

# Microwave Newsletter

Published by the Radio Society of Great Britain  
35 Doughty Street, London WC1N 2AE.

Content:- all reports to go direct to the RSGB Microwave Committee. Subscriptions:- to RSGB HQ when requested.  
Changes of address:- to RSGB HQ quoting the callsign or reference in the top right hand corner of your address label.

Date: 24.3.81 No. 02/81

This is the second newsletter to be distributed by HQ, and the first to incorporate our new letterhead. About 35 people have sent in subscriptions and anyone else who would like to receive the newsletter should send £3 (for 10 issues) to RSGB Headquarters, (marking the envelope "Microwave Newsletter"). Unfortunately, we cannot accept subscriptions for less than 10 issues.

News etc. should be sent in the normal way to J.N. Gannaway, G3YGF, 17 Crick Road, Oxford. All news is welcome, including operating news, details of equipment built, technical items. We rely on this support for the newsletter to continue.

## Ernie Hoare, G3RZD

We were deeply saddened to hear of the passing of Ernie Hoare, G3RZD ex-G8BEJ at the end of January. He was well-known to the Microwave Community as an enthusiastic and cheerful operator and constructor.

He started his 10GHz activities in 1976, though prior to that he had been something of a pioneer on 432MHz tv, and became one of the most active 10GHz operators in the country - in fact, not including the Cumulative Contests, he made over 150 10GHz QSO's. He held an RSGB 150km microwave award, earned with one of his many cross-channel QSO's, and with his close friend G8GKV was the first winner of the 5 QTH-square award on 10GHz. His best dx was a 210km contact with F6DLA/P.

As well as all his operating activity, he was also a keen constructor, and this winter he was building gear for 10GHz narrowband and 24GHz ready for the coming season.

He seemed very much the "amateurs' amateur" - though he had no professional contact with electronics, he built all his own microwave equipment, and obtained remarkable results through regular and consistent operating. He will be sadly missed, both on this side of the channel and by his many friends in France.

## Contests

By popular demand, an extra weekend has been added to the Microwave Cumulative contest series (with 3 out of 6 weekends to count). As with the last summer's contest, an extra band will be included with each weekend. Full details of rules etc. will appear in Radcom. The dates, with the corresponding extra bands are :-

19th April (3.4GHz)	19th July (2.3GHz)
17th May (24GHz)	16th August (24GHz)
21st June (5.7GHz)	13th September (5.7GHz)



The May RSGB Contest (2-3 May) will be split into two sections : 144MHz, and 432/1296/2304MHz.

The IARU UHF Contest, which includes all microwave bands, falls on 3-4 October. The rules will probably be similar to previous years (see June/July 1980 Radcom, p685).

#### Dates for your Diary

There will be an Amateur Radio Conference, taking place at Plessey West Leigh, Martin Road, Havant, on 22nd March. Speakers include G8DEK (semiconductor devices), G3PLX (Amtor), G3GVM (TVI and afi suppression), G3JVL (propagation), G3RZP (synthesisers for the radio amateur), G6NZ (detectors and early radio). Doors open at 9.00 for 10.00 start. Lunch will be available on site. Talk-in by G3WLE on S22.

The VHF Convention is on 11th April at Sandown Park. The Committee hope to have some sort of stand to display home-constructed gear, with the John Rouse Memorial trophy to be presented to the best piece of equipment. Please bring along any gear you can for this - don't be shy.

The next Winchester Round Table will be held on Sunday 14th June. More details nearer the event.

#### Beacons

GB3SWH is back on the air, from Bushey Heath Church (ZL29f, TQ146 945, very close to junction of A411 and A4140), 10368.250, 10mW n/b to 8dBi omnidirectional antenna, horizontally polarized.

A new 2.3GHz beacon, GB3NEW, is on the air, from the same site as GB3AND, running 50w erp beaming NNE, 30° beamwidth. Frequency is 2304.010. Reports please to G8ADM, or G3PYB. (Tel. 0264 64967).

#### Other News

DK2ZF sends details of his activities. He runs 50mW from a Gunnplexer, and his best dx so far is 272km. He will be active from Denmark-Blavand (EP31) from August 15th - September 10th and would like to try daily skeds to England. His address is :-

Rolf Niefind, DK2ZF,  
Lerchenstr 10,  
2407 Bad Schwartau,  
West Germany.  
Tel. 0451 27891

### Other Journals

Various items of microwave interest have appeared in other journals :

#### DUBUS-Info 3-80

23cm preamplifier with MGF1400-DJ8QL (Mechanically simple gasfet design , 0.8dB nf)

Front-end modification of IC202-YUINOP and YUIPKW (reduces nf to <3dB).

70cm preamplifier with NE57835-DD8BD

High-power varactor frequency multipliers-DL7QY (30W at 1152 to 17W at 2304, 12W at 3456 or 6W at 5760, using Siemens BXY19HA)

#### VHF Communications 3-1980

10GHz ssb: part 1 - local oscillator-DC8UG, DB1PM (includes some useful circuits)

Home-made parabolic dishes for microwave applications (very good, includes dual feed for 10GHz and 24GHz) -DL6MH

#### VHF Communications 4-1980

Local oscillator, transmit mixer and linear amplifier for the 9cm band (high-level mixer with 2C39's) - DF5QZ

G3JHM has also found some interesting references concerning superrefraction on 24GHz, which give some encouraging results and predictions. One in particular ("Calculated tropospheric dispersion and absorption due to 22GHz water vapour line". IEEE trans. Ant. and Prop. AP17 No. 5, September 1969, pp621-627) gives a figure of 0.02dB/km attenuation at 24GHz (760 mm Hg, 7.5g/m<sup>3</sup> water vapour, 20° temp), and in another paper, evaporation duct enhancement has been observed at 37GHz tying up closely with predictions. With the large number of stations building gear for 24GHz, we are clearly in for a very interesting summer's activity.

### Technical News

GWSNBK sends details of the afc system he uses in conjunction with the GDO33 24GHz Gunn oscillator power supply/modulator ("Microwaves", Radcom September 1980).

G8AFC et. al. will be going to EI-land around the period 23-30th. May, taking wideband and possibly narrowband gear.

### Operating News

The most exciting news of the past few weeks has been the tremendous lift at the end of January/beginning of February.

Thurs. 29th Jan. G3JHM copied the Alderney 10GHz beacon, GB3ALD from his home QTH at Four Marks, for the first time, at a distance of 175km, peaking 15dBn. The beacon was also heard by G8DEK from his home QTH (Winchester) at a distance of 163km, peaking 20dBn.

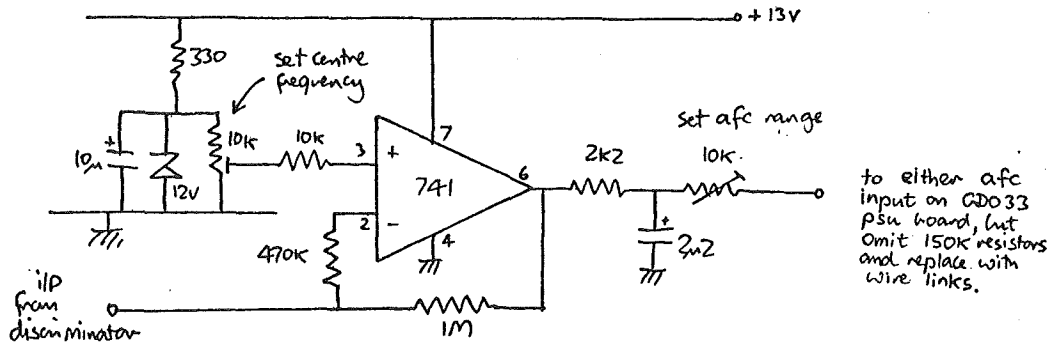
Fri. 30th Jan. GB3ALD was again copied by G3JHM and G8DEK, and also by GW3PPF at Garth Mountain, South Wales (YL34j). G3JHM tried unsuccessfully with G3VPF at his home QTH in Chickerell, Dorset, and with G8MCQ/P at Grange Arch, Purbeck Hills. G8MCQ/P also tried with GW3PPF/P, with no luck, which was surprising, as GB3ALD was audible on open-ended waveguide.

Sat. 31st Jan. GW8NBK (Cardiff) heard F1BQ/P calling CQ on 144MHz for 10GHz tests. F1BQ was copying the 10GHz GB3IOW beacon at good strength, and GW8NBK could hear the 1.3GHz GB3IOW at S9+ with just an indoor antenna. A sked was set up, and at 1430, GW3PPF/P (Garth Mountain) worked F1BQ/P (Octeville, AJ31j) for the first GW-F 10GHz QSO, at a distance of just under 300km. Signals were up to 40dBn. GW3PPF was also able to copy GB3ALD, at about 10dBn, and G3JHM was able to copy the same beacon from his home QTH all day. Curiously enough, Don noted that he could not copy the 10GHz GB3IOW beacon (which he can normally do under flat conditions) during this period. G8MCQ/P operated from Portland Bill, trying to work GW3PPF/P, but only heard a weak unidentified signal at about midnight on a northerly dish heading. Nick suspects that this was the LO of someone located on the Mendips looking for GB3ALD. Would anyone like to own up? GB3ALD was as strong as ever even at 1.00 am, though the foghorn on the lighthouse was apparently rather loud, too.

Sun. 1st Feb. GW3PPF/P and F1BQ/P repeated their contact of the previous day but signals were rather weaker, with deep QSB. Phil could never hear the 10GHz GB3IOW beacon, though the 1.3GHz GB3IOW was a huge signal. GW8NBK notes that the strength of the 1.3GHz GB3IOW beacon seems to be a good indicator of conditions on 10GHz. G3JHM/P (Cheesefoot Head, Winchester) copied GB3ALD at up to 20dBn, and was heard by F8WN/P (Mt. Casigny, 3km SW Deauville) at 5/5 with deep QSB. Unfortunately, conditions were fading rapidly, so Don could not complete a two-way QSO. G8MCQ/P operated from the Purbecks again, but had no luck with GW3PPF/P or F1BQ/P, though GB3ALD was still very strong.

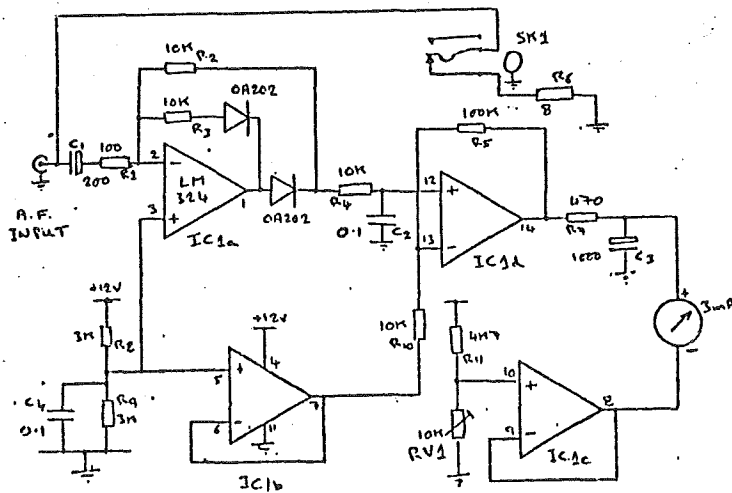
Throughout the period of the lift, conditions on the lower bands were excellent and much dx was worked on 1.3GHz. Congratulations (and thanks for reports) to everyone who took part in the tests. One obvious conclusion is the value of beacons (and regular monitoring of them) to detect such openings.

On February 22nd, G8ADP had a 3.4GHz QSO with G8NDJ over a highly-obstructed 5-6km path. G8NDJ runs about 100mW output, to an 18" dish with a log periodic feed.



CW8NBK afc system.

From Richard Marshall, G4ERP, comes details of a simple audio voltmeter. With suitable calibration, or an attenuator substitution method, this could be used for measuring ground or sun noise, or measuring noise figure by the hot/cold technique :



### "Introduction

The human ear, although a marvellous invention, is not particularly good at detecting small changes in audio levels. This is a distinct disadvantage when attempting to align a preamp or a receiver without the use of sophisticated Test equipment. The circuit described in this article is that of an audio meter which allows changes of less than 0.5dB to be observed. It has

been in use for some time now, and has proved invaluable for aligning and comparing preamps, receivers etc and when testing aerials.

### Circuit Description

The circuit of the meter is given in Fig 4. The basis of the unit is IC1 which is an LM324. This is a quad 741-type op-amp requiring only one power supply voltage, thus making it ideal for portable use.

The receiver audio output is applied to IC1a, which is connected as a precision rectifier. The raw d.c. is smoothed by the integrator network  $R_4$  and  $C_2$ , and then amplified by IC1d. The output at pin 14 has a +6V d.c. offset, and this prevents the direct connection of a meter to 0V. To overcome this, IC1c

generates on identical voltage so that the meter reads zero under no-signal conditions.

Resistor R is chosen to present the receiver with the correct impedance if the headphones should be removed from SK1. It should be of adequate power rating."

G3HWR has had some interesting ideas about waveguide for the new millimetre bands :-

*Properties of Non Standard Waveguide*

Cat No K & S	Description		Cut Off GHz	Useful Band (GHz)	Amateur Band				
	Type	O.D. in I.D. in			GHz	λ <sub>g</sub>	λ <sub>g</sub> /λ <sub>0</sub>		
262	□	.187 x .053 4.76 x 2.31	.126 x .063 3.56 x 1.66	39.8	40 to 75	47 47.2			
264	□	.256 x .123 6.35 x 3.18	.229 x .094 5.55 x 2.38	26.98	30 to 52	47 47.2	.6378 .635	.7783 .7734	1.221 1.217
266	□	.313 x .156 7.93 x 3.97	.281 x .125 7.14 x 3.18	21.0	24 to 41	24.0 24.192 24.25	1.249 1.239 1.236	35.72 24.96 24.65	2.066 2.014 1.995
268	□	.375 x .188 9.53 x 4.76	.344 x .156 8.74 x 4.0	17.17	20 to 34	24.0 14.192 24.25	1.249 1.239 1.236	18.18 17.86 17.75	1.459 1.442 1.435
181	□	.125 x 3.175 x	.0937 x 2.38 x	62.94	70 to 125	76 76.03 81 120	3.94 3.70 2.50	7.023 5.878 2.936	1.784 1.588 1.174
184	□	.219 x 5.56	.178 x 4.76	31.47	35 to 60	47 47.2	6.38 6.35	8.588 8.522	1.306 1.302

"Waveguide sizes are agreed internationally for frequencies up to at least 300GHz and for amateurs with access to them, these are the best to use.

For home built equipment which does not require to connect to other equipment, it is not necessary to use standard waveguide and non standard waveguide quite adequate in short lengths can be bent up from sheet metal.

Useful extruded metal sections are available from the model trade, these are used by modellers to represent the corresponding rolled steel sections ie., angle, I-beam, T-beam and square and rectangular box sections!

Attached is the price list of R.M. Trading Co. together with a list of retailers as at Autumn 1980.

Also attached is a list of the important properties of the four rectangular sections and the waveguide obtained when a channel section is attached to a flat sheet."

G3JHM has come across a source of tubular low-pass filters, with a cut-off frequency of 390MHz. These are made by Telonic, and have <1dB insertion loss at 384MHz, with >40dB attenuation at 480MHz, so would be useful in applications where a very clean 384MHz signal is needed (though 192MHz and 288MHz products would still need some attention). They are about 4½" long, and have TNC connectors. They are available through G3JHM, QTHR, at £5 each.

G3YGF notes that LUNAR (2785 Kurtz St., Suite 10, San Diego, CA 92110, USA), sell devices at the following prices :-

D432	\$25	FB gasfet
U310	\$2.75	V. nice j fet, used in Lunar 2m preamp
3SK97	\$5	dual gate gasfet
MGF1400	\$38	FB gasfet

Applied Invention, (RD2, Box 390, Route 21, Hillsdale, NY 12529, USA) sell MGF1400 at \$29. P & P will no doubt be extra.

Cliff, G8SHF reports that he found the GDO33 24GHz oscillator very sensitive to mismatch. He also had instability problems with the GDO33 psu/modulator design (though using different transistors to those specified), but cured it by fitting a 0.1 $\mu$ F capacitor between pins 2 and 6 of the 741. He reports (as do quite a few other people) that the 384MHz source design is very easy to build and gives excellent performance. Pcb's for this, plus a set of leadless disc capacitors, are available for £5.50 from G3YGF, who can also provide pcb's for the low-voltage drop regulator (see Newsletter 06/80) at £2.20.

————— " —————

Please send G3YGF information of your intended whereabouts for the first cumulative (19th April) to reach him no later than 6th April.

73 de G3YGF, G4CNV and G4KNZ

# PRICE LIST & ORDER FORM

PRICES EFFECTIVE FROM APRIL 1st 1980

Name \_\_\_\_\_ Date \_\_\_\_\_  
 Address \_\_\_\_\_ Order No. \_\_\_\_\_  
 Signature \_\_\_\_\_  
 Tel \_\_\_\_\_

## RETAIL PRICE LIST INCLUDING V.A.T.

**Model Centre**  
 Complete kit, inc. display stand contains a selection of the following items:

**ALUMINIUM TUBE (12 inch Length)**

Ref No	Quantity	Wt in Pack	Size	Price Per Item	Total
121	15	1.16	25		
122	12	3.22	30		
123	12	1.8	35		
124	11	1.12	40		
125	10	0.75	45		
126	8	0.57	50		

**COPPER TUBE (12 inch Length)**

Ref No	Quantity	Wt in Pack	Size	Price Per Item	Total
117	15	1.18	25		
118	12	3.22	30		
119	12	1.8	35		
120	11	1.12	40		

**SOFT BRASS TUBE (12 inch Length)**

Ref No	Quantity	Wt in Pack	Size	Price Per Item	Total
121	15	1.16	25		
122	12	3.22	30		

**ESSENTIAL STEEL WIRE (12 inch Length)**

Ref No	Quantity	Wt in Pack	Size	Price Per Item	Total
123	12	1.8	35		

**ROUND BRASS TUBE (12 inch Length)**

Ref No	Quantity	Wt in Pack	Size	Price Per Item	Total
124	11	1.12	40		
125	10	0.75	45		

**SHEET METAL (6 x 10 Sheets)**

Ref No	Quantity	Wt in Pack	Size	Price Per Item	Total
230	6	0.55	20		
231	6	0.12	25		
232	6	0.15	30		
233	6	0.18	35		
234	6	0.21	40		
235	6	0.24	45		
236	6	0.27	50		

**SQUARE BRASS TUBE (12 inch Length)**

Ref No	Quantity	Wt in Pack	Size	Price Per Item	Total
237	6	0.25	25		
238	6	0.32	30		
239	6	0.40	35		
240	6	0.48	40		
241	6	0.56	45		
242	6	0.64	50		

**SOLID BRASS ROD (12 inch Length)**

Ref No	Quantity	Wt in Pack	Size	Price Per Item	Total
243	6	0.12	25		
244	6	0.15	30		
245	6	0.18	35		
246	6	0.21	40		
247	6	0.24	45		
248	6	0.27	50		

**WPALE ANGLE (12 inch Length)**

Ref No	Quantity	Wt in Pack	Size	Price Per Item	Total
249	6	0.25	25		
250	6	0.32	30		
251	6	0.40	35		
252	6	0.48	40		
253	6	0.56	45		
254	6	0.64	50		

**BRASS CHANNEL (12 inch Length)**

Ref No	Quantity	Wt in Pack	Size	Price Per Item	Total
255	6	0.25	25		
256	6	0.32	30		
257	6	0.40	35		
258	6	0.48	40		
259	6	0.56	45		
260	6	0.64	50		

**RECTANGULAR BRASS TUBE (12 inch Length)**

Ref No	Quantity	Wt in Pack	Size	Price Per Item	Total
261	4	1.72	1.50		
262	4	1.78	1.75		
263	4	1.84	2.00		
264	4	1.90	2.25		
265	4	1.96	2.50		
266	4	2.02	2.75		

**HEXAGON BRASS TUBE (12 inch Length)**

Ref No	Quantity	Wt in Pack	Size	Price Per Item	Total
267	6	1.52	1.50		
268	6	1.58	1.75		
269	6	1.64	2.00		
270	6	1.70	2.25		
271	6	1.76	2.50		
272	6	1.82	2.75		

### ROUND PLATED SPRING WIRE (12 inch)

Ref No	Quantity	Wt in Pack	Size	Price Per Item	Total
192	40	1.37	20		
193	40	1.47	25		
194	40	1.57	30		
195	40	1.67	35		
196	40	1.77	40		
197	40	1.87	45		
198	40	1.97	50		

### BRASS STRIPS (12 inch Length)

Ref No	Quantity	Wt in Pack	Size	Price Per Item	Total
230	20	0.18	20		
231	15	0.12	25		
232	10	0.10	30		
233	10	0.16	35		
234	8	0.14	40		
235	8	0.18	45		
236	6	0.24	50		

### STEAMLINE TUBE (12 inch Length)

Ref No	Quantity	Wt in Pack	Size	Price Per Item	Total
237	6	0.25	25		
238	6	0.32	30		
239	6	0.40	35		
240	6	0.48	40		
241	6	0.56	45		
242	6	0.64	50		

### ROUND ALUMINIUM TUBE (12 inch Length)

Ref No	Quantity	Wt in Pack	Size	Price Per Item	Total
1199	8	1.22	20		
1100	8	1.8	25		
1101	8	2.4	30		
1102	8	3.0	35		
1103	8	3.6	40		
1104	8	4.2	45		
1105	8	4.8	50		

### ROUND BRASS TUBE (12 inch Length)

Ref No	Quantity	Wt in Pack	Size	Price Per Item	Total
1163	10	1.16	20		
1164	8	1.37	25		
1165	6	1.57	30		
1166	6	1.77	35		
1167	6	1.97	40		
1168	6	2.17	45		
1169	6	2.37	50		

**Wire & Tube Centre**  
 Complete kit, inc. display stand contains a selection of the following items.

**PLAIN WIRE (12 inch Length)**

Ref No	Quantity	Wt in Pack	Size	Price Per Item	Total
498	50	0.15	10		
499	42	0.20	13		
500	34	0.25	15		
501	26	0.32	18		
502	21	0.40	20		
503	17	0.48	22		
504	14	0.56	24		
505	11	0.64	26		
506	9	0.72	28		
507	7	0.80	30		
508	6	0.88	32		
509	5	0.96	34		
510	4	1.04	36		
511	3	1.12	38		

### STREAMLINE TUBE (12 inch Length)

Ref No	Quantity	Wt in Pack	Size	Price Per Item	Total
1107	5	1.4	1.50		
1108	5	1.8	1.80		
1109	4	2.2	2.10		
1110	4	2.6	2.40		
1111	3	3.0	2.70		
1112	3	3.4	3.00		

### TOOLS AND ACCESSORIES

Ref No	Quantity	Wt in Pack	Price Per Item	Total
206	3	Tubing Cutter	1.25	
321	6	Tubing Bender	1.50	
702	8	Brass Connectors	1.00	

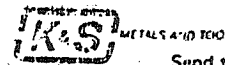
### DISPLAY RACKS

Ref No	Quantity	Wt in Pack	Price Per Item	Total
1006		Metal Centre Tube & Wire Centre	149.00	
2400		Easy Rider for 1005 Metal Centre	151.00	

(See notes with \*)  
 Total Carried Forward

Sub Total				
Rate P + P			35p	
Grand Total				

\*Not included in Wire and Tube Centre.  
 \*Included in Easy Rider add on set for 1005 Metal Centre.  
 In the interest of economy and speed of service, retailers must order in each quantity only. Retail direct spot or large quantities required.



Send to: R.M. Trading Co., 646 High Road, N. Finchley, London N12 0NL, Tel: 01-445 6531  
 EXCLUSIVE U.K. IMPORTERS OF K & S PRECISION ENGINEERING PRODUCTS

We list below current retailers with Metal Centres and Tube & Wire Centres.  
 MC = Metal Centre Stand \* TWC = Tube & Wire Centre Stand \* Not marked = Small selection only.

Address	MC	CHICHESTER	TWC MC	LETCHEWORTH	MC	PORTSMOUTH	MC
ADDLESTON (Waybridge) Addleston Models Ltd 63 Station Road Surrey KT15 2AR Tel: Waybridge 45440	MC	CHICHESTER Martlet Models 49 North Street Sussex PO19 1NF	TWC MC	LETCHEWORTH Brookers Tool Centre 23 Loys Avenue Herts	MC	PORTSMOUTH Ray Brown Models 10 Kingston Road Hants PO1 5RZ Tel: Portsmouth 25049	MC
ASHTON-UNER-LYNE (Lence) Ashton Model Supplies 201 Old Street	MC	CHIPPENHAM Chippenham Model Craft Ltd 65 New Road Wilts Tel: Chippenham 2466	MC	LONDON N7 Henry J. Nicholls & Sons Ltd 308 Holloway Road N7 6BP Tel: 01-607 4272	TWC MC	RICHMOND H.G.H. Models Ltd 6 Westminster House Kew Road, Surrey Tel: 01-940 7485	TWC MC
BANBURY Trinder Bros. Ltd. 2-4 Broad Street Oxon OX16 8BN Tel: OZ95 2546	MC	CROYDON L.H. Turtle Ltd 6-12 Park Street Surrey Tel: 01-688 5513/5	MC	LONDON N12 Michaels Models 646 High Road North Finchley Tel: 01-445 6531	TWC MC	ST. ALBANS Sams 12 Hatfield Road Herts	TWC MC
BELVEDERE Manor D.I.Y. Mr. Dickens T/A 90 Parsonage Way, Kent	MC	DONCASTER Evans Model Shop 65 Silver Street Yorks	MC	LONDON NW1 Aeronautical Models 39 Parkway Cannon Town	TWC MC	SIDCUP Modelline Hobbies & Crafts 242 Blackfen Road Kent	MC
BERKHAMSTED Morris 340 High Street Herts HP4 2DW	MC	DUBLIN The Modellers Den Aston Place Dublin 2 Eire	MC	LONDON SE10 Maritime Models Greenwich Ltd 7 Nelson Road Tel: 01-858 5561	MC	SLOUGH Slough Padic Control Models 273 High Street Berks Tel: Slough 39419	MC
BINGLEY Sonley's Model & Electronics 497 Martford Road West Yorkshire	MC	ENFIELD Red Baron Models Ltd 497 Martford Road Middlesex Tel: 01-804 7452	TWC MC	LONDON SE25 Norwood Junction Models Ltd 3 Orton Buildings Portland Road SE25 4UD Tel: 01- 653 4943	MC	STREET Somerset Tool Services 185A High Street Somerset	MC
BIRMINGHAM Babs Models 520 Coventry Road B10 0UN Tel: 021 772 4917	MC	EXETER Exeter Model Centre Ltd 39 Sidwell Street Tel: Exeter 35118	MC	LONDON SE27 Hobby's Knights Hill Square SE27 0HH	MC	TAVANTON Marrison Tool Company 30 Station Road Devon	MC
BOURNEMOUTH R.F. Austen Model Shop 131 Seabourne Road Southbourne BMS 25A Tel: 0202 424038	MC	FELTHAM EMA Model Supplies Ltd 58-60 The Centre Middlesex TW13 4BH Tel: 01-830 5270/8404	MC	LONDON E1 Medley Hobbies Ltd 131 Middlesex Street Bishopsgate Tel: 01-283 9870	TWC MC	TRURO The Hobby House Model Shop 4 Little Castle Street Cornwall TR1 2GL Tel: Truro 3599	MC
BRADFORD Medalidrome 182 Manningham Lane Tel: Bradford 26186	MC	HARLINGTON Radio Control Model Centre 214 High Street Middlesex Tel: 01-897 2326	MC	LEEDS 15 Flying Models R.E. & E. Sherwood T/A 88 Crossgates Road Tel: Leeds 646117	MC	UKERIDGE Percy's 235 High Street Middlesex UB9 4LE Tel: Uxbridge 33859	MC
BRIDLINGTON Northwood Trading Co. 22 West Street East Yorks Tel: 0262 71359	MC	HARROW 190 Station Road Middlesex	TWC MC	LIVERPOOL Stan Catchpoles's Model World 85 Bold Street Tel: 051 709 6039	MC	WAKEFIELD Wakefield Model Railway Centre R.M. Buckley (Wakefield) Ltd 260 Dewsbury Road Tel: Wakefield 74097	MC
BRIGHTON 4 Queens Road Quadrant BN1 3XJ Tel: Brighton 23125	MC	HEREFORD D & D Models 23 Church Street Tel: 0432 56795	MC	MANCHESTER 3 The Model Shop 209 Deansgate Tel: 061 834 3972	MC	WALLINGTON (Surrey) Tommy Harris Models Ltd 155 Stafford Road	MC
BRIGHTON Mintiques 62B Trolargar Street BN1 4EB	MC	MORNINGTON Radio Active (Models) 94 Ardleigh Green Road Essex Tel: 43 40016	MC	MIDDLESBOROUGH Hobby Drome 283 Linthorpe Road Cleveland	MC	WALSALL S.M. Grainger (Caldmore Models) Ltd 109 Caldmore Road WS1 3RB Tel: 0522 23282	MC
BURTON-ON-TRENT J & M Models 22 Derby Street Tel: Burton-on-Trent 64240	MC	HULL Reg Beaumont 150 Charterlands Avenue North Mumburds Hill HU5 3TR Tel: Hull 43701	MC	NEWCASTLE-UPON-TYNE Boydella 11-13 High Friars, Eldon Sq. Tyne & Wear	MC	WARLEY (Warcs) Hobby Spot 280 Hegley Road West Oldbury, B68 0	