICATION

160-80-40-20-15-10 plus full coverage of 2m (4m optional see below) plus WWV. No less than four switch selected filters are fitted giving the following selectivity: 500Hz, 2·2kHz, 5kHz and 60kHz. Three individually switch selected detectors are available: SSB/CW, AM, FM discriminator. Squelch control for noise free reception, drift free solid state vfo, dial readout to 500Hz, 25/100kHz calibrator and slow and fast avc.

OUR PRICE Securicor delivered £165
As above but with internal 4 metre converter added £178

OTHER EQUIPMENT

MIN-PRODUCTS COMPACT BEAMS AND VERTICALS
HQ-1 **£46.75.** B24 **£35.75.** RK3 **£20.85.** C4 **£20.85.** SAE for details
G-WHIPS MOBILE ANTENNAS EX STOCK. SAE for catalogue
J-BEAM ANTENNAS. SAE for catalogue
VHF 2m whips **£2.50.** ⅝ wave whips **£7.50**
MICROWAVE MODULES 2 & 70cm converters ex stock
SOLID STATE MODULES 2, 4 and 70cm converters ex stock
HIGH POWER WIGHTRAPS **£3.90** per pair
COMPACT 80/40 dipole **£9.90**
P1 259 plugs **35p,** insulators **10p**
Dipole centre insulators with so 239 socket **£2.30**
MAGNUM RF SPEECH CLIPPERS **£69** plus VAT
50 ohm coax **15p,** 75 ohm coax **8p**
300 ohm feeder **7p**
SHURE MICS 444 **£14,** 201 **£6**
NEW CDE ROTATORS AR30 **£27.50,** AR40 **£32.50**
TV FILTERS HP2A **£1.43**
MFJ 25/50/100 calibrator module **£8.50**
Secondhand Jr500SE receiver. Excellent **£45**
FERRITE TVI RINGS **23p**
RSGB PUBLICATIONS

POSTAGE EXTRA UNLESS STATED—WE WILL REFUND EXCESS. ALL PRICES INCLUDE VAT

BARCLAYCARD ACCESS HP TERMS
(Simply quote number, name and address and expiry date)

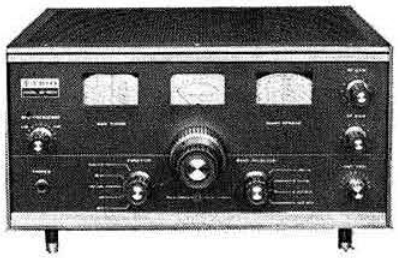
HOCKLEY AUDIO CENTRE

22 SPA ROAD HOCKLEY ESSEX

Telephone Hockley (03 704) 6835

Hours of business: 9.30 to 5.30 Monday to Saturday. E.C. Wednesday

9R59DS COMMUNICATIONS RECEIVER



This receiver is undoubtedly the most widely sold receiver in the UK for swl work or as a second receiver for the amateur operator. In fact quite a few operators are finding that its very price makes it an attractive proposition just so that they can check their transceivers, oscillators or for general listening work.

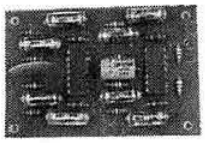
SPECIFICATION

0·5MHz to 30MHz general coverage plus individually calibrated bandspread dial for 80-40-20-15-10m. RF and AF gain controls, bfo, product detector for SSB and sensitive S meter. When you buy from us you also get the choice of a 2m converter for use with the receiver at an attractive price when purchased together. For the serious CW or SSB enthusiast we can also supply at a special price our MFJ SSB/CW filter that just plugs into the headphone socket and really does pick out even the weakest of dx signals.

OUR PRICE
Basic receiver **£51.75**
With 2m **£65.00**
With 2m plus SSB/CW filter **£75.00**

CW FILTER

CWZ-BX £11.00 plus VAT



CWF-2 £7.25 plus VAT, Kit ready built **£8.25**

- **Get razor sharp selectivity from any receiver or transceiver.**
- **Extremely high skirt rejection.**
- **Drastically reduces all background noise.**
- **No audible ringing.**
- **No impedance matching.**
- **Ultra modern active filter design uses ICs for super high performance.**

We have what we think is the finest CW filter available anywhere. The 80Hz selectivity with its steep sided skirts will allow you to pick out one signal and eliminate all other QRM and QRN. Simply plug it into the phone jack or connect it to the speaker terminals of any receiver or transceiver and use headphones, small speaker, or speaker amplifier. Better still, connect it between any audio stages to take advantage of the built-in receiver audio amplifier.
Build the 2" × 3" CWF-2 PC card into your receiver or get the self contained and ready to use CWF-2BX and plug in!

SPECIFICATIONS
BANDWIDTH: 80Hz, 110Hz, 180Hz (Switch selectable)
SKIRT REJECTION: At least 50dB down 1 octave from centre frequency for 80Hz bandwidth
CENTRE FREQUENCY: 750Hz
INSERTION LOSS: Typical gain 1.2 at 180Hz BW, 1.5 at 110Hz BW, 2.4 at 80Hz BW
INDIVIDUAL STAGE Q: 4 (minimizes ringing)
IMPEDANCE LEVELS: No impedance matching required
POWER REQUIRED: CWF-2 . . . 6 volts (2ma.) to 30 volts (8ma.); CWF-2BX . . . standard 9 volt transistor radio battery
DIMENSIONS: CWF-2 . . . 2" × 3" PC board; CWF-2BX . . . 4" × 3½" × 2½" (black winkle steel top, white aluminium bottom, rubber feet)

TRY this fantastic CW filter. If you don't think it is the best you have ever used, ask for your money back. We will cheerfully refund it. These filters carry a full one year warranty.

Write for FREE brochures and magazines test reports. Other IC active filters available: CW mini filter (1½"×2"), low pass, high pass, and wide bandpass filters. Audio amplifiers: ½, 1, 2 watts. Crystal calibrator.

UK sole distributors:
Waters & Stanton Electronics, 22 Spa Road, Hockley, Essex

AMATEUR RADIO BULK BUYING GROUP

OUR PRICES INCLUDE V.A.T.

COMPONENTS FOR RADCOM DESIGNS

Reprints of articles are available at 20p each plus large sae (included free in MiniKit 1). Nearly all components are available—as previously advertised—full details are in our price list. MiniKit 1 contains the P.C.B.s and other main components; MiniKit 2 all the semiconductors and MiniKit 3 (where available) all the resistors and fixed capacitors. All components (except MiniKit 3 items) are also available separately.

For G3TDZ 2m Tx/Rx

P.C.B.s (included in MiniKit 1)—Rx, 90p; Tx, 60p.
MiniKit 1—Rx, £5.20. Tx, £1.60.
MiniKit 2—Rx, £5.00. Tx, £3.40. Modulator, £1.80.
MiniKit 3—Rx, £2.40. Tx, 50p. Modulator, £1.20.

A limited number of crystals for the Tx are now in stock at £2.70. Let us know required frequency—we may have something close. 63MHz crystals for the Rx are due next month at £2.45.

For G3XGP Mini D.F.M.

Two versions of the clock board are available: the original with 100kHz oscillator and our modification to take the more readily available (and cheaper) 1MHz Xtal oscillator using a 7400 i.c. and an extra 7490 divider.

P.C.B.s (included in MiniKit 1)—I/p Amp, 80p; Display, £1.00; Clock—100kHz, 90p; 1MHz, £1.00 (modification detail included).

MiniKit 1—£10.50 (state clock frequency required).

MiniKit 2—£14.60. Add 50p for 1MHz clock version and also 60p for 30MHz i.cs if required.

MINITRONS and L.E.D.s

MINITRONS are the cheapest 7 segment numerical indicator available AND the digits are 0·36" high, will run on 5 volts and may be driven by 7447 i.c. Two versions available—standard type drawing 8mA per segment at £1.43 and high brightness version giving over five times as much light output at 15mA per segment at £1.60.

L.E.D.—new transparent plastic encapsulation giving 360° light output. Max. current 100mA at 1·8V. ONLY 21p each; 10 or more, 18p each.

MINI-BEAM HQ-1 AERIALS

We are now agents for the fabulous MINI-BEAM aerials. Model HQ1 for 10-15-20m with only 6ft. turning radius, £46.75. Special introductory offer—carriage free to U.K. mainland. High quality, low loss 50ohm coax cable also available at 15p per yard.

PLESSEY SL600 I.C.s

SL610/1/2	£1.81	SL620/1	£2.71
SL622	£6.80	SL623	£5.37
SL630	£1.71	SL640/1	£3.32

Holders—8-pin, 36p; 10-pin, 42p.

METAL CABINETS

Very smart ventilated metal cabinets in painted aluminium with brushed aluminium front panel, shock-proof plastic surround and metal tilt support bracket. Available in the following approximate sizes:

9" × 5½" × 5" high, £4.70.
11½" × 5½" × 5" high, £5.50.
11½" × 7½" × 5" high, £6.15.

DECON DALO PCB MARKER PEN—only 75p.

Full range of **IGNITION SUPPRESSION COMPONENTS** available—full details in our price list.

Post and packing (unless stated) 5p for orders under £1.00; 10p for orders over £1.00. FULL PRICE LIST sent on request (sae please). We now have Giro account no. 31 523 4008. Remember, our prices include VAT.

20 THORNTON CRESCENT, OLD COULSDON, SURREY CR3 1LH

SURPLUS ELECTRONIC COMPONENTS

Transistors, Disc ceramic, Tubular ceramic, Polystyrene, Polyester, Polycarbonate and Electrolytic Capacitors and Tubular ceramic Trimmers are still available. For full details see February advert (p. 123) or send sae for full price list.

D. G. PHILLIPS, 16 BACK LANE, STOCK, INGATESTONE, ESSEX

ambit international

DECADE COUNTER MODULES

Using FND70 LED display, 9368 driver i.c. and 7490 decade divider i.c. with 10-way plug in connector. A complete decade counter with latch facility. Double sided printed circuit board means stacking of digits within their own width. You can just add to counters the exact number of digits you require—£4.25.

AUDIO AMPLIFIER MODULES

TBA810S—7W – 7W R.M.S. High power audio amplifier. I.C., £1.65; PCB, 85p.
LM380—4W – 4W R.M.S. General purpose audio amplifier. I.C., £1.30; PCB, 75p.
Both above amplifiers may be used for mono.

FULL CATALOGUE available with details of Toko filters, R.F. Semiconductors, etc., 15p.

10% VAT must be added to all 'ambit' prices.

37a HIGH STREET, BRENTWOOD, ESSEX CM14 4RH

IS YOUR STATION COMPLETE ??

NOT WITHOUT A DIGITAL CLOCK IT ISN'T.

THE FABULOUS '222' IS EXCELLENT VALUE AT ONLY £5.75

Made by Copal/Caslon, the world's largest manufacturer of Digital Clocks, they are absolutely reliable and accurate. Mains powered (negligible consumption) with 24 hour readout and built in diffused lighting, in charcoal, white, flame or lime.

We are your specialists for the complete range of Copal clocks and would specially recommend:

THE '227'—A really beautiful 24 hour Digital Clock with alarm buzzer in Black, White, Red or Yellow. **ONLY £7.00**

THE SUPERB '601' with day, date etc., in a case of Satinised Aluminium. 24 hour. **ONLY £12.32**

THE '401'—Wall clock, 12 hour. **ONLY £8.82**

ALL PRICES INCLUDE VAT & Postage—NOTHING MORE TO PAY!!

Please remember, that *ONLY* when you buy from us your clock comes by return of post, carefully checked and tested, specially wrapped and fully guaranteed for 1 year. If you are not satisfied you have only to return it for a full refund without question.

AERO & GENERAL SUPPLIES (DEPT. S.D.)

NANAIMO HOUSE, 2 RINGWOOD AVENUE, LEEDS LS14 1AJ Tel. 658568

RADIO COMPONENT SUPPLIERS **J. BIRKETT** **25 THE STRAIT LINCOLN LN2 1JF**

Tel: 20767

3 GANG 365pf TUNING CONDENSERS. Sub-miniature size 2¼" × 1⅜" × 1⅜" @ 66p ea.

G.E. PROGRAMMABLE UNIJUNCTION type D13T1 @ 30p ea.

UNMARKED 1 AMP SILICON DIODES. Metal cased (SO16) 50 PIV @ 10 for 33p, 200 PIV @ 5p ea., 10 for 40p, 400 PIV @ 7p ea., 10 for 55p, 800 PIV @ 10p ea., 10 for 80p, 1000 PIV 12p ea., 10 for £1.

BSX 19, (2N 2368) @ 15p, BSX 20 (2N 2369) @ 20p.

10 SILICON BRIDGES UNTESTED 10 AMP MINIATURE @ £1.25.

20 UNTESTED UNIJUNCTIONS for 25p.

DIVIDE BY 2 300MHz COUNTERS with data @ 80p.

GOLD BONDED DIODES unmarked £3 per 1000.

RCA 2N 5838 250 VOLT 100 WATT NPN POWER TRANSISTORS. Ex new equipment 50p ea., 5 for £2.

REV COUNTER AND MILEOMETER I.C. in 14 Lead DIL Package, untested with suggested circuit. 5 for 60p.

40 WATT PLASTIC POWER NPN TRANSISTORS 3 for 50p.

1 Watt unmarked **ZENDERS** in the following voltages: 3·3v, 3·6v, 4·3v, 4·7v, 5·6v, 6·2v, 6·8v, 7·5v, 8·2v, 9·1v, 10v, 11v, 12v, 13v, 15v, 24v. All at 15p ea.

VHF FET's similar to 2N 3819. 3 for 60p.

GENERAL PURPOSE OP-AMPS tested Type 1 Direct Output, Type 2 Zener Controlled Output. Both with data, at 15p ea.

20 ASSORTED BRANDED 250mW ZENERS. From 3 to 13 volt @ £1.10.

4·7pf to 20pf CERAMIC TRIMMERS @ 3 for 10p.

GENERAL ELECTRIC USA THYRISTORS. Type C40A 100 PIV 25 amp @ 25p, Type C140B 200 PIV 25 amp @ 33p, 200 PIV 100 amp type C50B @ £3.20. All stud mounting, press fit type C32B 200 PIV 25 amp @ 27p.

500 Volt DISC CERAMICS in the following values: 2·2pf, 3·3pf, 4·7pf, 6·8pf 15pf, 27pf, 100pf, 180pf, 220pf, 330pf, 560pf, 680pf, 820pf, 1500pf, 2200pf, 3300pf, 4700pf, 0·01uf, 0·05uf. All at 16p doz.

SPECIAL OFFER OF BRANDED THYRISTORS, ZENER DIODES. Unijunction Transistor 2N 1671, Power Transistor, Silicon and Germanium Diodes, Transistors, Tuning Varactor, Single and 3 Phase Bridge Assemblies. First selection 250 pieces @ £20, second selection 500 pieces @ £12. Both lots ideally suitable for schools, colleges, universities, etc.

GAREX
COMPONENTS

Assembled, all transistor, printed circuit boards, with circuits.
AF board provides audio for phase mod. board also audio preamp for Rx
New **£1.85** Good used **90p**
10·7MHz I.F. board good used **£1.75**
2nd mixer 10·7MHz to 455kHz, with 11·155MHz xtal. **£1.60**
455kHz block filters. 50kHz b/w, low impedance **45p**
25kHz b/w, low impedance **£1.65**
25kHz b/w, high impedance **45p**
455kHz AM I.F. board (ex AM25B) good used **90p**
455kHz FM I.F. board (ex Cambridge or Vanguard) good used **£1.90**
Squelch Boards (ex Cambridge) FM 55p AM 30p
Squelch Boards ex AM25B Type A or B, **12p.**, 2 for 20p.
Mic. amplifier board ex AM25B **75p**
Mod. output board ex AM25B **40p**
Rx Audio board ex AM25B **40p**
Mic. preamp boards 2 transistor, emitter foll. output **55p**
Rectifier boards 4 diodes in bridge, + 1 bias diode, RF choke, resistors **8p**
Camera video boards (Lynx) **£3.50** slightly soiled **£2.30**
Plug-in rectifier valve replacement stack of silicon diodes, full wave 2·6kV at 200ma plus. Int. oct. base **68p**
Modulation transformers (all ex.) with circuits.
P.P. OC28/35 to QQV03-20a **£1.30.** Driver to suit, **50p.**
P.P. OC28/NKT404 to QQV03-10 **£1.10.** Driver to suit, **40p.**
Single EL84 to QQV03,-10 **90p.** P.P. EL84/6V6 to QQV03-20a, **£1.80**
P.P.6AQ5 to QQV03-10 **90p.**
Type 'O' variable capacitor 410pF, size 1·25" × 1·37" × 1" deep. **22p**
Circuit breakers ½amp, 1amp or 2amp. **40p**
Reed switch S.P.C.O. 33mm × 5mm dia. (75mm over leads) 10VA rating **30p**
Reed relay coils to match above, 24V (2·5k res.) 15p each, 4 for **50p**
Crystals HC6U, 12·700MHz, B7G 2.400MHz, all **25p**
Matrix pins, lead thro', 1mm diam pkt. of 100 **10p**, 12 for **£1.**
Valves EB91, ECC91, ECH83, ECH84, Z900T, 6BQ7A, all new **15p** each.
EC91, ECF80, 6BH6, 6BJ6, 6CB6, 6AT6, 6AQ5, all ex. **10p** each, any 6 for **50p.**
Transistors OC35, NKT404, 2G220, ADY23 all ex. **12p**, any 5 for **50p.**
723 voltage reg. I.C. TO5 metal case, 2/37V out at 150mA for 5/40V in **75p**
Relays Cambridge 12V 2 pole c.o. **15p**; 4 pole c.o. **17p.**
12V single make 25A **35p**; ditto, double make **35p**; ditto, d/m 6V coil **35p.**
Type 3000: 2 × 100Ω coil 4 pole c.o. **35p**
Type 2400: 2 × 200 Ω coil 4 pole c.o. + 1 make 8amp **25p**
186Ω coil 4 pole c.o. 8amp ex **20p**
625Ω coil 2 pole make 8amp ex **20p**
10kΩ coil 2 pole make 8amp **25p**
3·6kΩ coil 2 pole c.o. **25p**
14kΩ coil 2 pole c.o. + 1 break **25p**
14kΩ coil 2 make, 4 break **25p**

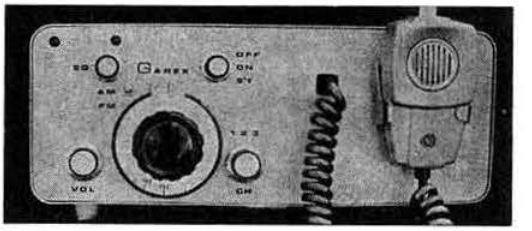
"ex." = ex equipment, guaranteed in working order.
Prices quoted are inclusive of all charges and postage to UK and Eire.

Mail Order only. Please send all orders and enquiries to

GAREX ELECTRONICS,
7 NORVIC ROAD, MARSWORTH, TRING, HERTS, HP23 4LS

S.a.e. with all enquiries please. Phone Cheddington (STD 0296) 668684
6pm-9pm and weekends only

INTRODUCING THE GAREX Mk II
TWOMOBILE FM/AM Tx-Rx



Based on a successful design, the **Mk II Twomobile** incorporates improved features to keep abreast of changing fashions on the 2 metre band, especially the growth of FM and mobile working.
Brief technical details:
Tx Rx and PSU for 12V DC input contained in one unit 12 × 4½ × 8" deep.
Tx Transistorised crystal oscillator (8MHz), multipliers and modulator, quick-heat tetrodes YL1080 driver and PA. No standby current. 3 switched crystal positions. Fist mic. with press-to-talk. Switched AM or FM.
Rx Fully transistorised. Continuous tuning from 144 to 146MHz, directly calibrated dial. VFO supplied from i.c. voltage regulator for improved stability under mobile conditions. 2 RF amplifiers, FET 1st mixer, 1st IF 10·7MHz, crystal controlled 2nd FET mixer, 2nd IF 455kHz, squelch, audio output to drive external 3Ω speaker. FM/AM reception selected by switch independent of Tx mode, utilising i.c. quadrature detector on FM.
34transistors, 2 i.c.'s, 14 diodes. Floating supply for pos. or neg. earth.
Delivered price complete with one Tx crystal and detailed handbook **£112.75.**

BRITISH MADE!

Mains Transformers and HT Chokes—see **March** advert.

Toroidal inverter transformers 12V DC input (all ex., with circuits)
265V at 150mA (Cambridge) 2·25" × 2" × 1·6" **£1.60**
(6/12V & 12/24V versions also available same price)
170/375V at 160mA (Vanguard) 2·75" × 2·5" × 2·5" **£1.80**
(24v version, same price)
V double 390V at 200mA 2·9" × 2·5" × 2·5" **£1.80**
V double 400V at 200mA and 250V at 150mA 3·5" × 2·75" × 2·25" **£2.40**
(NB: both on same winding—so cannot be added to give 650V)
HT choke suitable for 2-3kHz inverters **50p**
Audio transformers p.p. NKT 404 to 3ohm, small or large. **40p**
Drivers to suit, small or large **40p**
6AQ5 to 3Ω **40p**
Mobile hashfilter, 2 LT chokes, 4c's on plate **15p**
Rectilinear pots multiturn, preset, p.c. mtg.
10, 20, 25, 100, 250, 500, 1·5k, 2k, 2·5k. **25p** each, any 5 for **£1.**
Neons, min. wire ended, **5p** ea., 12 for **50p.**
Diodes CS34-A **25p**
Air spaced Trimmers (ex) 1·7–15pF, 2·4–30pF **12p**
Butterfly Trimmers large or small 2×6·4pf, large 2 × 17·5pf **65p**
Tx Multiplier Transformer for AM10, AM25B or T, High or Low Band **30p**

PORTABLE PETROL ELECTRIC GENERATORS

HONDA

ALL MODELS, FROM THE INCREDIBLY QUIET HONDA E300E WHICH GENERATES 300 WATTS A.C. PLUS 12v D.C. AND MEASURES ONLY 13" × 12" × 9" TO THE HONDA E4000E, 4 KW DIESEL SET.

For brochure & full details, call, write or phone GODALMING 23279

ASHLEY DUKES
FARNCOMBE STREET, FARNCOMBE, GODALMING, SURREY.

Semiconductors: Uhf power ZTX327 50p, 2N5915, £4, 40964 £1.20, 40965 £1.20, 2N4427 60p, 2N3866 60p, 2N5913 (2W) £1.50, 2N3375 (3W) £2.80, 2N5016 (15W) £8. **VHF power** 2N5180 25p, 2N5109 £1.10, 2N3553 £1.10, BLY33 £1.10, PT3500 £1.10, 2N3632 £3, 2N5102 £6.20, 40292 £3.60, 40282 £5, 2N5590 £4.50, 2N5591 £8. **Rx front end** 2N3478 35p fet's 40673 55p, 3N201 80p, 3N202 80p, MPF102 40p. **General purpose** BC183LA 6p, BC108B 7p, 2N3904 10p, 2N3906 15p, BC147 10p, OC35 15p, OC71 10p, OC200 20p, OC202 20p, OC171 25p, 2N3704 8p, 2N987 25p, BAX13 5p, OA47 5p. **Integrated circuits** TAA861 50p, CA3011 50p, CA3014 80p, CA3018 60p. **Capacitors** Tantalum 5p, 100 different ceramic 50p, 200 various 50p. **Resistors** ¼W 10Ω to 1M (E12) 3 of each value £1, any 1p each. **Valves** (not boxed) QQZ03-20 £2, YL1080 80p, 6080 £1.20. **Switches** 5 pole 18 way 75p each. **Heat sinks** TO5 chassis mounted via alumina or Beryllium 10p. **Crystal filters** 10·7MHz ±3·75kHz or ±7·5kHz 3dB ±12·5kHz 90dB £10. Miniature R.F. chokes 5p. 1 C/O Reed Relay type RS12 75p. 25 new marked transistors £1.

Mail order only with cash. All items new. P & P 10p.

T. PARR
60 Culver Lane, Earley, Reading, Berks.
RG6 1DY

NORTH WEST ELECTRICS

EDDYSTONE DIECAST BOXES · TRIO RECEIVERS · JACKSON CAPACITORS & DRIVES · DENCO COILS · "RADIOSPARES" TRANSFORMERS & COMPONENTS · FIBRE GLASS BOXES · ALI. MINI BOXES · COMPONENTS FOR FREQUENCY COUNTERS

Stamped addressed envelope for lists and quotations.

Most items as previous adverts still available.

769 STOCKPORT ROAD, LEVENSHULME
MANCHESTER 19 Phone: 061-224 4911

MEMBER OF THE RADIO AMATEUR RETAILERS ASSOCIATION

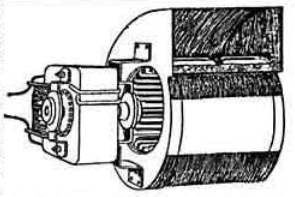
CRYSTALS FT243. 5750—6900, 7150—7900—8625 in 25kHz steps, **28p** each, 5 for **£1.24** post 8p. As stocks are getting low please state alternatives. No 80 series or 8100. Minimum order **56p.**

40 ASSORTED CRYSTALS. All 241A types, **£1.10**, post **22p.**

RF METERS. 2" round, 250MA 350MA, **69p** each. 1A, **80p**, post **20p.** 1A loose glass, sticky movements, etc., sold as faulty, 5 for **£1**, post **30p.**

BRASS PLUGS AND SOCKETS. Semi water-proof, 7 pin, 5A, **40p**, post **10p.**

APN.1. radio altimeter tra/rec 445MPz, complete with dynamotor and valves £2.40, carriage £1.



BLOWERS. 240V AC shaded pole "Mycalex" motor, continuous rated very silent. Double air intake, single output of about 45 C.F.M. overall size 4½" × 4½" × 5½". Ideal for cooling equipment, etc. Brand new. Our price owing to large purchase, **£2.47**, post **34p.** 2 for **£4.47**, post **43p.**

AC METERS 0-300V MI, loose glass, sticky movements, otherwise new. 4 for **£1.10**, post **30p.**

RF AMPLIFIER type 450, 8B79 valves, 2 crystals, 28.5 kc/s nd 31.5 kc/s relays. Micro switch. Res. condensers, Plessey Mk 4 sockets, 6 miniature fuse holders, size of unit 9" × 9" × 5½". Brand new, **£1.35**, post **65p.** Circuit diagram **18p.**

OSCILLATOR UNIT No. 704 for R1933A receiver. 3 valves EF91, 7 miniature wire ended crystals, 2 ceramic yaxley switches, microswitch, variable condenser abou t17PF, with slow motion dial, 2½" centre zero meter, 50 micro amps, cons res, plugs, sockets. In aluminium case. Good condition, **£1.20**, post **40p.** Circuit diagram **18p.**

PACKARD BELL 2-valve microphone amplifiers, complete in neat metal case with 2 valves 28D7 and 6SL7, 2 transformers, condenser and D.P.C.O. relay, attached to case are 2 leads, 1 with a 3-point plug and the other with a hand switch. **Price 90p.**, post **37p.** New and boxed with instructional manual and circuit.

ALL ABOVE PRICES INCLUDE VAT

ARTHUR SALLIS RADIO CONTROL LTD
28 Gardner Street, Brighton, Sussex, BTN 65806

PORTABLE TELEVISIONS

CASH & CARRY		Rec. Price	Our price
HITACHI P32	12"	£69.00	**£54.35**
HITACHI F54	14"	£78.00	**£61.44**
HITACHI 1899	9"	£65.00	**£51.99**
SONY TV11	11"	£66.00	**£55.00**
SONY TV9	9"	£79.20	**£64.24**
RIGONDA	12"	No RRP	**£39.00**
HMV 2818	14"	£67.10	**£51.60**
FERGUSON 3816	12"	£60.55	**£46.81**
HITACHI Rechargeable	9"	£97.00	**£77.00**

Sony Colour TV, Sony Hi-Fi, Tuners, Tape Decks, etc., in stock. **Grundig New Satellite 2000—special price £120.00.** SSB Unit £11.00 extra.

ALL PRICES INCLUDE VAT

PARK ELECTRIC CO LTD

211 Streatham Road, Mitcham, Surrey 01-648 6201

CHC ELECTRONICS [MAIL ORDER]

PL259 ptfe plugs 25p with reducer **31p** + 6p p.p.
10·7MHz (½" sq) IFT's set of 3 Interstage + 1 discriminator, 40p + 6p p.p.
Rechargeable Nickel-Cadmium U2 size 1·2V 4Ah rating **98p** + 6p p.p.
B9A Ceramic valve bases, 12 for **20p** + 5p p.p.
Adhesive linen insulation tape 72 yds × ½" **15p** + 5p p.p.
'N' type plugs 50Ω straight—20p + 4p p.p.
Audio Amplifier Modules. 250mW, 8Ω—**55p** + 10p p.p.
500KΩ LIN pots with D. P. Switch—12p + 4p p.p.
VMP (Miniature BNC) 'T' pieces—10p + 4p p.p.
450-470kHz IFT's (½" sq)—10p + 4p p.p.
Dual T05 Heatsinks—10p + 4p p.p.

Components and equipment bought for cash, send details for offer.

35 WOLSEY WAY, CHERRY HINTON, CAMBRIDGE

G3HEO **G8FAL**

D. P. HOBBS LTD.

Most radio components for the amateur, including:
Trio equipment, Microwave Modules converters, J-Beam aerials, Bantex whips, test meters, etc.

THIS MONTH'S BARGAIN OFFER
18PF Butterfly capacitors, **30p.**
24MHz coils in cans with core, **15p.**
72MHz double-tuned coils in cans with cores, **18p**
ALL NEW EX-PYE CAMBRIDGE
Prices include postage, add 10% for VAT

11 KING STREET, LUTON

Telephone 20907

A Kw! MOBILE?

BETTER THAN ANY LEGAL LINEAR. LLL's RF Clipper gives up to six times effective transmit power without distortion + more selectivity and gain on receive. FOR FT.101 ONLY. SPECIAL INTRODUCTORY PRICE UNTIL MAY **£43.00** inc. VAT. May price for FT.101 Mark 1 Clipper **£49.50** and for Mark 2/B version **£48.50.** Buy with FT.101 and get special cash price.

FT.101 "B" OR MARK 2? "B" has slightly higher Rx gain and selectivity. Use either with our R.F. Clipper for much more gain and selectivity and extra power. FT.101 "B" with fan and clipper **£355** + VAT. Mark 2 with fan and clipper **£317** + VAT.

Details **G3LLL, HOLDINGS LTD.,**
39/41 Mincing Lane, Blackburn BB2 2AF. Tel: 59595/6

CLASSIFIED ADVERTISEMENTS

RATES:

Private advertisements **6p** per word, minimum **£1.20.**
Trade advertisements: **12p** per word, minimum **£1.20.**
Box numbers 25p extra to wordage or minimum
10% series discount for 12 consecutive insertions of the same copy, pre-paid.
Semi-display (boxed) 1″ single column **£4.50.**
1½″ single column **£6.75.**
(Series discounts will be quoted for 6 and 12 insertions).
Please write clearly. No responsibility can be accepted for errors.
Latest date for acceptance—4th of preceding month.
All Classified advertisements must be prepaid.
Copy and remittance to:
ADVERTISEMENT SECTION,
RADIO SOCIETY OF GREAT BRITAIN,
35 DOUGHTY STREET, LONDON WC1N 2AE.

FOR SALE

QSL CARDS, GPO approved logbooks. **4p sae,** Elm Tree Press, Looe, Cornwall. PL13 1JT.

STYLI. Finest quality for most Crystal & Magnetic Cartridges: Double-Diamond, Diamond, Diamond/Sapphire, Double Sapphire, Sapphire, at lowest prices. Quick Service. FREE LIST sent for s.a.e. Felstead Electronics (RC) Longley Lane, Gatley, Cheadle, Cheshire SK8 4EE.

SB401 WITH MONITOR SB610E. Both perfect and unmarked, recently factory checked. Offers over £125. Going transceiver. G3KI. The Hours, Crandall, Farnham, Surrey.

G3TDZ 2 METRE TX/RX CHASSIS made up Aluminium £11.30. C.W.O. Magtronics, 55 Main Street, Snarestone, Burton-on-Trent. Phone Bedworth 316848.

TRANSFORMERS AND COMPONENTS for transistorised DC-DC converters for mobile/portable use. Designs from 60WDC. (transformer £2.40) to 2000W PEP SSB. (Transformers £17.00). Full details on request. Also large quantity of VHF mobile equipment and components—S.A.E. for list. B. M. Sandall, G3LGK, Amber Croft, Higham, Derby, DE5 6EH.

FT.501—ONE ONLY at old price Hurry and save £100. Holdings Photo Audio Centre, Mincing Lane, Darwen, Street, Blackburn BB2 2AF Tel: 59595.

"TOP BAND ON YAESU FT.401/560. Conversion Kits £11.00 inclusive of VAT. Special offer Top Band fitted free for cash purchasers of FT.401 this month. Full details S.A.E. G3LLL. Holdings Ltd. 39/41 Mincing Lane, Blackburn. Lancs: BB2 2AF. Tel: 59595/6."

SURPLUS FROM TRANSHIPMENT. "W2AU" baluns 1:1, 4:1 with lightning arrester. (Normally £7.50) £6.00 14p P & P. Few only. T.M.P. 3 Bryn Clyd, Leeswood, Mold, CH7 4RU.

GALVANISED BXI TOWER as new. Little used. TH4 Tower. Stored perfect. Offers. G3HZ, QTHR Tel: 061-437 3562.

SITUATION REQUIRED

EXPERIENCED REPRESENTATIVE, Communication systems —Time control—P.A.—P.A.X.—Radio paging, based Bristol, seeks position, all proposals welcomed. Licensed amateur. Sutherland, 336 Charlton Road, Westbury on Trym, Bristol.

MISCELLANEOUS

PATENTS and TRADE MARKS.—Booklet on request. Kings Patent Agency Ltd (B. T. King, Mem RSGB, Reg Pat Agent).—146A Queen Victoria Street, London, EC4. Tel: 01-248 7161. Telex: 883805. 60 years' refs.

DERWENT RADIO

Showroom: 5 Columbus Ravine Scarborough. Tel. 65996

QSL display strips for 120 cards **33p.**
Variable caps, 10pF, **17p,** 25pF **25p,** 30pF **25p.** 50pF Diff. **19p.** Double 500pF **66p.** Double 90pF **66p.**
Pre-set caps. 4·5pF **4p,** 3–20pF **4p,** 10–40pF **3p.** 10–120pF **3p.**
Decon printed cct pen **75p**
Rotary switches one pole eleven way **20p;** two pole eleven way **20p;** two pole six way **15p;** four bank six way **25p;** 10 assorted rotary **£1.**
Ferric Chloride, 1 lb **30p**
Amphenol PL 259 **33p.** SO 239 **33p.** SO 239 single hole fixing **33p.** Reducer **8p.**
Hi impedance headsets **99p**
Test meter leads **30p**
Denco IFTs **55p**
Denco coils (transistor) **44p**
4 digit magnetic counter **12p**
Ex service morse keys **52p**
300ohm twin per yard **8p**
Egg insulators **6p**
Veroboard bargain pack **60p**
Aluminium boxes. 2½ × 4 × 1 **27p.** 2½ × 4½ × 1 **27p.** 2½ × 5½ × 1½ **30p.** 2½ × 4 × 1½ **29p.** 2½ × 3 × 1½ **27p.** 7½ × 4 1½ **48p.** 3½ × 4½ 2 **42p.** 3 × 5 × 1½ **33p.**
Parcel sleeving 1mm etc. **30p;** 20 mixed disc ceramic **20p;** 50 mixed resistors **16p;** 8 new relays **£1**
6BA nuts/bolts **22p**
50 disc ceramics **33p**
Mixed capacitors **60p**
PTT dynamic mic. **£3.85**

Prices include VAT Post/Packing extra. SAE for lists
WANTED : GOOD RECEIVERS AND TRANSCEIVERS

GI3ZIA GI AMATEUR SUPPLIES EI6CD

Proprietor—J. F. MacMahon
Stockist for **KW, TRIO, YAESU, EDDYSTONE**
Please add 10% VAT to all prices.

KW	YAESU	TRIO
2000E—£275	FT101—£280	JR301—£75
2000B—£240	FT401—£310	JR599—£160
202RX—£160	FT501—£428	9R-59DS—£49.50
204TX—£170	FL2000B—£195	**USED**
107—£60.00	FR50B—£67	TS510 + PS—£155
101—£9.20	FL50B—£79	Collins KWM1—£125
103—£14.00	★ Full range of accessories always in stock.	
1000 LIN—£150	BOOKS—good selection of ARRL and RSGB—no VAT	

CARRIAGE EXTRA

10 CHURCH ST, ENNISKILLEN, N. IRELAND. Tel: 2955

Mk II 2m JFet converter. **£9.85.** This improved version of our very popular 2m converter uses BF256LB JFets to give the ultimate in performance.

Mk I 2m and 4m JFet converters still at **£8.85.** All units are constructed on 1st grade fibre glass p.c. board, and are housed in sturdy, smart diecast cases, they incorporate a band pass type input filter in front of the r.f. stage. A diode protects the circuit against accidental reverse polarity connection.

70cm converters, £14. Varactor triplers. **£9.85** as last month.

Sae for details and latest supply situation. p & p **15p.**
Available from **P. W. HOWEY,**
4 WEIR BRIDGE CLOSE, BARNWOOD, GLOUCESTER GL4 7LD

Essex Telecomms

New GEC-Marconi VHF AM or FM mobiles, bases and hand portables in stock—together with base and mobile aerials, no hole boot mounts etc. All MPT approved for private mobile radio. Wanted—Pye Westminsters, Motaphones, Pocket-Fones and Equivalent Base Stations.

ESSEX TELECOMMUNICATIONS LTD.
Unit 8, Co-ordinated Industrial Estate, Claydons Lane, Rayleigh Essex SS7 7UP.
G3MVV Rayleigh (03742) 79674 or 79883. **G3WCO**

WANTED

PYE RADIOTELEPHONE EQUIPMENT

Top Prices Paid

B. BAMBER ELECTRONICS,
20 Wellington St., Littleport, Cambs. Tel. Ely (0353) 860185

Service Engineer

A vacancy exists in our Service Department for an experienced SERVICE ENGINEER with suitable qualifications, for servicing HF and VHF SSB and PM equipment.

Salary will be over £1,800, dependent upon qualification and experience.

Sales Assistant

A young, lively person holding a Class A or B Radio Amateurs' licence is required to assist the Sales Manager. If you are interested in joining our team, we would be pleased to hear from you.

Further details from:

The Managing Director
WESTERN ELECTRONICS (U.K.) LTD
Osborne Road, Totton, Southampton
Telephone: Totton 4930

COMPONENT KNOWLEDGE?

We are currently extending our national sales force and are looking for Sales Engineers able to talk and sell electronic components for Service Departments, Technical Colleges, Universities etc. Excellent rates of commission are offered, backed by a delivery service second to none. Sales experience is an advantage but not essential since our merchandise is already well known and includes the top names in the industry.

First suitable applicants will be given total area franchise and we are looking for coverage in most British Isles counties. Ideally suited to TV Service Engineers who would like to earn real money combined with reasonable hours. This is a chance to join a progressive, rapidly growing company on the ground floor. Further details from:

G. BEASLEY, G3LNS,
H.R.S. Electronic Components, 89-90 Meriden Street, Birmingham B5 5LR. Overseas enquiries welcome.

RADIO-TELEPHONE INSTALLATION/SERVICE ENGINEER

Be independent and Radio controlled with a Company vehicle in the London Area.

Clean driving licence essential, telecommunications experience an advantage.

We will provide training, excellent basic salary, plus overtime paid to the right man.

Write or 'phone:

D. A. C. Jack (G3OFV) 20, London Road, Bromley, Kent. 01-464 1862

ENGINEERS

BBC RECEIVING STATION

Caversham Park, Nr. Reading, Berks.

There are immediate vacancies for engineers to undertake the operation and maintenance of radio receiving terminal equipment. The duties include the reception of foreign broadcasts for monitoring and relay purposes, the technical monitoring of the BBC's own transmitters, frequency and field strength measurements and the investigation of interference and other reception problems.

Applicants, who must have normal colour vision and hearing, should be able to demonstrate an active interest in radio reception techniques, receiving aerials and propagation.

The minimum qualification required is a City and Guilds Full Technological Certificate (Telecommunication) or an appropriate HNC.

There are opportunities for promotion and good club and canteen facilities are available. Starting salary is in the range £1815 to £2130 depending on experience, rising to a maximum of £2445. The majority of the staff are required to undertake shift duties for which a basic allowance of 8% on salary is paid. In addition there are generous actuality payments for night and week-end working.

Requests for application forms to **The Engineering Recruitment Officer, BBC, Broadcasting House, London W1A 1AA,** quoting reference 74.E.4019 RC and enclosing addressed foolscap envelope. Closing date for completed application forms, 30th April 1974.

BBC

INDEX TO ADVERTISERS

MEMBERS' AD ORDER FORM

FOR SALE ☐ WANTED ☐ (Tick as appropriate)

- **See Members' Ads page for conditions of acceptance.**
- **Not more than 32 words, plus name, address, etc.**
- **Do not forget 25p remittance plus wrapper.**
- **Please write in block capitals, or type.**

Licensed members are asked to use their callsign and QTHR, meaning that their address in the current callbook is correct. BRS and A members will, of course, have to provide their name and address. The wording will be edited to conform to a set style, and any ads which are not clear will be returned.

I enclose cheque/PO for 25p to cover the cost of this ad.

Signed .....

Date .....

Callsign..... QTHR

or Name and address.....

..... Tel.....

Printed in Great Britain for the RADIO SOCIETY OF GREAT BRITAIN, 35 Doughty Street, London, WC1N 2AE
by The Garden City Press Limited, Letchworth, Hertfordshire SG6 1JS

A. J. H. ELECTRONICS (G8AQN)

Proprietor: A. J. HIBBERD Tel: RUGBY daytime 6473, evening 71066

Terms of Business Cash with order, Mail order only, or Callers by appointment. S.A.E. with enquiries

Postage Charge 15p on Rs and Cs, 20p on others ALL PRICES NOW INCLUDE VAT

PHILIPS MINI COMPACT CCTV CAMERA type LDHO 050/03 complete with Schneider Xenon lens F1·9 25mm, focus from approx 6" to infinity, up to 5 MHz bandwidth 625 lines also has RF output at VHF, 1 volt P-P video output, mains input or 12 D.C. these are new but not boxed, less handbook, tested before despatch, bargain at half manufacturers price ONLY **£110.00** each.

PHILIPS CAMERA SYNC UNITS type LDH4310/00 in cast box, approx. 2" × 3½" × 1", 8 transistors, brand new, **£4.00** each (no gen.).

PYE FM BANTAMS on 49 MHz in good condition with battery box to hold HP7 type batteries 25 kHz channel spacing good condition P.O.A.

AM25B PYE VANGUARDS low band only less control equipment, 12 volt DC input 17 watts RF output, **£8.00** sorry no handbooks + **75p** post.

AM25T PYE VANGUARDS low band only fully solid state except for four valves in Tx, 12 volt DC input 17 watts RF output. Excellent condition, LESS control equipment, ONLY **£15.00** + 75p post.

PYE POCKETPHONES type PF1 UHF 460 MHz (will retune to 432 MHz) separate Tx and Rx, 50 kHz channel spacing less batteries, used condition, **£25.00** pair, i.e. one Tx and one Rx (untested).

AM10DV DASH CAMBRIDGES high and low band, OK for 70 MHz or 145 MHz single channel, fully solid state except for four valves in Tx, 7 watts RF output, used condition **£25.50** + 75p post, complete with handbook.

RF RECEIVER BOARDS as used in FM Cambridges, etc. NPN transistors only two types 68–88 MHz and 79–101 MHz, new, unused, **£2.50** each.

AM/FM CAMBRIDGE AND VANGUARD SPARES. we have a number of sets for breakdown. Let us quote you for any hard to get items, mechanical and electrical s.a.e.

PYE MICROPHONE INSERTS (dynamic) 300 ohm type 4103F, new, unused, **50p** each.

VHF RF Tx POWER TRANSISTORS (all new, unused). 2N3926 7 watt RF output at 175 MHz with 13·5 volt supply, **£2.00** each.

BLY36 13 watts RF output at 175 MHz with 13·5 volt supply, **£2.50** each.

BLY89A 25 watts RF output at 175 MHz with 13·5 volt supply, **£6.00** each.

FET—2N3823, **20p** each.

2N708, **15p** each.

DIODES BYX22/800 800piv — 1A, **10p** each.

PYE RADIOTELEPHONE CONTROLLERS, new unused in original boxes, **£22.00** + £1.00 post.

SET 470 kHz TRANSISTOR IFT'S, set of three 1st double tuned, 2nd and 3rd single tuned, supplied with spare 1st or 2nd IFT your choice, for use with OC171 type transistors or can be used with any near equivalent, size 9/16" sq. with circuit for reference to pin conections, new, unused, **38p** set.

SINGLE TUNED 470 KHz 3/8" sq. — **5p** each.

1 m/a METERS marked 0–100 m/a 3¼" dia. and 4½" dia., unused, both types **£1.25.**

LABGEAR TEST SETS made for field testing the LSP30 SSB manpack transceiver each unit contains a noise generator, dummy load to 10 watts audio amp, etc., brand new, unused in die cast box with meter instruction book, **£3.50.**

URI CO-AX CABLE 70 ohm in 100ft. rolls unused, ex-wd, low loss only 2·2 dB per 100ft. at 145 MHz. ONLY **£4.50**, post paid.

80 ohm **TWIN FEEDER**, **5p** yard.

PL259 plugs **25p** reducers **10p**.

6 CORE CABLE (2 screened) ¼" dia. (off white) **16p** yd.

TV SMOOTHING CAPACITORS 200 + 100 + 50 + 100 MFD at 325vw, **50p** each; 5 for **£2.00.**

TRANSISTOR PSU CAPACITORS 1650 + 1650 MFD at 63vw common negative, **40p** each.

1000MF 100vw (Erie) **40p** each.

SMOOTHING CAPACITORS 700 MFD at 200vw, ideal to put in series for high voltage PSU can type, **20p** each or 10 for **£1.35** (all new and unused).

PACK DRILLED PC BOARDS these were part of a cancelled project and are ideal for mock ups, etc., 1½" × 4", some available 5½" long, only in packs of 25 at **25p** per pack.

ELLIOTT X band attenuator type 1621/1C new boxed **£3.50** (last few).

SLIDE SWITCHES 2 pole change over, small type new, **12p** each.

HC6/U PLUG IN CRYSTAL OVENS 80 deg. C, 6/12 volt with base, new, unused, **35p** each.

EDDYSTONE KNOBS. ½" dia. ¼" spindle fitting (black), **10p** each, 6 for **50p.**

CRYSTAL FILTERS 21·4 MHz type TQF-3806 no gen., unused, **£1.75** each.

B9A CERAMIC VALVE BASES, 8p each, 10 for **55p.**

HI-FI SPEAKER CABINETS manufacturers seconds rejected for slight faults but perfectly usable, in most of these you would not see the fault, three types:—

No. 1. 7½" × 16½" × 8½" to take 8 × 5" elliptical speaker, teak veneered, **£2.75** each + 50p post.

No. 2. 17" × 10" × 7½" to take 8" round and 3½" tweeter teak veneered **£3.00** each (buyer to collect by arrangement).

No. 3. 12" × 21" × 10½" to take 13 × 8" elliptical and 3½" tweeter teak veneered, **£4.50** each, **£8.00** pair (buyer to collect by arrangement).
BULK TRADE ENQUIRIES WELCOME ON THE ABOVE CABINETS:

MAGNETIC TAPE READER made by UNIT DATA LTD., model No. 901, 9 tracks, as new condition. Untested but deck works OK (we have no way of checking the electronics). Reasonable offers, buyer to collect by arrangement.

TRANSISTOR DISC CERAMIC CAPACITORS (50vw).

3·9pf	68pf	220pf	680pf	4700pf
18pf	82pf	270pf	820pf	6800pf
22pf	100pf	330pf	1000pf	0·01mfd
33pf	120pf	390pf	1500pf	0·015mfd
47pf	150pf	470pf	2200pf	0·022mfd
56pf	180pf	560pf	3300pf	0·033mfd

PRICES:—22 to 1000pf + **18p** for 10; 1500pf to 0·015mfd + **23p** for 10; 0·015 to 0·033mfd, **28p** for 10; or all above less than 10, **3p** each.

MINIATURE AIR SPACED TRIMMERS 1–10pf ⅜" sq made by Oxley **15p** each **£1.25** for 10.

METALIZED FILM CAPACITORS

0·01 mfd 250vw (small rectangular type), **5p** each, **40p** for 10.

0·1mfd 250vw (small rectangular type), **5p** each, **40p** for 10.

0·22mfd 100vw (MULLARD), **5p** each.

0·1mfd 10vw (MULLARD), **5p** each.

2·2mfd 100vw (MULLARD) **10p** each.

RESISTORS (carbon film) ⅛, ¼ and ½ watt types, 22 ohm to 1 megohmin E12 series, i.e. 1, 1·2, 1·8, 2·2, 2·7, 3·3, 3·9, 4·7, 5·6, 6·8, 8·2, 10k. Prices: ⅛ and ¼ watt, **1p** each; ½ watt, 2 for **2½p** (All 5% tol.).
1000pf 500vw feed through capacitors, solder in type, ⅛" dia., **2p** each; **18p** for 10.

MINIATURE PRE-SET SKELETON POTS (vertical) ½" sq. 100, 220, 470, 680, 1k, 2·2k, 3·3k, 4·7k, 6·8k, 10k, 15k, 22k, 47k, 68k, 100k, 220k, 470k, 680k, 1M, 3½p each **30p** for 10.

RADIOTELEPHONE 10·7 MHz CRYSTAL MARKER OSCILLATOR solid state and built into die cast box 3½" × 1½" × 1½" high stability with voltage and temperature variations fibre-glass PC board and built-in battery, guaranteed 6 months with free calibration service to 12 months, brand new, our own make **£8.00** (VAT paid) + 20p post. Trade enquiries welcomed for quantity.

59 Waverley Road, The Kent, Rugby, Warwickshire.

IF UNDELIVERED Return to:— RSGB, 35 DOUGHTY ST LONDON WC1N 2AE

IF UNDELIVERED Return to:— RSGB, 35 DOUGHTY ST LONDON WC1N 2AE