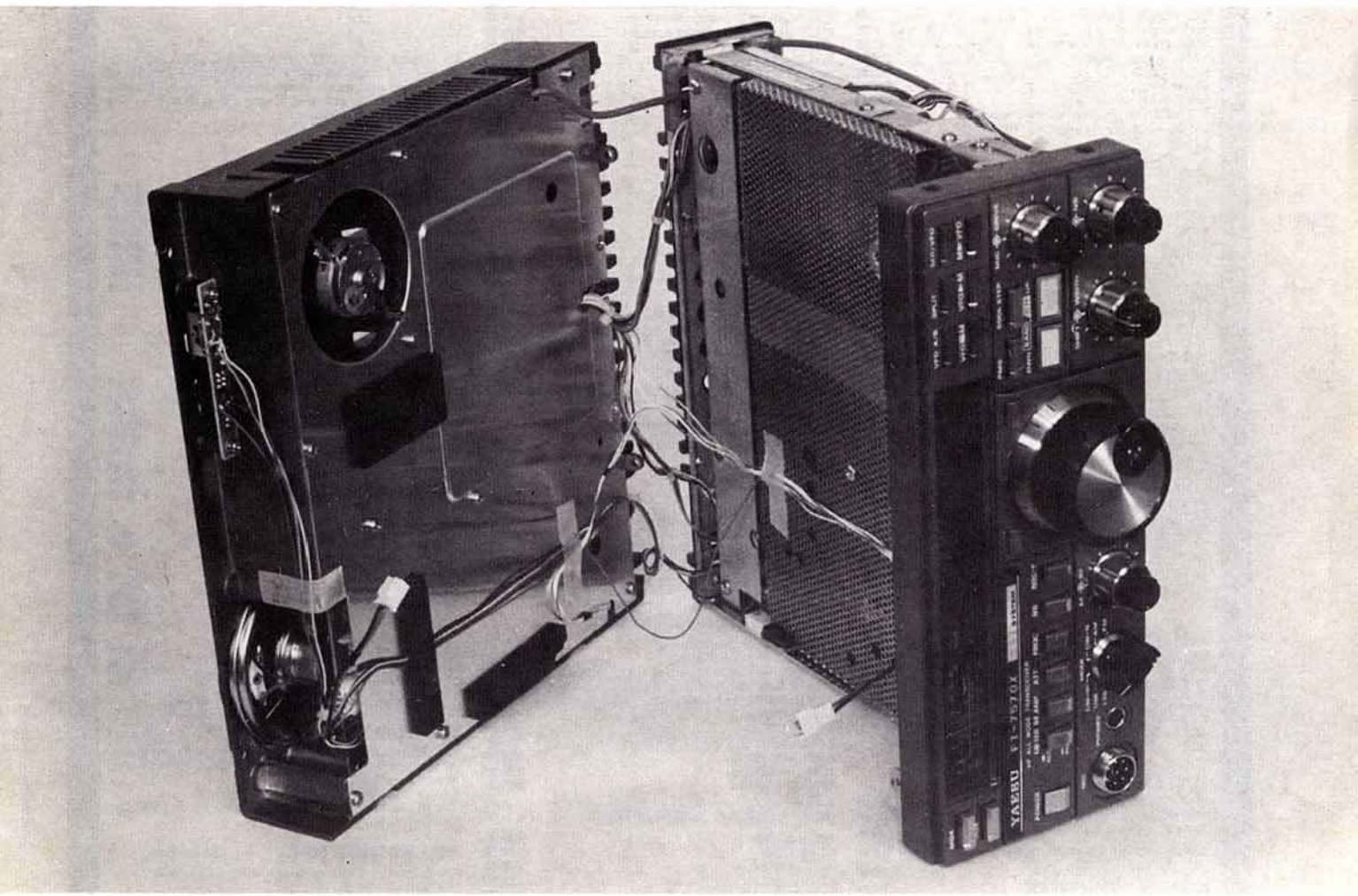
May 1985

RADio COMmunication

LOOKING INTO THE YAESU MUSEN FT757GX

Peter Hart reports his findings in this issue



Interior view of the FT757GX with upper and lower units separated

Journal of the Radio Society of Great Britain

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YAESU FC 757 AUTOMATIC	245:00
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MML 144/100LS	169:95
MML 144/200S	245:00

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CONTENTS

Technical articles on subjects of amateur interest are always welcome and should be sent to: The Editor, *Radio Communication*, 88 Broomfield Road, Chelmsford, Essex CM1 1SS.

All articles received are reviewed for technical merit by the RSGB Technical & Publications Committee, or an acknowledged expert on the subject, before acceptance. Payment at high competitive rates will be made for all articles published.

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The editor will be pleased to send intending authors a manuscript preparation guide and to give any other advice and assistance requested.

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introducing a new **HF** transceiver from TRIO, the **TS940S**,

The TRIO TS940S is a first class competition HF transceiver designed for SSB, CW, AM, FM and FSK operation on all amateur bands from 160 to 10 metres. The transceiver incorporates a 150kHz to 30MHz general coverage receiver having an excellent dynamic range (typically 102dB on 20 metres, 50kHz spacing, 500Hz CW bandwidth). Designed to cope with today's band conditions and with the serious DX'er/contest operator in mind, the TS940S has a comprehensive range of front panel receiver controls;

SSB IF slope tuning; operating in both LSB and USB modes, front panel controls allow the independent adjustment of either the high or low frequency slopes of the IF passband.

CW VBT (variable bandwidth tuning); allows the passband width to be varied within the range of the control without affecting the centre frequency.

IF notch filter; provides in the order of 40dB attenuation to the interfering signal.

AF tune; active filtering reduces interfering signals and white noise whilst operating in the CW mode.

Narrow/wide filter selection; a selection of filters, both 8.83 and 455kHz are available for the operator who requires maximum selectivity control. The TS940S comes with both 2.7kHz SSB filters (8.83 and 455kHz) and the 6kHz AM filter (455kHz) built-in.

CW variable pitch; dual mode noise blanker and separate RIT/XIT controls complete the facilities.

To aid serious operating on both amateur and broadcast frequencies, the TS940S has;

A large heavy diecast knob with a moulded rubber cover which when rotated at normal tuning speeds results in frequency steps of 10Hz. Rotation of the tuning knob in excess of 2 to 3 revolutions per second results in the step size and tuning rate being increased acccordingly.

In addition to instant access to each amateur band using the band select keypad, the same keys can be used to directly enter any frequency within the operating range of the transceiver. Once entered, the VFO can be used to tune away from the selected frequency. Truly flexible operating in the TRIO tradition.

The TS940S has two VFOs, front panel switches enable split frequency operation, both VFOs to be quickly put on the same frequency and the reversal of the transmit and receive frequencies during split frequency operation.

40 memory channels, each of which remembers both frequency and mode are available. Frequencies can be easily transferred from memory to either VFO. Memory information is backed up by an internally fitted lithium battery. The transceiver operating system is held permanently in ROM and is not dependent upon the back-up supply.

The transceiver will scan all memory channels and between user programmed frequency limits as set in memories 9 and 0.

Accurate and quick frequency readout is ensured by the use of a large fluorescent tube digital display combined with an analogue sub-scale. The analogue display can be switched to read a 1MHz or 100kHz span, tuning in either 20kHz or 2kHz steps.

A feature new to HF transceivers is a green back-lit dot matrix LCD which shows graphically VBT and IF slope tuning positions, can be used to review the frequencies stored in the 40 memory channels and other VFO, will provide information on the automatic sequence of operations when using the internal (optional) tuning unit, and when selected, displays both the time and owner programmed on/off switching times.

In addition, break-in keying on CW, a 28 volt solid state final amplifier stage, an RF speech processor coupled to the rig's ability to monitor its own transmitted audio and all mode squelch add up to give the TRIO TS940S even greater versatility of operation.

For those with failing sight or a blind operator the TS940S is a dream come true; not only is the operating mode identified by the appropriate CW letter sent in tone (F for FM, U for upper side band, etc) but, when fitted with the VS1 board (optional), a digitally encoded girl's voice will announce the operating frequency.

Combine the comprehensive receiver controls, advanced operating features and an ergonomically designed front panel and there is little more to say, except that, once again, TRIO have produced the world's finest HF rig, tomorrow's transceiver today, the TS940S!

TS940S HF transceiver..... **£1695.00** inc VAT.

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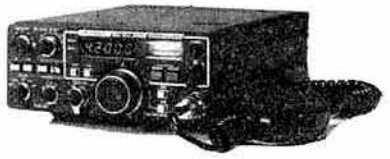
Telephone 0629 2817, 2430, 4057, 4995.

send £1 for complete mail order catalogue.

TR9130 TWO METRE ALL MODE TRANSCEIVER

This rig is proof, if one needed it, that TRIO do not bring out new models just for the sake of it. The TR9000 is remembered as a classic rig and today people are still asking for second hand ones. They're even a rarity on our S/H shelf. The TR9130 incorporates the improvements that all amateurs asked for, green display, reverse repeater, tune whilst transmitting, higher power, more memories and of course memory scan. TRIO's answer, the TR9130.
TR9130 . . . **£499.00** inc VAT.



TS780 DUAL BAND BASE STATION TRANSCEIVER

The TS780 is the perfect base station VHF/UHF transceiver for the enthusiastic operator. The rig has all the necessary control functions essential for operating on both today's busy two metre band and the wide open spaces of seventy centimetres. Full repeater facilities plus reverse repeater are included and the transceiver has the usual memory channels (10), two VFOs, up/down frequency shift microphone. IF shift, two priority channels, memory and band scan etc. A superb rig, I have one myself, write for a full enthuse!
TS780 . . . **£981.42** inc VAT.

TR7930 TWO METRE FM MOBILE TRANSCEIVER

Those who have used or owned a Trio TR7800 will know what I mean when I say that Trio, with the introduction of the TR7930 have improved on the unimprovable. The Trio TR7930 improves on the TR7800 by giving a green floodlit liquid crystal display, extra memory channels, both timed and carrier scan hold, selectable priority frequency and correct mode selection (simplex or repeater). The most significant change is the liquid crystal display, but closely following this must be the ability to omit specific memory channels when scanning and the programmable scan between user designated frequencies.
TR7930 . . . **£354.92** inc VAT.

R2000 GENERAL COVERAGE RECEIVER

The amateur bands are only a very small part of the radio spectrum, many other transmissions are available for the short wave listener. Broadcast stations provide an alternative source of current information both political and regarding the life style of the country. Fitted with the internal VHF converter the R2000 covers continuously frequencies from 118 to 174MHz giving access to amateur two metre transmissions (am, fm, ssb and cw) plus a lot more. Having 10 memories, memory scan and programmable scan the R2000 provides in one rig the perfect receiver.
R2000 . . . **£479.47** inc VAT.

TS930S HF TRANSCEIVER WITH GENERAL COVERAGE RECEIVE

Much has been said about the TS930S transceiver and it now has a place high in the affection of those amateurs fortunate enough to own one, indeed it has become the "flagship" of the TRIO range. Providing full amateur bands plus a general coverage receiver (150kHz to 30MHz), the TS930S has every conceivable operating feature for today's crowded frequencies.
TS930S . . . **£1350** inc VAT.

TR2500/TR3500 HANDHELD TRANSCEIVERS

Two first class hand held transceivers, one for two metres and the other for seventy centimetres. Ten memory channels, band and memory scan, repeater shift, reverse repeater and a low power position make the rigs extremely useful for the radio amateur who wishes to keep in touch with his local scene. A comprehensive range of accessories, base station charger, speaker microphone, mobile mount etc, can be added to enhance operation, accessories used with one rig being compatible with the other.
TR2500 . . . **£270.47** inc VAT.
TR3500 . . . **£291.85** inc VAT.

TS530SP HF AMATEUR BAND TRANSCEIVER

A logical progression from the reliable TS520 series the TS530S was the most popular HF rig in the range. I use the term "was" because TRIO decided to cease production and supplies were no more, however the demand from radio amateurs worldwide for the transceiver have continued and TRIO have reintroduced the rig. A standard HF valve transceiver without the frills but providing today's amateur with all necessary facilities for reliable worldwide communication, the TRIO TS530SP now with notch filter.
TS530SP . . . **£735.11** inc VAT.

just a part of the range

The following TRIO models although not shown are still current and available.

TS430S	HF T'ceiver	£769.50	TM201A	2M Mobile	£309.95
TS830S	HF T'ceiver	£832.75	TM401A	70cm Mobile	£340.68
TS130S	Mobile HF T'ceiver	£633.06	TM211E	2M Mobile with DCS	£396.08
TR9300	6M Multi-mode	£569.97	TM411E	70cm Mobile with DCS	£452.58
TH21E	2M Micro h'held	£188.46	TW4000A	2M/70cm Mobile	£536.51
TH41E	70cm Micro H'held	£214.50	TS711E	2M Base Station	£831.77
TR2600E	2M H'held with DCS	£295.69	TS811E	70cm Base Station	£964.97
TR3600E	70cm H'held with DCS	£314.87	R600	Gen. Cov. Receiver	£299.52

All prices include VAT. Carriage £7.00

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DAIWA MT20E, true flexibility. . . .

In describing the equipment let's start with the MT20E. A simple hand-held transceiver covering the entire two metre band (144 to 146MHz in 5KHz steps) and giving 1.5 watts (high) and 150 milliwatts (low). Full repeater facilities are provided including reverse repeater. Making it ideal for "fox hunting", the DAIWA MT20 has an S meter and for easy operation in the dark the frequency dial is illuminated. A quick release nicad battery pack, flexible aerial, belt hanger, earphone and AC charger are included and to extend operation additional BA2 nicad packs can be purchased and kept ready charged in your pocket.

For more effective portable operation add the LP1 carrying case with aerial mounting strap, the LA20 linear amplifier and the BA4 9.6V battery pack (fits neatly inside the linear) and power output is increased to 10 watts. The linear is extremely well designed and shows the care and attention that DAIWA have given to the accessories. The LA20 is the first linear designed for portable operation. The connecting cord between linear and rig not only carries RF but also the DC power for the MT20E. Connecting is easy, removing the BA2 battery pack from bottom of the transceiver reveals a BNC connector which is not only an aerial connection but the power connector. For convenience, when connected to a 13.8 volt DC supply the linear can be switched to recharge its internal nicad pack. When connected to a 13.8 volt supply, as when using the linear mobile (yes, a mobile mount is included with the linear) the output rises to 20 watts.

The LA20 is an extremely good buy on its own for either mobile or especially portable use (self contained batteries). To stop the DC supply to the transceiver, just remove the internal fuse. Simple! If you own a non DAIWA 2 meter linear and still want the convenience of an external DC supply for the MT20E, then use an SD1 (DC regulator/antenna converter). The SD1 has connections on its front panel for the transceiver (a BNC connector connecting DC voltage and antenna) and an SO239 on the back for connection to a linear.

MT20E	**£197.48**	carr 7.00
LA20	**£79.03**	carr 2.00
LP1	**£23.48**	carr 1.00
BA4	**£33.45**	carr 1.50
SD1	**£25.27**	carr 1.50
BA2	**£16.80**	carr 1.00
LP3	**£5.14**	carr 0.50

MT20E LA20 SD1 BA2

If I am absolutely honest,

I am not certain whether I own a NRD515 because of its unbelievable performance as a general coverage receiver or just for the sheer pleasure of having and constantly admiring probably the finest piece of equipment available today.

Perhaps it comes down to the same thing, certainly the other NRD owners I have spoken to have all expressed the same feelings, that the NRD515 is a receiver in a class of its own.

As a person not owning the receiver, you may ask what sets this particular one above all the others. This difficult to define—the feel of the equipment when wandering over the crowded band, its signal handling capability and selectivity can only really be appreciated by use. Technically, the equipment is above reproach. JRC's manufacture and production control methods as applied to other items in the range are equally applied to their amateur products. The other items referred to, only a small part of the vast range, are marine radio equipment, Marisat mobile terminal, Omega navigators, Doppler sonar, echo sounder/fish finders, communication satellite earth stations and a complete range of avionic beacons, radar and associated products. Indeed, a wide range of application of electronic and radio technology for land, sea and air.

You may be forgiven for associating such advanced technology with complexity of operation, a piece of equipment that needs an operator with an electronics degree. However, this assumption is incorrect. The NRD515 is easy to use with the minimum of controls to ensure the operator really enjoys his listening time. Digital readouts, MHz, mode and filter bandwidth switches together with a VFO knob that will tune the band continuously without using any other control, from 100KHz to 30MHz or vice versa. To assist with difficult band conditions the NRD515 has pass band tuning and the medium wave broadcast section to 600KHz to 1·6MHz has a preselector control to cope with crowded conditions. To give real "armchair copy" JRC have introduced the NCM515 remote control keypad. As its name suggests, the NCM515 enables frequencies to be quickly keyed into the receiver. Four memories are provided, two rates of frequency stepping in increments of either 100Hz or 10MHz and finally the ability to add to or subtract from the operating frequency by any frequency step. Add the optional 600Hz CW filter and the 96 channel memory unit and, as the other NRD515 owners would say, "a joy to own".

NRD515	monitoring receiver	**£965.00** inc VAT
NDH518	96 channel memory unit	**£264.00** inc VAT
NCM515	remote frequency controller	**£169.75** inc VAT
NVA515	speaker	**£45.41** inc VAT
CFL260	500Hz cw filter	**£56.72** inc VAT
CFL230	300Hz cw filter	**£78.53** inc VAT

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EMPORIUM NEWS

Good Morning

First of all a word about **our new Bournemouth Shop.** We have now appointed a Shop Manager, his name **is Colin,** callsign **G3XAS** and he is a local lad and well known on the South Coast for his knowledge and interest in small portable generators. He says his favourite mode of operation **is 80 metres mobile,** so those of you who know Colin will be able to pop into the shop and congratulate him on his new appointment. Those who don't know him can make his acquaintance on **Saturday, May 4th when the new Bournemouth shop opens.** I've already mentioned that parking is **free** and **easy.** Finding the shop is no problem. Either by good fortune or skill, the Department of Transport have purchased the two adjacent shop units and soon alongside us will be **Bournemouth's Driving Test Centre.** I am hoping that the Department will put up the customary large number of direction signs. I could obviously not do the same so I am grateful to our next door neighbours for their assistance.

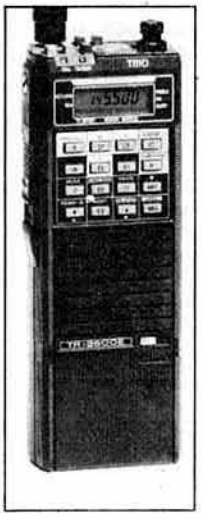
I've just returned from Bournemouth and I am pleased to say that alteration work is proceeding apace and all should be ready for the 4th May—that's the Saturday and we open at 9.00a.m. **Pop along** and see how Lowe Electronics do business.

Hope you all enjoyed the **RSGB** at the **NEC**—more about that next month.

Popping up to **Glasgow for their Convention**—that's **Saturday, 11th May.** The same venue as last year, i.e. Cardonald College, Mosspark, Glasgow and knowing the Organizers as I do it will **undoubtedly be a roaring success.** We are in the centre of the Gymnasium downstairs as last year. I always enjoy meeting the Scottish radio amateurs. Let's hope the chap who asked for a Gaelic voice synthesizer (VS1 Gaelic) instead of one that speaks English and Japanese doesn't attend!!

According to current information, the **TRIO TS940S** should be available at the end of April. I am sure that you, like us, will be impressed with the transceiver that will undoubtedly be another **outstanding success for TRIO.** Details on the new TS940S appear on our first page. **For a full colour leaflet** write or telephone to us here at Matlock.

I would like to **thank** the many people who wrote or telephoned with advice on how to keep the **birds** off my **aerials.** The cleverest was to play **Shirley Bassey** singing "Big Spender" with at least 50 watts per channel around 7.0 a.m. each morning. Apparently a genuine suggestion and one used on airfields before flying commences, but not suitable for a **high class** residential area in Matlock. To be truthful, I am going to try the black cotton, simple I am told, effective and, above all, quiet!!



Whilst dashing to and from Bournemouth I have had in my briefcase/overnight bag the **TRIO TR2600E** for 2 metres and the **TR3500** for 70 centimeters, yes I too am still waiting to change a TR3500 for its high specification Brother (Sister) **THE TR3600E.** The new keypad, memories and extra flexibility to my mind put the new TRIO handhelds far ahead of other manufacturers' models. I took the **TH41E** with me round our **local supermarket** and had great fun, pushing the trolley with one hand whilst operating with the other. I must admit that I have toyed with taking it down to Chapel with me on a Sunday evening in case the Sermon was boring but to date I have resisted the temptation. **Of course I wouldn't transmit,** only listen to the local lads.

Now that summer is here there will be many **TRIO TH21E's** and **TH41E's** taking to the **hills** and **valleys.** Talking of portable operation, no manufacturer has come close to providing a transceiver as successful as TRIO with the **TR9130** multimode mobile/base for the 2 metre band. I remember those warm summer days out portable in the Volkswagon Beetle, a Yaesu FT101 on the passenger seat, a Europa transverter on the floor, wife in the back seat with the fresh cut sandwiches, a flask of piping hot coffee for between overs and on the roof rack an 8 element Jaybeam. Wires everywhere and a flat battery on completion. **How much easier with the compact**

TS-711E £831.77 inc VAT
TS-811E £964.97 inc VAT

TR9130. For those who must have the best then there is the 2 metre **TS711E** and **TS811E** for seventy centimetres. **TR9130** £499, including VAT, **TS711E** £831.77, including VAT. **TS811E** £964.97, including VAT, carriage on the rigs being £7.00. True flexibility would be the **TRIO TS780** dual bander giving operation on both 2 metres and 70 centimetres. The **TS780** is currently £981.42.

THE NEW SHOP

A new LOWE ELECTRONICS shop in **Bournemouth** opens **Saturday 4th May**

Telephone 0202 577760. Managed by Colin G3XAS

Having recalled the pleasures of portable operation, I may just pop my TS711E in the car and see what can be done. I must admit though over the last few years I have become increasingly **shack bound**—I suppose that's what comes from having a good location and a tower. Talking about **towers,** I think every amateur should have one!!! I use a **Strumech** Versatower model P40 which I have nothing but praise for; don't forget that a Strumech Tower can easily be bought with a **Lowe Card.** And again having mentioned the **Lowe Card,** why not send for details and become **"One of the Family".** Special offers with your quarterly statement are just part of the ease of purchase that a Card will bring. For full details again write or ring us here at Matlock.

Since I last mentioned the **Telereader equipment,** we have been out of stock. The product is good, those who have used or seen the **CWR610E** RTTY/CW unit in operation will agree to that.

A friend has just lent me his **confidential frequencies book.** I'd like to tell you a few but they are all **confidential.** Ideal rigs for listening are the **TRIO R600** and **R2000** covering from around 150kHz to 30MHz. The **R600** is £299.52, including VAT—the **R2000** £479.47, including VAT, carriage £7.00. An **AR2001** covering from 25 to 550MHz is a fine addition to any station. **AR2001** £378.00, including VAT. If you have a desire for the ultimate in HF receivers then look at the photo and my enthuse on the **NRD515** from **JRC.** Still costing only £965.00, including VAT, carriage £7.00. The **NRD515** is as near as you will get to **a professional receiver** without paying a professional price.

So finally, **4 wheel drive.** Tak, my Japanese colleague came up with that line, must be something to do with his passion for **Suburu** cars. He seemed bitterly disappointed that we all managed to struggle to work during the winter in our conventional 2 wheel drive systems. I suspect he was going to offer us all lifts to work **and charge us heavily!** Anyway, back to the four motor rotators from **Daiwa.** Many have been sold and almost everybody says the same thing. Why didn't someone think of the ideal before. How convenient, enlarge the aerial array—if necessary add another motor.

That's about it for now—must check the 8 element and roof rack. If you hear me portable give me a call.

Gud DXes 73es FBYLS, XYLS, esFBOm, etc.

David G8GIY.

MICROWAVE MODULES LTD

2 METRE MULTIMODE TRANSVERTER MMT144/28-R

NEW RELEASE

FEATURES

- **25 Watts Tx Output**
- **GaAsFET RF stage**
- **Transmit ALC Circuit**
- **13.8V DC operated**
- **Repeater Shift (normal, simplex, reverse)**
- **High Level Double Balanced Rx Mixer**
- **LED Bargraph Power Meter**
- **RF VOX — Adjustable Delay and PTT Override**

SPECIFICATION

GENERAL

INPUT FREQUENCY RANGE	:	28 – 30 MHz
OUTPUT FREQUENCY RANGE	:	144 – 146 MHz
MODES OF OPERATION	:	SSB, FM, CW, FSK, AM
REPEATER SHIFT	:	Simplex, Normal (– 600 kHz) Reverse (+ 600 kHz)
INPUT/OUTPUT IMPEDANCE	:	50 ohm
RF CONNECTORS	:	SO239 (PTFE)
POWER CONNECTOR	:	5 pin DIN socket
DC POWER REQUIREMENTS	:	13.8V DC at 6 Amps peak

TRANSMIT SECTION

OUTPUT POWER	:	25 Watts
INPUT LEVEL RANGE	:	¼ mW to 300mW
ALC RANGE	:	20dB
LEVEL OF SPURIOUS OUTPUT	:	– 65dB or better

RECEIVE SECTION

CONVERSION GAIN	:	22dB +/– 1dB
NOISE FIGURE	:	2dB or better
3rd ORDER INTERCEPT	:	+ 19dBm (output)

Access | BARCLAYCARD VISA

HOURS:
MONDAY-FRIDAY
9 – 12.30, 1 – 5.00
E. & O.E.

DESCRIPTION

The MMT144/28-R is a high performance solid-state 2 metre multimode transverter, designed to allow users of existing HF band transceivers to establish a first-class transceive capability on the 144 MHz band.

The transverter incorporates many new and exciting features previously not found on equipment of this nature, which combine to make this product simply superb.

The MMT144/28-R can be used with virtually any 28 – 30 MHz transceiver having a low level output power in the range ¼ mW to 300mW. (An external attenuator can be used to allow a higher power level to be used if necessary.)

A noise-matched NEC GaAsFET preamplifier together with excellent filtering and a double balanced mixer produces a rugged receive converter, which has excellent strong signal handling characteristics and excellent immunity to overload and cross-modulation.

The transmit section produces a highly linear 25 watts output and incorporates an ALC circuit to ensure that a particularly clean signal is produced. This is an important feature which will virtually eliminate compressed signals and the resultant problems caused to local stations. A visual indication of relative output power is displayed by the front panel mounted LED bargraph display.

The unit incorporates the usual repeater features:— simplex, normal repeater (– 600 kHz), and reverse repeater (+ 600 kHz) and is ideally suited for all modes of communication on the 2 metre band.

The MMT144/28-R is housed in an aluminium extruded enclosure, which has both excellent electrical screening and thermal stability characteristics. Connectors are located on the rear panel together with the input level control and the DC supply fuse. Protection against reverse polarity is included. Antenna changeover at 144 MHz is achieved internally by a low-loss PIN diode switch.

This new design utilises 15 transistors, 4 regulator IC's, 3 other IC's and various diodes and PIN diodes.

All plugs are supplied.

PRICE: £215 inc. VAT (p + p £3.50).

MICROWAVE MODULES LTD.
Brookfield Drive, Aintree, Liverpool L9 7AN, England.
Telephone: 051-523 4011.
Telex: 628608 MICRO G.

		Inc VAT	Carr
JRC EQUIPMENT			
NRD515	New synthesised HF monitoring receiver	965.00	7.00
NHD518	Multi channel memory unit for NRD515	264.00	7.00
NCM515	Remote frequency controller	169.75	7.00
NVA515	Matching loudspeaker unit	45.41	3.00
JST100	Digitally synthesized 160-10M transceiver	998.00	7.00
NBD500G	Matching PSU for JST100	181.35	7.00
NVA88	Matching speaker for JST100	44.19	3.00
NFG97	ATU/SWR/POWER meter for JST100	150.00	7.00
VHF/UHF MONITOR RECEIVERS AND SCANNERS			
AR2001	NEW VHF/UHF scanning receiver 25-550MHz	378.01	7.00
SR1000E	DAIWA 1000 channel PLL receiver 144-154MHz	96.04	2.50
DAIWA ROTATORS			
MR750E	NEW Multitorque rotator controller	193.00	7.00
MR750PE	As above but with round and preset controller	217.64	7.00
LMC	Lower mast clamps for pole mounting	14.01	3.00
MR750U	Additional motor unit to increase torque and braking	64.64	3.00
DR7500X	For HF 3 element beams. Preset controller. 6 core cable	142.98	7.00
DR7500R	As for DR7500X but using the DAIWA round controller	153.67	7.00
DR7600X	Heavy duty. Up to 2 el 40m beam. Preset control	189.37	7.00
DR7600R	As for DR7600X but using the DAIWA round controller	213.41	7.00
KS065	Deluxe bearing for fixing stays to rotating mast	27.30	3.00
KR500	Elevation rotator (not Daiwa)	144.90	7.00
DAIWA POWER and SWR METERS			
CN410M	3·5-150MHz mobile cross needle power/SWR meter	48.00	1.50
CN460M	140-450MHz mini cross needle power/SWR meter	52.00	1.50
CN520	1·8-60MHz mobile cross needle power/SWR meter	39.50	1.50
CN500	1·8-60MHz mini cross needle power/SWR meter 20W	19.50	1.50
A500	Fixing bracket for CN500 series	2.10	0.30
CN620A	1·8-150MHz cross pointer pwr/SWR meter. Up to 1kW	66.21	2.50
CN630	140-450MHz cross pointer pwr/SWR meter. Up to 200W	98.11	2.50
CN650	1·2-2·5GHz cross pointer pwr/SWR meter. Up to 20W	129.50	2.50
CNW419	1·8-30MHz 200W general coverage tuning unit	159.64	7.00
CNW919	2M Power meter and antenna tuning unit	104.99	3.00
CNW518	3-30MHz 8 band hi power tuner cross needle pointer	233.09	7.00
CL680	1·8-30MHz 200W gen cov ATU (100W at 1·8MHz)	81.50	3.00
DAIWA POWER SUPPLY UNITS			
PS300	DAIWA heavy duty PSU 30A max 22A continuous	176.80	7.00
PS120M	DAIWA AC PSU 3-15V variable 12A maximum	87.33	7.00
PS80M	DAIWA AC PSU 3-15V variable 8A	72.68	3.00
PS50M	DAIWA AC PSU 9-15V variable 5·6A	55.91	3.00
DAIWA LINEAR AMPLIFIERS			
LA2035	DAIWA 2m lin amp, very small. 0·5W/30W at 13·8V	56.00	2.00
LA2035R	As above but with rx preamp	63.20	2.00
LA2065R	2M linear amplifier with rx preamp. 60W o/p	108.71	3.00
LA2155	DAIWA 2M 150W SSB/CW/FM amplifier	198.00	7.00
DATA COMMUNICATIONS EQUIPMENT			
CWR685E	TX/RX unit for RTTY/CW/ASCII with built in monitor	771.64	7.00
CWR670E	RX only unit RTTY/CW/ASCII requires external monitor	392.80	7.00
PK675	Printer kit for above unit	189.00	7.00
CWR610E	RX unit RTTY/CW/ASCII Code practise generator inc.	195.00	3.00
AMTOR10A	Comprehensive AMTOR unit	253.20	3.00
DR100	TRIO DATA-MITTER Modem for transmitting ASCII	148.10	3.00
NOVEX12A	Good quality 12" monitor. Amber phosphor	85.00	7.00
NOVEX12G	As above but with green phosphor	89.00	7.00
DM091G	9" Green monitor. All have metal cabinets	79.50	7.00
KEYS AND KEYERS			
CW3	Self contained morse practice oscillator	9.80	1.50
HK708	Straight key. Ball bearing pivots. Non skid base	16.30	2.50
HK702	Deluxe version of above on marble base	31.03	3.00
MK704	Squeeze paddle	15.40	1.50
EK150	Electronic keyer. Built in sidetone	103.38	3.00
MK1024	Electronic keyer with 1024 bit memory	185.52	3.00
HOKUSHIN MOBILE AERIALS			
2E	2M 5/8, 3·4 dB gain, foldover base	11.26	2.00
2NE	2M 7/8, 4·5 dB gain, foldover base	17.06	2.00
HS430HB	430MHz mobile gain aerial on half wave extension	8.30	2.00
OSCAR430	70cm 5/8+5/8+5/8 supergain mobile aerial	21.45	2.00
320	2M stainless 1/4 wave on PL259 plug	2.62	1.00
OTHER ACCESSORIES			
SWR50	The ever popular twin meter SWR bridge. 1·8-150MHz	14.95	2.00
DL60	60W dummy load with SO239 fitting	7.87	1.00
DL150	150W dummy load SO239 fitting	19.68	1.50
DL600	600W aircooled 50ohm dummy load	39.36	2.50
WA1	AKD wavemeter. 120-450MHz. Absorbtion type	24.95	1.50

LOWE SHOPS

In Glasgow the LOWE ELECTRONICS' shop (the telephone number is 041 945 2626) is managed by Sim GM3SAN. Its address is 4/5 Queen Margaret's Road, off Queen Margaret's Drive. That's the right turn off Great Western Road at the Botanical Gardens' traffic lights. Street parking is available outside the shop and afterwards the Botanical Gardens are well worth a visit . . .

In the North East the LOWE ELECTRONICS' shop is found in the delightful market town of Darlington (the telephone number is 0325 486121) and is managed by Don G3GEA. The shop's address is 56 North Road, Darlington. That is on the A167 Durham road out of town. A huge free car park across the road, a large supermarket and bistro restaurant combine to make a visit to Darlington a pleasure for the whole family.

Cambridge, not only a University town but the location of a LOWE ELECTRONICS' shop managed by Tony G4NBS. The address is 162 High Street, Chesterton, Cambridge (the telephone number is 0223 311230). From the A45 just to the north of Cambridge turn off into the town on the A1309, past the science park and turn left at the first roundabout, signposted Chesterton. After passing a children's playground on your left turn left again (between the shops) into Green End Road. Very quickly, and without you noticing it, Green End Road becomes High Street. Easy and free street parking is available outside the shop.

For South Wales, the LOWE ELECTRONICS' shop is located in Cardiff. Managed by Richard GW4NAD, who hails from Penarth, the shop (the telephone number is 0222 464154) is within the premises (on the first floor) of South Wales Carpets, Clifton Street, Cardiff. Clifton Street is easily found, being a left turn off Newport Road just before the Infirmary. Once in Clifton Street, South Wales Carpets is the modern red brick building at the end of the street on the right hand side. Enter the shop, follow the arrows past the carpets, up the stairs and the "Emporium" awaits you. Free street parking is available outside the shop.

For South Coast Radio Amateurs, there's a LOWE ELECTRONICS shop in Bournemouth. Its manager is Colin G3XAS. The shop's address is 27 Gillam Road, Northbourne, Bournemouth. That's the north side of town just off the Wimborne Road. The telephone number is 0202 577760. Easy to find, the shop has free street parking immediately outside.

LOWE ELECTRONICS' London shop is located at 223/225 Field End Road, Eastcote, Middlesex (the telephone number is 01 429 3256). The shop, managed by Andy G4DHQ is easily found, being part of Eastcote tube station buildings and as such being on the Metropolitan and Piccadilly lines (approximately 30 minutes from Baker Street main junction). For the motorist, we are only about 10 minutes' driving time from the M40, A40, North Circular Road (at Hanger Lane) and the new M25 junction at Denham. Immediately behind the shop is a large car park where you can currently park for the day for 20p. There is also free street parking outside the shop.

Although not a shop there is on the South Coast a source of good advice and equipment—John G3JYG. His address is 16 Harvard Road, Ringmer, Lewes, Sussex. (telephone 0273 812071). An evening or weekend telephone call will put you in touch with John.

Finally, here in Matlock, David G4KFN is in charge. Located in an area of scenic beauty a visit to the shop can combine amateur radio with an outing for the whole family. May I suggest a meal in one of the town's inexpensive restaurants or a picnic on the hill tops followed by a spell of portable operation.

MAIL ORDER

You don't need a 1750 Hz tone to gain access to the fastest mail order service for all radio amateurs and short wave listeners. With a copy of the LOWE ELECTRONICS catalogue and antenna book in the shack (send £1 for your copy) the best in amateur radio is quickly available.

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New! IC-3200E

A new exciting set is the ICOM IC-3200E FM Dual-band transceiver (144-430/440 MHz). This is the smallest transceiver available.

The IC-3200E employs a function key for low-priority operations to simplify the front panel. LCD display is easy to read in bright places, showing frequency, VFO A/B, memory channel duplex mode and S/RF meter information.

Other features include a 10 channel memory able to store operating frequencies, Simplex or Duplex. A memory lock-out function allows the memory scan to skip programmed channels when not required. The IC-3200E has a built-in duplexer and can operate on one antenna for both VHF and UHF. Options include: IC-PS45 DC. power supply, HS-15 mobile mic, SM6 and SM8 desk mics, SP-10 external speaker and UT-23 speech synthesizer. A great future is predicted for the IC-3200E.

IC-290D/290E

290D is the state of the art 2 meter mobile, it has 5 memories and VFO's to store your favourite repeaters and a priority channel to check your most important frequency automatically. Programmable offsets are included for odd repeater splits, tuning is 5KHz or 1KHz.

The squelch on SSB silently scans for signals, while 2 VFO's with equalising capability mark your signal frequency with the touch of a button. Other features include: RIT, 1 KHz or 100Hz tuning/CW sidetone, AGC slow or fast in SSB and CW, Noise blanker to suppress pulse type noises on SSB/CW.

You can scan the whole band between VFO's/scan memories and VFO's. Adjustable scan rate 144 to 146 MHz, remote tuning with optional IC-HM1 microphone. Digital frequency display, Hi/Low power switch. Optional Nicad battery system allows retention of memory.

*AT THE LAST COUNT

Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM Thanet ICOM

0,000
RS CAN'T BE WRONG

IC-505, 50MHz A New Dimension for the U.K.

At last, for those with permits to operate on the 50MHz band, there is available the IC-505 SSB CW portable transceiver which has already gained an excellent reputation world-wide.

The IC-505 features microprocessor frequency control, dual VFO's and 6-channel memories with memory scan. LCD ensures clear visibility even in sunlight. The 505 accepts a standard dry-cell pack, rechargeable nicad battery pack (BP10) or 13.8V external power supply.

Standard accessory circuits such as split switch, noise blanker, squelch and CW break-in are incorporated in the 505.

Other accessories available include the EX-248 FM unit, BC-15 charger unit and the LC-10 carrying case.

All these features make the IC-505 a great transceiver for operation on the 50MHz band.

You can get what you want just by picking up the telephone. Our mail-order dept. offers you: free, same-day despatch whenever possible, instant credit, interest-free H.P., telephone Barclaycard and Access facility and a 24 hour answering service.

Please note that we now have a new retail branch at 95, Mortimer Street, Herne Bay, Kent. Tel: 369464. Give it a visit, BCNU.

Authorised Icom dealers in the UK

Alexian Electronics Ltd. Edinburgh, 031-554 2591.
Alyntronics, Newcastle, 0632-761002.
Amateur Radio Exchange, London (Ealing), 01-992 5765.
Amcomm, London (S. Harrow), 01-422 9585.
Arrow Electronics Ltd., Chelmsford Essex, 0245-381673/26.
Beamrite, Cardiff, 0222-486884.
Booth Holding (Bath) Ltd., Bristol, 02217-2402.
Bredhurst Electronics Ltd., W. Sussex, 0444-400786.
Dressler (UK) Ltd., London (S. Harrow), 01-558 0854.
D.W. Electronics, Widnes Cheshire, 051-420 2559.
Hobbytronics, Knutsford Cheshire, 0565-4040.
Photo Acoustics Ltd., Buckinghamshire, 0908-610625.
Radcomm Electronics, Co. Cork, Ireland, 01035321-632725.
Radio Shack Ltd., London NW6, 01-624 7174.
Scotcomms, Edinburgh, 031-657 2430.
Tyrone Amateur Electronics, Co. Tyrone, N. Ireland, 0662-2043.
Reg Ward & Co. Ltd., S.W. England, 0297-34918.
Waters & Stanton Electronics, Hockley Essex, 0702-206835.

Listed here are authorised dealers who can demonstrate ICOM equipment all year round. This list covers most areas of the U.K., but if you have difficulty finding a dealer near you, contact Thanet Electronics and we will be able to help you.

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2 metre Yagis.
4144A – 4 element, 8dBd gain £19.00.
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Order now while stocks last.

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2M – 100W, £79.00.
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Also available, new G-series with GaAs FET pre-amp.
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all inc. VAT.

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Mk II/Kit D	AMTOR PC board (Assembled and tested)	**£110.00** £1.50
CP-1	AMTOR/RTTY/ASCII/CW Dumb Terminal Unit	**£189.75** £2.50
CP-1/CBM-64	RTTY/ASCII/CW Software, cable	**£39.00** £1.00
CP-1/VIC-20	RTTY/ASCII/CW Software, cable	**£39.00** £1.00
CP-1/BBC-B	RTTY/CW Software, cable	**£39.00** £1.00
MBA-TOR-64	AMTOR/RTTY/CW/ASCII Software, cable for CP-1 and CBM-64	**£69.00** £1.50
MBA-TOR-20	AMTOR/RTTY/CW/ASCII Software, cable for CP-1 and VIC-20	**£69.00** £1.50
RM-1	Low cost ASCII/RTTY/CW/AMTOR modem	**£89.50** £1.50
Software:	As for CP-1	
MP-20	"Micropatch" RTTY/CW/ASCII Terminal Unit, Software for VIC-20	**£159.85** £1.50
MP-64	As above, for Commodore 64. Note: MBA-TOR can be used with MP-64	**£159.85** £1.50
DDX-64	DOCTOR DX morse contester	**£96.95** £1.50

Data sheets on specific products available free of charge. Available direct or from dealers throughout the country

Access

Prices of imported equipment may vary according to exchange rate obtained at time of importation

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MODEL TB3 TRIBANDER

TB1 Rotary Dipole 2kw EL. 7.7m Rad. 3.85m **£77**
TB2 2 Element Beam 2kw gain 5dbd F/B 15db **£143**
TB3 3 Element Beam 2kw gain 8dbd F/B 25db **£212**
Securicor £6 extra

These highly rugged antennas are superbly built and represent the very best in engineering. Details, booklets are available upon receipt of SAE.
Jaybeam TB2 = £143. Hygain TH2 = £279.

"G5RV" DIPOLE OFFER

Probably the most famous all band dipole in the history of amateur radio. The 5RV antenna covers 80 to 10 metres without traps and is 102ft long. These ready tuned antennas are fully assembled and include 30ft of low loss feeder. All you need is the mast supports and the necessary extra length of 50ohm feeder. The half size version is similar but is only 51ft long and covers 40-10 metres. Now heavy duty models!

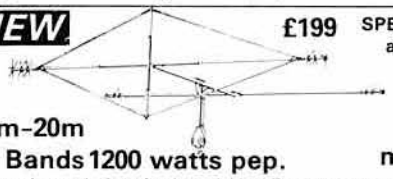
FULL SIZE **£17.95**
HALF SIZE **£14.95**
Carr and ins £2.00 extra

WELZ CP5 80–10M £149 (40–10M CP4 £109)

NEW

The Welz CP5 is Unique. It is the most highly efficient aerial system for the HF bands for the small garden. Less than 16ft high and yet providing automatic operation on all 5 bands 80-10 metres. It comes complete with a rigid radial system comprising 5 loaded radials (approx 6ft long) that can be either spaced 360 degrees around the antenna base or in a fan shape. All hardware is provided and the aerial is ready to be mounted atop a convenient mast. An alternative model is available; the CP4 which covers 10 to 40 metres.

NEW



£199

SPECIAL—We have a few brand new HQ-1's at £169. Please phone

6m–20m
4 Bands 1200 watts pep. model HQ-1

There is no substitute for the real thing! That's what purchasers of alternative models tell us. We've been selling this for 12 years and its superb construction and performance protected by World patents leaves the competition standing. Boom length 4.5ft. Element length 12ft, weight 15lbs. This antenna can be operated without an atu and really gets the DX even in the smallest QTH.
Free 24 hr delivery on this item.

NEW SWL AERIAL

3-30MHz, 50ft long complete with insulators, matching section and ready to go. 50ohm coax feed. £8.95

NATIONAL PANASONIC 600 £429

The receiver that has everything! Coverage from 150kHz-30mHz plus 87.5-108mHz FM. Band search plus 9 memories. USB, LSB, CW & AM. Dual speed tuning, micro computer controlled, LED display to 100Hz etc etc. Built-in mains supply or battery.

NATIONAL PANASONIC RF-3100 £249

Covering 150kHz to 30mHz in 31 bands plus FM broadcast, this receiver is ideal for the amateur on a budget. Its bright digital display and excellent stability make it a joy to operate whether on SSB, CW or AM. Up to the minute PLL circuitry ensure top performance on today's crowded bands.

SPECIAL: VHF/UHF AIRCRAFT LISTINGS

This unique frequency manual contains a complete list of all the VHF civil aircraft frequencies in use throughout the UK plus all the RAF-USAF and MOD airfield frequencies in both the VHF and UHF bands. No other publication offered at anywhere near this price has offered so much new information. Supplies are limited! **£2.95**

SPECIALS!

Communication Headphones low impedance	**£5.95**
Deluxe G5RV 80-10m dipoles	**£17.95**
SWL Wideband dipole 30-30mHz 50' long	**£8.95**

AOR 2001 RECEIVER

£369 + FREE FREQUENCY LIST

A firm favourite amongst listeners. The AOR 2001 covers 25-550mHz without gaps. It provides AM/FM and WFM reception and has programmable search. 12v DC or 230v AC and specially tweeked by us for best reception.

NEW WELZ PEP METER

£59! 1.8MHz 200MHz 2W/20W/200W

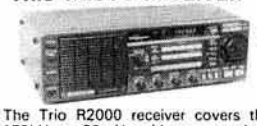
At last a meter that reads true PEP on both HF and VHF. This unique product now enables you to read average power, pep and VSWR. Surely an essential item in any SSB station. So now you don't have to wonder what you pep output is, you can actually measure it!

ICOM R70 RECEIVER

£599 + FREE H'phones, dipole antenna prefix maps and SWL book worth £21!

The Icom R70 is the ROLLS ROYCE of receivers. Covering 150kHz to 30mHz it has features far too numerous to list here. Suffice to say no other receiver at anywhere near this price can match its performance. As usual, each one is carefully tested by us before sale to make sure it meets its specification.

TRIO R2000 RECEIVER



£479 + FREE H'phones, dipole antenna prefix maps and SWL book worth £21!

The Trio R2000 receiver covers the entire spectrum from 150kHz to 30mHz with no gaps. Its programmable scanning and memories combine to make this SSB AM/FM receiver a firm favourite. The optional VC10 VHF converter at £128 adds to range 118-174mHz.

YAESU FRG8800 RECEIVER

£529 + FREE H'phones, dipole antenna prefix maps and SWL book worth £21!

Covering 150kHz to 30mHz this latest offering from Yaesu provides a really high performance receiver. Now with built-in memory and optional VHF module (118-174mHz) it can be thoroughly recommended.

SONY ICF7600DX

AM SSB

£178 + FREE AC PSU & Aerial

The Sony ICF7600 is a truly remarkable receiver covering 150kHz to 30mHz SSB/AM plus FM broadcast. Despite its size it gives superb performance even from its built-in telescopic aerial. The LCD readout, built-in clock and memories all go to make what is probably the World's smallest communications receiver.

FDK M750XX TRANSCEIVER 2M SSB/CW/FM

£389

A full 20 watts SSB/CW/FM at less than £400! Ideal as a mobile or base station this rig will give you plenty of DX and its good sensitivity means you'll hear plenty of DX as well. Complete with DC lead and mobile mounting backet.

BEST PRICES ON ALL BRANDS INCLUDING:

3.5-30mHz

WELZ AC36 ATU £85

1.8-160mHz

WELZ SP15M £49

1.8-160mHz

WELZ SP200 £87

TRIO, YAESU, ICOM, WELZ, FDK, DIAMOND, JAYBEAM, TONNA, MICROWAVE, MUTEK, SONY, PANASONIC, MINI PRODUCTS, SAGANT, GLOBAL, GNOS, SAFETY MICS, ROTATORS, DATONG

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USE YOUR CREDIT CARD FOR SAMEDAY DESPATCH

FDK SYNTHESIZED MONITORS

ATC720 118–138mHz AM **£189**
RX40 141–180mHz FM **£159**

Those professional quality synthesized monitors are ideal for a wide range of monitoring purposes. A number of these units have been supplied to government departments, civil and military airfield use, etc. Each receiver incorporates a thumbwheel switch for rock steady frequency selection. The units are powered by self contained, rechargeable batteries and each unit is supplied with AC mains charger and helical whip. The auto supplied with AC mains charger and helical whip. The auto tracking front-end tuning means high sensitivity. Other controls include AF and squelch and each receiver has its own built in speaker with provision for an external aerial.

YAESU FT290

£339 INCLUDES FREE NICADS & CHARGER

The FT290 is a legend in its own lifetime. What other rig can offer so much at such a price? Ideal as a portable, fixed or mobile unit the FT290 provides 2½ watts of SSB/CW/FM from 144-146mHz.

FASTEST MAIL ORDER SERVICE — BEST DEALS AROUND — PART EXCHANGE SPECIALISTS

FREE FINANCE

HAMPSHIRE, DERBYSHIRE, LOTHIAN, STAFFORDSHIRE

"BRITAIN'S No 1 BEST SELLER"

FT-290R

Multimode 2M Transceiver Dual VFOs
Microprocessor Control
Selectable Synthesiser Steps
Large LCD Display Ten memory Channels
'+' & '−' Repeater Function
Nicads for Portable available
2.5W/0.5W RF output
58(H) x 150(W) x 195(D) mm

"45W FM MOBILE"

Fully synthesised 2M FM Transceiver
45W (RH), 25W (R) Power Output
Dual VFOs
Optional Voice Synthesiser
1MHz/25kHz/12½kHz Steps
10 channel memory
'+' '−' Repeater shifts with reverse facility
Memory Priority and Programmable Memory Scan
17 Function LCD Display, LED 'S' Meter
One piece diecast alloy chassis
(Fan assisted cooling on 45W model)
140mm W x 40mm H x 180mm D

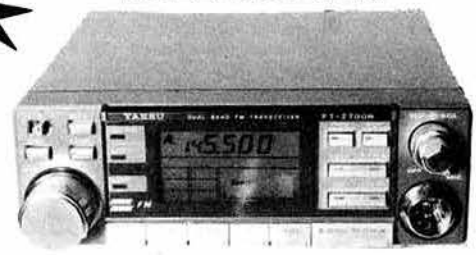
FT270RH

"MULTIBANDER BASE"

Synthesised Multimode Base Station
10W Output on HF, VHF & UHF, Possible Full Duplex! (Crossband with Option)
Continuous RF Power Control (0-10W)
Dual FVOs—Crossband Operation
Eleven Memories—Mode & Frequency
LED Display, Dual Meters (S & PO)
8 Bit Micro0processor Control
IF Shift/Width System
129(H) ×334(W)×314(D) mm

FT26R

"FULL DUPLEX"



FT2700RH

Dual Band FM 2M and 70cms
Full Duplex Operation
Aesthetically pleasing LCD Display/'S' Meter
25W power output both on VHF and UHF!
Optional Voice Synthesiser
1MHz/25kHz/12"kHz steps (12½ on UHF!)
'+' '−' Repeater shifts with reverse facility
10 Channel Memory
Priority Memory Scan/Programmable Memory Scan
One piece diecast centre chassis
50(H)×150(W)×168(D) mm

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SMC (Leeds)
257 Otley Road
Leeds 16, Yorkshire
Leeds (0532) 782326
9-5.30 Mon-Sat

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SMC (Jack Tweedy) Ltd
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New Whittingdon, Chesterfield
Chesterfield (0246) 453340
9-5 Tues-Sat

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SMC (TMP)
Unit 27, Pinfold Lane
Buckley, Clwyd
Buckley (0244) 549563
10-5 Tue, Wed, Fri
10-4 Sat

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SMC (Stoke)
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Talke Pits, Stoke
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2 YEAR GUARANTEE

YORKSHIRE, HUMBERSIDE, CO. DOWN, CLWYD, JERSEY

"SUPERB VALUE HF"

100W Output Transceiver
LSB/USB CW Modes Standard
Large LED Display/'S' Meter
Optional CW Narrow Filter
Optional FM (or AM) Unit
2M or 70cms with Matching Transverter
Matching Antenna Tuner available
Matching Scanner VF /Memories
95(H) × 240(W) × 300(D) mm

FT77

"HF AT ITS BEST"

FT757GX

100W Multimode HF Transceiver
Fully Computer Compatible
Dual VFOs
100% Duty Cycle
General Coverage Rx
FM & CW Narrow as Standard
Programmable Memory Scanning
All Mode Squelch
Triple Microprocessor Control
Matching Automatic ATU (Opt)
Full Break-in CW
93(H) × 238(W) × 238(D) mm

"60-905MHz SCANNER"

FRG9600

60-905MHz coverage
NBFM/WBFM/AM-N/AM-W/SSB
100 Memory Channels
Keyboard Frequency Entry
7 Tuning/Scanning Rates
Computer Compatible
VFO for tuning SSB
Programmable Band Scanning
24 Hour Clock/Timer
80(H) × 180(W) × 220(D) mm

"C.A.T. HF RECEIVER"

All mode, 0·15-30MHz, HF Receiver
Keyboard frequency entry + Dual Speed VFO
12 Memory Channels, Stores Mode & Frequency
Large 12 Function LCD Display (inc 'S' or SIMPO)
Programmable Memory Scan
Selectable Band Scanning
Optional VHF Converter 118-174MHz
Computer Interface as FT757GX (incl. RS232)
Two Function Clock/Timer with Auto Facility
All Mode Variable Squelch
118(H) × 334(W) × 225(D) mm

FRG8800

***FREE FINANCE**
On many regular priced items SMC offers Free Finance for invoice balance over £120.
20% down and the balance over 6 months or
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You pay no more than the cash price!!
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SMC SERVICE
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Importer warranty on Yaesu Musen products.
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Communications ltd.

AUTHORISED YAESU

SCANNING RECEIVER

MS-8400

From S.M.C. the MS-8400 VHF/UHF microprocessor controlled scanning receiver with 40 programmable memory channels, keyboard entry of frequency or command; automatic band search, AM and FM selectable, 4 selectable scanning steps, priority channel, connections for external antenna, DC supply and loudspeaker. Supplied c/w telescopic antenna mounting bracket, etc.

SPECIFICATIONS

Frequency Range:	Low VHF 68,000 MHz ~ 88,000 MHz Mid VHF 108,000 MHz ~ 136,000 MHz High VHF 136,005 MHz ~ 174,000 MHz UHF 360,000 MHz ~ 512,000 MHz
Scanning steps:	5, 10, 12.5 and 25 kHz VMF (10, 12.5 and 25 kHz UHF)
Channels:	40 programmable memories
Modes:	AM or FM selectable
Scan rate:	Approximately 18 channels per second
Scan delay:	2 seconds **Priority sampling:** 4 seconds
Audio output:	1.2 Watts
Selectivity:	Better than −60 dB @ ±25 kHz
Power supply:	DC 12V ~ 16V 0.6A max
Memory backup:	9 volt, battery (PP3)
Antenna:	Telescopic antenna or External
Loudspeaker:	2.5" x 4" oval speaker
Size:	190(W) x 250(D) x 85(H) mm
Weight:	1.7kg

£249.00 inc.
Price includes free carriage

POWER METERS

IN LINE POWER/SWR BRIDGES P.E.P., AVERAGE 1·8-440MHz

The Hansen range covers 30 quality models with top-of-the-line the FS710. This is a flat frequency response, peak envelope power and average in-line wattmeter with many novel features. Notable being the 'power independent' SWR scale—no forward power calibration knob, just direct reading SWR.

				£
		HANSEN		
FS710H	1.8-60 MHz	15/150/1500W	PEP Auto SWR	P.O.A.
FS710V	50-150 MHz	15/150W	PEP Auto SWR	107.80
FS500V	50-150 MHz	20/200W	PEP	81.95
FS300H	1.8-60 MHz	20/200/1000W		53.50
FS300V	50-150 MHz	20/200W		53.50
FS602M	50-150 MHz	20/200W	PEP	P.O.A.
FS210	1.8-150 MHz	20/200W	Auto SWR/ Power Meter	65.50
FS301M	2-30 MHz	20/200W		42.25
FS301MH	2-30 MHz	200/2000W		42.25
FS711H	2-30 MHz	20/200W	Head/ Display	43.65
W720S	130-430 MHz	20/200W	Head/ Display	41.50
FS5E	3.5-150 MHz	20/200/1000W	(1KW HF only)	42.75
SWR3E	3.5-150 MHz	20/200/1000W	(1KW HF only)	28.75
SWR50B	3.5-150 MHz	Twin Meter		30.50
FS20DL	3-150 MHz	1/10W Dummy/SWR/Power		43.65
FS20D	3-150 MHz	5/20W Dummy/SWR/Power		43.65
		JD		
JD110	1.5-150 MHz	10/100W		16.50
		SMC		
S3-30L	Mini (CB style)			9.20
T3-170L	3.5-170 MHz	Rotative	Twin Meter	17.25
		WELZ		
SP300	1.8-500MHz	20/200/1KW	SWR/ Power	121.50

NB: PRICES INCLUDE VAT AT 15%
Carriage free by post

MORSE EQUIPMENT

			p.p.
MORSE KEYS			
HK703	Straight Key	£29.35	£1.20
HK704	Straight Key	£19.95	£1.20
HK706	Straight Key	£16.65	£1.00
HK707	Straight Key	£15.50	£1.00
HK710	Straight Key	£39.95	£1.75
HK808	Straight Key	£49.95	£1.75
HK711	Key Mounting	£32.75	£1.50
BK100	Mechanical Bug	£24.95	£1.75
MK701	Single Lever Paddle	£28.50	£1.60
MK702	Single Lever Paddle	£29.75	£1.60
MK703	Squeeze Key	£28.95	£1.75
MK705	Squeeze Key	£25.65	£1.75
MK706	Squeeze Key	£23.50	£1.75
IKP60	Iambic	£9.95	FOC
HK802	de Luxe Brass Key	£86.30	£2.00
HK803	de Luxe Brass Key	£82.65	£2.00
HK804	de Luxe Brass Key	£78.25	£2.00
MHK831	Super de Luxe squeeze & straight key	£189.00	£3.50
MORSE EQUIPMENT			
KP100	Squeeze 230/13·8V	£82.50	£2.00
KP200	Memory 4096 Multi Ch Mem Back Up 230/13·8V	£169.50	£2.50
D70	Morse Tutor (Datong)	£56.35	FOC
MMS1	Morse Tutor (M/M)	£115.00	FOC
MMS2	Morse Tutor Advanced	£169.00	FOC
MICROWAVE MODULES—RRTY EQUIPMENT			
MM2001	RTTY to Video	£189.00	FOC
MM4001	RTTY Transceiver	£269.00	FOC
MM4001KB	RTTY Tx/Rx keybd	£299.00	FOC
MM1001KB	Morse Keyboard	£135.00	FOC
MM1000KB	ASCII CW conv c/w keybd	£135.00	FOC

PRICES INCLUDE VAT at 15%
Carriage as shown

10M FM CORNER

Join the many others who have found that operating 10M FM can be a pleasant alternative to the overcrowded 2M band. The SMC Oscar 2 10M gives you 40 channels, channel 1 being 29.310 MHz and channel 40 29.7 MHz, a power o/p of approximately 4 watts and a receive sensitivity of better than 0.3μV for 12db sinad. Also for your enjoyment when the band opens up, we have incorporated a - 100kHz repeater shift (by using the original panel Hi/Low power switch), so from the car or at home you can enjoy 10M FM.

OSCAR 2 10m FM £65.00 inc

ACCESSORIES		INC	P/P
SMCGP27	¼ Wave vertical	£29.00	£2.65
SMCVA27	¼ Wave vertical no radials	£29.00	£2.65
SMC11V11S	Glass fibre loaded radials	£32.15	£2.65
SMC10SE	10M Mobile whip	£15.95	£2.00
RSL-28b	Yaesu 10M mobile whip	£10.65	£2.00
SMCGCCA	Gutter mount and cable	£11.50	£2.00
SMCSOCA	4M cable assembly 10SE	£5.65	£1.50
FLEXI 10	G. Whip mobile 10-80M	£52.33	£2.35
MULTI-M	G. whip mobile 10/15/20	£33.92	£1.85
FLEXIWHIP	G. Whip 10M mobile	£19.21	£1.85
GW BASE	Base for all G. Whips	£6.90	£1.00
SMTC3170L	Twin meter SWR bridge	£17.25	FOC
SMC100LP30	Low pass filter	£5.30	FOC
120406	4 Amp DC power unit	£14.95	£2.35
SP55	Extension L/S	£16.50	FOC

NB. PRICES INCLUDE VAT AT 15%
and carriage by post or Securicor

PUBLICATIONS

	£	p/p
I.P.C. (PRACTICAL WIRELESS)		
Out of Thin Air	1.20	0.75
Passport to Amateur Radio	1.50	0.75
Wires and Waves	3.00	0.90
Are the voltages correct?	1.00	0.50
Introducing R.T.T.Y	1.50	0.50
R.S.G.B.		
Teleprinter Handbook	11.65	1.35
Radio Communications Handbook	8.95	2.05
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Amateur Radio Techniques	4.75	1.35
HF Antennas for all Locations	4.75	1.35
Guide to Amateur Radio (Soft)	2.75	0.75
Radio Amateur Operators Manual	4.25	0.75
1983 Call Book (UK)	1.00	0.80
1984 Call Book (UK)	5.00	0.50
R.A.E. Manual (10th Edition)	2.75	0.75
T.V.I. Manual	1.50	0.50
Morse Code for Radio Amateurs	1.00	0.50
VHF/UHF Manual (3rd Edition)	4.25	2.00
VHF/UHF Manual (4th Edition)	8.50	2.00
Prefix Map	2.25	1.25
Great Circle Map	1.50	1.20
Amateur Radio Logbook	2.30	1.25
S.M.C.		
Countries List	0.35	1.20
G.R.A. Locator Map (Special Coating)	0.50	1.20
Transparent Overlay 50km Rings	1.00	
Maidenhead Locator Map	1.50	1.20
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Complete S.W.L. Handbook	9.95	0.85
S.W.L. Antenna Handbook	8.45	0.75
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Radio Communications Receivers	11.75	0.90
Secret Shortwave Spectrum	6.50	0.75
UNIVERSAL ELECTRONICS INC		
Clandestine Confidential S.W.	6.35	0.85
World Press Frequencies (RTTY)	6.35	0.85
RTTY Today, Modern Guide	6.35	0.85
MISCELLANEOUS PUBLISHERS		
Amateur Radio (Stokes/Budd)	8.95	1.30
Log Book (Jaybeam)	2.30	1.25
Maidenhead Locator Map	1.50	

Prices include V.A.T. at 15% (where applicable) Postage extra. U.K. and B.F.P.O. rates for one off items only shown. N.B. For larger orders (any mix) p/p may be much lower than sum of individual charges

ROTATORS

The finest range: be it Kenpro, C.D.E., Channel Master, SMC has over 19 models to choose from. Ask the experts for the right model to suit your requirements—it should save you money. Write, phone or call.

KR600RC

9502B

FU200	Thro'	3 Core	Light Duty	£49.95
KR250	Bell	6 Core	Lighter Duty	£61.95
9502B	Offset	3 Core	Lighter Duty	£69.49
AR40	Bell	5 Core	Medium Duty	£115.00
KR400	Bell	6 Core	Matches KR500	£109.95
KR500	Thro	6 Core	Elevation	£139.95
AR50	Bell	5 Core	5 Position (AR40)	£139.00
KR400RC	Bell	6 Core	Medium Duty	£132.50
CD45	Bell	8 Core	Heavy Duty	£189.95
KR600RC	Bell	8 Core	Heavy Duty	£189.50
HAM IV	Bell	8 Core	Heavier Duty	£299.00
KR2000RC	Bell	8 Core	Heavier Duty	£366.50
T2X	Bell	8 Core	Very Heavy Duty	£365.00
HDR300	Bell	8 Core	Digital Readout	£699.00

Control Cable			p.p.
RC5W	5 Way	mtr £0.44	£1.90
RC6W	6 Way	mtr £0.59	£1.90
RC8W	8 Way	mtr £0.67	£1.90
9523	Support Bearing for 9502b F4200	£19.65	£2.50
KC038	Lower Mast Clamp for KR400 600, etc	£12.85	£2.50

Prices including VAT and carriage, but carriage on accessories is extra unless sent with rotators

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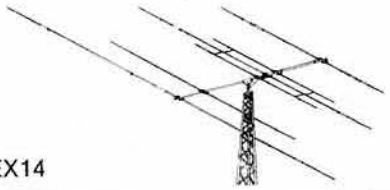
HF ANTENNAS

SMC have the greatest range of HF antennas eg. Multi Beams/Quads, over 20 models. Shown below is the sensational new Explorer 14—contact us for full details.



EX14

MULTIBAND BEAMS		Inc VAT	P&P
EX14	Explorer 10-20m	£499.00	£7.50
TH3JNR	3 Ele 10-20m	£298.00	£4.50
TH5Mk2	5 Ele 10-20m	£649.00	£7.70
TH7DXX	7 Ele 10-20m	£755.00	£9.75
TB3	3 Ele 10-20 Jaybeam	£212.75	£5.90
HQ1	Mini Quad 10-20	£199.00	£4.00
G4MH	Mini Beam 1-20	£88.50	£4.50
TA33JNR	3 Ele 10-20 Moseley	£177.10	£6.00
Mustang 2	2 Ele 10-20 Moseley	£177.10	£6.90
Mustang 3	3 Ele 10-20 Moseley	£220.80	£6.90
GQ2E	2 Ele 10-20 Quad	£299.00	£5.90
GQ3E	3 Ele 10-20 Quad	£536.00	£9.20
GQ4E	4 Ele 10-20 Quad	£745.00	£10.00
Hyquad	2 Ele 10-15M dipole 20M	£345.00	£8.00
LP1007	Log Periodic 13-20 MHz	£2195.00	DIST
3Y1015D20	3 Ele 10/15M Dipole 20M	£179.00	£5.95
DB10/15A	3 Ele 10-15m	£209.00	£4.80

TB3

MONO BAND BEAMS			
103BA	3 Ele Yagi 10m	£99.00	£3.95
105BA	5 Ele Yagi 10m	£220.00	£3.95
153BA	3 Eli Yagi 15m	£135.00	£3.90
155BA	5 Ele Yagi 15m	£339.00	£5.90
203BA	3 Ele Yagi 20m	£259.00	£4.90
204BA	4 Ele Yagi 20m	£420.00	£7.30
205BA	5 Ele Yagi 20m	£499.00	£9.40
18TD	Dipole Tape 10-80m	£230.00	£2.80

HF5V

HF5R

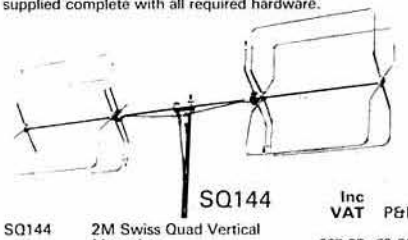
VERTICALS			
12AVQ	Vertical 10-20m	£78.95	£2.75
14AVQ/WB	Vertical 10-40m	£106.00	£2.75
18AVT/WB	Vertical 10-80m	£172.00	£2.75
18V	Vertical 10-80m taped	£38.80	£2.75
C4	Vertical 10-20m	£89.00	£2.50
SMCHF5V	Vertical 10-80m	£66.50	£3.00
SMCHF5R	Radial Kit for above	£41.00	£3.00
TRAP DIPOLE			
SMCTD/HP	High Power 10-80m	£49.00	£2.65
SMC TD/P	Portable inc coax	£69.00	£2.65
MOBILE			
Tribander	10-20m Slide sw.	£29.33	£2.20
Multimobile	10-20m	£33.92	£1.85
Flexiwhip	10m only	£19.21	£2.20
Extra coils	For above to 160m	£7.25	£1.00
Flexiten	2, 10, 12, 17, 15, 20, 30, 40, 80M	£52.33	£2.35
Bases	For above	£6.90	£1.00

NB: PRICES INCLUDE VAT AT 15%
Carriage extra. Mainland rate shown.

BASE ANTENNAS

HF, VHF, UHF, BASE STATION ANTENNAS

SMC-HSA range of bse station antennas covers from 80M through to 70cm. All have SO239M connectors and are supplied complete with all required hardware.



SQ144

		Inc VAT	P&P
SQ144	2M Swiss Quad Vertical Mounting	£67.95	£2.85
GP2M	2M⅝ c/w groung plane 3·4dB ¼	£22.95	£2.85
GG144W	2M2 × ⅝ colinear 6·5dB ¼	£33.95	£2.85
GP23	2m3 × ⅝ colinear 7·8dB ¼	£49.95	£2.85
GP432X	70cm 3 × ⅝ 6·8dB ¼	£36.95	£2.85
70N2V	2M/70cm colinear 2·8dB ¼/5·8dB ¼	£36.80	£2.85
HS770	2M/70cm Duplexer 50W 30dB isolation	£17.65	£1.95
VHFL	65-520MHz Discone Rx only	£19.60	£2.85
GDX1	80-480MHz Discone 3dB ¼	£49.50	£2.85
GDX2	50-480MHz Discone 3dB ¼	£62.85	£2.85
GDXA	100-480MHz Discone 3dB ¼	£41.85	£2.85
LT606	50-500MHz Log Periodic 7-8dB	£159.95	£3.50
HF5V	Trapped Vertical 10-80M 5 bands	£66.50	£3.00
HF5R	Loaded Radial Kit	£41.00	£3.00
3Y1015D20	3 ele 10, 15M dipole 20M	£179.00	£5.95
GP714	70cm 14 step colinear 10dBi	£88.20	£2.85

POWER SPLITTERS

144MHz 2 way N connectors 1kW	£30.65	£1.50
144MHz 4 way N connectors 1kW	£33.75	£1.50
432MHz 2 way N connectors 1KW	£29.15	£1.50
432MHz 4 way N connectors 1kW	£31.80	£1.50
1296MHz 2 way N connectors 1kW	£24.55	£2.00
1296MHz 4 way N connectors 1kW	£25.70	£2.00

JAYBEAM

4 METRES				
4Y/4M	Yagi 4 element	7dBd	£32.78	£2.65
PMH2/4M	Phasing harness 2 way		£17.82	£1.65
2 METRES				
H0/2M	Halo head only	0dBd	£6.53	£1.50
HM/2M	Halo with 24" mast	0dBd	£7.48	£1.65
C5/2M	Colinear omni vert	4·8dBd	£86.25	£2.65
LW5/2M	Yagi 5 element	7·8dBd	£15.53	£2.65
LW8/2M	Yagi 8 element	9·5dBd	£19.56	£2.65
LW10/2M	Yagi 10 element	10·5dBd	£25.30	£2.65
LW16/2M	Yagi 16 element	13·4dBd	£35.07	£3.65
PBM10/2M	10 ele Parabeam	11·7dBd	£49.45	£3.65
PBM14/2M	14 ele Parabeam	13·7dBd	£60.95	£3.65
Q4/2M	Quad 4 element	9·4dBd	£31.63	£2.65
Q6/2M	Quad 6 element	10·9dBd	£41.40	£2.65
Q8/2M	Quad 8 element	11·9dBd	£51.75	£2.65
D5/2M	Yagi 5 over 5 slot	10dBd	£27.60	£2.65
D8/2M	Yagi 8 over 8 slot	11·1dBd	£37.95	£2.65
5XY/2M	Yagi 5 ele crossed	7·8dBd	£29-90	£2.65
8XY/2M	Yagi 8 ele crossed	9·5dBd	£38.53	£2.65
10XY/2M	Yagi 10 ele crossed	10·8dBd	£43.80	£2.65
PMH2/C	Harness cir polarisation		£11.50	£1.65
PMH2/2M	Harness 2 way 144MHz		£13.23	£1.65
PMH4/2M	Harness 4 way 144MHz		£31.62	£1.65
70CMS				
C8/70	Colinear Vertical	6·1dBd	£92.00	£2.65
D8/70	Yagi 8 over 8 slot	12·3dBd	£28.18	£2.65
PBM18/70	18 ele Parabeam	13·5dBd	£34.50	£2.65
PBM24/70	24 ele Parabeam	15·1dBd	£46.00	£2.65
LW24/70	Yagi 24 element	14·8dBd	£31.05	£2.65
MBM28/70	28 ele Multibeam	11·5dBd	£23.00	£2.65
MBM48/70	48 ele Multibeam	14·0dBd	£37.96	£2.65
MBM88/70	88 ele Multibeam	16·3dBd	£51.75	£2.65
8XY/70	Yagi 8 ele crossed	10dBd	£45.85	£2.65
12XY/70	Yagi 12 ele crossed	12dBd	£55.20	£2.65
PMH2/70	Harness 2 way		£12.07	£1.85
PMH4/70	Harness 4 way		£24.73	£1.85
23CM				
CR2/23CM	Corner reflector	13·5dBd	£43.13	£2.65
PMH2/23CM	Harness 2 way		£32.78	£1.65

NB: PRICES INCLUDE VAT AT 15%
Carriage extra, mainland rate shown

SMC-HS

HF, VHF, UHF ANTENNAS MOBILE VERTICALS

SMC-HS Mobile Elements, tabulated below, feature an inbuilt PL259M connector, which mates with the SO239M on any of the four standard mounts. This arrangement is ideal for easy removal —band changes, comparative test, car wash, anti-vandal, system checks from the feed point, portable operation and for ease of garaging etc. All models have fold over bases (either lift and lay or locking collar) except the 78B which has an inbuilt ball in case the mount must be fitted askew.

SMC 78F

GCD

SMC258

GCD

	SMC-HS MOBILE ANTENNAS	£	P&P
SMC6P2T/PL	Telescopic 2M PL259 fitting ¼λ	5.75	0.85
SMCT144h	Telescopic 2M ½ wave BNC	10.35	0.85
SMC6P2T/BNC	Telescopic 2M BNC fitting ¼λ	6.90	0.85
SMC2H/PL	Helical 2M PL259 fitting	5.95	0.85
SMC2H/BNC	Helical 2M BNC fitting	6.90	0.85
SMCHS430S	70cm ½ wave BNC 2.5dB¼	8.75	0.65
SMC2QW	2M ¼ wave 0dB¼ 1.6'	2.70	1.85
SMC2NE	2M ⅝ wave fold 3.0dB¼ 4.3'	7.95	2.00
SMC2VF	2M ½ wave fold 3.0dB¼ 3.5'	14.66	2.00
SMC78F	2M ⅝ wave fold 4.5dB¼ 5.7'	14.74	2.50
SMC78B	2M ⅝ wave ball 4.5dB¼ 5.6'	14.74	2.59
SMC78SF	2M ¼ wave short 4.7'	16.95	2.50
SMC88F	2M 8/8 wave 5.2dB¼ 6.5'	22.95	2.50
SMC118M	Colinear 2M 11/8 7dB¼ 9.7'	39.85	2.65
SMC258	70cm 2 × ⅝ fold 5.5dB¼ 3.1'	26.95	2.00
SMC268E	70cm 2 section colinear 6dB¼	29.95	2.00
SMC358	70cm 3 × ⅝ 6.3dB¼ 4.7'	20.95	2.00
SMC70N2M	Dual band 2M 2.7dB¼ 70cm 5.1dB¼ (½λ & 2½λ)	20.95	2.00
SMCHS770	144/432 Duplexer 50W	19.55	1.85
SMC20SE	20M 1.72M 100W PEP	21.50	2.50
SMC15SE	15M 1.72M 130W PEP	16.85	2.50
SMC10SE	10M 1.72M 200W PEP	15.95	2.50
SMC17SE	17M 1.915M 200W PEP	18.75	2.50
SMC12SE	12M 1.915M 200W PEP	16.85	2.50
RSL-28b	Yaesu 10M mobile whip	10.65	2.00
SMCGCCA	Gutter clip 4 mtrs cable	11.50	2.00
SMCSOCA	Cable assembly 4M PL259	5.65	1.50
SMCSOCAL	Cable assembly 6M PL259	5.95	1.50
SMC50CALLR	Cable assembly 5M PL259	6.65	1.50
SMCROL	Rollet, 10mm thick (for above)	1.15	0.50
SMCTMCAS	Trunk mount c/w 6M cable	10.65	2.00
HDTMCA	HD trunk mount c/w 5M cable	16.10	2.00
SMCSOMM	Magnetic base c/w 4M cable	11.95	2.00
SMCSOWM	Adjustable wing mount base	4.95	0.90
SMCGCD	Gutter clip deluxe	5.30	1.50
SMCBSD	Bumper strap deluxe	10.95	1.50
HS88BK	Bumper mounted extension for 144 MHz antennae	23.35	2.00

SOMM

HS770

NB: PRICES INCLUDE VAT AT 15%

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See preceding pages for complete addresses and phone numbers of branches

RADIO SOCIETY OF GREAT BRITAIN

THE NATIONAL SOCIETY REPRESENTING ALL UK RADIO AMATEURS

Founded 1913 Incorporated 1926 Limited by guarantee A member society of the International Amateur Radio Union

PATRON: HRH PRINCE PHILIP, DUKE OF EDINBURGH, KG

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

Headquarters and registered office: **Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JW**
Telephone (Dialling code 77 from London, 0707 from outside London) 59015. Telex 25280 (RSGBHQ G)
Secretary and general manager: D A Evans, G3OUF

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Microwave manager: D S Evans, G3RPE
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Correspondence to RRs and honorary officers should be addressed directly to them (QTHR), not to RSGB HQ

ANNUAL SUBSCRIPTION RATES

Corporate member: UK and overseas (*Radio Communication* by surface mail): **£16.50 UK associate member under 18: £6.20 Family member: £6.60**
UK students over 18 and under 25: £9.30 (Applications should give applicant's age at last renewal date and include evidence of student status)
Affiliated club or society/registered group (UK): £16.50 (including *Radio Communication*); **£9.90** (excluding *Radio Communication*)
(Subscriptions include VAT)

RSGB QSL BUREAU

QSL cards for distribution should be sent to:
Mr E G Allen, G3DRN, QSL Bureau manager,
30 Bodnant Gardens, London SW20 0UD

A list of QSL Bureau sub-managers is obtainable from RSGB headquarters.

RSGB NEWS SERVICES

Headline News
Telephone 0707 (77 from London) 59312 for a recording of the latest amateur radio news.

GB2RS Broadcasts
Sunday news broadcasts from stations throughout the UK using the callsign GB2RS on frequencies in the 3·5, 7 and 144MHz bands. Details of frequencies, locations and times can be obtained from RSGB headquarters.

EDITORIAL

Learning Morse

Morse, being somewhat removed from the day-to-day experience of most people, is a classic example of the chicken and egg problem: until one fully knows its delights and advantages, it is difficult to generate the necessary commitment to learning it; until one has used it regularly, it is difficult to appreciate its advantages. The value of morse, and therefore the cost-effectiveness of the effort involved in learning it, has to be taken on trust. The latter capacity, regrettably, is something that seems to be declining decade by decade.

Despite this, we appear to be in a situation where morse is beginning to bloom again, which many would welcome as something of a return to the fundamentals of amateur radio. Three examples will suffice to illustrate the reasons for our mild optimism.

First, the analysis of the first 750 RSGB User Reports received produced something of a surprise: it showed that almost exactly two-thirds of the Class A licensees reported that they used cw on a regular basis—a far higher proportion than had been expected. We hope this picture will be confirmed by subsequent reports.

Second, we have been rather pleased with the response to the RSGB Morseman project. So far, there have been over 400 requests for kits, special components and technical information. Because it is a relatively sophisticated piece of equipment, we feel it will be particularly popular with clubs, being handed from member to member as it fulfils its purpose as a tutor. It is an encouraging start.

Third, the apparent initial success of the morse for Class Bs experiment. To-date, nearly 6,000 Notices of Variation have been issued by the RSGB on behalf of the DTI; rather more than anticipated. This corresponds to a fifth of all Class B licensees. One has only to listen on the appropriate bands to see that a fair proportion are already taking advantage of this facility.

With regard to learning morse, we sometimes wonder whether it can ever be such an onerous task as some imagine. Taking a positive attitude to learning morse and an acceptance of the challenge in the best traditions of amateur radio, can really achieve wonders. If any members would like to pass-on details of the learning methods which proved successful or unsuccessful for them, how long or short a time it took to become competent, and any other aspects or learning morse, we shall be only too happy to summarize their contributions to pass-on to others facing this rather exciting challenge.

dah-dit-dah

David Evans, G3OUF

Amateur Radio News

Noisy Ambassadors

The Society has previously reported problems of interference in the 144MHz band which were thought to be caused by BT Ambassador telephones. Thanks largely to the number of amateurs who supplied the Society with details of the problems which have been experienced, the RSGB was able to supply both the DTI and BT with comprehensive information on the problem. It is pleasing to be able to report that a solution has now been found, and BT has taken action to stop the unintentional radiation from these telephones.

Only a relatively small number of the Ambassadors in service were faulty, and they are all associated with business "key system" installations: the domestic-type Ambassador was not responsible for the problem. In essence, the interference was caused by l.e.d. driver circuitry "taking off" at around 144MHz, and the resulting rf was radiated via the line cord. The cure is very simple, involving decoupling, and BT engineers are correcting all installations reported to them as causing interference. The necessary modification is incorporated in new production.

Members who suspect that a telephone of this type is causing rfi are asked to contact their local BT office, quoting "Ambassador ESG RFI problem". BT will then investigate. Any member who needs further assistance is asked to contact the membership services department at RSGB HQ.

VAT on Members' Ads

The Chancellor of the Exchequer announced on 19 March, as part of the Budget, that Value Added Tax would be payable on all advertisements in newspapers and magazines from 1 May 1985.

As advised in the *RSGB News Bulletin* insert in the April issue of *Radio Communication*, the cost of Members' Ads received on or after that date will be: £2.30 for every 40 words or part thereof. All advertisements received after 30 April 1985 which are not accompanied by the correct remittance will be returned to the sender, as the Society itself would otherwise have to pay the tax.

Raised in the House

On 11 February Mr Wigley, MP for Caernarfon, asked the Secretary of State for Trade & Industry if he would introduce legislation to permit the broadcasting of church services, including the singing of hymns, on citizens' band radio. In reply Mr Butcher said that cb radio was intended for short-duration two-way communication, and that it was a condition of the licence that the transmission of music in any form was not permitted. These conditions were necessary because the frequencies available were limited and were for the use of all people for business and pleasure. CB was not intended for broadcast purposes and he did not consider that it would be in the interests of cb users as a whole for the licence conditions to be altered in the way Mr Wigley was suggesting. This was particularly the case since church services were broadcast on radio and television.

On 18 February Mr Chope, MP for Itchen, asked the Secretary of State for Trade & Industry what his department was doing to protect legitimate cb users in the Southampton area against the use of foul language, music broadcasting and other interference on the mobile user's channel, the calling channel and the emergency channel. In reply Mr Butcher said that he shared Mr Chope's concern about the misuse of cb radio. His department was currently reviewing the work of the Radio Investigation Service with a view to increasing the effectiveness of its law enforcement activities. As part of this effort a series of campaigns in selected areas against licence abuse and licence evasion was planned. CB radio would be one of the first services to be tackled, although he could not, for obvious reasons, say where these campaigns would be particularly concentrated.

Privatising the ether?

Mr Geoffrey Pattie, Minister of State for Industry & Technology, announced on 12 March 1985 that the Department of Trade & Industry has invited a London firm of management consultants, CSP International, to undertake the first part of a feasibility study on the pricing of the radio spectrum. Mr Pattie said that the demand for radio spectrum was rapidly growing, and that new commercial radio communications involving radio pagers and cellular radio telephones were additional users of what was a finite natural resource. He added that, in some cases, demand exceeded supply.

The Department of Trade & Industry is responsible for frequency assignment in the UK. Up to now those parts of the spectrum allocated for commercial and industrial uses have been dealt with on a "first-come first-served" basis with a licence fee based on administrative costs. The two main areas to be investigated under the terms of the feasibility study are the benefits, if any, which would result from bringing market forces and the price mechanism to the area of spectrum management, and the matter of whether it would be technically and administratively feasible to do so.

The first part of the study is expected to take about six months to complete, and will evaluate current and future usage of the fixed service: this encompasses point-to-point radio links which are principally in the uhf and microwave areas of the spectrum. The second part will study all other areas of spectrum usage, including pmr, broadcasting, amateur and cb radio, emergency services and what the DTI's press release refers to as ". . .other specialized needs".

Users of the radio spectrum will be fully consulted, and the Society expects to be approached to assist in the area of the study concerning amateur radio. Members will be kept fully informed.

It is interesting to note that the impetus for the commissioning of this feasibility study came from one of the recommendations of the Merriman Committee's report on the radio spectrum, which was published in July 1983.

QSL Bureau news

An additional sub-manager has been appointed to assume responsibility for Class B callsigns in Northern Ireland. All other GI callsign groups will continue to be handled by the existing sub-manager. The division will, therefore, be as follows:

Mr J M Bruce, GI4SJB, 28 Ballymenoch Road, Holywood, Co Down BT18 0HH—GI1 three-letter calls, GI6 three-letter calls and GI8 three-letter calls;

Mr R Parsons, GI3HXV, 45 Erinvale Avenue, Belfast BT10 0FP—all other GI callsigns.

Members are asked to note once again that the RSGB QSL Bureau will be **closed** this month between 10 and 24 May. Cards must **not** be sent to G3DRN between those dates.

Cable television standards

A major study confirming the view that new technical standards should be established before wide-band cable television systems are generally introduced into the UK has been completed at the Electronic Research Establishment. The study, which was undertaken at the request of the Department of Trade & Industry, followed concern which had been voiced about the electromagnetic compatibility of cable systems and their component parts: ERA attempted to establish the extent to which the emc behaviour of cable systems might be affected by individual component performance. Two problems in particular called for investigation: radiated field emissions and immunity to radio frequency fields.

The conclusion of the report (which, incidentally, costs a mere £135) is that while radiated emissions from the systems examined might not cause unacceptable interference, the achieving of immunity to external fields required substantial improvement to avoid interference. This was particularly true of breakthrough from amateur and mobile radio transmitters.

News from Australia

An interesting release from the Wireless Institute of Australia describes some ways in which it intends to celebrate its 75th anniversary, which falls during 1985. As of 10 March the special callsign VK75A will be on the air from time to time: it has been specially issued by the Australian administration. Special QSL cards will be

available. Various contests and awards are planned, and *The Month on the Air* gives the details. A number of formal dinners will be held during the year, culminating in the Federal 75th Anniversary Dinner to be held in Melbourne at the Southern Cross Hotel on 9 November 1985. Many dignitaries will be attending, including members of the IARU Administrative Council. A limited number of tickets is available, and overseas visitors will be welcome. Enquiries to the Secretary, PO Box 300, South Caulfield, Victoria 3162, Australia.

The RSGB extends to the Wireless Institute of Australia—which is, incidentally, the world's oldest radio society—very hearty congratulations and good wishes for its future.

The February 1985 issue of the WIA journal *Amateur Radio* carried a full-page outline of the various sections of Murphy's Law as applied to electronics. A few of the more unfamiliar axioms are given below:

1. If the breadboard trial model functions perfectly, the finished product will not work.
2. If a device requires N components, there will be N – 1 components available.
3. Interchangeable components won't.
4. The necessity of making a major design change increases as the assembly and wiring of the unit approach completion.
5. The availability of a component is inversely proportional to the need for that component.
6. Any wire cut to length will be too short.
7. A crystal oscillator will oscillate at the wrong frequency, assuming that it oscillates at all. A self-starting oscillator won't.
8. A circuit protected by a fast-acting fuse will always protect the fuse by failing catastrophically.
9. A component selected at random from a group having 99 per cent reliability will be a member of the one per cent group.
10. After the 24th cabinet-to-chassis screw has been replaced, the pa valve will be found under the circuit diagram on the bench.

A trenchant item in March issue, entitled "The Royal We", reads as follows:

I know you have to be rich to afford amateur radio equipment these days, but how is it so many amateurs are rich enough to have a staff to run their station? Clearly they have a staff of technicians, as they refer to themselves in the plural "we". "We have a tribander Yagi, and our rig is a Fox Tango 107. We should be happy to QSL via the bureau". The other possibility is that they are royals and thus have a legitimate right to use the use of the plural. But how can I tell whether to say "73 to all of you" or "73 your Majesty"?

Some UK amateurs clearly have the same well-staffed stations! Perhaps one should bear in mind the comment of the great English writer and critic Addison: he said that "we" should only be used by queens, newspaper editors and pregnant women. . . .

Cost hike in Canada

Radio Licence fees were increased across the board in Canada from 1 April 1985: a Canadian amateur radio station licence has incresed in cost from $13 to $20 per annum. The increases are in line with the desire of the Canadian licensing authority to move towards full recovery of spectrum management costs through fees paid by users. PMR licence charges in particular have risen sharply.

PA0AA

Headquarters is sometimes asked for information on the transmissions of news and morse practice which are broadcast from the headquarters station of the Dutch national society, VERON. In fact PA0AA has been transmitting weekly morse exercises for beginners and advanced operators for over 35 years, and the current transmission schedule (all broadcasts take place on Fridays) is as follows:

1830—information for amateurs, in Dutch.
1845—DX news in English, compiled both from the VERON publication DX'press and from other sources.
1900—Morse practice for beginners.
1930—Morse practice for advanced operators.
2000—RTTY transmissions.
2030—Repeat of 1830.
2045—Repeat of 1845.
2100—Station takes calls.

All times are gmt. The frequencies used by PA0AA are 3,602kHz, 14,103kHz, 144·8MHz (fm) and 433·45MHz (fm).

On the last Friday of each month there is a morse "proficiency run" at 2100, with speeds of 15, 20, 25, 30, 35 and 40wpm.

Mode L in the USA

The FCC has released a Notice of Proposed Rulemaking which is largely concerned with access to microwave frequencies in the USA. The notice proposes, among other things, to authorize earth-to-space operation at 1,260-1,270MHz (Mode L): Oscar 10 periodically operates in Mode L, and as matters stand American amateurs are unable to use the satellite at these times. In a related matter the American Radio Relay League has filed a motion for interim operating authority which asks the FCC to authorize Mode L operation in the USA while the notice is being considered.

The notice also proposes to clarify a few remaining points from WARC 79, notably the position of the 1,800-1,900kHz and 1,900-2,000kHz bands which are now to be listed separately.

Straight Key Evening

The fourth annual Straight Key Evening sponsored by the Edgware & DRS will take place on 30 May 1985. This year the society is aiming to attract more cw operators than ever; from the old-timers to the newest G0. SKE is not a contest but is intended to promote relaxed and chatty contacts using the simplest of all modes—the straight key.

Join in when you can, say from 1900 onwards, and stay as late as you wish. All comments will be appreciated, especially nominations for the best fist, ie steadiest and cleanest sending, for which a prize key may be awarded. Comments should be sent to John Bluff, G3SJE, QTHR, tel 01-204 1034.

Hants Raynet

Throughout the spring and summer, the Raynet groups in Hampshire will be involved in a varied range of events and are looking for additional members to participate in the activities. Anyone interested should contact Martin Dyer, G8GGQ, tel Romsey 515581. Newly-licensed amateurs and swls are welcome.

Stolen equipment

On 13/14 February from Roy Bailey, G6WLE, QTHR: Yaesu FT70R, serial number 041387; 432MHz linear amplifier home-made from Wood & Douglas 70LIN10 kit; Oscar 144/432MHz dual-band antenna; home-made duplexer; and Yaesu PA3 car adapter/charger. Information to any police station, or tel 048 839441. Reward offered.

Radio Fraternity Lodge

Mr Eric Drackley, G3HTP, was recently installed as worshipful master of the Radio Fraternity Lodge of Freemasons for 1985-6. The secretary of the Lodge is Mr G Wakefield, G5WG, QTHR, and he would be pleased to hear from any member who has a call and is also a member of a lodge.

MECOM '85

Amateur Radio Association Bahrein (ARAB) had a large stand at the Middle East Communications Exhibition (MECOM '85). A special event station using the callsign A99A operated between 4 and 7 February, which was active on hf bands, and on Oscar 10 using an indoor antenna within the exhibition hall. Over 650 contacts were made on 14MHz, but satellite operations were not successful because of computer-

Mrs Joan Heathershaw, RSGB President, with members of the Southdown ARS at the official opening of that society's new headquarters in the Hailsham Leisure Centre, Southdown. *Photo:* G6GOS

generated rfi from other stands at the exhibition. A 120ft tower and Jaybeam antenna were used for the hf antenna system.

Sidebands

Although there was an HF Committee presence at this year's NEC exhibition, a separate HF Convention will also take place this year. The date will be 29 September 1985, at the Belfry Hotel, Milton Common, Oxfordshire.

Microwave Modules celebrates its 10th anniversary this year—nice to see a British company still doing well in the amateur radio market.

The Russian magazine *Sovietskii Patriot* seems to be suggesting that some new Russian amateur satellites will be launched shortly—the RS9 beacon and transponder have been ground-tested in the Moscow area.

Want a blue l.e.d? The latest Farnell catalogue has one, but it'll cost you £4.28 plus VAT.

Well-known Scottish operator GM4VAN is being extensively pirated on hf, 144 and 430MHz—any information will be gratefully received by the Mid-Lanark ARS.

We hear that the Sinclair C5 electric tricycle doesn't like vhf rf—the circuitry which senses that the motor is overloaded goes into "lock-out" mode. Back to the pedals. . . .

Mobile Rallies Calendar

All information for inclusion in this column must be sent to the editor, not to RSGB HQ.

5 May
Swansea ARS Mobile Rally, Patti Pavilion; adjoining St Helen's CC Ground on Swansea-Mumbles road A4067. Open 10.30am–5pm. Talk-in on S22, GB2SWR. Morse tests. Details GW4HSH, QTHR, tel 0792 404422.

5 May
Second Anglo-Scottish Rally, Kelso's Tait Hall, 11am–5pm. Talk-in on S22. Entrance £1. Organized by Kelso, Borders and Galashiels ARSs. Details André Saunders, GM3VLB, Physics dept, Kelso High School, or GM4UIB, QTHR, tel 0573 24664 and 24654, eveings only.

5 May
BATC Rally, Post House Hotel, Crick, close by junction 18 on M1, from 10am. Details G8CJS, QTHR, tel 0532 670115.

6 May
Mid-Cheshire ARS Mobile Rally, Winsford Civic Hall, High Street, Winsford, Cheshire. On A54 eight miles from M6 junction 18. Details G4VOH, QTHR, tel 06065 4719.

12 May
Swindon Radio & Electronics Rally. Oakfield School, Marlowe Avenue, Swindon, Wilts. Open 10am. Talk-in on 144MHz (S22) and 432MHz (SU8/GB3TD). Morse tests available. Details G8SFM, QTHR, tel 066689 307.

12 May
Drayton Manor Mobile Rally, Drayton Manor Park, near Tamworth, Staffs, on A4091 one mile south of A5/A4091 junction. Open from 11am to 5pm. Talk-in on 144 and 432MHz, callsign G3MAR/A. Details G8BHE, QTHR, tel 021-422 9787.

19 May
Mid-Ulster Mobile Rally, Parkenaur, Co Tyrone. From 12 noon. Details GI1CFS, QTHR.

19 May
Northern Mobile Rally. Great Yorkshire Showground, Wetherby Road, Harrogate. Open 11am. Caravan site at showground. Details H. Moore, 269 Leeds Road, Ilkley, West Yorks LS29 8LL.

26 May
Plymouth Mobile Rally, Devonport High School, Devonport, Plymouth. Opens 10am. Talk-in on S22. Details G8XTE or G6XZG, PO Box 46, Plymouth, tel Cornwall 319.

26 May
East Suffolk Wireless Revival. Civil Service Sportsground, Bucklesham, Nr Ipswich. Talk-in by GB4SWR. Details G4IFF, tel 0473 44047.

26 May
Maidstone YMCA ARS Biennial Mobile Rally. Y Sports Centre, Melrose Close, Cripple Street, Maidstone. From 11am. Details G3ISD, tel 0795 77431.

2 June
Spalding & DARS Mobile Rally. Talk-in from 10am. Details Betty Whitley, G4ZGT, 45 Exeter Drive, Spalding, Lincs.

9 June
Elvaston Castle Mobile Rally, Elvaston Castle Country Park, 5 miles SE of Derby on B5010. Organized by the Nunsfield House ARG. Open 10am. Talk-in GB2ECR on 144 and 432MHz. Details G4PZY, tel Derby (0332) 767994; G4CTZ, tel Derby (0332) 799452; or club hq tel 0332 755900.

9 June
Mid-Lanark ARS Open Day, Wrangholm Hall, Motherwell. From 10.30am. Talk-in on S22. Details GM4UXX.

16 June
Denby Dale Mobile Rally, Shelley High School, Nr Skelmanthorpe, Huddersfield. Talk-in on S22 and SU8. Open 11am. Details G3FQH, QTHR, tel 0484 862390.

16 June
RNARS 25th Anniversary Mobile Rally, *HMS Mercury*, Leydene, near Petersfield, Hants. From 10am to 5.30pm. Talk-in on 144 and 432MHz. Details G3WAO, 3 Humber Close, Stubbington, Fareham, Hants, tel 0329 665757.

30 June
Rolls Royce ARC Mobile Rally. **This rally has been cancelled.**

30 June
Buxton Mobile Rally. Pavilion Gardens, Buxton. Talk-in on 144MHz. Open 10.30am–5pm. Admission 50p. Details G6MIF, tel 0298 6174.

30 June
28th Longleat Amateur Radio Rally, Longleat Park, Warminster. Open 10am–5pm. Authorized morse tests, preference being given to handicapped; test enquiries to G4UWS, QTHR, tel 0272 772550. Details G4FRG, QTHR, tel 0272 848140.

7 July
Nottingham Amateur Radio Electronics Fair, Victoria Leisure Centre, Gedling Street, Near Nottingham City Centre. 10.30am–5pm (10am, disabled). Details G6MIF, tel 0298 6174.

14 July
Sussex Mobile Rally, Brighton Racecourse. From 10am. Talk-in on 145·50 and 3·5MHz. Details G6YPY, QTHR, tel 07918 5103.

14 July
Droitwich Mobile Rally, Droitwich High School. Details G4ASO, tel 0905 351565.

21 July
Cornish RAC Rally, Cornwall Technical College, Redruth. 10am–5pm. Talk-in on S22. Details G4RVP, tel Penzance 763549.

21 July
McMichael ARS Mobile Rally, Bells Hill, Stoke Poges, Nr Slough. Talk-in on S22 and SU8. Open 11am. Details G8IHF, c/o McMichael Ltd, Wrexham Road, Slough, Berks.

21 July
Anglian Mobile Rally, Stanway School, Colchester, Essex. Talk-in on 144MHz. Open 10am–5pm. Details G6HQI, 26 Pondfield Road, Colchester, tel 0206 862403.

28 July
Scarborough ARS Rally. The Spa, Scarborough. Open 11am. Talk-in on 144MHz (S22), 432MHz (SU8), and RB0, GB3NY. Details G4YWR, QTHR, ex-G6CXK, tel 0723 360587.

11 August
Derby Mobile Rally, Lower Bemrose School, St Albans Road, Derby (off Derby ring road). Open 10.30am. Talk-in GB3ERD. Details G4EYM or G3SZJ, tel 0332 556875.

11 August
Hamfest '84. Organized jointly by RAIBC and Flight Refuelling ARS. Details G6DUN, tel 0202 762828.

11 August
Wythall Radio Rally. **Due to unforeseen circumstances, this rally has been cancelled.**

18 August
West Manchester RC "Red Rose Rally", Haydock Park Racecourse, Newton-le-Willows, one mile from M6 junction 23. Talk-in on S22, GB2RRR. From 10am. Details G6TYB.

25 August
18th Preston Annual Rally, Lancaster University. Leave M6 at junction 33 and proceed N on A6 for two miles. Talk-in on 144MHz fm. Entry 50p. Opens 11am. Details G3DWQ, tel 0772 53810.

25 August
BARTG Rally, Sandown Park, Esher, Surrey. Details G8VXYO.

1 September
Cambridge Amateur Radio Rally, Kelsey Kerridge Sports Hall, Gonville Place, Cambridge. 10.30am–5pm (disabled, 10am). Adjoining multi-storey carpark. Details G6MIF, tel 0298 6174.

8 September
Lincoln Hamfest, Lincolnshire Showground, on A15 four miles north of Lincoln. From 10.30am to 5.30pm. Talk-in on 144 and 432MHz (S22 and SU8). Details G4STO, QTHR.

8 September
Telford Radio Rally & Exhibition, Telford Town Shopping Centre, Shropshire. Details G8UGL, tel Telford 584173, or G3UKV, tel Telford 55416.

15 September
Vange Mobile Rally, Nicholas School, St Nicholas Lane, Basildon, Essex. From 10am to 5pm. Talk-in on 144MHz, GB4VMR. Details G4OJN, QTHR.

15 September
Peterborough Mobile Rally, Wirrina Sports Stadium, Bishops Road, Peterborough. 10.30am–5pm. Details G3EEL, tel Peterborough 62881 after 6pm.

16 March 1986
Pontefract & DARS Components Fair, 11am–4.30pm, Carleton Community Centre, Pontefract, mid-way between Pontefract and Darrington on the A1.

Special Event Stations

All information for inclusion in this column must be sent to the editor, not to RSGB HQ.

7, 9, 25 April, GB2GWR
Operated from the main entrance of Temple Meads Station, Bristol, to celebrate 150 years of the Great Western Railway. From 10am to late, on 144 and 432MHz ssb, and 3·5, 7 and 14MHz ssb. Some cw may be included. Details G4ZCK, tel 0272 712675.

21 April–18 May, GB0SGD
To celebrate St George's Day, this station will be manned by members and friends of the Wisbech & D AR&EC on most bands. A special award will be issued. Sec *MOTA* in April issue for details. Further details G4KHF QTHR.

27/28 April, GB0MRS
Operated from Mansfield Leisure Centre in connection with "Expo '85". Details G4AAH.

1 May, GB2UUJ
Operated by the University of Ulster ARC at Jordanstown Campus to highlight the University Rag Week. On 14, 21, 28MHz, and 144MHz ssb/fm, from 10am to 10pm. Special QSL cards. Details GI4FZU.

3–5 May, GB4MGB
Celebrating an international gathering of the MG Car Club at Silverstone Grand Prix Circuit, Towcester, Northamptonshire. Havering RC and Northampton RC will operate the station on hf and vhf. Special QSL cards. Details G6SWT, or MG Car Club, PO Box 251, Studley, Warks B80 7AT.

4–5 May, GB2OH
The RAFARS Cleveland, Durham, Tyne & Wear Area Group will operate from the National Trust's Ormsby Hall, three miles southwest of Middlesbrough, from 10am to 6pm on both days, on 3·5–28MHz and 144MHz. Special QSL card. Details G6DSN.

4–5 May, GB0RER
Commemorating 25 years of railway preservation on the Ravenglass & Eskdale Railway, Ravenglass, Cumbria. Operational on 3·5, 7, 14 and 144MHz. Special QSL card. Details GM3ULP.

5–6 May, GB0LTF
On the occasion of the Llantrisant Town Festival, this station will operate on ssb and cw on hf, mainly 3·5 and 14MHz from 10am to 6pm on both days. There may also be some 144MHz activity in the evenings. Special QSL card. SWL reports welcome. Details GW3POM, tel 0443 224532.

5-11 May, GV4VE
To commemorate the 40th anniversary of VE-Day, this station will be operational on ssb and cw on the 3·5 to 28MHz bands. Special QSL card and RSARS Aff No 40. QSL manager G4KIE, RSARS QSL bureau manager. Details G4OHX, tel 01-302 1955 evngs only.
5-11 May, GM0HFC
Operational during Shetland Isles "Home Faring".
5-12 May, GV2VE and 8 May, GV4OVE
These "Peace in Europe" stations will be operated by the Bromsgrove & D ARC. GV2VE will be located at the Avoncraft Art Centre, and schedule details will be sent on receipt of an sae by G4IVJ. Three stations will be operational as GV4OVE from the Avoncraft Museum of Building from 0001 to 2359gmt on 8 May. SSB on 1,910, 3,730, 7,080, 14,210, 21,210, 28,510kHz, and 144·210 and 432·210MHz. CW on 1,830, 3,530, 7,030, 14,030, 21,030, 28,030kHz and 144·030MHz. FM on 144MHz. Details G4IVJ.
8-15 May, GV2VFP and 15-31 May, GB2VFP
To commemorate the signing of Instruments of Surrender at Luneberg Heath on 8 May 1945 and at Berlin on 9 May 1945. Operational in conjunction with Salisbury R&ES. Special QSL card. Details G3ESO, tel 0980 23001 or G2AX, tel 072274 3837.
9-11 May, GB2LIB
To celebrate the 40th anniversary of liberation of the Channel Islands on 9 May 1945. The station will be operated from Castle Cornet, Guernsey, from midnight to midnight gmt on Liberation Day itself, and between 1000 and 1700 gmt on 10/11 May. It is hoped to operate most hf bands and 144MHz. Details Peter Rouse, 5/7 Park St, St Peter Port, Guernsey, CI.
11 May, GB3YCS
York ARS will operate this station from York Scout Council's HQ camp at Snowball Plantation; Stocton on Forest, York, in connection with the annual "get-together" of all Cub Scout packs in the area. Operation on hf and 144MHz fm, and perhaps rtty. Details G3WVO, tel York 36230.
11-18 May, GB4LI
During an expedition to Lundy Island organized by the Nene Valley RC, this station will be operated on 1·8 to 28MHz, and 144 and 432MHz. Special QSL card. Details G4NWZ/G6GWZ, please enclose sae.
18-19 May, GB4HSC
Operated by Dudley ARC, this station will be in the grounds of Himley Hall, Dudley, in connection with a sponsored sail by Himley Sailing Club in aid of the RNLI. All modes, including rtty, hf and vhf. Details G4NRA.
18 May-2 June, GB4GWR
The Vale of White Horse ARC will operate this station at the Didcot Railway Centre, to celebrate the 150th anniversary of the Great-Western Railway, from 11am to 5pm daily on hf and vhf. The station will also be steam mobile for 30min each day from the footplate of one of the working locomotives, operating on 144MHz fm (probably S22) low power—special QSL cards for this operation. Full details will be sent by G4PFY on receipt of an sae. Details from, and offers of help to G4PFY, tel 0235 812565.
25-27 May, GB2IWF
During the International Waterways Festival at the Boat Museum, Ellesmere Port, the Wirrel & DARC will operate this station on hf and vhf/uhf, with possibly some evening and night working. Visitors will be very welcome. Details G8TRY, tel 051-630 1393 (home) 051-227 1018 (work).
29 May-1 June, GB4RBW
Operational on all bands and cw, from the Royal Bath & West Showground, Shepton Mallet, Somerset. Special QSL cards. Details PO Box 9, Shepton Mallet, Soms.
1 June, GB2WM
To mark the Wolverhampton celebration of 1,000 years of recorded history, Wolverhampton RS will operate this station from the Mander Centre from 8am to 6pm. VHF and hf, phone and cw. Special QSL card. Details Keith Jenkinson, tel 038482 3749, daytime.
1 June, GB0POS
During Paisley On Show (Civic Week), operational on 7 and 144MHz ssb/cw/rtty and possibly atv. Details GM4FDM.
2 June (Manor Heath Park, Halifax), 30 June (Greenhead Park, Huddersfield), 21 July (Woodhouse Moor, Leeds), 18 August (Thomas Park, Wakefield), 1 September (Lister Park, Bradford) —GB4WYP
"Police Community Exhibitions" will be held on the above dates at the places shown, during which the West Yorkshire Metropolitan Police ARC will operate GB4WYP on 3,680, 7,050 and 14,150kHz + or – QRM, and 144MHz fm. Special QSL cards. Contacts will give points towards the "Sherlock Holmes Award" issued by the International Police Association RC. Details PO Box 9, Wakefield WF1 3QP.
22 June, GB0PGD
This station will be operated by the Plessey (Beeston) ARC, as part of the Plessey Gala Day, on hf and 144MHz. Special QSL card. Details C Archer, G4VFK, 3 Alexandra Crescent, Beeston, Notts NG9 2BS, tel 0602 226321.
30 June, GB4LMR
Operational mainly on hf before and during the Longleat Mobile Rally, talk-in also available. Details G4FRG.
7, 14 July, 12, 13 August, 1, 8 September, GB1GWR and GB0IKB
These stations will be operated from the Weston-super-Mare Railway Station by Weston-super-Mare RS to commemorate the 150th anniversary of the Great Western Railway on 31 August. The July and September operations will coincide with special steam excursion trains which will call at the station; and the August operation will mark the visit of the Brunel Exhibition Train; Izambard Kingdom Brunel built the railway. Details G4/KA0NGP.
13-14 July, GB2SMR
Operational as talk-in station on 144 and 432MHz at the Sussex Mobile Rally by the Brighton RC, it will also be active on the hf bands. Details G4IIL.
20-30 July, GB2OVV
In connection with "Orkney Viking Venture", a series of camps for Ranger Guides celebrating the 75th anniversary of the founding of the Girl Guides, GB2OVV will operate from a croft cottage at one site overlooking Scapa Flow, on hf ssb and 144MHz ssb or fm. Details GM6WPA or GM3IBU.
27 July-3 August, GB2SGC
To celebrate "Peak '85", the Scout and Guide international camp at Chatsworth Park, Derbyshire, this station will be operational on hf, vhf, uhf and Oscar 10. Special QSL card. Offers of help from the Notts/Derby area to, and details from G6NED.
August, GB2BR
Swindon & D ARC will operate this station during August from the railway workshops at Swindon, during an exhibition to celebrate the 150th anniversary of the GWR. Details G8SFM, tel 066 689 307.
3 August, GB2FAA
Yeovil ARC will operate this station from the RN Air Station, Yeovilton, as part of the international air day, on hf and vhf, cw and ssb. Details G4JBH, tel 0935 23873, or G3BEC.
10/11 August, GB2YFT
Operated at the Yeovil Festival of Transport, Yeovil Showground on A37, by Yeovil ARC on hf/vhf/uhf, cw and ssb. Details G4JBH.
17 August, GB2MSS
At the Mid-Somerset Agricultural Show, Shepton Mallet, Yeovil ARC will operate this station on hf/vhf/uhf, cw and ssb. Details G4JBH.
17-18 August, GB2TC
To celebrate the 500th anniversary of Henry Tudor's visit to Tamworth prior to the Battle of Bosworth, the Tamworth ARC will operate the station on 3·5 and 144MHz from 10am to 8pm on 17 August, and from 10am to 5pm on 18 August. Special QSL card. Details G4SRI.

Other Events

All information for inclusion in this column must be sent to the editor, not to RSGB HQ.

5 May
Northampton RC Car Boot Sale, 10am-5pm, Obelisk Community Centre, Obelisk Rise, Northampton. Trade and club stands £10. Others £5 Entrance fee £1. Talk in on S22 and 432MHz. Details G6XKT.
11 May
Glasgow Amateur Radio Exhibition, Cardonald College, Glasgow. Admission £1. Details GM4FDM or GM4JDU.
2 June
RAIBC Picnic, Broadlands, Romsey, Hants.
4-6 June
Scotelex '85, the 16th Annual Electronics Exhibition & Convention, organized by the Institution of Electronics. To be held in the Exhibition Hall, Royal Highland Society, Ingliston, Edinburgh EH28 8NF. Details from Exhibition Organizer, Institution of Electronics, 659 Oldham Road, Rockdale, Lancs OL16 4IE, tel 0706 43661.
15 June
Staffordshire Raynet open-air picnic. 2pm. Cannock Chase Country Park. Details G4PFO.
2 September
Scottish Amateur Radio Convention, SARCON 85, Dundee.
6 October
Welsh Amateur Radio Convention. Details later.
12 October
Midlands VHF Convention, British Telecom Training School, Stone, Staffordshire.
13 October
Second Yeovil QRP Convention. Details G4JBH, tel 0935 23873.

OBITUARIES

The Society records with regret the deaths of the following radio amateurs:

Mr P B Dodd, VK3IF, G3PBD, VQ4, 5 and 1PBD, 5H3PBD, YA1PBD
Peter Dodd died on 4 March. He retired last year after 14 years' service with the Wireless Institute of Australia, as federal secretary/manager. Peter was well known for his mobile radio exploits in 1970, driving through, Europe, the Middle East, parts of SE Asia, Australia from Perth to Sydney and New Zealand north and south islands. He operated 5H3PBD in the presence of HRH The Duke of Edinburgh at Tanganyika's independence celebrations at midnight when the country prefix changed from VQ3. He was dedicated to the cause and furtherance of amateur radio.

Mr L Light, G3KDL
Leslie Light died on 12 January, at the age of 75. First licensed in 1955, he was a member of the RSGB and Harrow RS, and also an active supporter of the RAIBC. Leslie operated mainly on hf and participated regularly in the 'Early Bird's' net on 80m.

Mr B Oldfield, G4REJ
Bill Oldfield died on 23 February. He was a founder member of the Bath & (DARC) and served as vice-chairman. Bill had great enthusiasm and was always helpful towards newcomers to the hobby.

Mr A Potts, G8ZOA
Albert Potts died on 6 March, aged 51. Although only licensed a few years, he was well known in the Staffordshire area on 2m and was also a member of Raynet.

Mr A C Richards, G4ZUB (ex G8VOF)
Arthur Richards died on 20 February, aged 75. He was active in the Southwest on 2m and 70cm, and had only recently started on the HF bands with his new call. He had been a member of Yeovil ARC, and was active on the committee for many years. Arthur was also a member of both the Mendip and Yeovil repeater group.

Mr L Taylor, G3JMU
Les Taylor died on 20 February, aged 68. He was a founder member of Lowestoft and District ARC, and joined Raynet in 1953 as one of the original volunteers. Until recently Les was group controller for North East Suffolk.

Mr E C Ward
Ted Ward died on 2 February. He joined the Yeovil ARC's RAE class in May 1984 and took the RAE in December. His pass certificate was taken to him in hospital just before he died.

Also:

Mr W O Allen, G4BMB, on 20 February;
Mr J Butler, GW3VVJ, on 30 January;
Mr A B Dixon, G3FAS, on 25 November 1984;
Mr D K Harrison, G6WOK;
Mr H I Humphreys, GW8SGA, on 16 February;
Mr S R Von-Lehman, RS50926, on 21 April 1984;
Mr J McIntosh, GM3FAK, on 29 January;
Mr D B Smith, GI3UFT, on 4 November 1984;
Mr H A Woods, G2AXH

Members' Mailbag

THE EDITOR,
RADIO COMMUNICATION,
86 BROOMFIELD ROAD,
CHELMSFORD, ESSEX
CM1 1SS

CONSPIRACY EXPOSED

Sir—I write as a new member and RAE aspirant, never having made waves of any sort in 64 years.

From my limited reading so far, it seems to me that what is called amplitude modulation is really sideband generation modulation. It seems likely that many hams and even radio enthusiasts know this but are involved in a gross conspiracy of silence. I also give it as my opinion that true a.m. with sidebands tuned or filtered out or suitably suppressed, is well known to a select few who are using it for their own ends and laughing up their sleeves. These few know very well that correctly-designed transmitters and receivers truly modulate and demodulate carrier waves by varying their amplitudes without benefit of sideband and with full audio frequency reproduction.

Now that this conspiracy has been exposed it is time for the secrets of the circuits to be revealed.

Gordon Lines, RS86997

Mr Lines' tongue is evidently firmly in his cheek, but we couldn't resist publishing his letter! Any comments from learned members?

HELPING THE INFIRM

Sir—There must be many infirm amateurs around, who through old age, disability or accident, are no longer able to climb towers and attend to antenna repairs.

In these days of chronic unemployment, there must be a few of the bright young sparks who could get together and form themselves into a little company for the express purpose of doing antenna work at a reasonable price for those unable to help themselves. One of them should be a safe and capable climber of masts and towers and should be suitably insured. An old van with accommodation for spending the odd night in and to carry tools would be an asset.

If you would be good enough to publish this letter, and if anyone who feels competent and willing to do such work I should be pleased to hear from them and perhaps offer a few more suggestions.

John R Petty, G4JW

Mr Petty's idea sounds attractive, although the safety and insurance aspects of such work are most important and would need to be borne carefully in mind.

INTERFERENCE TO SLOW MORSE

Sir—I would be grateful if you could print this letter in your magazine hoping that it will reach the culprits who tune-up on the RSGB slow morse transmissions on 3·5MHz. I know that they may not be RSGB members, from the number of G2s, G3s, GW4s, G4s I heard calling CQ. May I send my thanks to G3GNS, RAF Locking, whose transmissions I write about. Please gentlemen, let this poor G1 listen and learn.

D W Dixon, G1JLC

PS. Keep up the good work on your excellent magazine.

CONTESTANTS COMMENT

Sir—During the course of the recent AFS Contest both I and G3MA called stations, only to receive the reply G3LP? and G3MA? Obviously the other stations were expecting three-letter call stations to answer them. One station has actually logged me on his sheet as G3LAN to make quite sure that he had worked a three-letter callsign.

We are old enough to know what valves were, but we are young enough to know which end of a key goes up and down.

Norman F O'Brien, G3LP

Sir—I would like the opportunity, via your letters column, to address a few remarks to the gentleman with the two-letter G3 callsign who, during a recent 7MHz contest called to tell me how outraged he was that this band should be used in this manner instead of as a means of inter-G communication.

I wonder how he would have felt, if I had called him during one of the interminable and banal conversations he and his ilk inflict on the air waves each and every weekend, in which the art of discussion of the trite and trivial is polished to perfection?

I could have pointed out to him, that to me this is an abuse of the amateur licence, which is intended to further the holder's self-education in the mysteries of wireless, not to be an aid to the pompous windbags intent on boring everyone else to death, or the numerous cliques totally enraptured in their own importance to the complete exclusion of all others not of a similar bent.

Judging from the number of replies I received to my "CQ contest" calls, there are many more who are prepared to accept and join in the occasional contest. Perhaps ragchewing on the lower frequencies should be restricted to one weekend per month and only over a 10kHz portion of each band!

Tom Morris, G4XTM

Sir—I refrained from writing to you last September when you published a detailed account of the Cefalu conference decisions concerning hf contests, for fear of becoming to hf contests what a certain MP has become to the *General Belgrano!* However, Roger Western's interesting article (*Rad Com* January) does beg one or two questions.

The proposals rightly aimed to reduce the appalling nuisance of long contests which monopolize whole weekends on hf, and thus prevent normal QSOs. As I have said before, if people want contests, let them have them but **not** at peak times, and certainly not at the expense of their non-participating colleagues. Again this morning (23.2.85) there is some wretched French contest blocking up the whole of 14MHz. There is no sign of any dx, as luck would have it, and I got up early for a VK sked which again, had conditions been better, would have been totally impossible to keep anyway with all the noise from splattering hyped-up contesters.

Mr Western says that there are no referenda or market research data concerning contests: the RSGB supports contests by tradition, relying on "culled" views—no doubt from contest participants. "Where do you draw the line?" he says: "At the point where non-participants can find no escape."

Since I refer only to hf, and in particular to the 14MHz band, I would say that this morning's episode has reached that point. 21 and 28MHz are closed. In any case my sked is for ssb, so please, someone, don't write and tell me to go on cw. Why is there no market research?—because radio societies like the RSGB consistently **fail to ask**. I wrote mentioning a questionnaire last year, which you kindly published, but I suspect you will never research this vexing question, because you do not want to know the answer.

Mr Western further remarks: "When the bands are filled with contest traffic . . . who is in the minority?" Yes, when spectators invade the football pitch, there is precious little sport to be had!

The RSGB is a respected and responsible body. Some of the above I have said tongue in cheek of course; I realize that the hf contest problem is largely exaccerbated by other bodies, but I do say that you gloss over a problem you will not research, and when you throw your hands in the air and proclaim: "How could it happen that other countries' delegates . . . get it so wrong?", you should first perhaps ask your members whether your policies are the right ones or not. At Cefalu, you were in the minority.

Jeremy Boot, G4NJH

The whole subject of the amount of spectrum taken up by contest use is, and will always be, a difficult one simply because of the diversity of opinions held by members on the subject. Mr Boot's letter is the first we have received which suggests that the Society is not in touch with the ramifications of the problem, but we most certainly are: it crops up at lectures, in discussions and in letters to headquarters. As always, we will seek to find the best solution we can. Questionaires to members are very powerful ways of ascertaining opinions, as the Society well knows—there have been more than one in the last few years, and one along the lines proposed by Mr Boot is planned for later in 1985.

INK + PAPER v RADIO

Sir—I have just received my December issue of *Radio Communication*. May I say that this journal is now in my opinion the almost perfect format to serve the needs of a society such as ours. It has the right amount of diverse interests equally balanced with the necessary advertisements. It is sought-after in this part of the world more than the locally-produced journal serving the same purpose. It is my only contact with my Society, and I would like to thank the editor and his staff for getting it right.

I would, however, like to make a criticism about another field of radio communication distributed by the Society: the Sunday news bulletin. On a recent return to the UK I listened on 3·5 and 144MHz to the GB2RS broadcast, only to find the same old boring format. Very few *interesting* comments from listeners, and there seemed to be no group participation. I would like at this point to say that I realize this is not the fault of the Society but the fault of the archaic restrictions imposed on the RSGB by the DTI. Incidentally, the Society can boast a longer existence than a department whose recent claim to fame was the bowing to public pressure. I find it quite strange that a society with the track record of the RSGB cannot be trusted to bend the normal licensing rules more than they can at present, and be allowed to further the aims of the Society to increase the understanding of personal radio communication to amateurs and non-amateurs alike. I mean the mutual participation of the entire country in the broadcast via hf to vhf/uhf repeater network. For Class B operators, a lot of whom have considerable technical expertise, to be allowed, for one day a week, to make comments on their repeater which can be retransmitted, with a prominent Society member's supervision, onto the hf bands. To allow articles (regarding amateur radio) to be swopped or sold over the air, and for sought-after items to be requested by the same medium (similar to Members' Ads). For technical lectures on things affecting everyone to be broadcast countrywide by anyone with detailed knowledge, including Class B operators.

"Impossible," I hear you say, "waste of time asking DTI." Is it? Well, everything mentioned above is done here in South Africa every Sunday. All you get is: "This is GB2RS. This station is not licensed for communication but I will be glad to answer reports under my own callsign GXXXX."

Can the Society please make an effort to improve this valuable service, which will probably do a great deal in achieving the aims mentioned by David Evans's editorial "Working Together". It seems ironic that the Society is better at communicating with ink and paper than it is with the medium it is there to promote. I would also like to see a regular exchange of ideas between societies on the hf bands on well-documented frequencies where everyone in the world can listen at different times, with recordings and translations of different societies' contributions relayed where the propagation has not allowed direct reception.

Surely in 1985 the IARU societies can be allowed to do more than they do at the moment. I'm not advocating a free-for-all but a special, controlled modernization of the societies' ability to get over to all radio amateurs and short wave listeners, and equally important for radio amateurs and swls (via their club stations) to get over to their societies.

Ian Myford, ZS6BIS

The Society is currently considering ways of improving and extending the GB2RS news

service. We are not short of ideas but we do need to consider cost and practicability in great detail.

CLASS B MORSE EXPERIMENT

Sir—The purpose of this letter is not to add fire to either side of what seems to be a split amateur community, namely those who agree with the Class B morse experiment and those who do not.

David Evans stated in your February issue that as Class B operators were required to identify themselves by speech at the beginning and end of each transmission, they must confine themselves to the all-mode section of the band in use, and avoid the cw-only parts. I think it is fair to say that the vast majority of amateurs stick to band plans totally, but as a quick listen on 144MHz in most parts of the country will reveal, not all do so. I myself am extremely interested in meteor scatter operation, while friends of mine are deeply, and at great cost of equipment, involved with eme. Other amateurs specialize in rtty, Amtor, fax and other modes of transmission, all of which are catered for by the present band planning arrangements, and all of which require quiet, QRM-free frequencies to be successful.

With the above in mind, I would implore the Society, in consultation with the RRD, to specify a range of frequencies in the all-mode section of each band for this experiment to take place, and for these frequencies to become part of the Letter of Variation issued to applicants.

I am the first to admit that 99·9 per cent of Class B amateurs are fully responsible and caring towards their fellow amateurs, but human beings are individuals and it only takes one incorrectly-placed transmission, whether by ignorance or intent, to spoil for another amateur what might have been the end product of months of hard work.

K J Wood, GM3WCS

Several letters have been received on the subject of whereabouts in the band Class B licensees using morse should operate: some members have criticised the Society for stressing that those taking part in the experiment should not operate in the exclusive cw segment of a particular band. Mr Wood's letter essentially encapsulates why the Society feels this approach to be sensible, although we have always taken the line that band plans should not be made mandatory—the two main reasons for this being that: (a) *in principle, self-regulation is better than enforced regulation, and* (b) *as the state-of-the-art changes, alterations in band plans need to be made easier for users (in practice, all member societies of IARU Region 1) to implement without the need for changes in the applicable legislation to be made. Imagine trying to get all 55 governments of the IARU Region 1 countries to agree on a common band plan!*

Guidelines for Class B operators taking part in the experiment have been sent to all those requesting a Notice of Variation. These were drawn up and agreed with the DTI, and in fact the band plans for the 144 and 430MHz bands are given on the reverse of the notes. The points made by Mr Woods in his letter are suitably covered in paragraph 2 of the "Guidelines" section, and it is only necessary to reiterate Mr Woods' point that one incorrectly-placed transmission could cause a good deal of frustration and an annoyance to other operators.

FROM WHENCE CAME LID?

Sir—There was once an I1 station I have always held in high regard, that of Gugilielmo Marconi, who, it is told, once remarked "I too am but an amateur" or words to that effect, and what was good enough for the Marchese is surely good enough for me.

Among those words which particularly apply to our hobby is the word "shack", and it is not difficult to imagine how it arose in the early days of international working, but there is one word which I cannot relate to any aspect of the hobby in any way whatsoever, nor have I seen it explained in any magazine. Indeed, among those whose callsigns are new there will be some who have never even heard of it; so I wonder, before it is too late, whether some old-timer can let us know the circumstances of its origin. it is the term "lid", meaning an incompetent operator.

Allan L Taylor, G3JMO

The debate about the source of the word "lid" has gone on for many years: several allegedly definitive origins have been quoted but no-one seems totally certain. The one we like best says that the term originated because badly sent morse was said to sound like the lid banging on a boiling kettle! Another common claim is that the word is an abbreviation of "lifted", meaning that the bad operator had been "lifted" from his position and given other work.

THE NAME GAME

Sir—I write to reinforce J M Stevenson's view in the January "Members' Mailbag", that the title radio amateur is one to be carried with some pride.

In a recent article by Justinian in the *Financial Times*, we are told: "The system of lay magistrates represents a triumph of amateurism in public life. Various arguments which command and receive considerable respect can be put forward to support it." It is well known, of course, that many "amateur" magistrates are also radio amateurs. What is derogatory in the word amateur?

The late John Buchan propounded the view that any self-respecting Englishman was better at his chosen hobby than at his chosen profession. Indeed, was not the recipient of a recent major award for poetry, a banker by profession?

Perhaps there are those of us who take ourselves just a little too seriously these days? Not that I personally take the business of amateur radio anything but seriously! But writing as one who has taken an active and keen interest in amateur radio since 1930, literally at my father's knee, I should be very sad to see the proud title of radio amateur diminuted in any way.

Leslie Greville Smith, JP, G4SUJ

WELCOME—A LIGHTHEARTED LETTER

Sir—May I, as a mere xyl, express myself, and possibly many other "ham widows", in a light hearted manner:

It's taken over the baby's room,
The chimney sprouts a 2m boom.
Goodbye, farewell to evening gowns,
He's just bought Goonhilly Downs.
Aluminium poles and lots of cable,
And Rad Com *mags on the table.*
My desk, a carpet and two chairs
Were stolen for his room upstairs.
No time to spare for the xyl,
Can't talk to her and G4s as well.
He's pinched my new electric fire,
Swapped it for a mile of wire.
Oh! how really stunned I am,
My man's become a radio ham!

Diane Garland,
wife of Garry, G4UEI

GENERALITIES

Sir—With regard to the letter by G2RX *(Rad Com* February 1985). It would seem to me that if a Council member takes the time to sit down and write an article for the magazine, he should be paid for it like any other contributor! I am quite amazed that there are those who think otherwise. Maybe such payment would return the magazine to its former glory as a vehicle for the radio amateur constructor, and not a paperback for the black box owner.

A young lad of 14 may find it difficult to raise the fee for his RSGB subscription, so why not flexibility in such matters? Indeed, why not a life membership fee, or an ending of fees after a certain age? We are supposed to be a brother and sisterhood looking out for the welfare of each other, or have I got that wrong?

Leaving Mr Reed's letter, I would like to mention the changes that have overtaken us in the past years, the great demi-god "HF" no longer controls the complete imagination of all radio amateurs. The introduction of computers —equipment as yet not fully recognized it would seem—with their friendly handshaking with satellites, has opened new doors for the hobbyist far from the sole domain of those greedy G4s "Bless em". With 144 and 432MHz equipment even G8s 6s and 1s can communicate with the world without bashing a key once! It would seem that the Keyboard is the in thing these days.

As the old adage states: "Those who walk with eyes down see only groundplanes, those who walk with eyes up see satellites!"

J M Stevenson, G8ZRY

AERONAUTICAL MOBILE

Sir—As a pilot and amateur I support G4NJU in making a plea for aeronautical mobile operation to be licensed. I would, however, suggest that the P1 (captain) should not divert his attention from either his flying or his aircraft r/t, and that if a qualified pilot wishes to use his amateur gear he should fly as P2 (copilot) or in the back seat. In this way no finger could be pointed at flying amateur types being liable to drop on the populace. Perhaps other pilot amateurs could let headquarters know of the support (or otherwise) of an IAM licence, to guide the RSGB in talks with the DTI.

Gerry Kennedy, G3OGK/VP8LZ

This point had already occurred to a couple of pilots on headquarters staff—any comments from other aviators?

73, 88 AND COMPUTING

Sir—Further to the article on the origin of the terms "73", "88" etc, I had been given to believe that these brevity-codes were of second world war origin. Servicemen abroad, who could only communicate with their families via military channels, were presented with a menu of numbered standard phrases of which only the number was signalled, being converted back to the standard phrases in the UK prior to delivery by telegram. The system served two purposes: it eliminated the need for a censor and abbreviated the message text considerably. In this context the presence of 73 and 88 would seem reasonable.

On a different tack, I was delighted to see that the *Computing* articles listings are in Microsoft, which will run on the majority of machines. Unfortunately the recent grey-line program will not run on mine! Please do not adopt the BBC machine—I suggest that few of us are prepared to pay £400 for a rather average machine which is a bit short of memory.

J M Dunnett, G4RGA

"73" and "88" long preceded the war, and are believed to come from a similar 19th-century system in the USA.

NW FRONTIER DAYS

Sir—In the 'twenties, and early 'thirties, transmitting licenses were unobtainable on the NW Frontier of India, so two of us, "Pop" Seymour of No 5 (AC) Sdn, and myself of 31 (AC) Sdn, later No 3 (Indian) Wing, became lawbreakers, VU2DX and VU2AA (later 2RE) respectively. Both of us used single-valve transmitters (TARG) and OV2 receivers, using Wimdon antennas. The QTH was RAF Station, Quetta, in what was then Baluchistan, India. 2DX went QRT when Pop returned to the UK, but I continued my illicit activities, but with the tacit blessing of authority as my rig and cards were always good to side-track some senior inspecting officer.

All went well until the night of 31 May/1 June 1935 when a severe earthquake devastated the cantonment and reduced the RAF Station to rubble, with heavy loss of life and many injuries. Two or three days later, I was surveying the ruins and wondering if it was worth the effort to dig and try to find my station, when a native postman arrived with a registered letter, in which was my licence. This caused me to redouble my efforts, and I found what was left of my station; enough to get going again at RAF Peshawar until returning to the UK in 1936.

The RAF survivors of this earthquake, getting less every time, hold an annual reunion on 31 May each year, and this year will be the 50th. I am wondering if any geriatric brass-pounder remembers working, or has cards from any of the three calls, or even more unlikely, one of my BERS79 cards. If there are, it would be nice to hear from them. I'm now rising 76, and am still active on 14MHz cw.

R A Evenett, VU2EF, G3AGZ, ZE2JI

A Dual-Conversion Multimode Receive I.F./AF Strip

S NIEWIADOMSKI, MSc, BRS54049*

(PART 1)

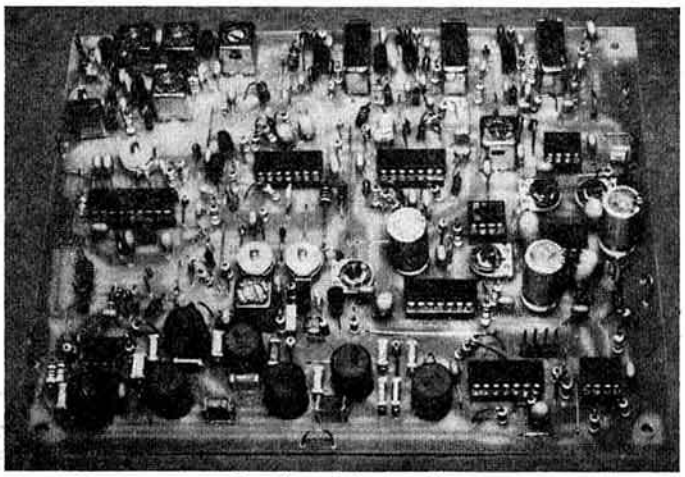
THERE SEEMS to be an absence in amateur literature of constructional articles on general-purpose receive i.f./af strips. For someone wanting to build an i.f. strip quickly and easily, perhaps because he wants to experiment with receiver front-ends, the choice is severely limited. The usual source for such information is to be found in articles on complete receivers or transceivers, but these usually reflect the interests of the designer as regards the modes of operation and the audio performance. Probably the nearest thing to a general purpose i.f. strip can be found in certain vhf receivers; three notable designs being described in [1], [2] and [3].

One i.f. strip which is available to amateurs in kit form is based on the G4CLF design [4] using Plessey SL1600 series ics. However, this cannot be described as general-purpose, as it was designed specifically for ssb and incorporates components for transmit as well as receive operation. As none of the published designs satisfied my requirements I decided to design a general purpose i.f./af strip, with the aims of producing a good-quality final design, and at the same time to improve performance and simplify design in certain areas—particularly in the use of dc switching and prewound inductors in the af filters.

Design criteria

Probably the most important choice that has to be made for any i.f. strip is the input frequency. For many years 9MHz has been a popular i.f. in amateur receivers. The exact reason for this choice is obscure, but it has the advantage (to an amateur) of allowing the two most popular amateur bands, 3·5 and 14MHz, to be received with a single local oscillator tuning 5·0–5·5MHz. Additionally, good image frequency rejection can be achieved on the hf bands without resort to complex pre-i.f. filters. High-quality crystal filters are available for 9MHz, but these have always been expensive. The cost of equipping a multimode i.f. strip with several 9MHz filters, each optimized for a particular mode, would be prohibitive to the average constructor.

More recently, 10·7MHz has become increasingly common as an i.f. for hf receivers. Initially this was encouraged by vhf receiver designers using surplus commercially-produced filters for nbfm. Filters suitable for ssb use are now available to amateurs (for example, the 10M22D, available from Cirkit Holdings) but these are still expensive when compared with 455kHz filters. The advent of digital frequency readout for receivers has also helped the move to 10·7MHz; modules are now available which can be programmed to give offsets of 10·7MHz, but not 9MHz.



Top view of the chassis

*29 Mackinley Avenue, Stapleford, Nottingham NG9 8HU.

The best value for money for i.f. filters can still be obtained at 455kHz. To combine the advantages of 10·7MHz from an image rejection point of view, and 455kHz because of the comparative cheapness of filters, a dual-conversion scheme was chosen. Also, 455kHz has the advantage that carrier insertion oscillators can be built with good stability without the need for crystals.

A complete list of the design criteria to be met is given below:

(a) low-level i.f. input at 10·7MHz;
(b) conversion to 455kHz for i.f. filtering;
(c) selectable i.f. filters to suit modulation mode being received;
(d) ssb, cw, a.m. and nbfm detectors;
(e) fast attack, slow decay audio-derived agc;
(f) agc line-driven S-meter;
(g) variable level nbfm squelch;
(h) selectable af filters;
(i) all controls (including volume) dc controlled;
(j) single-rail operation from nominally 12V;
(k) all inductors pre-wound;
(l) easily reproducible, therefore construction on single-sided pcb;
(m) all components readily obtainable;
(n) all connections to pcb via connectors, making removal of pcb easy;
(o) sub-equipping permissible to suit particular preferences;
(p) 9MHz permissible as first i.f. if desired.

All the above criteria have been met by the design described here.

The last two criteria are considered in more detail in the final chapter of this article.

Circuit description

A block diagram of the i.f./af strip is shown in Fig 1, and the complete circuit diagram is shown in Fig 2.

Input amplifier/converter

TR1 forms an input buffer stage with an input impedance equal to the value of resistor R1 (100kΩ). The drain of TR1 feeds a 10·7MHz filter consisting of two 10·7MHz i.f. transformers (T1, T2) connected back to back. TR2 is the 10·7MHz–455kHz converter, with the conversion oscillator output applied to the source and the 455kHz output selected by the 455kHz i.f. transformer T3.

The difference frequency between the two i.f.s (10,245kHz) is generated by TR3 and coupled to TR2 source via T4. Crystal X1 is the oscillator frequency determining element, and a degree of trimming can be achieved by adjusting trimmer C95. If the alternative conversion frequency of 11,145kHz is required, X1 should be replaced by a crystal of this frequency and T4 tuned for maximum output at 11,145kHz.

The gain of the input amplifier and converter, when loaded with the filter driver stages (TR4, TR6 and TR7), from 10·7MHz input to 455kHz output is approximately 24dB.

455kHz filter stages/output selection

The secondary of T3 couples the 455kHz output from the converter into the filter driver stages, one of which is provided for each filter F1–F3. No switching is incorporated on the input side of the filters, so that all three filters are driven at all times. A removable link, LK1, provides a useful access point for injecting signals into the filter drivers during testing (see later).

F1, a Murata CFM455F or NTKK LFC12, is used in the fm signal path. It has a −6dB bandwidth of 12kHz and a −50dB bandwidth of 24kHz. This filter (as do the two other ceramic i.f. filters) provides good performance at reasonable cost. The correct drive impedance for F1 (1·5kΩ) is provided by R12, the collector resistor of TR4. R13, the emitter resistor of TR4, is bypassed for ac by R14 and C13, which give an ac gain for TR4 of approximately 3. R15 matches the output impedance of F1

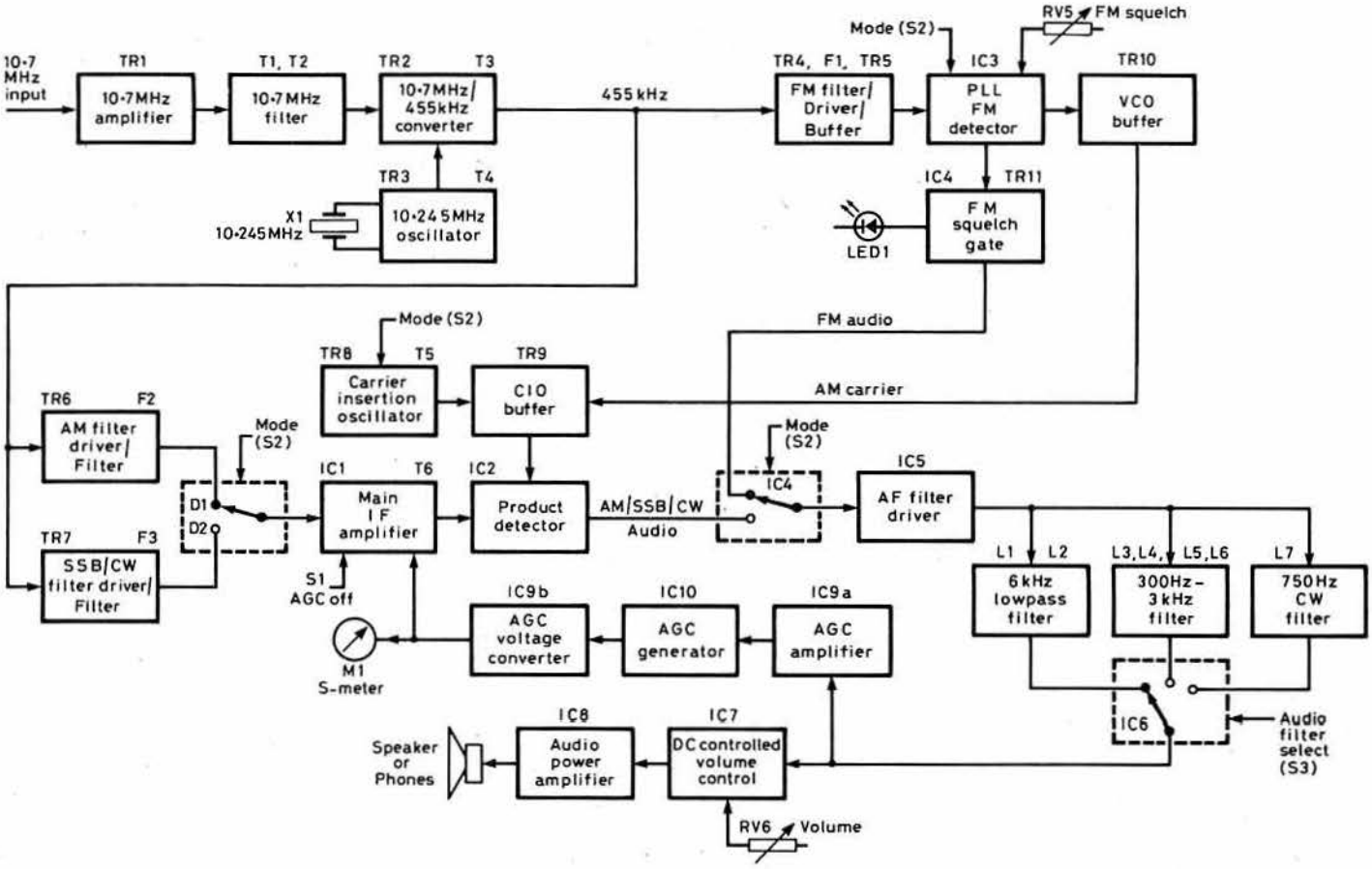


Fig 1. Block diagram

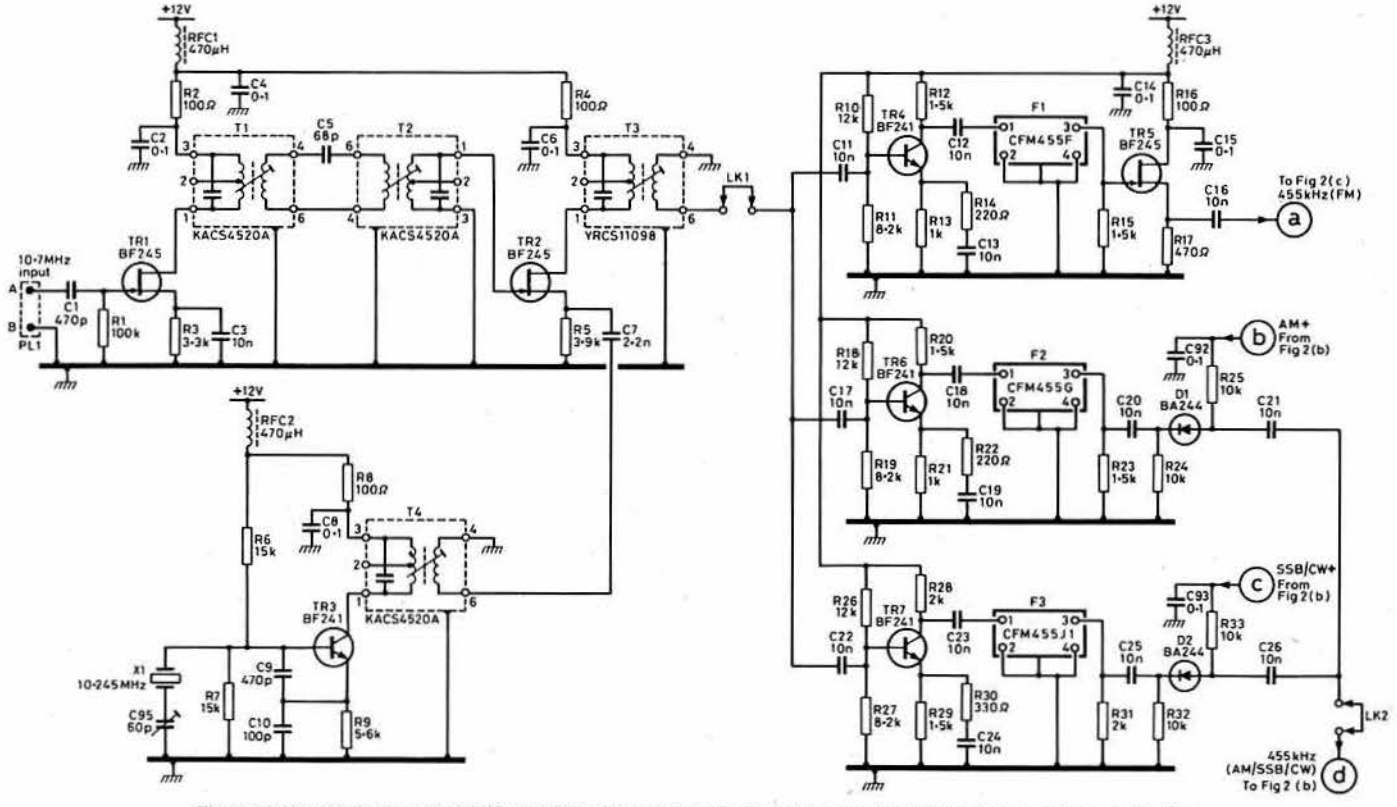


Fig 2. (a) Circuit diagram: 10·7MHz amplifier/filter, 10·7MHz–455kHz converter; 455kHz filters, drivers, switching

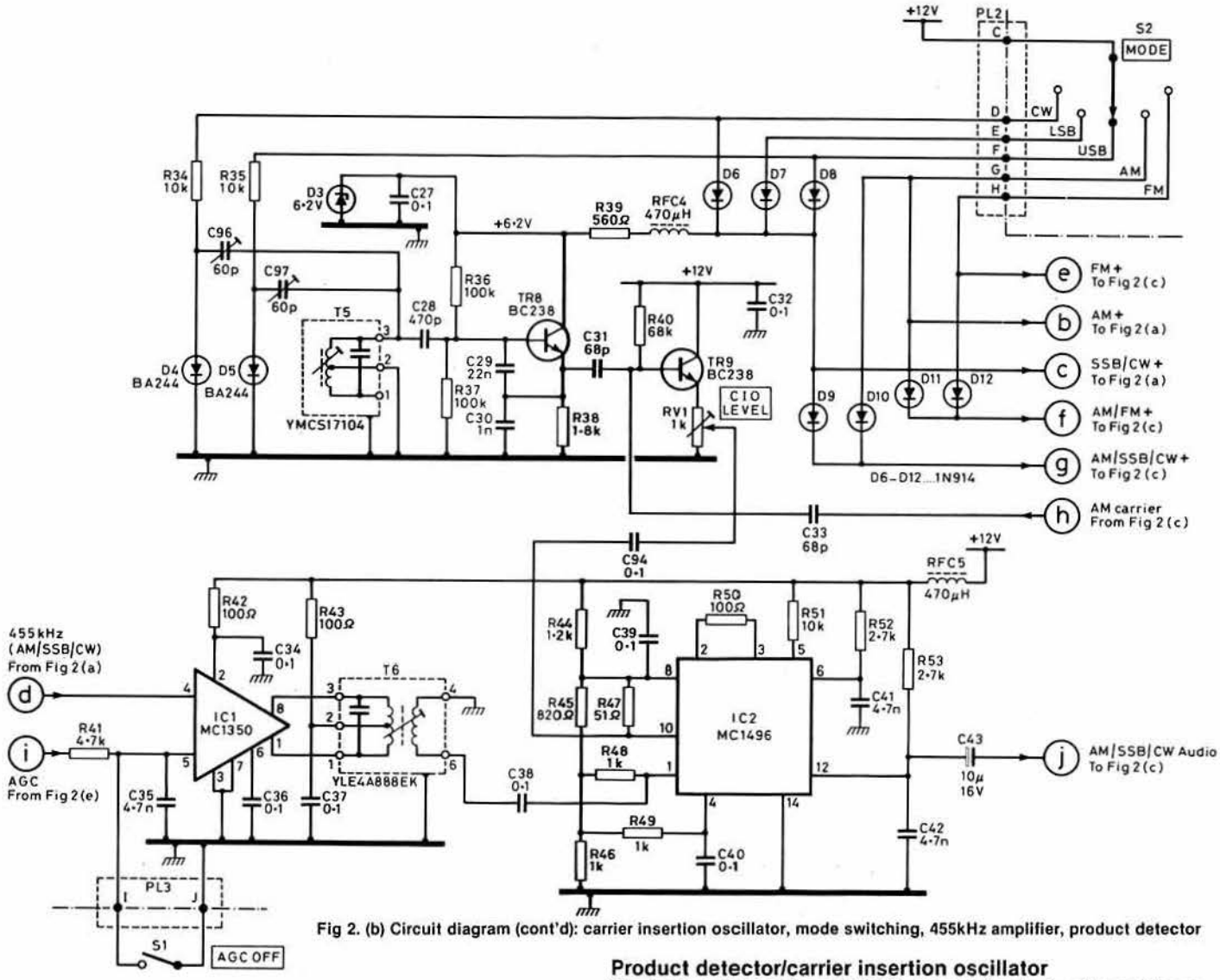


Fig 2. (b) Circuit diagram (cont'd): carrier insertion oscillator, mode switching, 455kHz amplifier, product detector

(again 1·5 kΩ) and also biasses the gate of the fet source follower TR5. This stage buffers the correctly-matched output of F1 to the low impedance input of the fm detector IC3.

F2 is the a.m. filter. Here a Murata CFM4555G or NTKK LFC8 is used. This filter has a −6dB bandwidth of 8kHz and a −50dB bandwidth of 16kHz. R20 sets the drive impedance to the filter (again 1·5kΩ) and R23 terminates the filter correctly.

The ssb/cw filter is F3, a Murata CFM455J1. This filter is more expensive than F1 and F2 and has a −6dB bandwidth of 2·6kHz and a −50dB bandwidth of 8kHz. The input and output impedance of this filter is 2kΩ, matched by R28 and R31 respectively. Again the ac gain of the driver stage, TR7, is set at 3 by R30 and C24.

Selection of either the a.m. or ssb/cw filter output is determined by the MODE switch, S2. When in the a.m. mode, a positive voltage is applied to D1 (a BA244 switching diode) via R25, causing D1 to conduct through R24 and enabling the output of F2 into the input of the main i.f. amplifier, IC1. When in the usb, lsb or cw mode, D2 is made to conduct through R32 and R33, and the output of F3 is selected. Link LK2 gives another useful point at which test signals can be injected. No buffering is required between the outputs of F2 and F3 and the input of IC1, as the input impedance of IC1 is sufficiently high not to significantly affect the termination impedance seen by the filters.

Main i.f. amplifier

IC1, the main i.f. amplifier, is a Motorola MC1350. This ic has a maximum gain of 45dB and an agc range of 65dB [5]. AGC is applied to pin 5 and can be disabled, holding IC1 at full gain, by earthing pin 5 via switch S1. The push-pull output of IC1 is taken via T6 to the product detector, IC2. Current is supplied to the output transistors of IC1 via the centre tapped primary of T6.

Product detector/carrier insertion oscillator

The product detector is an MC1496, biassed for single-rail operation as described in the Motorola circuit data [6]. IC2 is used as a product detector in both the ssb/cw and a.m. modes. Its operation as an ssb/cw detector is well documented, but I have not previously seen this ic used as an a.m. detector in amateur literature.

The principle of operation as an a.m. detector is to inject a carrier into pin 10 of IC2 at exactly the signal carrier frequency. This can be achieved in this application because the fm detector, IC3, contains a phase-locked loop which locks to exactly the incoming signal carrier frequency. Buffering is provided between the vco output of IC3 and pin 10 of IC2 by a fet buffer stage TR10 and emitter follower TR9, which is also used to buffer the ssb/cw cio output when in the usb, lsb or cw mode.

In the a.m. mode, the vco frequency of IC3 produces a zero beat with the received a.m. carrier, and equal frequency beats with the two a.m. sidebands, at the output of IC2. This rather novel method of a.m. detection was chosen for two reasons: first, no separate a.m. detector has to be incorporated; and second, no switching between a.m. and ssb/cw detectors is required as in either mode the audio output appears on pin 12 of IC2.

When in the usb, lsb or cw mode, the carrier source is the ssb/cw carrier insertion oscillator formed by TR8 and associated components. Power is only applied to the ssb/cw cio when in the usb, lsb or cw mode, a stabilized supply being derived by D3 and R39. In the lsb mode the frequency of the cio is determined by the inductance and internal capacitor of T5. T5 is adjusted to set the lsb mode frequency approximately 1·5kHz above the i.f.

When in the cw or usb mode, D4 and D5 respectively conduct, placing trimmers C96 or C97 in parallel with T5. These lower the frequency of the cio. In the cw mode the cio can be set to either side of the i.f., but when in the usb mode the cio must be on the lower side of the i.f. The labelling of the modes as lsb or usb here is arbitrary, as the switch setting suitable to demodulate the incoming sideband depends on whether sideband reversal

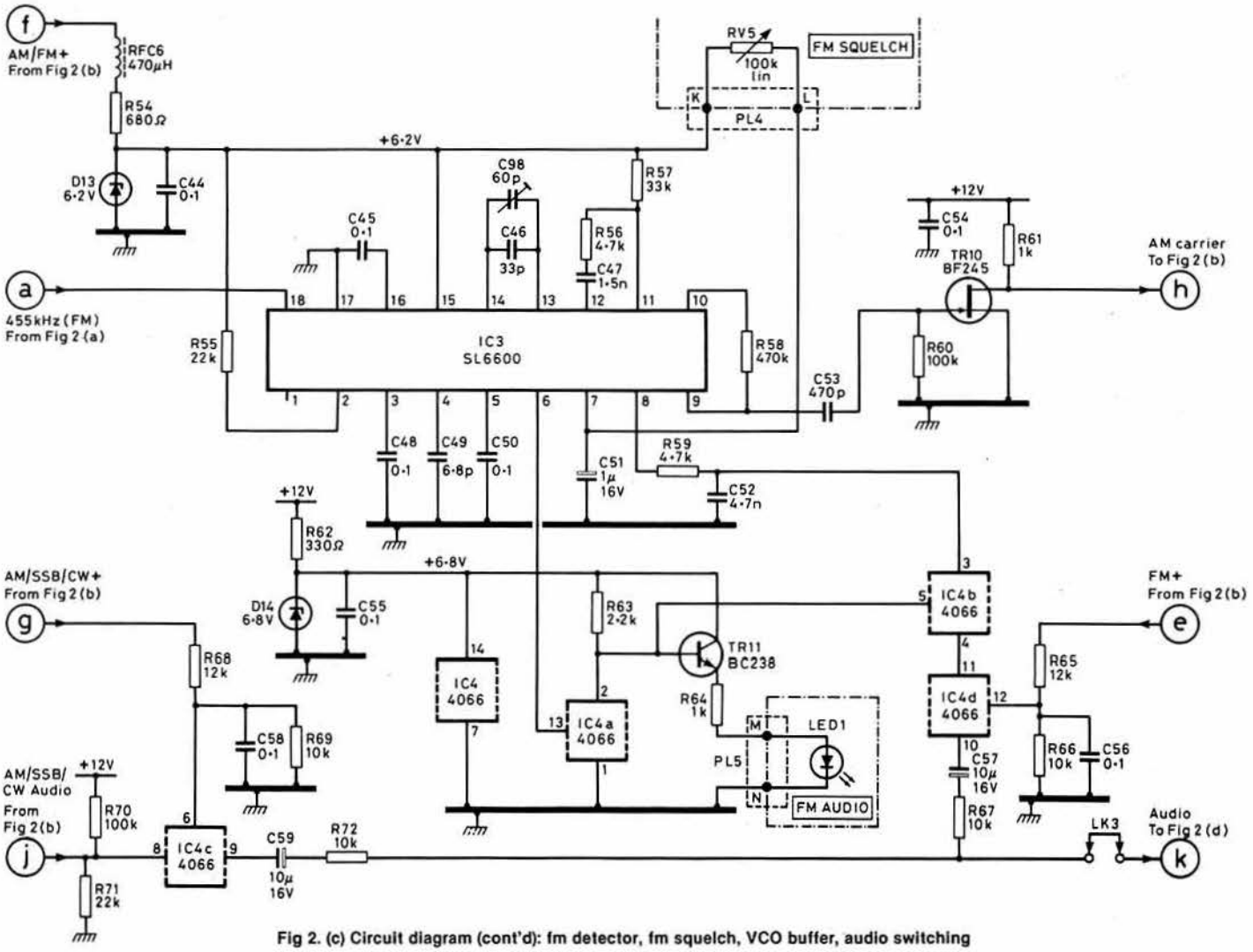


Fig 2. (c) Circuit diagram (cont'd): fm detector, fm squelch, VCO buffer, audio switching

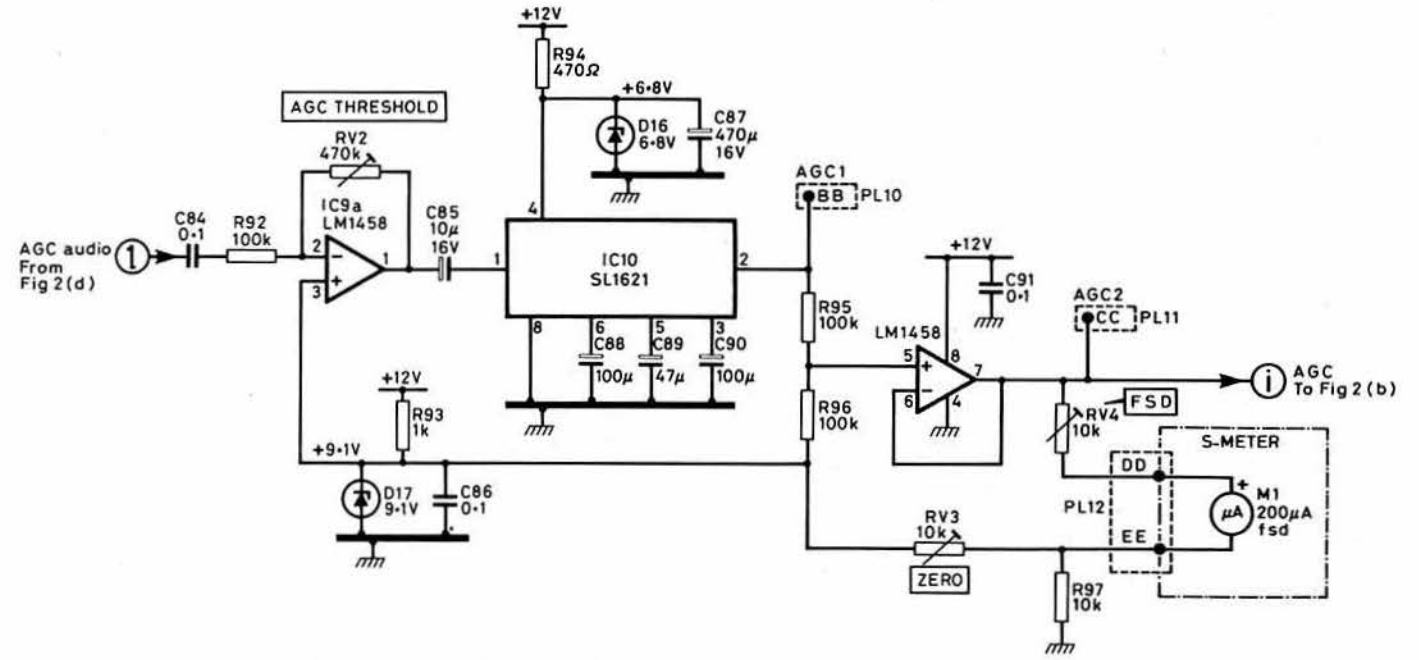


Fig 2. (e) Circuit diagram (cont'd): agc amplifier, agc controller, agc voltage converter

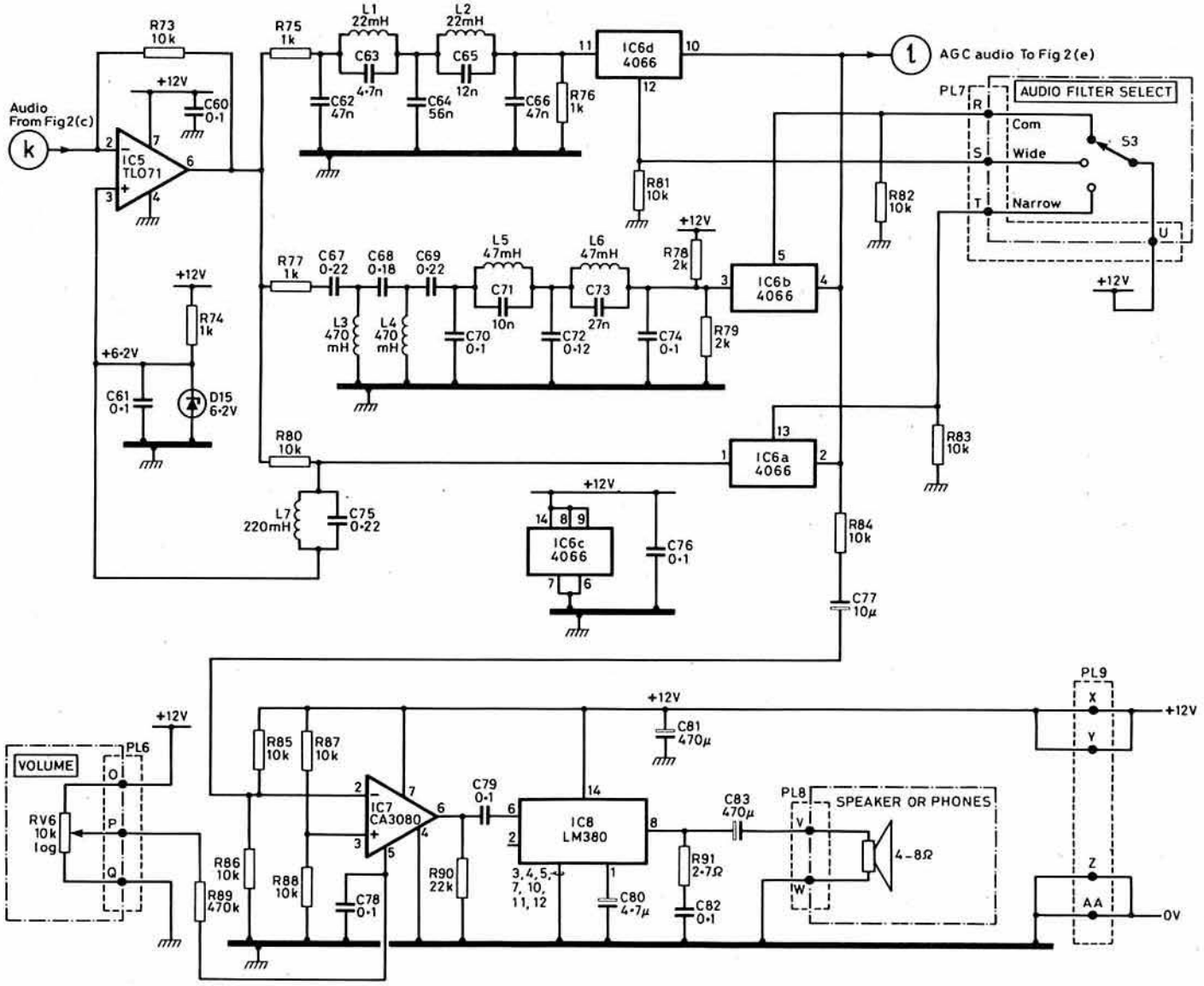


Fig. 2 (d) Circuit diagram (cont'd): audio filter driver, audio filters, audio filter switching, volume control, power amplifier

has taken place earlier in the i.f. strip or the receiver in which it is used due to the conversion frequencies used.

FM demodulator/squelch circuit

FM demodulation is provided by IC3, a Plessey SL6600 (or SL6601) low power (2·5mA maximum supply current) pll ic. In this application it is used as an amplifier/limiter/demodulator at 455kHz. This versatile ic can also be used as a single-conversion circuit from, say, 10·7MHz to 100kHz [7]. Power is applied to IC3 via D11 or D12 when S2 is in the a.m. or fm mode, and R54 and D13 generate a stabilised 6·2V supply. Adjustment of the free-running vco frequency is achieved by trimmer C98, and the pll filter components are C47 and R56. The demodulated fm audio output appears at IC3 pin 8 and passes via a simple lowpass filter formed by R59 and C52 to the input of the cmos analogue switch IC4b. IC4b is used as a squelch switch to mute the fm audio output when no fm signal is being received.

Pin 6 of IC3 is a squelch output whose voltage is almost at supply potential when the fm audio needs to be muted. Unfortunately this is the opposite polarity required by the control input of IC4b (pin 5). The squelch control signal is therefore inverted by IC4a which also switches TR11 to give a visual indication of the muted status via LED1. When the fm audio path is enabled, LED1 is illuminated and when it is disabled by squelch action, LED1 is extinguished.

The squelch level is adjusted by means of potentiometer RV5, connected between pin 7 of IC3 and its 6·2V supply rail. C51, between IC3 pin 7 and ground, determines the squelch attack time. Experimenters may wish to vary C51 (the recommended range of C51 is between 10nF and 10µF) to suit their preferences.

Detector output selection

Selection of either fm or a.m./ssb/cw audio is achieved by enabling IC4d or IC4c respectively. IC4d is enabled by placing a positive potential on pin 12, its control input, equal to almost its supply voltage, via the potential divider formed by R65 and R66. Alternatively, IC4c is enabled via diodes D6 and D9 in the cw mode, D7 and D9 in the lsb mode, D8 and D9 in the usb mode or D10 in the a.m. mode. Again IC4c is not enabled directly, but via a potential divider formed by R68 and R69.

Power is permanently supplied to IC4, derived from the 12V rail by R62 and the 6·8V zener D14.

It is important when using cmos analogue switches that the potential on an input never exceeds the supply voltage, otherwise permanent damage may occur. This is why IC4 is powered from a 6·8V supply (slightly greater than the supply of IC3) and the control inputs to IC4c and IC4d are potted down by R68/R69 and R65/R66. Another requirement of cmos analogue switches when used with a single supply rail is that the input waveform should not fall below 0V. If this does happen, breakthrough to the output of off switches can occur. The combination of R70 and R71 ensures that the input of IC4c is biassed at approximately half-rail. A dc offset is present on the audio output of IC3 which provides bias to the inputs of IC4b and IC4d.

The audio outputs of IC4c and IC4d are merged via dc blocking capacitors C59 and C57 and R72 and R67, which set the gain for each audio path in conjunction with R73.

Again, a link is provided in the audio path for test access.

TO BE CONCLUDED

Equipment Review

The Yaesu Musen FT757GX hf transceiver

PETER HART, G3SJX*

FT757GX transceiver with FP757GX switched-mode psu

Introduction

Ever since the FT757GX was introduced towards the end of 1983, I have been asked on many occasions for my opinion of this transceiver. It has attracted much interest, offering all-mode general-coverage hf operation, with many additional features, in a very small unit at an attractive price. Many features such as additional i.f. filters, keyer, a.m. and fm operation etc, which are often optional extras, are built-in as standard in this transceiver.

This 100W transceiver is powered from a nominal 13·5V supply, and two suitable mains power units are available. The FP757HD is a heavy-duty "conventional" psu, and the FP757GX is a small lightweight switched-mode psu. The transceiver is pictured with the switched mode psu. Other matching accessories include FC757AT automatic atu, computer interface and FTV700 series of transverters.

Principal features

The FT757GX combines, in one unit, an amateur-bands transceiver covering all nine bands and a general-coverage receiver tuning 500kHz to 30MHz. Full transmit and receive operation on ssb, cw, fm and a.m. is provided, with narrow bandwidth cw and wide bandwidth a.m. i.f. filters fitted as standard. A frequency synthesizer is incorporated which provides two separate vfos tuning in 10Hz steps at 10kHz/revolution of the 45mm control knob. The vfos may be used independently on transmit and receive for split-frequency working. Eight memories are provided together with scanning between two stored frequencies. A blue fluorescent display indicates frequency to 100Hz. When the power is removed, the vfo and memory frequencies are retained by a lithium battery located on the local unit pcb.

Receiver functions include switchable rf amplifier and attenuator, i.f. shift and width adjustment, unlimited range clarifier, adjustable noise blanker, fast/slow agc and all-mode squelch.

Transmitter functions include audio speech processor, vox, built-in iambic keyer, full cw break-in and metering of alc or relative power output. A ducted thermostatic fan cooling system is employed.

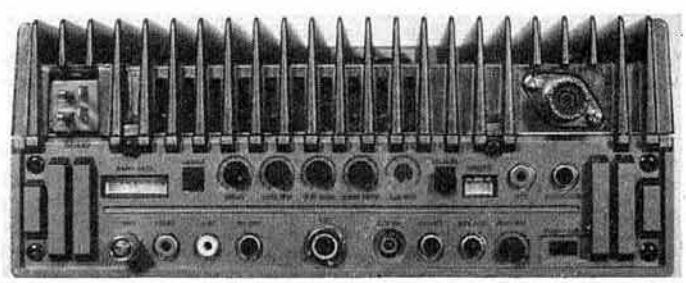
The rear panel carries a number of rotary controls to set the vox parameters, compression level and power meter sensitivity. Connectors provide 13.5V dc input, 13·5V and 8V dc output, antenna, audio input/output, external speaker, ptt, key (straight or keying paddle), alc and low-level rf output. There is no provision for using a separate external receiver. Two sockets provide external control. A three-pin connector allows remote control from a computer via a suitable interface (FIF80, FIF65 or FIF232C). An eight-pin connector outputs coded band data to control the FC757AT automatic atu. Linear switching is provided by a ground on the transmit pin for lightweight switching purposes only. Where heavy-duty relays require to be switched or an isolated switch is required, the FRB757 relay box should be used.

The FP757HD heavy-duty power supply is rated for 30min continuous operation at maximum power output. The FP757GX switched-mode power supply is fine for ssb or cw, but is rated for only 30s maximum continuous operation at full power on fm or rtty.

A 36-page instruction manual is provided, which covers in detail the operation and installation of the equipment. Block and circuit diagrams are given, but no technical descriptions or service information.

Description

The FT757GX is very small and ideal for mobile operation, measuring 24(w) by 10(h) by 24cm (d) and weighing 5·2kg. The FP757HD heavy-duty psu is similar in size and weighs 6·9kg. The FP757GX switched-mode psu has a similar base area but is only 3·9cm high and weighs only 2kg. The transceiver is constructed as two mechanically-separate shielded units which are bolted together (see photograph). The lower unit comprises the bulk of the circuitry contained on two large circuit boards. This unit also contains the front panel, which is sheet steel overlaid with a plastic moulding. The upper unit contains the transmitter power amplifier, heatsink and fan, output lowpass filters and a 6·5cm-diameter speaker. A larger forward-facing 12 by 8cm elliptical speaker is mounted in the FP757HD psu.



Rear view of the FT757GX

*42 Gravel Hill, Addington Croydon, Surrey

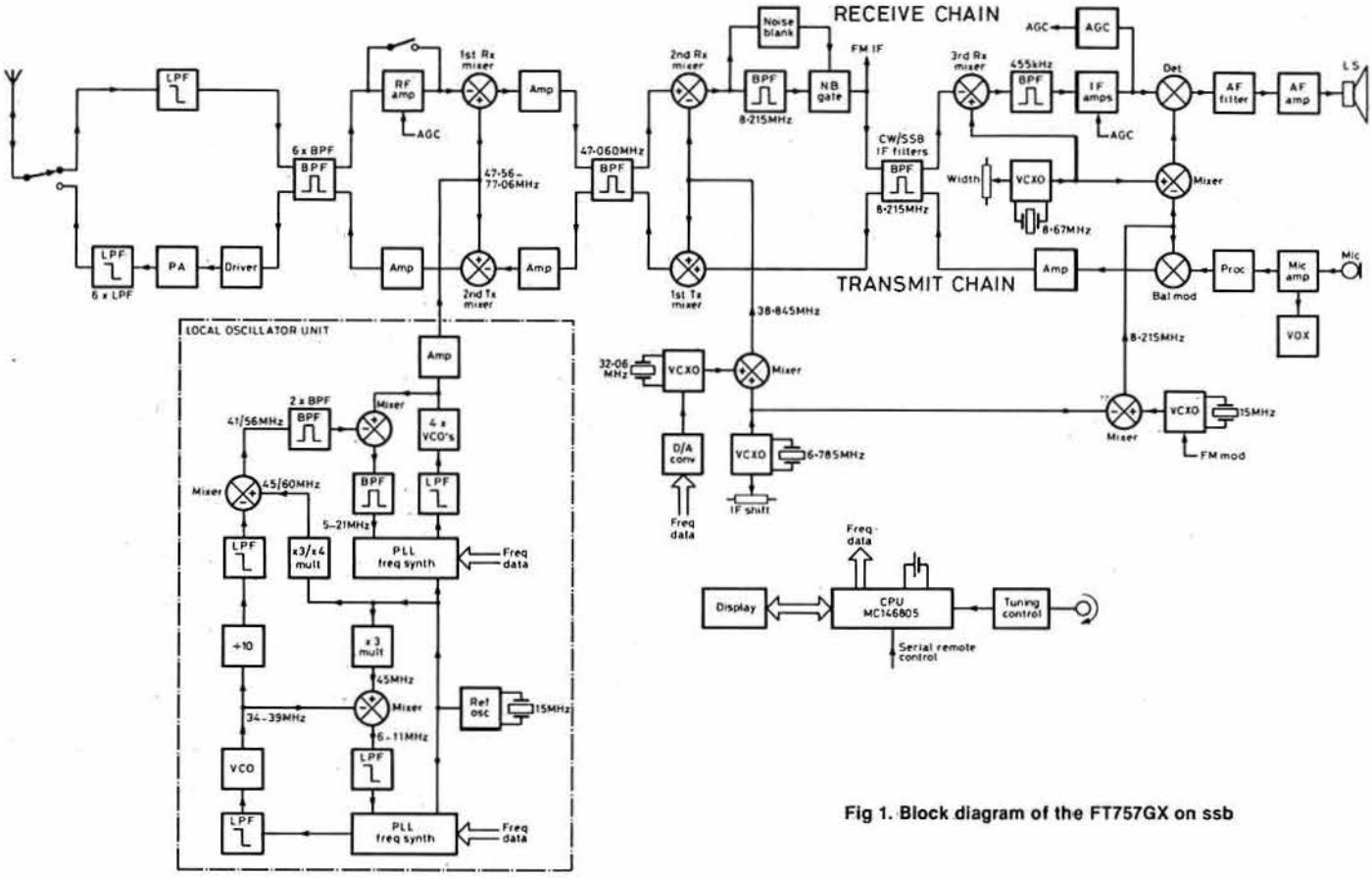


Fig 1. Block diagram of the FT757GX on ssb

Fig 1 shows a block diagram of the transceiver on ssb. The receiver is triple conversion with i.fs of 47·06MHz, 8·215MHz and 455kHz. On transmit, ssb is generated at 8·215MHz and mixed via 47·06MHz to final frequency. This is a similar architecture to the FT980 [1]. Push-pull fets are used for the receiver first and second mixers, and cascode fets for the rf amplifier.

The frequency synthesizer architecture is similar to that used in the IC740 [2]. Local oscillator drive for the signal-frequency mixer is derived from a double-loop synthesizer generating 47·56–77·06MHz in 1kHz steps. 10Hz steps are generated by shifting the frequency of the second-conversion oscillator over a total range of 1kHz using a varactor diode and d/a converter. Hence the first i.f. shifts in frequency by up to 1kHz. LSI frequency synthesizer ics are used for both loops.

Three microprocessors are used in the equipment. Frequency and band data for the frequency synthesizer, switched filters etc are handled by an eight-bit mask-programmed cmos microcomputer type MC146805 which has sufficient built-in rom and ram to require no external memory for this application. Internal ram contents are backed up using a lithium battery. The display uses a second microprocessor (TMS2370) and the keyer uses a four-bit processor type TMS1751C.

Serial remote control of the frequency or memory from an external computer is possible using a suitable interface (FIF232C etc). This is the same interface as is used with the FT980 (see [1] for further details) but the data transfer protocol is simplified. The interface is one-way only, the FT757GX does not send data back to the computer. Data is input to the transceiver at 5V logic levels as asynchronous Ascii characters at a data rate of 4,800 baud. One data frame comprises five bytes, one byte instruction (eg set frequency) and four bytes data (eg the frequency to be set). The comments made in [1] regarding interfacing the FT980 to a BBC computer also apply to the FT757GX.

Measurement technique

The measurement technique was similar to that used in previous reviews [3], [4] and [5]. All signal input voltages are given as pd across the antenna terminal, and two-tone intermodulation products are quoted with respect to either originating tone. Unless stated otherwise, all measurements were made on ssb with the rf amplifier on. Measurements were confined to amateur frequency allocations only.

Receiver measurements

Sensitivity

Table 1 shows the sensitivity figures on ssb. These indicate a noise floor of −132 to −135dBm, or a noise figure of about 6 to 9dB. On 28MHz the fm sensitivity was 0·35μV for 12dB s+n:n for 3kHz peak deviation, and the a.m. sensitivity was 1·4μV for 10dB s+n:n for 30 per cent modulation depth.

S-meter calibration

The input signal level required to give an S9 meter reading is shown in Table 1. With the preamplifier off, these levels are 20 to 25dB greater, and with the front-end attenuator in circuit, a further 20dB greater. On 14MHz the calibration was as follows:

S-Reading	Input signal	Relative Increase
S1	2μV	
		4dB
S3	3·2μV	
		3dB
S5	4·5μV	
		5dB
S7	8μV	
		10dB
S9	25μV	
		18dB
S9+20	200μV	
		19dB
S9+40	1·8mV	
		22dB
S9+60	22mV	

The spacing between S-points is too small at low readings but the linearity above S9 is reasonable.

Spurious responses

Table 1 shows the 47·06MHz i.f. rejection and image response figures. On 14MHz and above, the 47·06MHz i.f. rejection deteriorates by up to 15dB when the rf amplifier is switched out. Half first i.f. rejection of 23·53MHz was better than 115dB on 14MHz and below, and 75–80dB on 18MHz and above. One third i.f. rejection of 15·69MHz was 84–88dB from 10 to 21MHz, and greater than 100dB on other bands. Rejection of the 8·215MHz i.f. was about 100dB.

Table 1. Receiver measurements

Frequency	Sensitivity on ssb for 10dB s + n:n	Input for S9	Image rejection	47·06MHz i.f.rejection
1·8MHz	0·14μV (−124dBm)	18μV	80dB	56dB
3·5MHz	0·14μV (−124dBm)	16μV	84dB	59dB
7MHz	0·16μV (−123dBm)	18μV	86dB	71dB
10MHz	0·16μV (−123dBm)	25μV	89dB	83dB
14MHz	0·13μV (−125dBm)	25μV	92dB	84dB
18MHz	0·16μV (−123dBm)	28μV	93dB	78dB
21MHz	0·18μV (−122dBm)	32μV	96dB	76dB
24MHz	0·14μV (−124dBm)	22μV	95dB	74dB
28MHz	0·18μV (−122dBm)	32μV	89dB	71dB

With the antenna terminated in 50Ω, five weak spurii were logged, none moving the receiver S-meter.

Other spurious responses checked as in [4], greater than 100kHz off-tune were:

Frequency	Worst Response	Other Responses
1·8MHz	13mV	Three up to 70mV
3·5MHz	40mV	Five up to 70mV
7MHz	28mV	Seven up to 70mV
10MHz	32mV	Nine up to 70mV
14MHz	32mV	Six up to 70mV
18MHz	35mV	Five up to 70mV
21MHz	40mV	Six up to 70mV
24MHz	13mV	Several 30-70mV
28MHz	16mV	Several 30-70mV

Some of the spurious responses on 28MHz fell inside the 27MHz cb band and could possibly cause weak breakthrough.

AGC performance

The agc threshold was measured as 4μV. A 120dB increase in the signal level above the threshold resulted in a 1dB increase in audio output. The attack time was 2ms (fast) or 5ms (slow) and the decay time 0·1—0·5s (fast) or 1—2s (slow) depending on signal level.

Selectivity

Reciprocal mixing generally limited measurements on selectivity to about 60dB down the filter skirts. Results for the various modes were as follows:

	BANDWIDTH		
Response	SSB/CW-W	CW-N	A.M./FM
−6dB	2·44kHz	520Hz	5·3kHz
−60dB	3·73kHz	2·77kHz	13kHz

Reciprocal mixing

Measurements made at 21·4MHz on ssb were:

Frequency offset	Input level	Level with respect to noise floor
3kHz	−57dBm	75dB
5kHz	−53dBm	79dB
10kHz	−47dBm	85dB
20kHz	−38dBm	94dB
30kHz	−34dBm	98dB
50kHz	−28dBm	104dB
100kHz	−18dBm	114dB
200kHz	−13dBm	119dB
300kHz	−12dBm	120dB

These figures indicate an oscillator noise sideband performance of −118dBC/Hz at 10kHz off-tune. This is a better result than other synthesized Yaesu equipment (FT980 [1]) but not as good as the Icom IC740 [2] or non-synthesized equipment such as the FT102 [4].

Blocking

Front-end blocking varied with on-tune signal level due to the varying gain of the agc-controlled rf amplifier. At frequencies offset from the carrier by greater than 15kHz, front-end blocking occurred at −20dBm (22mV) for S2 on-channel signals or −13dBm (50mV) for S9 on-channel signals. Within 15kHz of the on-tune frequncy this figure was degraded by up to 20dB by signals passing through the 47·06MHz roofing filter and blocking the second mixer.

Third-order intermodulation

The intermodulation performance was evaluated on 7MHz with tone spacings of 5 to 100kHz. With tone spacings below 20kHz, the intermodulation performance degraded dramatically, again due to overloading of the second mixer. The results were as follows:

Tone spacing	Third order intercept	Two-tone dynamic range
5kHz	−51dBm	55dB
10kHz	−44dBm	59dB
20kHz and greater	−1·5dBm	88dB

On 28MHz with 50kHz tone spacings, the third-order intercept was measured as +5·5dBm, giving a two-tone dynamic range of 92dB. Fig 2 shows the combined effects of intermodulation, blocking and reciprocal mixing. Reciprocal mixing predominates over blocking at all levels but, in the presence of several strong signals, intermodulation is likely to cause most problems.

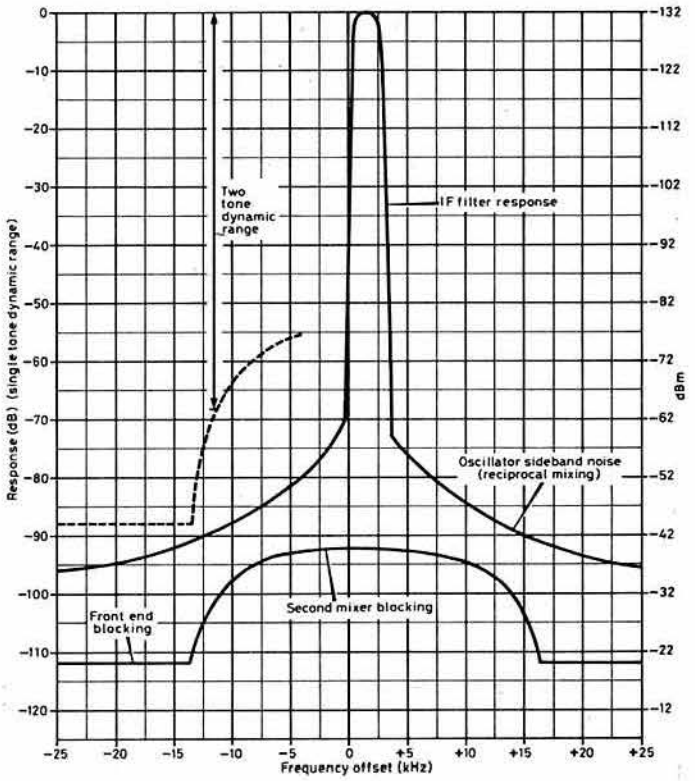


Fig 2. FT757GX effective selectivity curve on usb

Overall inband linearity was assessed with 200Hz signal spacings [4]. The level of intermodulation products generated was fairly constant at −30dB for input signals up to 70μV. This reduced to −20dB for 2mV input signals. This is not a very good result.

Audio

The maximum power output before the onset of clipping was 1·8W into an 8Ω load, or 2·3W into a 4Ω load. Up to this level the distortion was constant at about two per cent. Maximum audio output could be achieved with 0·5μV input signal.

Transmitter measurements

CW power output, harmonics and spurii

Setting the drive according to the manual, the maximum power output on cw and fm together with the harmonics and other spurii were:

Frequency	Power output	Harmonics	Other spurii
1·8MHz	108W	−55dB	Three at −75dB
3·5MHz	100W	−58dB	One at −73dB
7MHz	100W	−52dB	Three −70 to −75dB
10MHz	103W	−53dB	Several −70 to −80dB
14MHz	104W	−58dB	Several −60 to −80dB
18MHz	110W	−54dB	Many −60 to −80dB
21MHz	110W	−58dB	Several −60 to −80dB
24MHz	110W	−58dB	Several −60 to −80dB
28MHz	105W	−57dB	Five −60 to −80dB

The cw keying performance was evaluated in manual mode using an external keyer. Fig 3 shows the rf envelope and keying waveform for dots at 30wpm. In full break-in mode there is a delay of nearly 40ms and characters are heavily clipped. Note that the rf actually appears after the character has been completed! The semi break-in result shows less distortion but there is still a delay of 25ms. At 40wpm (Fig 4) no rf comes out of the transmitter at all in full break-in mode, and in semi-break-in there is noticeable character shortening. The internal keyer in automatic mode shows much less distortion but no quantitative measurements were made. In both manual and automatic modes keying is controlled by software routines in the keyer microprocessor. It is here where the delays are occurring. There is no simple solution to this problem apart from bypassing the keyer completely in manual mode.

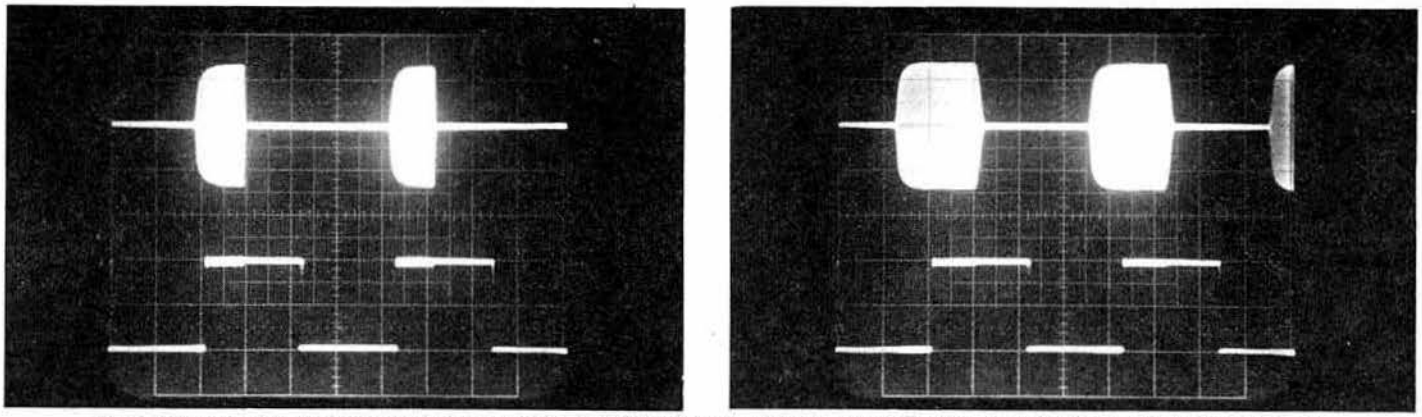


Fig 3. CW keying waveform (bottom) and rf envelope (top) at 30wpm. Horizontal scale 20ms/div. Left: full break-in. Right: semi-break-in

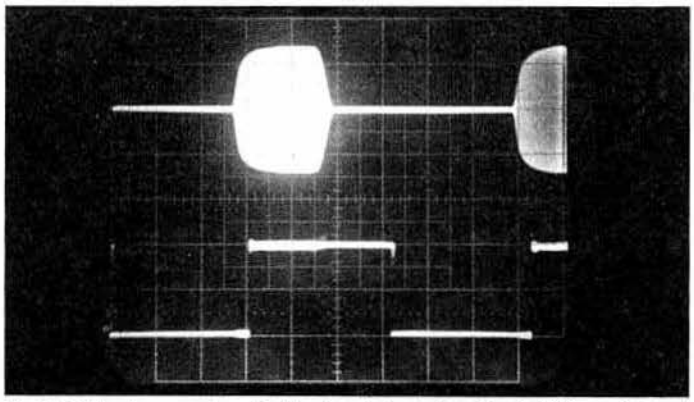


Fig 4. CW keying waveform (bottom) and rf envelope (top) at 40wpm in semi-break-in mode. Horizontal scale 10ms/div

SSB power output and distortion

With maximum two-tone audio drive according to the manual, the following results were obtained with the processor off:

Frequency	Power output (p.e.p)	Third-order ips	Fifth-order ips
1·8MHz	110W	−36dB	−41dB
3·5MHz	101W	−36dB	−40dB
7MHz	104W	−36dB	−38db
10MHz	107W	−34dB	−38dB
14MHz	109W	−30dB	−40dB
18MHz	116W	−26dB	−40dB
21MHz	116W	−24dB	−40dB
24MHz	116W	−21dB	−36dB
28MHz	110W	−27dB	−35dB

Reducing the drive slightly resulted in a dramatic improvement in ip level on the higher frequency bands. The intermodulation product level at ±10kHz was about −60dB and at ±20kHz was −75 to −80dB.

The carrier suppression and sideband suppression with a 1kHz audio tone were both -60dB.

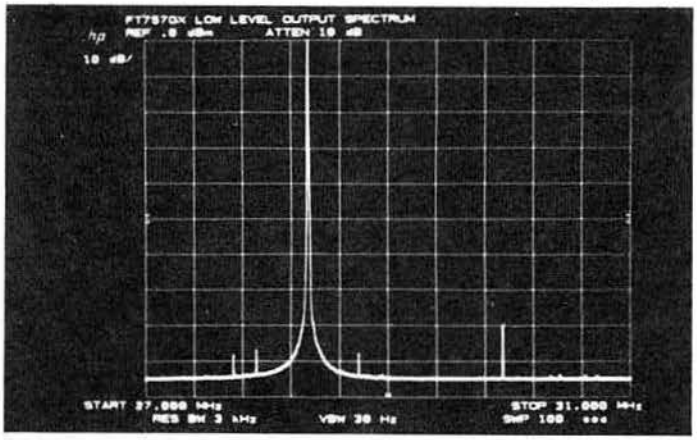


Fig 5. Transverter low-power output spectrum on 28MHz. Horizontal span 27 to 31MHz. Vertical scale 10dB/div

Audio

The audio bandwidth on both lsb and usb was measured as 250Hz—3·0kHz at the −6dB points. Full output could be achieved with 2mV af input at the microphone, and audio distortion was extremely good at around 0·1 per cent.

Transmitter noise output

Noise measurements at full output on cw at 21·4MHz (see[4]) were:

Frequency offset	Noise output	Noise output with respect to carrier in a 2·5kHz bandwidth
5kHz	−54dBm/Hz	−70dB
10kHz	−63dBm/Hz	−79dB
20kHz	−71dBm/Hz	−87dB
50kHz	−81dBm/Hz	−97dB

Operation into mismatched loads

On 28MHz with full cw power output, the transmitter delivered between 48 and 94W into a 2:1 load vswr, and between 32 and 68W into a 3:1 vswr.

Low-power (transverter) output

The transmitter power amplifier stages are disabled by breaking the link from inside the four-pin 12V power plug. Note that the pin numbering of these connectors differs between Japanese and British made items. At least 0dBm cw is available on all bands from the low-level rf output socket, and on ssb −44dB intermodulation products were measured at 0dBm p.e.p. output. First local-oscillator leakthrough is fairly high at −35 to −40dBm but can be easily filtered out. Fig 5 shows the inband output spectrum on 28MHz.

Other measurements

Frequency indication and stability

The frequency drift on 28MHz amounted to 250Hz during the first hour from switch-on, and a further 60Hz in the second hour.

On cw the frequency display indicated true transmit frequency which is correct for received signals with a 700Hz beat note.

Battery operation

The current consumption on receive was about 1A and on full power transmit, about 18A. Satisfactory operation was obtained down to 10·5V supply below which the synthesizer logic and display ceased to function. Heavy-duty battery leads are essential for mobile operation. The transmitter power output was 85W at 10·8V supply.

Transmit-receive switching speed

The increasing popularity of Amtor and future modes like packet radio brings a requirement for rapid switching between transmit and receive. The FT757GX, being designed for full break-in operation, would appear on the surface to be ideal for these modes. Fig 6 shows the measured switching speeds on ssb as a result of shorting the ptt line. These are given for full output on transmit and full recovery on receive. Transmitter modulation was applied as an audio tone to the mic socket. It has been suggested by BARTG that 20ms is an allowable switching speed for Amtor. The 28ms transmit enable and 40ms receiver recovery times are too long for satisfactory Amtor operation. Since carrying out these measurements, SMC have advised that removing C139 on the rf board reduces these time delays to about 10ms.

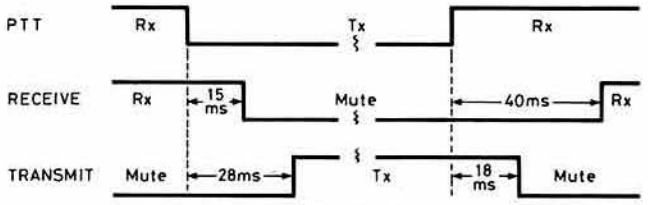


Fig 6. Receive/transmit switching speed on usb

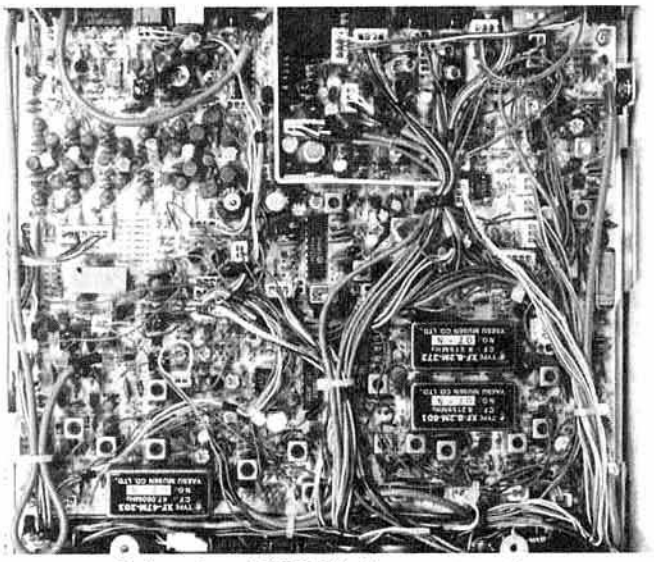
On-the-air performance

The FT757GX offers a remarkably large number of facilities in such a small box. The receiver generally performed quite well, although copy of weak signals could be difficult under conditions of heavy adjacent channel interference on the lf bands. Careful use of the rf amplifier and attenuator was necessary under these conditions. Some weak spurious signals were heard on some bands when using multiband antennas. These could usually be eliminated with the FC757AT atu. The slow tuning rate of 10kHz/revolution of the relatively small control knob made frequency changes of several hundred kilohertz a tedious business. The frequency synthesizer was a little "clicky" and tuned unevenly; particularly noticeable every 100Hz on cw. This rendered a somewhat unsteady sound when tuning cw stations. The agc characteristic left much to be desired. The attack time was not sufficiently fast, and a longer decay time would have been preferred. The narrow cw filter seemed to possess rather wide skirts.

SSB performance on transmit was excellent. Good-quality reports were generally received, the transmission was narrow and the processor was particularly effective. On cw, using the internal keyer, good results were obtained and full break-in was effective up to 20wpm or more. The transmission was narrow with no clicks. The keyer controls, however, are awkwardly placed on the top of the case, and the speed control in particular is most difficult to adjust. With external keying, results were not as good. In full break-in mode, dots were severely distorted and key clicks were audible to greater than ±5kHz. A second key jack by-passing the keyer would avoid this problem and also allow the use of external CQ senders etc to be used in conjunction with the internal keyer.

Split-frequency operation was simple to use, but the memories required a careful reading of the manual, practice and a clear head to make full use of the facilities.

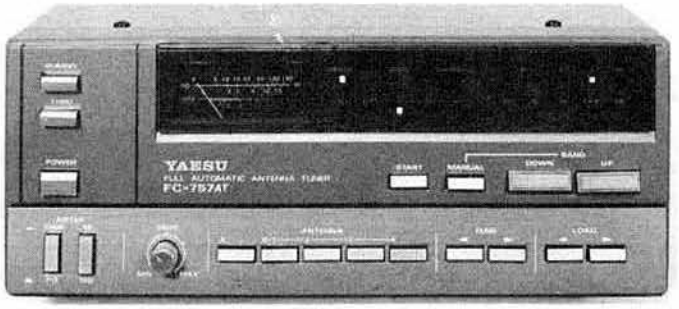
The switched-mode power supply, FP757GX, was found to be remarkedly rfi proof. Although some hash could be received with end-fed antennas draped near the psu, with coaxial-fed antennas there was no trace of interference on any band.



Bottom view of FT757GX with cover removed

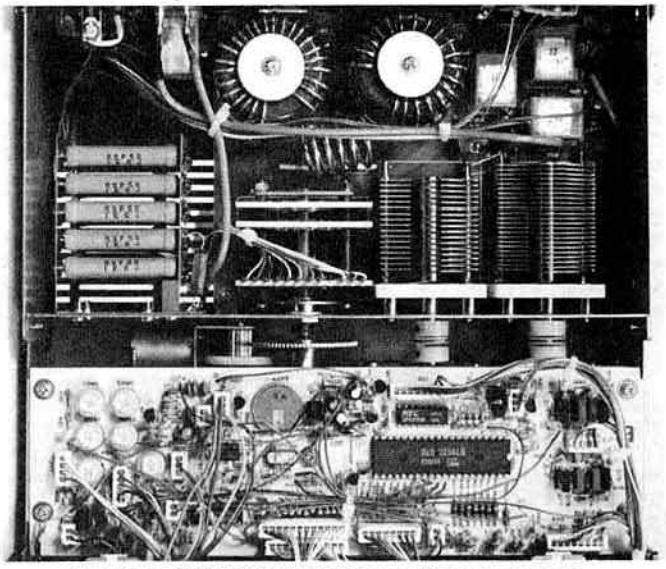
FC757AT automatic atu

The FC757AT atu comprises an extended pi-network with two motorized variable capacitors and a motorized switch selecting coil taps and fixed capacitors all controlled by yet another microprocessor. The band is selected automatically by data fed from the FT757GX, which also supplies the power. The automatic atu is rated at 150W and includes a dummy load, power meter, switching for two antennas or up to five with the FAS-1-4R remote extender unit, and a battery backed-up memory which holds the most recent settings for each band. These are selected initially whenever a band change is made. The atu will match up to 5:1 vswr (2:1 on 1·8MHz) and provide a final match better than 1·5:1. Manual overide is also provided.



FC757AT automatic atu

Operation is very simple—it is really only necessary to switch it on and leave it. The time taken to achieve a match is often quite long, in excess of 30s sometimes, and a better match can often be obtained on a second try.



Top view of FC757AT automatic atu with cover removed

Conclusions

The FT757GX is a versatile little transceiver. Its main features are the extensive facilities offered in a small portable unit at an attractive price when compared with other similarly featured equipment. For top-class dx and contest working it has a number of shortcomings. The close-in dynamic range is poor, the synthesizer has a poor tuning characteristic, particularly on cw, and there are problems with the cw keying. The current low value of the pound with respect to both the dollar and the yen has recently resulted in a substantial rise in the prices of both Japanese and American equipment. The FT757GX currently sells for £829, the FP757GX switched mode psu is £180, and FP757HD heavy-duty psu £200. The FC757AT atu is £290. All prices are inclusive of VAT.

Acknowledgements

The reviewer would like to thank G3WRR, G3UFY and G3WBN for comments on the transceiver, and South Midlands Communications Ltd for the loan of the equipment.

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[4] "The Yaesu Musen FT102 hf transceiver", P J Hart, G3SJX. *Rad Com* January 1983, pp32-6.

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Technical Topics

by Pat Hawker, G3VA

Some years ago, when the promise of reliable, 24h, high-capacity microwave links via satellite began to be achieved with the launching of Early Bird in April 1965, it was widely, if rashly, assumed that the use of hf, with all its many propagation variables and its limited (often non-coherent) bandwidths would soon be relegated almost entirely to hf broadcasting and amateur radio. Some believed that even these two services would finally become primarily *via satellite* services.

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Satellites, hf and the Services

While this was never my belief, I recall a press trip in 1965 to Hughes Aircraft at Culver City, Los Angeles, a few weeks before the launching of Early Bird (later renamed Intelsat 1), the very first geostationary communications satellite to go into commercial service in July 1965. The complex, clean-air assembly and stringent environmental testing of satellites, together with laser research at the firm's Malibu Beach laboratories, tend to merge in my memory with the opportunity it gave to visit the original Disneyland at Anaheim and to see the west coast premiere of the film *Sound of Music* (how that dates the period!).

Hughes Aircraft had found it necessary to bend the ears of that party of visiting European journalists because of the great reluctance of European PTT authorities to recognize the advantages of the synchronous orbit, with, for example, the UK still pushing for a lower orbit with station-keeping satellites involving tracking and hand-over with multiple earth terminals. The great protagonist of the 22,300-mile geostationary orbit was Dr Harold Rosen, who had earlier expounded his ideas to me on a visit to London in 1964. He led the team that developed the techniques for putting satellites into geostationary orbit, and was convinced that the British Post Office's doubts on excessive time-delay with the high orbit could be largely overcome by the use of better echo-suppressors—as indeed proved the case.

The developed countries have transferred their long-distance telephone circuits from hf to satellite, and are still in the process of developing higher-capacity ocean cables based on fibre optics. But the developing countries still need cost-effective, thin-line, medium-distance communications for which hf and vhf meteor scatter continue to offer many attractions. But hf is also being increasingly reclaimed by the Services, both for communications and for radar, due to the growing doubts about the vulnerability of satellite communications to jamming and anti-satellite weaponry. Currently, the US Navy, for example, is committed to a massive investment in new hf systems that will use frequency-hopping techniques and digital encryption for voice and data. This will make hf communications extremely difficult to intercept, to disrupt by jamming, or to locate by other than the most sophisticated df systems. Digital encryption of vocoded speech can provide completely "secure" links with a data rate of 2·4kb/s.

The present sunspot minimum, with the use of frequencies above about 7MHz restricted largely to mutual daylight paths, has resulted in the lower half of the hf spectrum becoming more crowded than ever. For amateurs, new threats are arising. With what are called "adaptive" systems and embedded real-time channel evaluation techniques, both commercial and Service transmissions are seeking and using any relatively clear channels they can find, often regardless of whether or not they have registered these with the International Frequency Registration Board. Frequency hopping at rates of tens or hundreds or even thousands of times per second, as now being planned, may superficially appear to present other users of the spectrum with few problems since, for most of the time, any particular frequency is not in use. A transmission of a few milliseconds duration will not seriously disrupt other transmissions unless the transmitter is very local.

Unfortunately this situation rapidly degrades when there are a considerable number of frequency-hopping transmissions. The effect then is similar to a rise in the continuous background noise, reducing the opportunities for weak-signal dx operation. Let us hope that the Services of all nations restrict their frequency-hopping and frequency-agile transmissions to outside the "exclusive" amateur allocations, though this may be asking too much. Spread-spectrum and adaptive systems may turn out to be dirty words to the civilian users of the spectrum!

Another unfortunate consequence of the renewed interest of the Services in hf and vhf is that they seem obsessed with achieving ever higher volumes of "instant" traffic—gone are the days when the Royal Navy aimed at maintaining "wireless silence" during operations unless within sight of the enemy (a change brought about by remote-sensing of ships by satellite radar, etc). This is tending to result in many more broad transmissions using various forms of phase-shift-keying of digital data streams that can blot out 3, 6, or even more than 10kHz of precious spectrum.

Nor are the Services keen to maintain the spectrum efficiency of hand morse, with the result that they are endeavouring to substitute keyboard systems that are highly resistant to interference. In this way they hope to avoid the cost of training morse operators despite the many advantages of retaining "kiss" systems. One technique currently being field tested by the Admiralty Research Laboratory (formerly ASWE) requires a full 3kHz ssb bandwidth to transmit messages at about 12wpm (10bits/s), repeating each "bit" five times on different audio frequencies by occupying, in effect, 10 100-baud channels. The tests they have conducted appear to have been heavily weighted in favour of the complex keyboard system—and against cw—and one hopes that the Navy will think again before abandoning morse as its fall-back system!

Many of the new techniques were discussed at a recent international "HF communications systems and techniques" conference held in London. A number of well-known amateurs—mostly wearing their professional hats—were present. Papers were presented by Dr Ulrich Rohde, DJ2LR/W2, on current work by RCA, with special emphasis on digital and frequency-hopping techniques; Professor Mike Underhill, G3LHZ, on "silent tuning" of transmitter antenna tuning units; Pat Gowen, G3IOR, on the fascinating hf ducting uncovered by amateur satellites; Maurice Hately, GM3HAT, on his "dipole of delight", etc. It was also a personal pleasure to meet Rich Rosen, K2RR, editor of *Ham Radio*, who came over to London especially to attend this conference. An article based on DJ2LR's paper is due to be published shortly in that magazine.

Trigonal reflectors

For most vhf arrays, operators accept the backward-looking lobes of Yagi antennas as an inevitable fact of life. In *TT*, November 1982, pp959-60, G8SEQ proposed the use of a second resistive-loaded reflector as a means of improving the back-to-front ratio of a 144MHz Yagi array, though subsequently theoretical considerations showed that even with an accurately-matched load in the centre of the second reflector half the energy in this element would inevitably be re-radiated, thus somewhat limiting the effectiveness of this approach.

It is perhaps surprising that more attention has not been paid to the use of trigonal reflectors—a technique first described (for a 120MHz array) by A Wheeler Nagy in 1936 and analysed by Dr George Brown in his definitive study of directional antennas (*Proc IRE*, Vol 28, No 1, January 1937, pp120-2).

In the UK the value of trigonal reflectors has perhaps been underestimated due to what appears to have been a long-standing error in several

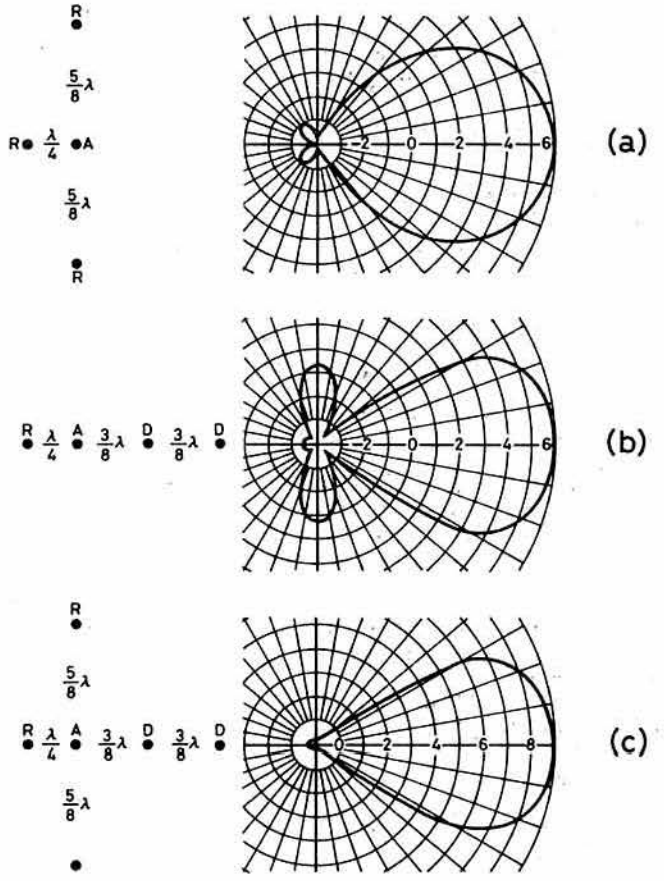

Fig 1. Use of trigonal reflectors compared with the single reflector of (b) shows the improved side and back lobe performance. But note that these diagrams originally used in *Radio Handbook* of 1938 are drawn to a linear rather than a logarithmic scale as would be done today. A logarithmic scale would make the side lobes more prominent on all diagrams. Note also the element spacings are those that were commonly used in the 'thirties, with the reflector a full quarter-wave behind the driven element

editions of the RSGB's handbook where what purports to be a "Yagi array with trigonal reflectors" (Fig 13.19 in *Radio Communication Handbook*, 5th edn) shows the three reflectors mounted in a flat plane.

In *Break-in* (September 1984, pp10-11), Rex Cassey, ZL2IQ, reproduces some diagrams from the *Jones Radio Handbook* of 1938 which show (Fig 2) that the three reflectors should be located on a parabolic curve which has the feedpoint of the driven element as it focus.

He provides the following up-dated design criteria:

(a) the added reflectors should all be the same length as the normal reflectors;

(b) the three reflectors should lie on a parabolic curve, $y^2 = 4ax$ (Fig 2) but note that in modern practice a is usually much less than the λ/4 of the pre-George Brown era or Yagi antennas;

(c) if the added elements are directly above and below F, their distance away will be $2a$. However, they can be placed anywhere on the parabola. For example, if $x = a/2$, then y will be $\sqrt{2}a$.

It seems worth adding that there is no reason why more than three reflectors should not be used provided that they all lie on the parabola and are symmetrical (ie 3, 5, 7 reflectors).

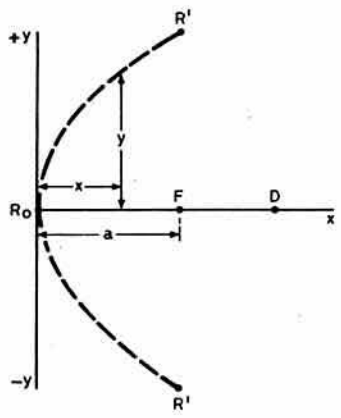

Fig 2. Trigonal reflectors should be located on the parabola having its focal point at F where the driven element is located

More on the rccb

L J Carpenter, G4CNH, is a little concerned that Fig 1 of the January *TT* showed an rccb connected directly between the supply meter and the customer's consumer unit, even though the prime purpose of the diagram was to show the principle of an rccb rather than provide a practical wiring diagram. G4CNH admits the diagram may appear correct but warns that, as shown, the rccb has no input protection itself apart from the company fuse. A fault in the rccb or even accidental contact of its terminals would not only be very dangerous, but also blow a fuse rated at about 60A! He believes that an rccb is best positioned *after* the consumer unit, and this arrangement lends itself very easily to having an rccb-protected outlet socket, as available from a number of sources, introduced into the normal ring main circuitry. In this case the 30A fuse fitted inside the consumer unit also protects the rccb. He adds:

"Houses with a modern electrical installation should have separate ring main circuits for upstairs and downstairs. The downstairs ring main is the circuit normally used to supply such appliances as washing machines, spin driers, electric kettles, garden tools and shacks. It therefore makes sense to fit an rccb to this ring main, at the very least.

"You are right to encourage the fitting of an isolator (eg heavy-duty double-pole switch) in the shack. I personally use a four-pole 240V ac contactor with one pole providing a latching supply. A shrouded push-button activates the contactor which can then be de-activated simply by interrupting the latching supply. To achieve this I have two switches wired in series, one switch at the operating position and the other switch by the door. This arrangement allows anyone to remove power safely from the equipment, *or you*, in the event of an accident. The use of a contactor or heavy duty relay is a must, the strong return spring fitted to such devices will easily part any contact(s) attempting to 'stick together'.

"And finally, the outside shack *must* have a separate earth. If for some reason the mains earth became detached at the supply, then the metalwork of some equipment could acquire a very unpleasant potential indeed. This is where the fitting of an rccb may possibly help."

John Nelson, G4FRX, has spotted an error in the reference (*TT* January) to the rccb as a "no-volt" detector". He writes: "The point about the no-volt relay is *not* that it falls out and stays out in the event of a temporary mains failure; it does no such thing. The facility is used in industry, and especially in traction applications, to isolate a piece of equipment if *a phase or neutral* voltage disappears. In the case of, for example, the B&R socket-outlet 13A rccb (which can readily be added to an existing socket not protected by an rccb) this does occur as an added bonus to normal rccb operation. A number of other rccbs, although definitely not all, act in this fashion.

"I believe that several bodies choose rccb devices based on their ability to act as this form of 'no-volt' relays, presumably with a view to the hazards which could conceivably arise if the neutral wire went open-circuit not far upstream of the socket."

G4FRX also stresses the point made by GW4CFC in the January *TT* that an rccb can in no way protect the user against faults arising downstream of an isolating (double-wound) transformer of any type. "Those of us who still enjoy high-power operation should not be deluded into thinking that rccb will in some magical way protect us against getting across the high-voltage anode supply required for a 4CX250B or 813 or what have you. But in these cases the rccb might still prove useful in the not unknown event of the primary developing an intermittent short-circuit to the core—something that unfortunately still happens with almost irreplaceable transformers. But they can do little more and should not be allowed to become counter-productive in giving a false sense of security."

Des Shepherd, G3LCS, and Paul Mullineaux, G3XEN, both draw attention to the RS "Powerbreaker" 13A rccb, stock No 334-094, but in a rather different way. G3LCS feels the £18.25 is well worth the investment for a bottom-of-the-garden shack run off a 13A plug for over 25 years. On the other hand, G3XEN has been concerned with five of these particular devices in the engineering department of Lancaster University. He provides a word of caution: "Five of these are in use on extension distribution board leads, but when we decided to test the trips they all worked fairly well for small leakage currents, though the trip time proved variable. But when we applied a short-circuit to earth to the miniature trips, they did not trip at all—instead two 13A hrc mains fuses blew, one in the trip and one in the 13A plug which was supplying it. So much for 30mA, 30ms!"

EMC and cable tv

The problem of signal leakage into and out of multichannel tv cable networks has become a matter of considerable concern to American vhf amateurs since there is now widespread distribution of programme channels on carriers within amateur radio bands; for example, US Channel E has its video carrier on 145·25MHz. Phil Karn, KA9Q ("Hints & Kinks" *QST*

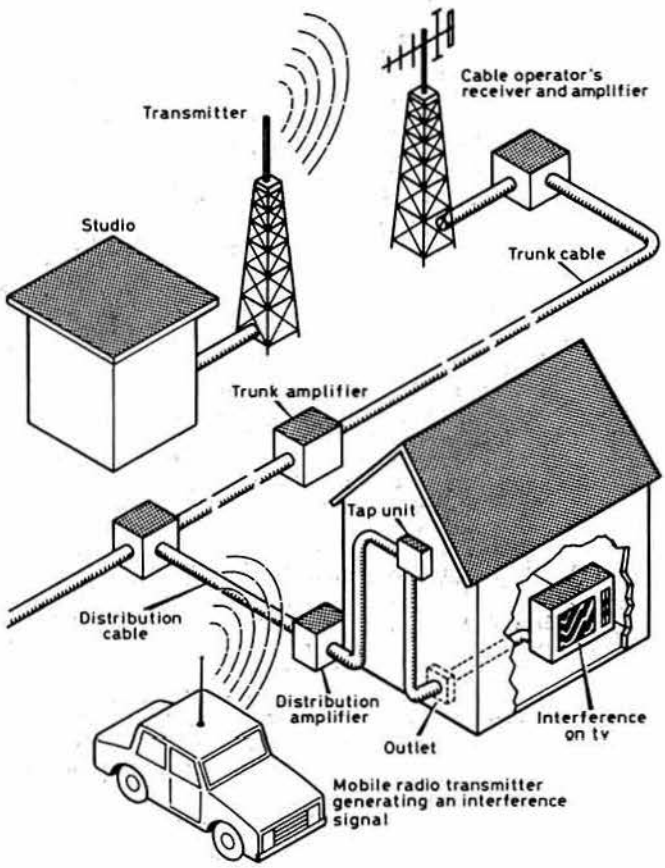

Fig 3. A typical tree-and-branch cable-television network showing the main component parts. The link between studio and the cable operator's master receiver often takes the form of a geostationary satellite distribution link

November 1984, p55) describes a novel, but apparently effective way of tracking down leaky cable "taps". This is to tune a mobile ssb transceiver to obtain a low audio beat of the carrier and then listen for the Doppler frequency shift that occurs as you drive past the signal source. At 40mph (64km/h) the shift on 144MHz while passing a source is twice the 9Hz Doppler shift (ie 18Hz), which he finds readily detectable on the receiver.

He reports that driving past a leaky tap thus results in both S-meter peaking and a sudden change in beat note. If the vehicle passes close to the leak—for example, from a cable pole close to the roadway—the shift is more sudden and the signal will peak higher than when the leak is at a greater distance; eg from a subscriber's installation in a house. A number of leaks tend to produce a confusing interference pattern. Once a serious leak or leaks is located it is then up to the cable company to deal with it.

Although it is now clear that, in the UK, multichannel cable is not going to spread as rapidly as was widely believed in 1982-3, the problem of cable tv in-band emc has already been encountered in some locations, eg Milton Keynes. The Electrical Research Association (ERA) has recently completed a major study which confirms the view that more stringent technical standards need to be established before wideband cable tv systems are generally introduced into the UK (ERA Report No 84-0059, price £135 to non-members, the availability of which has been brought to my notice by John Wilson, G8KIS).

ERA points out that the leakage of rf energy through imperfect connectors, cables and other components can cause interference to radio and tv reception and that the cable tv system may itself suffer interference due to the fields produced by transmissions from "broadcasting authorities, police, gas boards and even cb users".

ERA has investigated both a conventional "tree and branch" cable system (Fig 3) and a more advanced "switched star" system. Components and elements such as cables, taps and isolators were individually assessed. Radiated emissions from trunk and distribution cables were found to be negligible, but the emissions increased significantly as more components were added to build up the systems. Two components stood out as having significantly more effect on system emc behaviour than others, namely the tap-off units and safety isolators; clearly, ERA suggests, much depends on the quality of their design and construction.

ERA's conclusion is that while radiated emissions from the systems examined might not cause unacceptable interference, the immunity to external fields required substantial improvement to avoid interference—particularly from amateur and mobile radio transmitters. It may well be that the levels of radiated energy with which ERA were concerned were high enough to have interfered with weak-signal amateur radio reception, even if "acceptable" for other services, though I have not yet had an opportunity of studying the complete ERA report.

Testing high-current power units—another look

In the March *TT*, p193, G3GED noted the advantages of using a number of parallel-connected power transistors rather than lamps in order to provide an electronic test load for heavy-current power supply units. John Brown, G3EUR, is concerned that G3GED's arrangement (March Fig 8) does not include any low-value emitter resistors to ensure correct load-sharing between the four 2N3055 transistors. In practice some degree of load sharing can result from the finite resistance of the emitter connecting leads but, as in series regulators, it is unwise to rely on this. G3EUR writes:

"I use the same idea of a 2N3055 'electronic load' but with load-sharing and a small potentiometer to vary the current. The gain of different 2N3055 devices can vary a lot, and the arrangement shown would not be a very stable or safe load. In my version (Fig 4 (a)) the use, when required, of a separate 12V 1A psu for a driver stage provides a near-constant current load and opens the way to turning the electronic load into a useful tester.

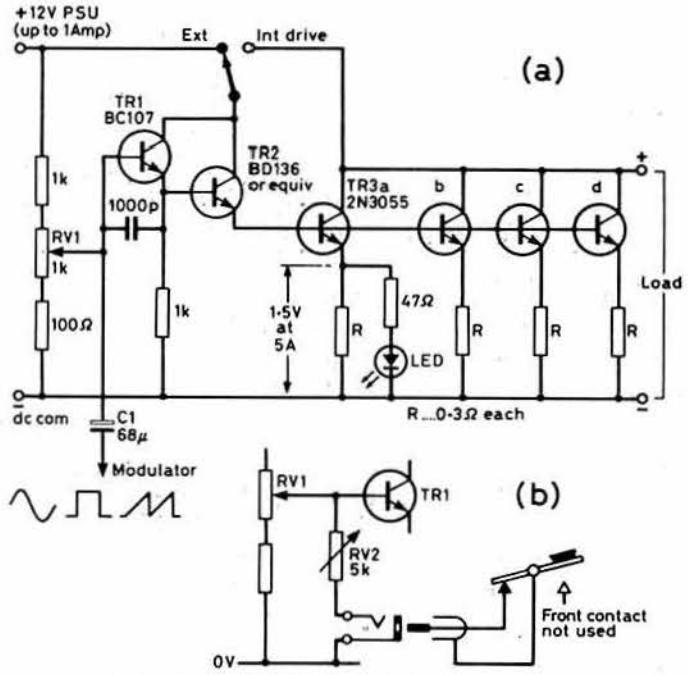

Fig 4. (a) G3EUR's electronic test load for high-current power supply units incorporating load-sharing 0·3Ω resistors and facilities for dynamic testing. (b) Use of the back contact of a morse key for dynamic testing in the absence of a function generator, etc. See text regarding the adjustment of RV1 and RV2

"Switching the dc at the base of TR1 (or just twiddling RV1) 'perturbs' the load so that the response of the psu can be seen on an oscilloscope connected across the load. The load current can be conveniently monitored by the voltage developed across one of the 0·3Ω resistors. Note that the driver will need about 1A to provide the base current for the 2N3055 devices at full current. An l.e.d. connected as shown in Fig 4 (a) across one of the 0·3Ω resistors can form a simple, cheap maximum-current indicator."

Incorporation of a driver arrangement enables the psu to be tested under various conditions. A function generator, 600Ω source or af generator, can be used to check the output under sine-wave, square-wave, triangular-wave conditions. A morse key connected as shown in Fig 4 (b) provides a useful way of checking output under varying current conditions, the maximum current being set by RV1 with "key down", and minimum current conditions set by RV2 with "key up". All this can be done without having to connect an untried psu to vulnerable solidstate equipment.

A similar technique could also be used with float-charged battery supplies to check ripple, etc, which (as mentioned in a separate item in the March *TT*) can sometimes affect the performance of communications equipment supplied in this way.

Digital signal processing

In *TT* (October 1984, p859) I referred briefly to the new Rockwell-Collins communications receiver model HF2050 as the first production model (currently being delivered to the Canadian Department of National Defence) to incorporate digital signal processing in all stages beyond the analogue double-conversion front-end. It includes the use of digital filtering under software control to provide the main selectivity in lieu of the traditional crystal or mechanical filters. As noted later, further information on this new receiver was given at the *HF communications systems* conference.

Another presentation which discussed alternative approaches to this form of receiver came from V Considine of Birmingham University. This paper ("Digital processing architectures for hf radio receivers" *IEE Conference Publication No 245*, pp86-8) underlined the basic problem of achieving a spurious-free dynamic range of 90dB required to achieve a dynamic range comparable with modern analogue receivers.

If one accepts the 90dB figure, then an adjacent channel (3kHz) suppression of 30dB is a normally acceptable minimum for high-grade professional receivers. However, since signal levels in adjacent channels may differ by the 90dB figure based on a statistical study of signal levels in the hf band, this suggests that a final requirement for dynamic range is of the order of 90 + 30dB, and that a dynamic range of 120dB is desirable for all early wideband stages of a receiver (this may be *desirable* but there can be few front-ends that reach this figure without taking into account the use of attenuators/agc, etc—*G3VA*).

The two basic design approaches for hybrid analogue/digital receivers (a/d) are shown in Fig 5. Fig 5 (a) outlines an upconversion approach using a conventional roofing filter. Fig 5 (b) adopts a 0kHz i.f. (that is, a direct-conversion or homodyne technique) in which quadrature (I, Q) channels are used to overcome the ambiguity as to whether the required signal is above or below the original local oscillator frequency, and thus dispenses with the requirement for an analogue filter. These two arrangements differ in that in (a) a bandpass signal is digitally processed in a single channel, whereas

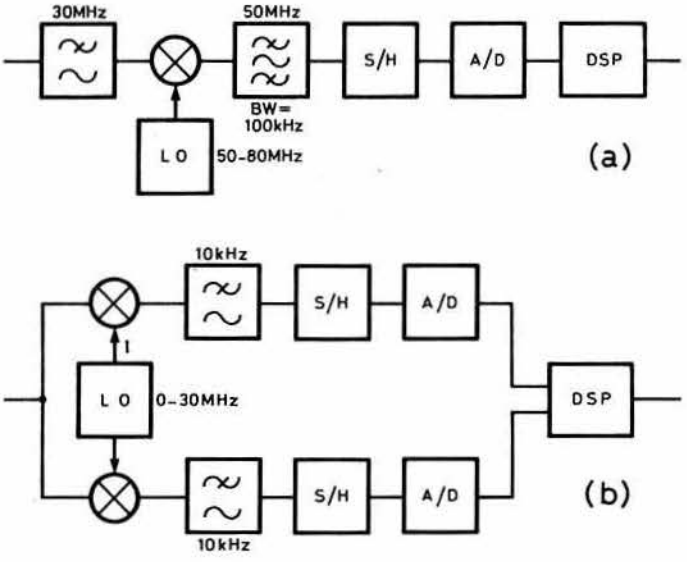

Fig 5. Basic arrangements for hybrid analogue/digital receivers incorporating digital signal processing. (a) Single-channel, single-conversion superhet (in practice a double-conversion analogue front-end is more likely to be employed to bring the i.f. signal down to 1·6 or 3MHz). (b) Dual-channel homodyne approach: s/h, sample and hold; a/d, analogue/digital converter; dsp, digital signal processing

in (b) two lowpass signals are produced in a homodyne arrangement.

The Birmingham paper notes that a 120dB signal range requires analogue/digital conversion with a 20-bit precision and that this is at present still beyond the capability of available devices. For an experimental receiver, Bagwell and Considine adopted the single-channel approach. On the other hand the Collins HF2050 uses the dual-channel zero i.f. or homodyne configuration.

Etching and drilling pcbs

R P Bown, G3PCN, describes a method of etching printed circuit boards which he has used for many years and which does not involve the use of any form of ferric chloride that can so easily result in yellow fingers and holes in the carpet. He writes:

"The liquid I use is a 1:1 solution of hydrochloric acid (spirits of salts, 30 per cent w/w) available in any hardware store, and hydrogen peroxide BP (20 vols) available from all branches of Boots and other chemists.

"The acid is added *to* the peroxide, although even mixing the solution the other way around by accident has never resulted in the dreaded heat reaction! The real advantage of this method is that the etching process can be seen, since the liquid etchant remains clear throughout the process; also, any etchant on the hands is colourless and not immediately corrosive!

"Nevertheless, normal precautions should be taken, and any splashed etchant washed down with cold water. The etchant time seems somewhat quicker than with ferric chloride, but this can be conveniently judged by observing the board while it is immersed. About 10 min at 65°C is typical. The etchant should be replaced when it appears very green in colour due to the copper reaction taking place.

"Anyone who has worked with the usual ferric chloride etchants knows only too well how messy the process can be, plus the difficulty of obtaining a supply at short notice from a local High Street shop at the weekend. The chemicals suggested above can be procured locally and remain stable and safe for long periods without any special storage problems arising."

Alf Hussey, G4KUN, recently sent along a sample of a small pcb that he had produced in a matter of minutes without the use of any chemicals or photographic techniques. The result looks a little crude but nevertheless would appear to be perfectly adequate for many purposes. He writes:

"This method may be of interest to other radio enthusiasts who have access to a drilling machine. By mounting a 1/16th-inch slot drill (this is a type of milling cutter) in the chuck, and then with the chuck lowered or the table lifted so that the cutter just touches the copper surface. After drawing the required pattern on the piece of board, it is a quick and simple matter just to push the board under the cutter, using it as a router. This just cuts away the top few thousandths of an inch of copper. The finished article requires a few strokes of a file to remove the slight burr. My sample board took just 6min to produce."

Rockwell-Collins HF2050 receiver

A paper on the Collins HF2050 receiver ("A digital signal processing hf receiver", *IEE Conference Publication No 245* pp89-93) was presented by D T Anderson. As noted in *TT* October 1984, although this receiver is a high-grade professional receiver in the plus-$6,000 range, it seems entirely possible that the lower component count and ease of assembly, as well as the good characteristics of digital filtering, will prove attractive for the designers of equipment for the amateur service when the necessary large-scale integrated circuits (lsi) become more readily available.

Fig 6 shows the overall arrangement of the HF2050, with its first i.f. at 99MHz then converted down to 3MHz under the control of a low-noise synthesizer providing signal frequency coverage that includes vlf/lf/mf/hf. The digital signal processing is shown in Fig 7, with quadrature processing on the digital bit stream derived from sampling the 3MHz i.f. signal using a 12MHz clock. The processing is described as follows:

"The 3MHz i.f. signal is buffered and then digitized by an a/d converter. The output filter of the rf translator acts as an anti-aliasing filter for the a/d input signal. The a/d is a flash-type and is operated without a sample-and-hold. The a/d output is a digital 3MHz i.f. sampled at 12 megasamples/s (msps).

"The a/d output samples are inputted to the i.f. translator. The translator mixes, filters and reduces the sample rate (decimation) of the signal. It outputs a baseband (0Hz i.f.) signal consisting of an in-phase (I) and a quadrature (Q) component. Each component is in 2's complement form and is sampled at 48 kilosamples/s (ksps). The finite-impulse-response type (fir) which produces no phase distortion. A patent application describing the i.f. translator was filed by Rockwell.

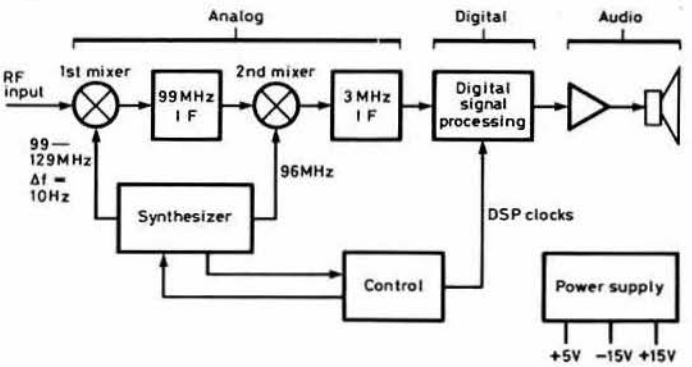

Fig 6. Block diagram of the Collins HF2050 receiver, the first production model of a general-purpose communications receiver incorporating digital signal processing and filtering

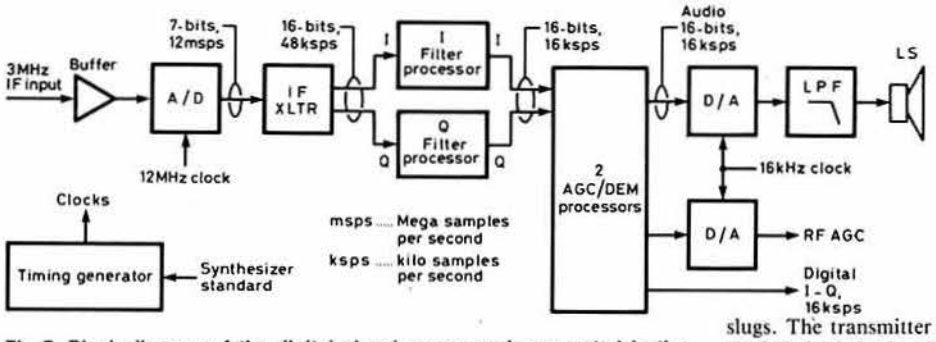

Fig 7. Block diagram of the digital signal processor incorporated in the Collins HF2050

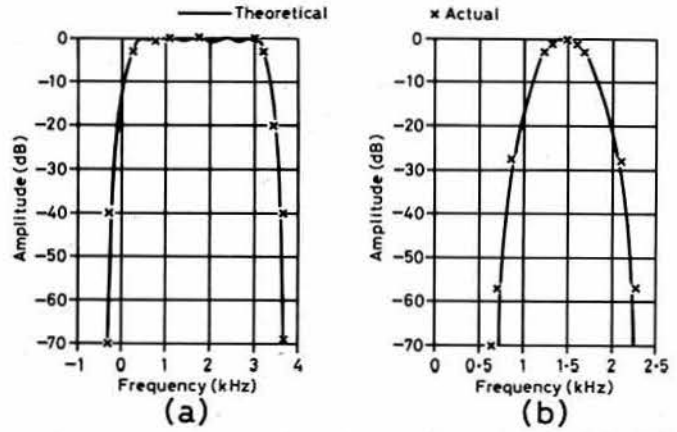

Fig 8. (a) Amplitude response of the ssb digital filter in the HF2050. (b) 300Hz cw filter response. Differential delay responses of such digital filters is very much better than with mechanical or crystal filters, a factor of importance for rtty and digital data operation

"Next, filtering is done on the I-Q components separately using filter processors. This filtering provides the final selectivity of the receiver, and is equivalent in function to the mechanical and crystal filters found in all-analogue receivers (but note that in effect the filtering is carried out on the 0kHz i.f. signal and is thus the equivalent of af filtering in a superhet or direct-conversion receiver—*G3VA*). The excellent filter responses are shown in Fig 8. The filter processors are vlsi digital signal processors containing a filtering program. Receiver bandwidth, ripple and selectivity are determined by programmed data within the processors. In the first production deliveries of the receiver, six different filtering operations (two cw, two a.m., ssb and isb) are implemented within the two I and Q filter processors . . . . the filter processors decimate the sample rate to 16ksps for each of the I and Q components.

"The agc/demodulator processors are the same type vlsi processor as used for filtering except that they contain agc and demodulating programs. Each agc/demod processor (one for cw, ssb and a.m., and one for isb) inputs the I-Q signal from the filter processors . . . . "

Those of us who are more used to analogue than digital technology may find the above description a little obscure, although the overall arrangement is reasonably clear.

Choosing the right material

John R Hey, G3TDZ, is concerned about the use of unsuitable materials noted in some constructional articles etc, particularly the use of "lossy" plastics at rf. He writes:

"It has been known for many years that certain plastics are very poor at rf, especially at vhf. Perspex, nylon, and colour-filled plastics such as pvc, are very lossy indeed and dissipate significant amounts of rf energy. A friend wound a 'rubber duck' antenna on to a nylon tube; it collapsed in a heap after only 15s of rf being applied! Every old-time tv service engineer remembers the fate of line transformers built from perspex. They went yellow, then turned brown, then black, and finally burst into flames.

"Polythene, polystyrene, polyester, polycarbonate and polypropylene are all fine, as are glass, ptfe, ceramics, and those old paper-based materials Paxolin and Tufnel.

"For many years I have used successfully a J-stick 144MHz antenna which is mounted inside a polypropylene tube. The popular grey pvc drainpipe, often used for this purpose, is much too lossy and sends the swr meter soaring. The white polypropylene tubes made by Marley and sold at d-i-y shops are quite good.

"Some years ago, after the publication of one of my constructional articles in *Rad Com*, a constructor sent me his transmitter which he said could not be tuned up. Each stage appeared to tune in itself, but there was a net loss at each stage so that there was hardly a sniff of rf at the antenna socket. All components were correct and his soldering was impeccable. It was not until I inadvertently put a finger on one of the coils that the truth emerged—preceded by some bad language. The coil was almost red hot!

"I replaced each tuning slug with Aladdin slugs. The transmitter came to life and worked perfectly. If readers are reminded of the losses in materials periodically, constructors may have fewer disappointments."

It is indeed worth noting that there are still unknown factors in the use of materials in different environmental conditions and demanding applications. It was not until after the early Comet aircraft disasters of the 'fifties that much attention was paid to metal fatigue. Even today every very cold spell seems to be accompanied by a quota of gas explosions caused by leaks in the pipes.

Alun Williams, G3KSU, recently drew my attention to the sudden collapse on a calm but very cold morning of a 298m-high, 15-year-old cylindrical steel television transmitting mast near Detmond, West Germany, following a week in which the temperature had never risen above −15°C. Did the sustained cold cause one of the enormously strong guy cables to snap? Was there a sudden ground subsidence? Are tall cylindrical steel masts inherently less reliable than the traditional triangular steel lattice masts? Even the most experienced constructional engineers appear to be baffled by some of the questions that have arisen from this and other tv mast failures.

Plumbers' ptfe tape

Ken Lanyon, GM4GSJ, draws attention to the ptfe tape used in the plumbing trade for sealing water joints in mechanical couplings. He writes:

"This useful tape is quite cheap, and, although fiddly to handle owing to the static engendered as it is unwound, is not messy, as are most pvc adhesive tapes. When it is used for 'making-off' cable joints and terminations, it moulds itself neatly around soldered joints and does not show any tendency to peel off or unwind, even though it has not specific adhesive coating. I believe that if carefully applied it should prove waterproof.

"A further merit is that it will withstand soldering-iron temperatures, and this led me to use it, instead of pvc tape, while making one of the baluns described in *HF Antennas for All Locations*. After 'stretch-straightening' the 18swg wire and spiral wrapping it with ptfe tape for sufficient length (about 10in) the windings lay close and smooth on the ferrite rod: not too difficult to achieve with bifilar winding but much more problematic with trifilar construction.

"When wrapping three wires they naturally fall into a triangular configuration, and as winding proceeds they tend to twist, suggesting that achieving neat and close coupling of the conductors may be difficult when applied to the ferrite rod. But I found that in practice this procedure flattened the triangular format and, at the same time, tightened the wrapping, thus ensuring close and even coupling.

"In addition, the electrical properties of ptfe must be reflected in this type of tape and so far I have never heard of any disadvantages in using it for amateur radio applications."

G E Birkhead, EI9DZ (G4KOQ), recently constructed an atu which required the use of a balun (*Radio Communication Handbook*, 1974 ed, p585). This suggested the ferrite core should be covered with two layers of "3M No 27 glass-cloth insulating tape" which is not readily available on this side of the Atlantic. He purchased instead a roll of pure ptfe tape from the plumbing department of the local hardware store and wound approximately three layers around the ferrite core. This makes a neat job with the insulating properties of ptfe.

Adhesive copper tape

A Rawlings, G1CIJ, has found adhesive-backed copper tape (*TT* February) very useful for constructing the directors and driven element of a roof-space 144MHz ZL-Special antenna. He writes:

"I used 1 by 1in timber as the frame, and ran the tape around the timber element in a double row. The driven elements were built similarly and cross-joined to give the correct phasing. A small variable capacitor was added to adjust the swr down to about 1·3:1. This type of tape is available in 33m lengths in four sizes (4mm, 4·75mm 6mm and 8mm wide) from:

Copperfoil Enterprises, 141 Lyndhurst Drive, Hornchurch, Essex RM11 1JP. For the 4mm size I paid about £2.95 plus 50 p&p a few months ago. Soldered connections can be made satisfactorily, and I have no doubt that such tape could find many other applications."

I suppose it could be argued that using the copper tape on a timber base limits the rf insulation, though this would not apply to tape stuck on to window glass, for example. A number of references have been made in *TT* to the use of very-low cost aluminium kitchen foil to form elements of indoor wideband hf and loop-type vhf antennas (see *TT* July 1983, p609).

Alternative energy—pedal power

The use of a static bicycle or hand generator to charge batteries in order to keep radio equipment working in remote locations has a long history. It has been shown that an energetic "cyclist" can generate over 100W of electrical power; though it can be exhausting to keep up this output over extended periods unless the overall efficiency of the system is high.

A recent article by Penn Clower, W1BG (*Ham Radio* December 1984) on "The bicycle-powered station" adopts the unusual approach of using a vehicle alternator to provide a regulated 110V ac output. This he uses directly to power a 100W ssb transceiver with no attempt to provide any form of energy storage other than adding some 2kg "flywheel" weight to the rim of the bicycle wheel which drives the alternator. This technique makes it essential to achieve high-efficiency if only to eliminate excessive huffing and puffing on the part of the energetic operator/rider. An effective and relatively sophisticated voltage-regulator is also necessary because of the large swings in the load presented by an ssb transceiver, and the significant variation in the power delivered by the rider during each pedal revolution.

In practice, W1BG claims that a middle-aged adult in average physical condition should be able to produce 50W continuously for an hour without undue strain; he reports that a 30–40min contact leaves him damp but by no means exhausted when using his static 10-gear bicycle which doubles as an exercise machine. For receive-only he loads his machine with a 40W electric light bulb. For less energetic operators, W1BG indicates that a typical Delco-Remy car alternator plus electronic regulator could be driven by wind, water or petrol-powered installations.

In its original application, the alternator is a three-phase machine with a y-wound stator driven by a rotating field coil. The three output phases are full-wave rectified to produce dc output with about 14 per cent ripple. Windings are arranged so that seven electrical output cycles occur during each mechanical rotation of the shaft, accounting for the advantage shown by an alternator at low rotational speeds compared with the more common two-pole dc vehicle generator. For a given field current, W1BG notes, the unregulated output of either type of machine is directly proportional to the shaft rate, but an alternator of this type, with its 7:1 advantage, can reach a reasonable output at a much lower speed. In a vehicle a relatively crude regulator is satisfactory since the storage battery regulates the output delivered to the various loads. W1BG connects a step-up transformer into the ac portion of the low-voltage alternator to provide 110V ac output. This could, of course, be 240V for European rigs, though the use of an unmodified rectified alternator with a 12V car battery would avoid many of the voltage-regulation problems. With either approach, the supply delivered to the equipment must be regulated to within about five per cent of nominal. Care needs to be taken with solidstate equipment to suppress any voltage spikes. For details of the elaborate electronic regulator etc, W1BG's long article in *Ham Radio* should be consulted. □

GB3PT

THE FIRST RTTY REPEATER

P Mellor, G4BIK,*
and
D Bailey, G8OPN**

THE FIRST rtty repeater, GB3PT, has now been on the air for five years and, until recently, was the only operational rtty repeater in the UK.

GB3PT is located at the Pye Telecommunications radio site at Barkway, Herts (loc JO02AA) and it was first operational on 14 October 1978. The repeater was constructed by members of the Pye Telecommunications Amateur Repeater Group, but responsibility for GB3PT and the two speech repeaters GB3PI (R6) and GB3PY (RB14) was transferred to the Cambridgeshire Repeater Group in 1982. The group is also responsible for the 1,296MHz repeater GB3PS (RM3) which became operational in December 1984, also located at Barkway.

Technical details

When GB3PT was designed and built in 1977–8 it was decided to use a logic system using 4000 series cmos, although the ultimate intention was to use a microprocessor logic. Microprocessors were not in such widespread use as they are today, and as none of the group members had anything more than a basic understanding of the hardware and software involved in designing a processor-based logic, it was considered that a temporary cmos logic was the best solution to put the repeater on the air as quickly as possible. The cmos logic was built by Ron Whitby, G8MEI, and remained in service until April 1981, when it was replaced by the present logic.

The characteristics of the microprocessor logic are very similar to the original cmos logic, but with added facilities such as test messages generated by the repeater on request. The rtty tones and the uart clock are derived from crystal oscillators and, therefore, the test messages (and relayed signals) should be accurately on frequency and at the correct speed. A block diagram of the repeater is given in Fig 1.

Incoming rtty signals are demodulated by the DT600, which is a limiter-discriminator demodulator basically similar to the ST5 and ST6. The autostart circuitry of the DT600 is used to detect the presence of mark tone which is necessary for accessing the repeater. The demodulated signal is then passed to the 8251 uart, through the processor to the transmit section of the uart, and this regenerated signal then drives a crystal-controlled afsk oscillator which is used to modulate the T461 transmitter. A 1kHz pip-tone is used to indicate a station is attempting to access, and the pip audio is combined with the cw callsign audio and the rtty tones in an audio combining unit.

The speed currently in use is 45·45 baud, but this may change to 50 baud in view of the increasing number of stations using this speed. There is no direct audio path between the receiver and transmitter, and therefore the repeater can only relay rtty signals having correct shift, polarity and speed. One disadvantage is that a calling station has no means of knowing what his transmitted signal sounds like at the repeater, but it may be possible to add some indication of received signal strength as an extra facility in the future.

The processor logic uses an 8085 cpu with the necessary on-board buffering and gating, 4k (max) eprom and 3k of ram on one card, and the input/output ports, 8253 timer ic and 8251 uarts on another card connected by ribbon cables. The present program uses 2k of eprom, but this will probably grow if and when extra facilities are added.

Standard Pye uhf transmitter (T461) and receiver (R460) equipment is used, with a home-built power amplifier following the transmitter to boost the rf output from the rack to 20W. This is fed through FHJ2-50 feeder to an SA460 stacked-dipole array at 140ft agl, giving an erp of 20W (as the feeder loss equals the antenna gain). Lower-loss LDF5-50 feeder is used on the receive side with another SA460 array at 180ft agl. The loss of this feeder is only 1·8dB. Antenna separation has been measured as 56dB, and Pye AE450F filters are used as notches in both the transmit and receive lines to provide the necessary extra isolation required. The minimum total isolation required between transmit and receive is 70dB.

*10 Greenfields, Earith, Huntingdon, Cambs PE17 3QH.
**52 Queensway, Trumpington Road, Cambridge.

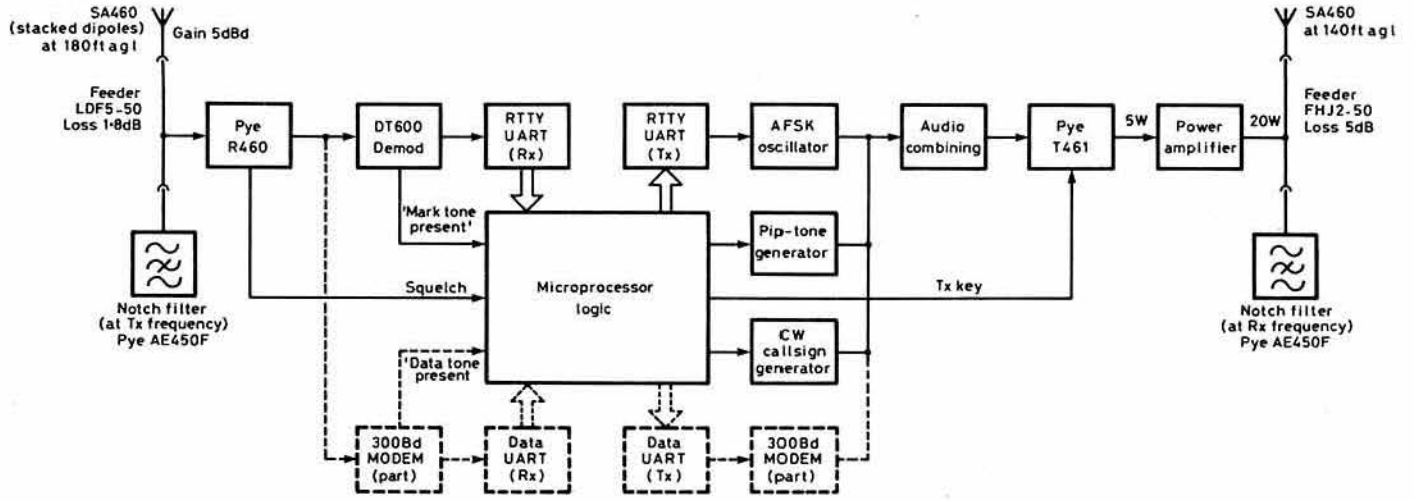

Fig 1. Block diagram of GB3PT

How to use the repeater

The repeater sends a periodic cw callsign once every 5min, and if you can hear it you should be able to access it. Key your transmitter modulated with mark tone, and the repeater should reply with a carrier and a 1kHz pip tone. Through rtty is not possible until you have typed in "GB3PT", when the pip tone will stop, indicating successful access. The repeater will now relay any rtty signal on the input for an unlimited period. There is no timeout, although if no valid rtty character is received for 30s the repeater will send "Invalid signal" and close down. It will start relaying rtty again as soon as the rtty re-appears on the input. When you drop carrier at the end of each over the repeater will send "KKK" in rtty.

To re-access, simply key your transmitter and continue typing. It is not necessary to type in "GB3PT" again unless the repeater has closed down. Test messages are available by typing in the message request signals as listed below. Each request must be preceded by a "+" and followed by a "+", for example, "+RY+" will instruct the repeater to send 10 lines of "RYRYRY...". If more than one request is entered then only the last one will be obeyed. The test message will be output soon after you drop carrier, and wait for the "KKK" after the message has ended before retransmitting.

SD Station details for GB3PT
RY 10 lines of RYRYRY...
QF 10 lines of "the quick brown fox..."
C7 Creed 7 test message
75 Creed 75 test message
BK 30s of space tone
YY Five lines of "YYYY..."

Future developments

Possible future developments include:

(1) Single antenna working is on trial at present using the receive antenna. If this is successful it could lead to the possibility of changing to a horizontally-polarized antenna, allowing more distant stations with beams to access the repeater. Transmitter output power has been reduced to ensure erp limits are not exceeded now that the lower-loss receive feeder is in use for both transmit and receive.

(2) A real-time clock to give a date-time group at the beginning and end of each period of transmission.

(3) A message storage routine allowing the repeater to be used as an electronic mailbox.

(4) Some form of receiver signal strength metering, available on request.

Data operation through GB3PT

GB3PT became operational in data mode on 8 August 1984 for a trial period using data standards as proposed by the Cambridgeshire Repeater Group.

There are numerous data formats, various baud rates and many different fsk tone frequencies currently in use for data transfer. This created a problem of which standard should be used by the repeater.

The CUTS data standard, which consists of two fsk tones of 1,200 and 2,400Hz, was found to be unsuitable, as the harmonic relationship between the two frequencies, when being used over a radio link with even slight distortion, could introduce unacceptable errors in the data transfer.

The BARTG proposed use of narrow-shift rtty tones (1,275 and 1,445Hz) was also rejected, as many home computer users would not have a rtty terminal unit. These tones also made design of the repeater's software difficult, because the repeater would have to decide which speed of data was appearing at the output of the single-tone demodulator. It was also found during air tests that many common terminal units will not demodulate higher speed data.

The proposed standard for data transfer on GB3PT was decided, after careful consideration, to be CCITT standard V.21 modem tones, at 300 baud.

There are four tones, in two groups:
980 and 1,180Hz...Originate mode;
1,650 and 1,850Hz...Answer mode.
GB3PT will always be in answer mode similar to when using telephone data services.

There are many units on the market to transmit and receive data using these tones, in ready-built form or as a kit. These can interface to most micros which can then use GB3PT with the computer being used as a half, or full, duplex Ascii terminal. Data standard is eight bits, one stop bit and no parity.

Access of the data mode

When GB3PT is accessed from "cold" it decides on the data relay, or rtty relay mode by the frequency of the mark tone signal being sent by the station attempting access. If the tone is 1,445Hz the repeater assumes an rtty relay mode, whereas if it receives a 980Hz tone it assumes data relay mode. The repeater, on receipt of the relevant mark tone, then transmits the appropriate output mark tone with a pip-tone to show that there is a station attempting access on the input.

The user then has to type "GB3PT" in Ascii at 300 baud. If "GB3PT" has not been correctly entered within 1min, the repeater sends "Invalid access" and then shuts down. When the user has accessed correctly, the pip-tone disappears and data will be transferred by the repeater. When the user has completed his over and has dropped carrier, the repeater sends "KKK", CR, LF, in the appropriate code, and another user can then go ahead. When the QSO has finished, the repeater identifies itself in either Ascii or Murray code and then in cw before the repeater transmitter drops carrier. The repeater will now accept either rtty or CCITT V.21 tones when accessing again from "cold".

GB3PT details

Location	Barkway, Herts, JO02AA
Repeater receive frequency	434·90MHz, UK repeater
Repeater transmit frequency	433·30MHz, channel RB12
Effective radiated power	20W
Polarization	Vertical (Omnidirectional)
RTTY speed	45·45 baud
RTTY tones	Mark, 1,445Hz Space, 1,275Hz
Data speed	300 baud
Data tones	In 980 (1)/1,180 (0)Hz Out 1650 (1)/1,850 (0)Hz (CCITT Recommendation V.21)

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RSGB SLOW MORSE PRACTICE TRANSMISSIONS

Alterations and additions to this list should be sent to RSGB headquarters

Time	Callsign	MHz	Mode	Town	Notes
Sundays					
0915	G3WNR	145·250	F2A/F3E	South Shields, T & W	[1]
1015	G3CGD	1·875	A1A/A3E	Cheltenham, Glos	
1100	G2FXA	1·910	A1A/A3E/J3E	Stockton-on-Tees	
1100	G3BLS	145·250	F2A	Osney, Oxford	[1]
1200	G3HVI	145·250	F2A/F3E	Stoke-on-Trent, Staffs.	[1]
1200	G3GNS	1·910 / 3·550 / 144·250	A1A	Locking, Avon	[5]
1200	G3PER	145·575	F2A/F3E	Heysham, Lancs	[1]
1500	G4PYR	144·250	A1A/J3E	Solihull, W Midlands	[2]
1815	G3WNR	145·250	F2A/F3E	South Shields, T & W	[1]
1830	G4NZU	145·250	F2A/F3E	West Bridgford, Notts.	[1]
1830	GW4OXB	145·275	F2A/F3E	Swansea, West Glam	[1]
1900	G3LUC	145·250	F2A/F3E	Shildon, Co Durham	
1930	G4VBL	144·625	F2A/F3E	Fulham, SW London	[1]
1930	G3LDW	144·250	A1A/J3E	Halesowen, W Midlands	[1]
2000	G4TKM	145·425	F2A/F3E	Birmingham	[1]
2000	G4NHG	145·250	F2A/F3E	Stoke-on-Trent, Staffs.	
2005	G3OLU	145·375	F3E	Braintree, Essex	[1]
2100	G4EWK	144·850	F2A	Burton-on-Trent, Staffs	[7]
2130	G3ORP / G4UAQ	144·250	A1A/J3E	Maidstone, Kent	[6]
2130	G4TET	145·250	F2A/F3E	Great Barr, Birmingham	[1]
2200	G4OJD	145·250	F2A/F3E	Brixham, Devon	[1]
Mondays					
1400	G4OOC	145·250	F2A/F3E	Leeds, W Yorks	[1]
1830	G3GNS	1·910 / 3·550 / 144·250	A1A	Locking, Avon	[5]
1830	G3LUC	145·250	F2A/F3E	Shildon, Co Durham	
1830	GW4OXB	145·275	F2A/F3E	Swansea, West Glam	[1]
1900	G4FEX	145·250	F2A/F3E	Horsley Woodhouse, Dbys	[1]
1900	G3ULY / G4EXD	1·880	A1A	Culgaith, Cumbria	
1900	G3CMH/A	144·250	A1A/J3E	Yeovil, Somerset	[1]
1900	G8QR	145·250	F2A/F3E	Norwich, Norfolk	[1]
1900	G4ILD / G3ZQS	145·250	F2A/F3E	Riston, Lancs / Darwen, Lancs	[1]
1900	G4DLB	145·250	F2A/F3E	Banbury, Oxon	[1]
1900	G4UOL	145·250	F2A/F3E	Ilford, Essex	[1]
1900	GM3YAN	3·560	A1A	St. Andrews, Fife	
1915	GM4RSJ	145·250	A2A/F3E	Prestwick, Strathclyde	[1]
1930	G4VBL	144·625	F2A/F3E	Fulham, SW London	[1]
1930	G4LLU / G4JSQ	144·160	A1A/J3E	Wolverhampton, W Mids	[1]
1930	G4NRO / G4IAV / G4GBK	145·275	F2A/F3E	Atherton, G Manchester	[1]
1930	G4SXU	145·250	F2A/F3E	Harrogate, N Yorks	[1]
2000	G2FXA	145·525	F2A/F3E	Stockton-on-Tees	[1]
2000	G3GMS	145·250	F2A/F3E	Whitley Bay, T & W	[1]
2000	G4INM	145·250	F2A/F3E	Chelmsford, Essex	[1]
2000	GI4VSC	145·250	F2A/F3E	Belfast	
2000	G4OO	145·250	F2A/F3E	Spalding, Lincs	[1]
2030	G3ASR	1.875 / 144·175	A1A/J3E / A1A/J3E (lsb)	Harrow, Middx	[1] [8]
2030	G4ICC	3·535	A1A/G3E	New Duston, Northants	
2100	G4OTV / G4RPQ / G4RWT	145·250	F2A/F3E	Tunbridge Wells, Kent / Goudhurst, Kent / Paddock Wood, Kent	[1]
2100	G3AVJ	145·250	F2A/F3E	Huyton, Merseyside	[1]
2100	G3WOR	144·250	A1A/J3E	Lancing, Sussex	[4]
2115	GW2FOF	145·250	F2A/F3E	Porth, Mid Glam	[1]
Tuesdays					
0930	G4NHG	145·250	F2A/F3E	Stoke-on-Trent, Staffs.	
1100	G4IAV	145·275	F2A/F3E	Atherton, G Manchester	[1]
1200	G3GNS	1·910 / 3·550 / 144·250	A1A	Locking, Avon	[5]
1830	G4ILD / G3ZQS	145·250	F2A/F3E	Rishton, Lancs / Darwen, Lancs	[1]
1830	GW4OXB	145·275	F2A/F3E	Swansea, West Glam	[1]
1900	G3WQK	144·775	F2A	Eastbourne, E Sussex.	[1]
1900	G4RS	3·565 / 145·250	A1A/J3E / F2A/F3E	Catterick, N Yorks	[1]
1915	GM4RSJ	145·250	A2A/F3E	Prestwick, Strathclyde	[1]
1930	G4BFJ	144·625	F2A/F3E	Banstead, Surrey	[1]
1930	G4DAL	145·250	F2A/F3E	Lancaster, Lancs	[1]
1930	G4TDO	144·160	A1A/J3E	Wolverhampton, W Mids	[1]
1930	G4NRO / G4IAV / G4GBK	145·275	F2A/F3E	Atherton, G Manchester	[1]
2000	G4INM	145·250	F2A/F3E	Chelmsford, Essex	[1]
2030	G4PDP	144·250	A1A/J3E	Biggleswade, Beds	[1]
2100	G4EWK	144·850	F2A	Burton-on-Trent, Staffs	[7]
2100	G3AVJ	145·250	F2A/F3E	Huyton, Merseyside	[1]
21.15	GW2FOF	145·250	F2A/F3E	Porth, Mid Glam	[1]
2200	G4RXR / G3AWL	144·250	A1A/J3E	Easington, Co Durham	[1]
2200	G4OJD	145·250	F2A/F3E	Brixham, Devon	[1]
2230	GI4NRE	145·250	F2A/F3E	Enniskillen, N Ireland	
Wednesdays					
0930	G4NHG	145·250	F2A/F3E	Stoke-on-Trent, Staffs.	
1100	G4IAV	145·275	F2A/F3E	Atherton, G Manchester	[1]
1400	G4OOC	145·250	F2A/F3E	Leeds, W Yorks	[1]
1830	G3GNS	1·910 / 3·550 / 144·250	A1A	Locking, Avon	[5]
1830	G4TYF	145·250	F2A/F3E	Bishop Auckland, Co Durham	[1]
1830	GW4OXB	145·275	F2A/F3E	Swansea, West Glam	[1]
1900	G4ILD / G3ZQS	145·250	F2A/F3E	Rishton, Lancs / Darwen, Lancs	[1]
1900	G2ABC	145·250	F2A/F3E	Truro, Cornwall	[1]
1900	G3ULY / G4EXD	3·583 / 145·475	A1A / F2A	Culgaith, Cumbria	[1]
1900	G3KWT	145·250	F2A/F3E	Leeds, W Yorks	
1900	G4UOL	145·250	F2A/F3E	Ilford, Essex	[1] [10]
1900	G4DNB	28·450	A1A/A2A/J3E	Brighouse, W Yorks.	[1]
1900	GM3YAN	3.560	A1A	St Andrews, Fife	
1915	GM4RSJ	145·250	A2A/F3E	Prestwick, Strathclyde	[1]
1930	G4NRO / G4IAV / G4GBK	145·275	F2A/F3E	Atherton, G Manchester	[1]
1930	G4SQV	145·250	F2A/F3E	Little Eaton, Derby	[7]
1930	G4VIT	144·250	A1A/J3E	Darlaston, W Midlands	[1]
1930	G4SXU	145·250	F2A/F3E	Harrogate, N Yorks	[1]
1930	G4WVX	144·625	F2A/F3A	Burnham, Bucks.	[1]
2000	GI4VSC	145·250	F2A/F3E	Belfast, N Ireland	
2000	G4INM	145·250	F2A/F3E	Chelmsford, Essex	[1]
2000	G4JTVZ / GJ4TXB	145·250 / 144·250	F1B/F2B / A1A	St Helier, Jersey, CI / St Peter, Jersey, CI	[1]
2000	G2FXA	144·250	A1A/J3E	Stockton-on-Tees	[1]
2000	GW4KDP	145·550	F2A/F3E	Barmouth, Gwynedd	[1]
2000	G3SWP	144.250	A1A/J3E	Doncaster, S Yorks	[1]
2000	G4OO	145·250	F2A/F3E	Spalding, Lincs	[1]
2115	GW2FOF	145·250	F2A/F3E	Porth, Mid Glam	[1]
2130	GM4HYF	28·350 / 145·250	A1A / F2A	SE Glasgow	[1]
2200	G4KZZ	145·250	F2A/F3E	Coventry, W Midlands	[1]
Thursdays					
0930	G4NHG	145·250	F2A/F3E	Stoke-on-Trent, Staffs	
1400	G4OOC	145·250	F2A/F3E	Leeds, W Yorks	[1]
1830	G4ILD / G3ZQS	145·250	F2A/F3E	Rishton, Lancs / Darwen, Lancs	[1]
1830	G3GNS	1·910 / 3·550 / 144·250	A1A	Locking, Avon	[5]
1830	GW4OXB	145·275	F2A/F3E	Swansea, West Glam	[1]
1900	G4FEX	145·250	F2A/F3E	Horsley Woodhouse, Dbys	[1]
1900	G3BLS	145·250	F2A	Osney, Oxford	[1]
1900	G4RS	3·565 / 145·250	A1A/J3E / F2A/F3E	Catterick, N Yorks	[1]
1915	GM4RSJ	145·250	A2A/F3E	Prestwick, Strathclyde	[1]
1930	G3ASR	1·875 / 144·175	A1A/J3E / A1A/J3E (lsb)	Harrow, Middx	[1] [8] [11]
1930	G4NRO / G4IAV / G4GBK	145·275	F2A/F3E	Atherton, G Manchester	[1]
1930	G4YFO	144·625	F2A/F3E	London, N.19	[1]
2000	G2ACZ	1·819	A1A	Mablethorpe, Lincs	
2000	G4INM	145·250	F2A/F3E	Chelmsford, Essex	[1]
2000	G3GMS	145·250	F2A/F3E	Whitley Bay, T&W	[1]
2000	G4PYR	144·250	A1A/J3E	Solihull, W Midlands	[2]
2000	G4NHG	145·250	F2A/F3E	Stoke-on-Trent, Staffs	
2100	G3WOR	144·250	A1A/J3E	Lancing, Sussex	[4]
2100	G4EWK	144·850	F2A	Burton-on-Trent, Staffs	[7]
2100	G3AVJ	145·250	F2A/F3E	Huyton, Merseyside	[1]
2200	GM4HYF	28·350 / 145·250	A1A / F2A	SE Glasgow	[1]
2200	G4OJD	145·250	F2A/F3E	Brixham, Devon	[1]
Fridays					
1830	G4ILD / G3ZQS	145·250	F2A/F3E	Rishton, Lancs / Darwen, Lancs	[1] [1]
1830	G3GNS	1·910 / 3·550 / 144·250	A1A	Locking, Avon	[5]
1830	G4TYF	145·250	F2A/F3E	Bishop Auckland, Co Durham	[1]
1830	GW4OXB	145·275	F2A/F3E	Swansea, West Glam	[1]
1900	G4PJZ	145·250	F2A/F3E	Mapperley, Notts	[1]
1900	G4OBK	3·565	A1A/J3E	Chorley, Lancs	[1]
1930	G4WVX	144·625	F2A/F3E	Burnham, Bucks	
1930	G3HVI	145·250	F2A/F3E	Stoke-on-Trent, Staffs.	[1]
1930	G4NRO / G4IAV / G4GBK	145·275	F2A/F3E	Atherton, G Manchester	[1]
2000	G3RR	145·550	F2A/F3E	Barnoldswick, Lancs	[1]
2000	G4INM	145·250	F2A/F3E	Chelmsford, Essex	[1]
2030	G3CAR	144·625	F2A/F3E	High Wycombe, Bucks	[1]
2115	GW2FOF	145·250	F2A/F3E	Porth, Mid Glam	[1]
2100	G3AVJ	145·250	F2A/F3E	Huyton, Merseyside	[1]
2200	G4RXR / G3AWL	144·250	A1A/J3E	Easington, Co Durham	[1]
Saturdays					
1200	G3GNS	1·910 / 3·550 / 144·250	A1A	Locking, Avon	[5]
1830	GW4OXB	145·275	F2A/F3E	Swansea, West Glam	[1]
1930	G4XQI	145·275	F2A/F3E	Stockport, G Manchester	[1]
1930	G4TDO	144·160	A1A/J3E	Wolverhampton, W Mids	[1]
1930	G4VBL	144·625	F2A/F3E	Fulham, S.W. London	[1]
2000	G4TKM	145·250	F2A/F3E	Birmingham	[1]
2115	GW2FOF	145·250	F2A/F3E	Porth, Mid Glam.	[1]

Notes

All times are clock time

[1] Omnidirectional
[2] Vertical to NW
[3] Vertical to S
[4] Horizontal to E and W
[5] Reports to RAFARS Locking
[6] Tilted polarization to N and S
[7] To SW
[8] Horizontal
[9] To NE
[10] Starting speed 12wpm
[11] First and third Thursdays in each month

MODERN VHF/UHF FRONT-END DESIGN

Ian White, G3SEK*

PART 2. STRONG-SIGNAL PERFORMANCE

PART 1 of this article dealt with the performance of vhf/uhf receivers with the weak signals that we very much want to hear. This part deals with their performance with the strong signals that get in our way! Strong unwanted signals on the same frequency as a weak wanted signal are a fact of life, and the solutions are well known: good i.f. selectivity, a good sharp beam, and a good pair of ears with something in between them. This part of the article deals with a different type of problem, caused by strong signals which are *not* co-channel, yet still somehow manage to interfere with the wanted signal.

The general problem is often called front-end overload, though this blanket term covers several quite different effects. The three most important front-end overload effects are intermodulation, gain compression, and reciprocal mixing. There are many other overload effects, but these are of lesser practical importance in ssb/cw receivers. Designing and testing for good performance in these three main areas should take care of the other overload problems too.

Intermodulation

Intermodulation occurs when two or more signals mix together to produce extra signals that were not there before. Mixing between the local oscillator (lo) and the signal frequencies to produce the i.f. is the only kind of intermodulation that *ought* to occur in a receiver front-end. The other kinds of intermodulation that ought *not* to occur will produce spurious signals, and these may interfere with a weak wanted signal. It is important to realize that these spurious signals did not exist until they were generated *in the receiver*—but they cause just as much QRM as signals that arrive legitimately via the antenna!

The front-end has to cope with far more incoming signals than you ever hear. In a typical amateur radio vhf/uhf receiver the front-end is receiving all the signals present within a bandwidth of several megahertz, while you are hearing only those that get through the selective i.f. filter. At low signal levels all front-ends behave in a linear manner. This means that each incoming signal is processed separately, with no interactions between signals. But if incoming signals are very strong they can easily drive a poor front-end beyond its linear range. Then the signals begin to intermodulate; they mix together to produce new signals. So intermodulation is caused by non-linearity in the front-end.

If two signals on frequencies f1 and f2 mix, the first of the new frequencies to appear are (f1 + f2), (f1 − f2) and the second harmonics of each signal, 2 f1 (ie, f1 + f1) and 2 f2. These new frequencies are known as second-order intermodulation products (ips) because they were created by mixing *two* original "parent" frequencies. If the parent frequencies are close together, their second-order ips will be far removed in frequency, and can easily be filtered out [1].

If the two strong signals at frequencies f1 and f2 are increased in strength, another set of ips appears. These are the third-order products, so called because they involve mixing between three signals. These three signals could be totally independent, or the same effect can be generated by our two signals f1 and f2 on their own. Since these two frequencies can either add or subtract, the full range of possible third order ips includes:

the third harmonics (f1 + f1 + f1) and (f2 + f2 + f2);
the sum products (f1 + f1 + f2) and (f1 + f2 + f2); and
the difference products (f1 + f1 − f2) and (f2 + f2 − f1).

If both of the parent frequencies f1 and f2 are close to the wanted frequency, then the third-order sum products are all somewhere up in the third harmonic region and will not trouble us. But the two difference products containing a minus sign are somewhere close to their parent frequencies. For example, if f1 = 144·240MHz and f2 = 144·260MHz, their third-order ips fall on 144·220MHz (f1 + f1 − f2) and 144·280MHz (f2 + f2 − f1). Fig 7 shows how the two parent signals and their ips would appear on a spectrum analyser display. If the receiver front-end is allowed to generate these spurious signals, no practical kind of rf filtering can take them out, because they are too close to the frequencies you want to listen to. If one of these ips happens to fall on the frequency of a weak wanted signal, it will cause QRM. And if that *can* happen, then sure enough it *will*!

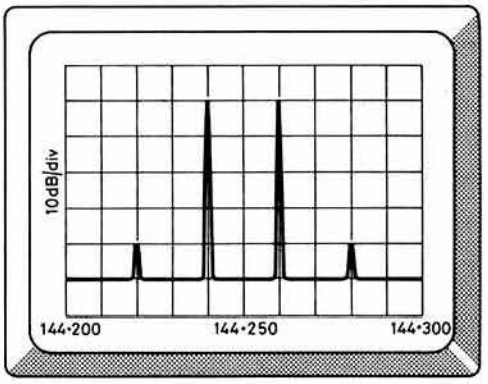

Fig 7. Spectrum analyser display of two equal carriers on 144·24 and 144·26MHz, with third-order ips at 144·22 and 144·28MHz

In the example above, the two strong signals were spaced 20kHz apart, and their third-order ips were evenly spaced 20kHz above and below them (Fig 7). As the strength of the two equal parent signals increases, the strengths of their third-order ips (also equal) come up three times as fast, increasing 3dB for every 1dB increase in the two parent signals. So the onset of intermodulation can seem quite sudden. Further increases in the strengths of the parent signals will produce new generations of higher-order ips. Thrashing through the algebra [2] shows that the odd-order (3rd, 5th, 7th etc) ips are the troublesome ones, because they can fall close to the parent signals. All these ips lie above and below their parents, at uniform frequency spacings (Fig 8). Fifth-order ips require stronger parent signals than third-order before they rise above the noise, but then they increase in strength five times as fast as the parent signals; and pro-rata for seventh- and higher-order products [2], which can thus appear very suddenly indeed if provoked by strong-enough parent signals.

Intermodulation requires at least two strong parent signals. If either one goes away, all their ip offspring will disappear. But relief will probably be short-lived, because the remaining strong signal can intermodulate with any other strong signal that comes along, to make a new set of third-order ips. And if the first signal comes back, making three in all, there will now be *four* (work it out) different sets of ips!

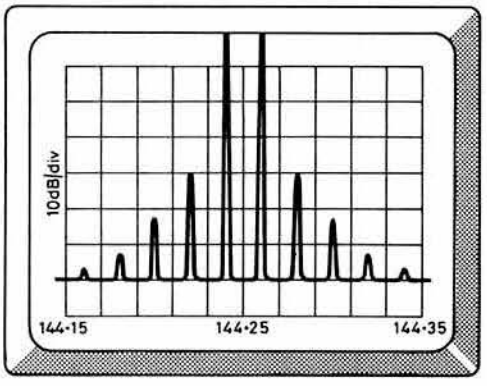

Fig 8. The same two carriers as in Fig 7, but increased in amplitude (off screen) to create severe intermodulation. Sweep expanded to show ips up to ninth order

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So far we have been talking about single frequencies; ie, unmodulated carriers. There's worse to come. An ssb signal contains several different frequencies at once, and when these intermodulate in your receiver the effect is to slightly broaden the apparent bandwidth of the signal [3]. If two perfectly clean ssb signals intermodulate, then as well as each one seeming broader, their third-order ips together wipe out a further slice of spectrum, typically 20kHz. Remember, this is not the fault of the transmitters: the ips are generated in the receiver. With the low end of the band full of strong ssb and cw signals during a contest or an opening, intermodulation in the average commercial vhf/uhf receiver front-end can be ghastly. Listening on the band is like wading waist-deep through a shifting swamp of ips!

At this point I'd better inject a note of calm. *DON'T PANIC*, as the good book says [4]. It *is* possible to build vhf/uhf front-ends that have virtually no noticeable intermodulation, even at "open contest" signal levels. Compared with an ordinary receiver, the effect is startling: there are still plenty of strong signals around, but there are also spaces between them where the weak dx comes through in the clear.

Gain compression

Gain compression occurs when a strong incoming signal drives some stage in the front-end so hard that it can barely produce any more output. The gain of the "saturated" stage is thus reduced, taking with it all other signals, including the wanted one. In an extreme case, gain compression simply makes the receiver collapse in embarrassed silence whenever a strong signal comes on! Gain compression is easier to recognize if produced by a strong carrier than by ssb. When the carrier comes on, the background noise goes *down*, together with all other signals. If the carrier is keyed, the background noise appears as "negative" morse code, the dits and dahs being the silences in between. Note that gain compression requires only one strong signal, unlike intermodulation which requires at least two.

Reciprocal mixing

Reciprocal mixing is a large-signal effect caused by imperfections of the receiver's lo. Although reciprocal mixing has nothing to do with non-linearity of stages in the signal path, which causes gain compression and intermodulation, it is still a front-end problem. To understand how reciprocal mixing occurs, we need to take a short digression into the workings of oscillators and frequency synthesizers.

Starting with simple(?) oscillators, these in principle should produce only one frequency, corresponding to the resonance of the tuned circuit. Energy at this frequency goes round and round the oscillator's feedback loop, with the active device (usually a transistor) providing just enough gain to make up for circuit losses round the loop.

Unfortunately, oscillators never produce only one frequency: besides the main carrier and its harmonics, they produce energy at *all* other frequencies as well! Far away from the carrier frequency, there is a level background of noise due to the oscillator device and other resistive circuit losses. Other sources of wideband noise can include noise on the dc power supplies, and switching transients coupled in from nearby digital circuitry (especially of course in a synthesizer lo). All these sources of noise modulate the main carrier, and thus produce noise sidebands on either side of the carrier frequency. The closer to the carrier frequency, the higher the level of the noise sidebands, while at frequencies further away the noise sidebands sink below the level of broadband noise. Seen on a spectrum analyser, the result is a so-called "noise pedestal" standing out above the broadband noise and centred around the carrier (Fig 9).

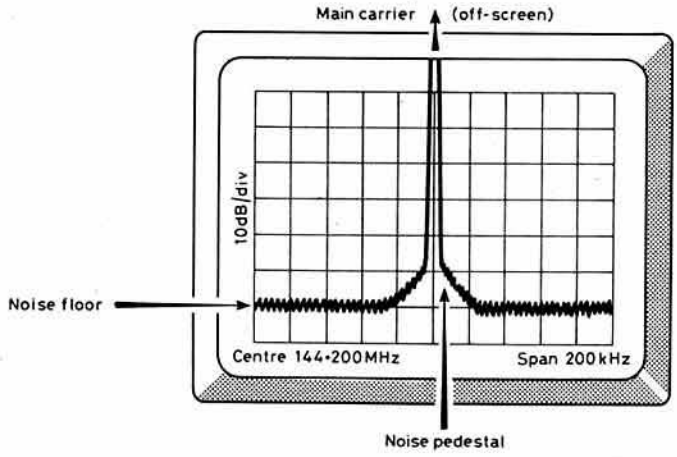


Fig 9. Narrowband noise spectrum of a carrier

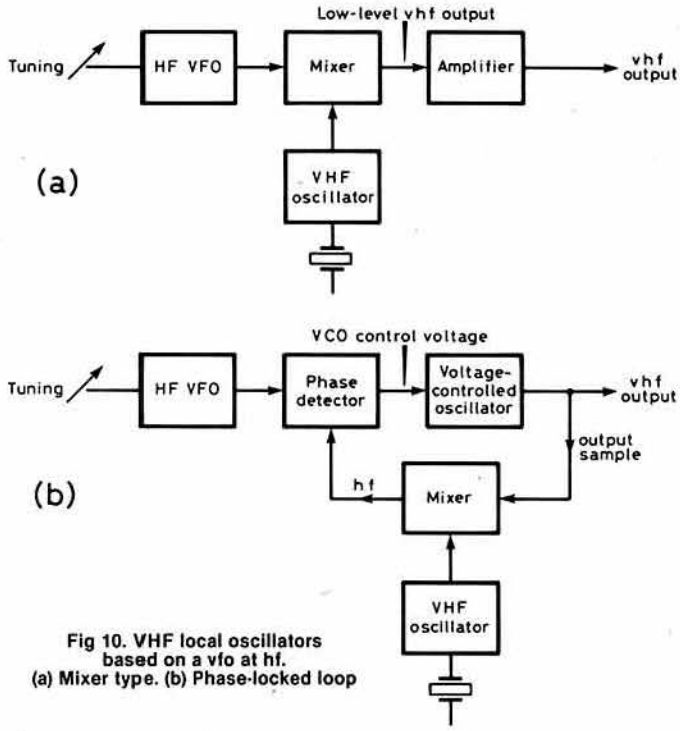


Fig 10. VHF local oscillators based on a vfo at hf. (a) Mixer type. (b) Phase-locked loop

Detailed analysis of the factors governing the levels of noise in oscillators is beyond the scope of this article. Suffice it to say that noise sidebands are better suppressed (relative to the carrier level) if the carrier level itself is high, and if the loaded Q of the frequency-determining tuned circuit is high. Oscillator design is far from simple, but it is quite easy to build a noisy oscillator by accident!

Because of the difficulties of obtaining adequate frequency stability in a vfo at vhf or uhf, transceiver los are usually either mixers or phase-locked loops (plls). Mixer vfos typically add the frequencies of an hf vfo and a vhf/uhf crystal oscillator (Fig 10(a)), and amplify the resulting output to a suitable level. Examples of transceivers using this technique are the old TS700 and the IC201. However, mixer vfos offer their own special opportunities for oscillator noise. The mixer cannot be run at too high a level without producing spurious products, and the carrier level at the output of the mixer can sink perilously close to the circuit noise. Any subsequent amplification of the low-level carrier also brings up the accompanying noise.

Other transceivers of similar vintage, such as the FT221 and FT225, use similar frequencies for the hf vfo and the vhf crystal oscillator, but add them by using a pll which is essentially a feedback control system. In Fig 10(b) the output signal is generated by a voltage-controlled oscillator whose frequency is also heterodyned down to hf using a vhf crystal-controlled oscillator. The phase of this hf signal is compared with that of the vfo, and any error voltage is fed back to control the vco. Tuning the hf vfo thus makes the vhf vco follow in step, at a constant frequency difference set by the crystal oscillator. That sounds fine: it produces the same output frequency as if the vfo and the crystal oscillator had been mixed directly, and the pll avoids the problems of spurious mixing products and noise in low-level circuitry. Or does it?

Phase-locked loop systems certainly *can* give very low noise sidebands if designed and constructed with care. But a bad pll can be very noisy indeed. In addition to all the noise problems that can beset ordinary oscillators, noise can easily be coupled onto the vco control line, leading to fm noise sidebands. Also, some designers have skimped on the normal precautions for generating a good-quality vco signal, relying instead on the phase-lock feedback loop to clean-up the vco signal for them. The result has been an lo with poor to bad levels of noise sidebands; a pity, because a little more care in design and layout could have produced a very "quiet" lo.

More recent vhf and uhf los are usually of the digitally-synthesized pll variety. These too *can* have good noise performance, but digital synthesis offers yet further opportunities to get things wrong! Parts of these synthesizers contain digital circuitry generating high-speed, high-level switching transients which can stray on to the vco control line unless careful precautions are taken. The frequencies fed to the phase detector in digital loops are quite low, and any leakthrough to the vco supply or control lines can cause modulation sidebands; in different systems these sidebands may

sound like carriers or like noise. It is very difficult to get rid of unwanted low-frequency modulation on the vco control signal, because filtering affects the ability of the loop to lock-up quickly and stay locked. The design of pll synthesizers thus requires some very careful trade-offs between various aspects of performance [5].

So much for our digression into oscillator noise. Now, what about reciprocal mixing?

Normally the mixer accepts a strong signal from the lo plus a weak wanted signal, and frequency-shifts the latter into the passband of the selective i.f. filter. But the mixer will do the same for any other pair of signals separated by the i.f. Reciprocal mixing gets its name because the roles of lo and signal are reversed: the strong signal is an unwanted one off-frequency, and the weak signal is part of the lo noise sidebands. For example, if you are listening to 144·250MHz with an i.f. filter centred on 10·700MHz, your lo is tuned to 133·550MHz (Fig 11(a)). The intention is that any signal appearing on 144·250MHz is mixed with the lo and delivered into the i.f. passband. Now if a strong signal appears on 144·26MHz, 10kHz away, it can mix with the lo noise sidebands around 133·56MHz, delivering that noise onto the 10·7MHz i.f. and raising the background noise level (Fig 11(b)). Note that the offset between the wanted frequency and the strong unwanted signal, 10kHz in our example, is the same as the offset between the lo carrier frequency and the interfering part of its noise sidebands. This means that the severity of reciprocal mixing will have the same frequency dependence as the lo noise spectrum. Reciprocal mixing between close-in strong signals and close-in lo noise is usually masked by leakage of the unwanted signal through the i.f. filter [6]. The main problems usually occur at the frequency offsets corresponding to the lo noise pedestal, though a particularly noisy lo may cause reciprocal mixing problems at frequencies all across its broadband noise floor.

On the air the effect of reciprocal mixing is opposite to that of gain compression. When a strong carrier appears, the background noise goes *up*. In a transceiver, the lo is used for both receive and transmit functions, so if the receiver suffers from reciprocal mixing, the transmitter will also radiate noise sidebands. It can be very hard to distinguish reciprocal mixing in your own receiver from the corresponding problem in someone else's transmitter. The only way to be sure is to test your own receiver independently, using a low-noise signal source.

Until fairly recently, reciprocal mixing was virtually unknown (or at least unrecognized) in vhf/uhf receivers for the amateur radio bands. This was partly because front-ends were even more vulnerable to intermodulation and gain compression than they are today, and also because los were generally quieter than their modern synthesized counterparts. Now that front-ends are getting better (slowly!), reciprocal mixing is becoming the limiting factor in strong-signal performance, and lo noise is coming under increasing scrutiny [5, 6, 7].

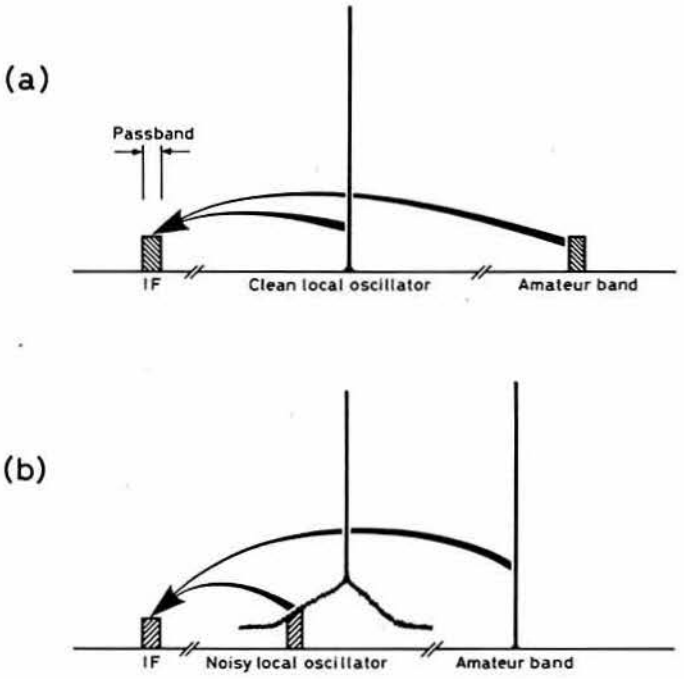


Fig 11. (a) Normal mixing. Local oscillator converts amateur-band signal into i.f. passband. (b) Reciprocal mixing. Strong amateur-band carrier converts local oscillator noise into i.f. passband

Dynamic ranges

We have seen that there are three main problems of front-end overload : intermodulation, gain compression and reciprocal mixing. They are all different, so each starts to be noticeable at a different level of strong unwanted signal. Two strong signals are needed to cause intermodulation, but only one to cause gain compression or reciprocal mixing. Intermodulation and gain compression are both due to some stage in the front-end being driven beyond its linear range, so keeping the gain in the front-end as low as possible helps cure both problems together.

However robust a front-end may be, it can still be overloaded by a strong-enough signal. Our objective is not to "cure" overload, but to make sure that overload hardly ever happens, even at the strongest amateur-band signal levels. For all practical purposes intermodulation is non-existent if the ips never rise significantly above the background level of system noise. Similarly, the receiver can be considered immune to gain compression or reciprocal mixing if these effects never significantly change the system noise level.

This principle, that what you don't hear doesn't trouble you, leads directly to the idea of spurious-free dynamic range (sfdr). The bottom end of the dynamic range is the power level of the weakest audible signal. The top end is the power level of the strongest off-frequency signal that the receiver can tolerate without the particular overload effect becoming noticeable. And the sfdr is the difference in decibels between these two power levels. Since each overload effect appears at a different level of strong signal, the receiver possesses a different sfdr for each.

The idea of spurious-free dynamic range relates directly to the things you hear when using a receiver. However, it needs a certain amount of further definition to turn it into something measurable. The power level of the "weakest audible signal" is arbitrarily defined as equalling the receiver's effective thermal noise power, $kT_{RX}B$ (recall Part 1). Other names for this power level are minimum discernible signal (mds) or noise floor. Formal definitions for the points at which the various overload effects become significant have been proposed by Wes Hayward, W7ZOI, and these lead directly to methods of measuring the various types of sfdr [6, 8]. The W7ZOI dynamic range tests are based firmly on reality—what you measure is also what you hear on the air—so it is not surprising that they have become the standard for hf equipment reviews in *QST* and *Rad Com*. However, the test methods described by Hayward were developed for hf receivers, and need some further development for use at vhf and uhf; but that's another story.

Notes and references

[1] If signals on a very wide range of frequencies are allowed to enter the front-end, and they then intermodulate, their second-order ips can fall close to the wanted frequency. This can occur if there are two extremely strong fm or tv broadcast transmissions on frequencies about 144MHz apart. Second-order ips from these two wideband signals can cover the 144–146MHz amateur band. Fortunately the cure is simple: the unwanted parent signals are so far in frequency from 144MHz that they can easily be kept out of the receiver by filters.

[2] Chapter 6 of the excellent *Introduction to Radio Frequency Design*, W A Hayward (Prentice-Hall Inc, Englewood Cliffs, New Jersey, 1982, ISBN 0-13-494021-0) gives a clear account of the algebra of intermodulation.

[3] Intermodulation occurs in transmitters as well as receivers, and the two can be very difficult to distinguish. Intermodulation in ssb transmitters is responsible for the reintroduction of signals on the opposite sideband (which had earlier been filtered out), and hence for broadening of the signal. The same broadening is heard if the intermodulation occurs in the receiver. Being of fairly low order, these ips are quite close to the main signal and their level usually drops quite rapidly as you tune away; they sound like unintelligible "mush". Spiky-sounding, impulsive "splatter" or "buckshot", often spreading over several tens of kilohertz, is due to very-high-order intermodulation which is much more likely to be generated in overdriven transmitters than in overloaded receivers—but that's also another story!

[4] *The Hitch-Hiker's Guide to the Galaxy* (Megadodo Publications, Ursa Minor and Surbiton, various dates).

[5] *Introduction to Radio Frequency Design* (see note 2), chapter 7. *Frequency Synthesis by Phase Lock*, W F Egan (John Wiley & Sons, New York, 1981).

[6] *Solid State Design for the Radio Amateur*, Wes Hayward, W7ZOI, and Doug DeMaw, W1FB, chapter 6. (ARRL).

[7] See [5] and [6] and also;
"Dynamic Range, Intermodulation and Phase Noise", Peter Chadwick, G3RZP. *Rad Com* March 1984, p221.
"Modern Receivers and Transceivers: What Ails Them?", Wes Hayward, W7ZOI, and Doug DeMaw, W1FB. *QST* January 1983, p11.

These references, together with equipment reviews in various magazines and frequent items in *Technical Topics*, show the increasing attention being paid to lo noise in receivers and transceivers. However, most commercial transceivers fail to meet our expectations. As Pat Hawker and others have pointed out, the introduction of synthesizers was mostly to avoid the labour costs of building and calibrating traditional LC vfos. For dx working on the hf, vhf or uhf amateur bands, the scanning and memory facilities of synthesizers are a poor recompense for the attendant lo noise, which in many transceivers impairs the most basic functions of receiving and transmitting.

[8] "Defining and Measuring receiver Dynamic Range", Wes Hayward, W7ZOI. *QST* July 1975, p15. Although the same information is incorporated in Hayward's *Introduction to Radio Frequency Design* and in *Solid State Design for the Radio Amateur*, the original article is more detailed and well worth reading.

TO BE CONTINUED

4-2-70

*by Ken Willis, G8VR**

THE 1985 NATIONAL VHF CONVENTION, held at Sandown Park Racecourse on 23 March, proved to be bigger and better than ever. More people passed through the turnstiles than at any previous such event, while the number of traders exhibiting was considerably up compared with earlier years. The interest in a convention such as this stems mainly from the fact that current licence conditions make it necessary for Class B operators to confine their activities to the vhf/uhf bands, whereas years ago vhf was a specialist activity, forcing those few wishing to use these frequencies to build their own equipment since nothing much was available from commercial sources. The Japanese "black-box" changed all that, virtually overnight, so today's vhf operators are not all cast in the same mould, but instead display an interest in many facets of vhf/uhf communication, not simply the quest for better front-ends, bigger antennas and the like which still remain the domain of the so-called weak-signal operators. To many vhf operators today, the fact that their activities take place at vhf is perhaps co-incidental, since they could do much of what they wanted on any other frequency.

The convention will, according to custom, be fully reported in a later issue of *Radio Communication* with joint-authors covering the three lecture streams which formed the main afternoon programme. It was good to meet in person so many enthusiasts, several having travelled really long distances to attend the event. When Sandown Park was chosen as an alternative to the old "Winning Post" at Twickenham, many thought that the new venue was altogether too large, but the crush on the floor this year, which at times made it difficult to move around at all, suggests that we shall even grow out of this location eventually.

VHF/UHF Newsletter

During one of the lecture sessions at Sandown Park, the VHF Committee sat in forum to respond to questions from the floor. Some discussion arose on the relative roles of the recently-initiated *VHF/UHF Newsletter* and *4-2-70*. One speaker went so far as to suggest that the emergence of the newsletter had resulted in copy being "filched" from *4-2-70*. This is by no means the case. The newsletter is aimed at providing a quick response to vhf matters too urgent to await the normal periods required to get a journal such as *Radio Communication* from rough copy to final print stage. In addition, *4-2-70* (and its predecessors under various titles) has for many years not been regarded as a vehicle for technical information of the sort requiring circuit diagrams, component details and the like, since such matters are typically covered by *Technical Topics* or by specialist articles.

4-2-70 aims to provide news and views of a general nature on all topics related to frequencies between 50 and 500MHz. It is *your* feature and must always reflect the input received from readers over a wide range of subjects where vhf or uhf is the common denominator. It tries to strike a balance between the various interests of readers, be they repeaters, weak-signal operation, sstv, rtty, satellites etc, and if at any time the emphasis on any one topic appears too great, it simply reflects a large input from readers related to those matters at the time. For example, very little has been happening in recent months to make the dx-minded operators get very excited. On the other hand there have been some interesting developments in the repeater field, with some engineering information being received which indicates the level of sophistication which some of these "machines" now possess. Packet radio is a subject being very much talked about, while the use of the micro in our hobby becomes ever more important. 50MHz has sometimes dominated the available space because it is a very active band now (during certain hours) and likely to be one which we will all be able to use at sometime in the future. So all these things I regard as meat for *4-2-70*, though I may not myself have a personal interest in all of the topics reported to me.

Returning now to the newsletter, this will, from time to time, include circuits and technical information of a detailed nature. It will also include material of an operational nature, mainly of interest to weak-signal operators (including eme and ms), and stop-press type information which can be distributed more quickly through the newsletter because of its simpler format and method of preparation. The editor of the newsletter does not have access to information sent to *4-2-70*, nor do I see his copy prior to publication. Indeed, Dave Butler and I go to extreme lengths to avoid seeing one another's copy, since this might inhibit either or both of us from including a specific item in order to avoid duplication. Duplication will sometimes occur, since there are sources of information used by technical writers in a given field which are distributed "at large". You will often notice duplication between the various magazines and journals in our subject field for this reason, but to omit something of interest simply because it might appear elsewhere would not be a sensible way of keeping readers informed.

4-2-70 is *your* feature, as is the *VHF/UHF Newsletter* for those who subscribe to it. It is in your own interest to tell us what you want or expect from these publications, and to back up your demands by contributing, whenever possible, items of interest which you think deserve a more general dissemination.

Activity in some rare Spanish squares

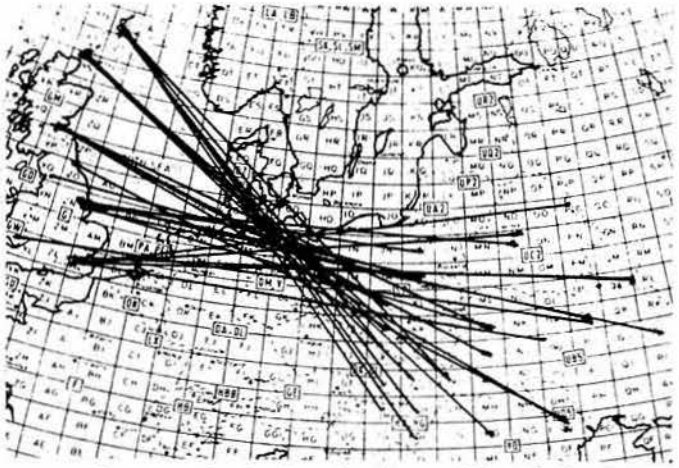
The *SM6EOC/SM6AFH 2 Metre News-sheet* gives details of stations active in some rare Spanish squares. Olle and Thomas seem to prefer the old notation, so it is presented here just as they stated it. From XY square, EA7APD and EA7BVD are both active on tropo and also monitoring for sporadic-E openings. From ZA, EB4IM is similarly active, while in YY, EA7CGH and ED7GEL will be stations who will be on the look-out for dx contacts. For those who prefer meteor scatter, EA4CVS in XZ is equipped for ssb-ms as well as tropo and Es monitoring. Skeds can be arranged by telephoning Adolfo on 927-532331, or write to him QTHR (in International callbook). Having recently paid a visit to some amateurs in EA5, I can testify to the tremendous problems which face the vhf operator in those parts due to high mountains which are a feature of the area. "Fives" are rare on vhf, but from ZX square, EA5BYS and EA5BSH are both active on tropo and looking this year for Es contacts. Meteor scatter can be useful in getting over some of those high peaks, and therefore the presence of EA5EMM and EB5EHX in ZZ square, both active on cw ms (maximum 1,000lpm) is good news for the squares hunters. Skeds may be made on the 14MHz vhf net.

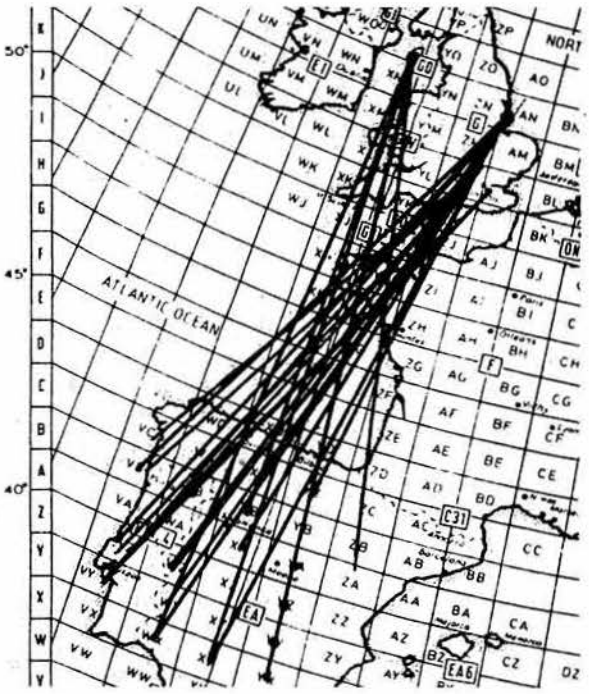
Olle also says that, at the present time, beacon EA1VHF is off the air while some problems of harmonic radiation from it are cleaned up.

Repeater news

It is understood that the problems associated with the widespread coverage of the new IoM repeater GB3GD (R1) have been largely overcome. From its vantage point on top of Snaefell, some 2,036ft asl, the signal put out was enormous and heard over considerable distances, causing some co-channel interference.

*11 Old Downs, Hartley, Kent DA3 7AA





Two maps showing the paths of some of the typical contacts made during the sporadic-E event of 30 June 1984. Courtesy Mel Collins, G4XKZ.

The Carlisle repeater GB3AS changed from R1 to R0 to permit GB3GD to use the R1 channel, and while this change was in progress the opportunity was taken to refurbish the hardware. Rumour has it that the cavities were cleaned with tea-leaves, resulting in an increase in signal as received at Stewarton from S1 to S5/6!

The Leicestershire Repeater Group has just published its very professional news-sheet *LENS*, which is more like a magazine than its name suggests. Like so many other groups, the editor makes a plea for subscriptions via new members; many operators regularly use the installation without in any way contributing to its upkeep, a problem not unknown among the repeater fraternity. Just to indicate how complex (and expensive!) some of the repeater systems are these days, the Leicester repeater GB3CF uses an FT726R and a Phelps Dodge six-chamber cavity system imported ready-tuned from the USA in a box "the size of a coffin". We will show a picture of this installation at a later date. The group has future plans which include a link between GB3LE and GB3XX, a 50MHz beacon, a phone-patch on GB3LE, and a dedicated single-channel in-line phone-patch repeater—and all this on top of proposals already submitted for a 28MHz phone repeater, a 1·3GHz phone repeater, a 10GHz video beacon and a GB3LEX-GB3LE link; a most ambitious programme by any standards, and a costly one.

Sporadic-E

By the time this copy reaches the reader, we shall be on the threshold of another sporadic-E "season" on the 144MHz band, while this year we have many operators equipped for 50MHz who may hear all sorts of interesting things just outside the band emanating from countries still using that part of the spectrum for broadcasting of one sort or another. While we prize Es as a means of working super dx on 144MHz, what causes it is still very much a matter of conjecture. What we can say is that patches of intense ionisation occur at random heights typical of the normal E-layer, and from time to time the ion density is high enough to reflect 144MHz signals back towards the earth, "bending" them around the earth's curvature to reach distant points. The geometry clearly shows this, and also why stations at remote ends of a link can hear one another, often at very high signal levels, while others along the route hear either only one side of the contacts or nothing at all. The duration of such events can be measured in minutes or just a few hours, and often the reflecting patch moves during the event so that as it fades out in one region it appears in another. Altogether it is a fascinating phenomenon which has been the means of adding exotic calls to the log, and cards to the collection, of many vhf operators who happened to be in the right place at the right time.

One of the theories proposed to explain sporadic-E is that the ionization patch is generated as a result of thunderstorm activity. Many people have discounted this on the ground that during a typical Es event the weather has often been hot and sunny in the UK with no trace of thunderheads or lightning strikes. But, of course, the important thing is what happens in the region where the patch is forming, not at either end of the link produced by reflections from this patch.

Mel, G4XKZ (Bexleyheath), became interested in this subject during the winter months, and decided to plot lines between stations making Es contacts, using only information available from published information such as is found in *4-2-70*. Although his data base was limited, the results appear in the illustrations which plot two events, one on 8 June 1984 to eastern Europe and the USSR, and the other on 30 June between the UK and Spain and Portugal. In the illustrations, the cross-over area where one supposes the ionization to be located shows up very clearly and, even allowing for some movement of the patch during the event, the patch is obviously a large one. Mel was not content to rest there, however, for he approached the meteorological authorities and asked for specific information on the weather situation in the region of the cross-over at the time of the sporadic-E event. In both cases he was informed that a thunderstorm had been in progress! Moreover, in the event of 30 June the appearance of the Portuguese stations came at a different time from the Spanish opening. Mel was able to determine that quite separate thunderstorm activity could have accounted for both of these paths, since two such storms occurred at more or less the right place at the expected times.

Of course, one must not take these observations too literally. Thunderstorms occur in the troposphere, while the ionization which gives rise to Es is much higher up—in the E-layer region. The question would seem to be, does the thunderstorm produce the ionization higher up, or does the ionization produce thunderstorms much lower down? (For a more basic explanation of sporadic-E, see *Technical Topics* February 1985—*Ed*)

This year it would be a useful project for stations to plot their own contact "lines", noting the time of each contact to indicate whether the ionized area was drifting, and then we might, with the help of the Met Office, be able to check this interesting theory further.

50 and 70MHz

If you have tried to make the 70MHz Yagi described in the RSGB *VHF-UHF Manual* (Table 6, page 8.13) and the *Radio Communication Handbook* (Table 13.3 page 13.12), you probably found that it would not match. Larry, G4OXY, was one who found himself in this predicament, so he experimented further and soon came to the conclusion that there is a dimensional error in both of these tabulations. The reflector should be positioned 32·5in from the driven element, not 22·5in as stated. Once this dimension is corrected, a very good match can be obtained. Larry prefers a half-wave coaxial balun to feed the antenna, and now gets a very low swr and excellent antenna performance. One problem arising from this misprinted dimension is that, having got to the point of assembling an antenna to the tabulated figures, the boom will now be some 10in too short. The dimensions quoted in the table for the 145 and 432MHz arrays are correctly stated. We must thank Larry for having the persistence to adjust the reflector spacing until a good match was obtained, when it became obvious that the real spacing should be 32·5in.

After a long interval, Gordon Pheasant, G4BPY, is again listening on 50MHz, although he is not licensed to transmit on the band. Gordon was a very dedicated 50MHz observer up to a couple of years ago, and his reports were regular features of *4-2-70*. He is now listening on 28,885kHz every day between 7.30 and 8.10am, but bemoans the fact that very few 50MHz operators monitor this frequency for crossband contacts which he

is always ready to make. He has worked crossband (50/28) so far with G2SP, G3APY, G3COJ, G3ENY, G3FDW, G3NOX, G3WBN, G4FXW, G4GLT, G4NVS, G4RXD and G8VN, so things are apparently not quite so quiet as he says, but nevertheless he makes a plea for more stations to listen on 28MHz. Gordon has also heard GW3LDH, GW4HBK, GJ3YHU and a host of G stations, and gets regular signals from GM4FZH, usually as strong as 569. He plans to extend his three-element Yagi to five elements and to experiment with a three-element delta loop antenna on the band. Patient monitoring for OX3VHF on 50·045MHz has so far proved negative.

The VHF Committee has devised a 50MHz band plan for the 50MHz experiment in consultation with the 6 Metre Group. It is as follows:

50·000		
CW only	50·000–50·080	Beacons
50·100		
Narrowband modes	50·110	DX calling
	50·200	Local ssb calling
	50·400	MS cw reference frequency
	50·500	MS ssb reference frequency
	50·600	RTTY calling
	50·600 ±	RTTY working
51.000		
Narrowband modes		Pacific dx window
51·100		
All modes		
52·000		

Adherence to this plan will help both listeners (and crossband operators) as well as promoting an orderly state of affairs on the band. Unfortunately, with the sun approaching its low point in the solar cycle there is not much hope for any F2 propagation but, with so many stations now equipped for the band, anything exciting which occurs this autumn has a good chance of being noticed by someone, somewhere.

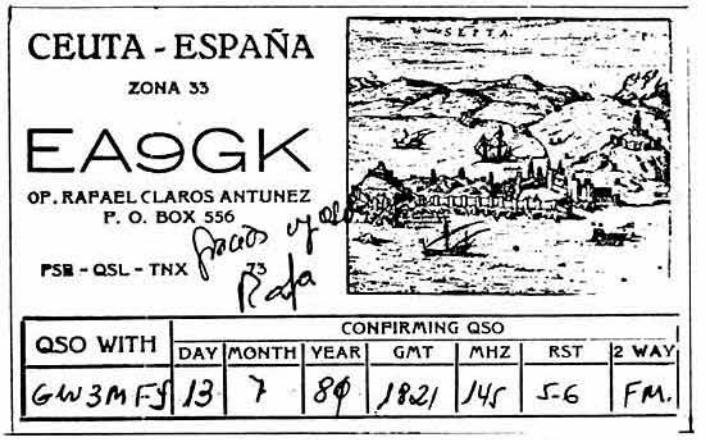
Some time back Bob Burbeck, G4NOB, wrote about the possible effects of 50MHz amateur activity on television reception in the rest of Europe. He commented that we have just switched off a network of a large number of ideally-sited transmitters with antennas five times higher than typical pmr installations (and higher still than amateur antennas); a total erp of several megawatts having been suddenly removed from the air. He asks "Would someone explain . . . how our re-use of Band 1 for pmr, amateur or any other similar use can possibly have an impact on European tv?". He goes on to say that if a 50MHz mobile rally were organized on the cliffs of Dover at about 8pm on a winter's night, a "few hundred viewers in Calais" might have problems, but these would hardly match those encountered over the past 30 years by viewers in various parts of Europe.

Bob goes on to say that we are much more likely to suffer from European broadcasting in the 50MHz region than cause problems to it, and in any case his experiences with a portable multi-standard tv set around Europe in recent years suggests that there has been a noticeable decline in the use of Band 1 for tv broadcasting. This, he thinks, may have been due to a combination of tropo and sporadic-E interference which drove viewers to other channels. If all this can be shown to be true in practice, and one suspects that it can, then this should augur well for an eventual allocation for all UK amateurs in this part of the spectrum.

As announced over the RSGB newscast on 17 March, a report from OZ9QV says that there will be a meeting of amateurs in Greenland in July with 50MHz activity planned. Jeremy, G3IMW, is stated to be in the picture since he was due to meet OZ9QV and OZ5DI in London on 24–27 March. Jeremy's phone was given in the newscast as being 01-340 0789.

That first GW-EA9 contact—the plot thickens

In *4-2-70* December 1984, GW8FKB claimed a first-ever GW contact with EA9, having worked I0SNY/EA9 in Ceuta on 7 July 1983. Later (*4-2-70* March 1985) this was disputed by GW4EAI who sent a QSL card confirming a contact with EA9HG on cw on 30 July 1981. Now comes a claim which considerably pre-dates both of these. It is from Bill Lee, GW3MFY (Mid-Glamorgan) who sent the QSL card illustrated which indicates that he worked EA9GK as long ago as 13 July 1980 on fm! Bill says that the QSO was as a result of tuning around 145MHz during a sporadic-E opening and hearing two Spanish-speaking stations in earnest conversation on fm. He says he could not resist breaking in. Few of us could, I suspect, but is it not interesting that two of the three claims were for contacts on 30 July in different years, while the third was also in the same month? As we have mentioned here before, sporadic-E has an uncanny knack of coming up at more or less the same dates every year, give or take a few days. If you want to work EA9, then, stay close to the rig in the late afternoon from the middle to the end of July. Meanwhile,


CEUTA - ESPAÑA

ZONA 33

EA9GK

OP. RAFAEL CLAROS ANTUNEZ

P. O. BOX 556

PSE - QSL - TNX 73

QSO WITH	CONFIRMING QSO						
	DAY	MONTH	YEAR	GMT	MHZ	RST	2 WAY
GW3MFY	13	7	80	1821	145	5-6	FM.

Card confirming GW3MFY-EA9GK contact on 144MHz in July 1980, the latest claimants for the first ever GW-EA9 contact

anticipating that someone will now inevitably challenge this latest claim, Bill remarks: "next, please; keep the pot boiling!".

On the subject of super dx, John McKavanagh, GI4SIP (Belfast), reported that in the summer of 1983 when he worked Y23SJ (KK) via sporadic-E, the contact was apparently monitored by a receiving station in Pavlovsk, Ukraine, square TH04d—in the old notation. This would be 3,140km distant from Belfast (1,950 miles), and John wonders whether this represents any sort of GI dx record for this mode of propagation. The QSL from the listener took two years to arrive, which is interesting. Without wishing to detract in any way from John's achievement, I will simply mention a trick played by some listeners in certain countries which shall remain nameless. They wait until a station publishes a list of dx contacts worked in the quarterly journal *Dubus*, and then they send a card purporting to have heard one or both sides of the contact, giving the details as printed in the journal. Some people will go to any lengths to get a QSL card which is a bit special!

Contests and awards

Steve Lawrence, G4EOF, of 7 Ashfield Road, Market Harborough, Leics, is the contest manager associated with the Worked All Britain Awards scheme. He says that two vhf/uhf contests have been planned for 23 June 1985. The first, for QRP stations not running more than 3W, will be held between 1000 and 1200gmt on 23 June; the second, between 1400 and 2100gmt, will have no power restriction up to the legal limit for the band used. Rules and contest logs are available from Steve on receipt by him of a sae. A trophy will be awarded to the overall winner of the single-operator section, with certificates for leaders of other sections (there are hf bands included in the contest for those who can use them).

As announced at the VHF/UHF Convention in March, the VHF Committee is sponsoring a new Monday Night Award for 432MHz operation as part of their intention to encourage a greater use of this band. The aim is to stimulate activity periods on the band by giving operators a goal to work towards. This, it is hoped, will help those new to the band to realize the potentialities of 432MHz working, and especially to show some of its advantages over the 144MHz band. To obtain the award you must produce a list of stations worked on 432MHz where the last letter of the station worked forms a complete alphabetic list, A to Z. Two such lists are required for the award, one for contacts with Class A stations, the other for Class B contacts. Stations outside the UK will count towards the Class A list. All contacts must be made on a Monday night between 6pm and midnight. Completed lists with dates and times of the contacts should be sent to the vhf awards manager, G5UM, who will issue certificates. QSL cards will not normally be required, but the VHF Committee reserves the right to demand proof of contact if necessary. Repeater and satellite contacts will not count, though direct contacts can be arranged via a repeater. Any mode can also be used and, since the certificate can be endorsed in any way to suit the applicant, you can try to make all of the contacts via ssb or sstv if you want to do it the hard way. Further details can be obtained by sending an sae to G3ZNU, G3WSN or G5UM, all QTHR. The award, which started on 1 April ends on 31 March 1986.

Some indication of what can be achieved on 432MHz is evident from a note from G5UM, who recently issued a certificate to G4MAW (Devon) for having worked and confirmed 90 squares and 15 countries on the band. G4MAW has in fact worked over 100 squares, but awaits cards to up-grade his claim.

G4BWP (Henlow) wishes to draw attention to the CQ World-Wide VHF

WPX Contest which is to be held between 0000 gmt 20 July and 0000gmt 22 July 1985. All bands 50MHz to 1·3GHz will be authorized for contest contacts, and all modes are permissible. Consecutive serial numbers should be given plus callsign. Scoring is one point per contact on 50, 70 or 144MHz, two points per contact on 432MHz and four points per contact on 1,296MHz. Multipliers are calculated from the number of different prefixes worked *per band*. Full details are in *CQ Magazine* February 1985. The rules give some advantage in this country to the fortunate 50MHz permit-holders, since the contest is primarily a USA event where 50MHz is a general allocation, as is the 220MHz band which figures in the rules but is inapplicable here. G4BWP is prepared to send out copies of the *CQ Magazine* announcement on receipt of an sae, he is QTHR.

From here and there

Interference on the 144MHz band in Kent, reported last month in *4-2-70*, as being due to the Kent Fire Service transmissions, is now known to be due to the fact that the Fire Service has an allocation on 146·00MHz. Since they operate on fm, the deviation on the signal makes it penetrate a full 9kHz into the satellite portion of the 144MHz band. Headquarters is in touch with the licensing authority in this connection, but it is believed that similar problems arise in other parts of the UK. Anyone who has information on such matters is invited to write to *4-2-70* giving as many details as possible.

Stan Clark, G6NUO, whose indoor antenna operation was mentioned in *4-2-70* November 1984, was previously restricted to fm. He has now purchased a TS700 and has found ssb to open up a whole new world for him through contacts with Coblenz, France, Wales and the Isle of Man, all using the indoor three-element quad. He is now encouraged to start thinking about an outside antenna which should improve things still further. Stan is one of the band of operators who are partially disabled, so being able to reach out and make contact with operators in other countries is an exciting experience. If you have anyone in your neighbourhood who needs a helping hand or the loan of a piece of unused equipment, please make the effort —it will not only brighten someone's life but also be in the spirit of our great hobby.

The British Amateur Radio Teleprinter Group announces that its annual rally at Sandown Park will take place on Sunday 25 August this year. The rally organizer is Peter Nicol, G8VXY, telephone 021-453 2676. Club secretaries seeking lecturers should also note that BARTG has set up a "Datatalk Register" which contains details of speakers, their specialist topics, and geographical areas they are prepared to cover. Write to Ian Wade, G3NRW, QTHR. The register is mainly concerned with data communications topics. □

Microwaves

*by Mike Dixon, G3PFR**

Sheffield round table

The next round table to be held at the Department of Electrical Engineering, Sheffield University, will be on Saturday 25 May commencing at 10am and finishing at 5pm. Barry Chambers, G8AGN, QTHR, will supply more details if required: the format will be informal and will be "part-time workshop, part-time beginners 10 and 24GHz, and part-time 'simple 10GHz narrowband' ". There will be facilities for a "bring-and-buy" and the usual comprehensive range of test and alignment equipment. This is always a first-class meeting and I can thoroughly recommend it as being a very enjoyable (and useful) day out among like-minded souls.

Component service

Due largely to the hardening of the dollar against most other currencies, Steve, G4KNZ, QTHR, reluctantly announces increases in the prices of some of the components offered as a service to members. New prices are as follows: low voltage-drop regulator boards, £1.75; MGF1402 GaAsfets, £13.50; MD4901 varactors, £10.50. At the moment the remaining component prices are stable but, no doubt as stock renewals are made, other prices will rise.

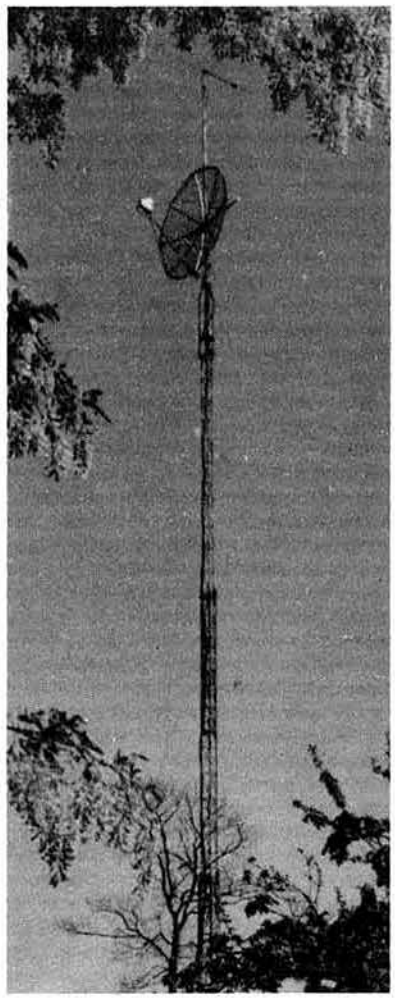
Operating news

John, G4BYV, wrote: "One nice contact this month (February) on 13cm with Tony, G4CBW (YN square). He was using a 2·5ft dish in his shack, and reports were 5/3 to 5/6. In one hour's operating on 3 March, I worked five PA0 stations on 13cm and heard DL0HC/P (DL square)—they all want to know why our contests are not all-band like theirs!"

Jack, G5UM (microwave awards manager, QTHR) recently recorded the first microwave squares award to a G1 operator—John Acton, G1DOX, of Telford, gained five squares on 1·3GHz. Also on 1·3GHz, Roger, G4PMK, claimed a 15-squares sticker from his Didcot QTH; moved house to Wantage, and soon after was able to claim a 20-squares sticker from his new location. Down in Devon, Dave, G3PBV, reached his 25 squares worked, and G4MAW of Paignton gained a 35-squares award, only the fifth to be made in this category.

Michael, OH2AUE, wrote to say that he and Pauli, OH2DV, had a two-way 10GHz ssb contact (over an unspecified distance) on 3 January this year: this is believed to be the first such contact in Finland, although one-way contacts over distances of 78km (ssb) and 47km (nbfm) took place last summer. Michael is using a JVL transverter and has obtained an output of "over 1·5mW with an overall receive noise-figure of 9·5dB". Pauli's approach is somewhat less conventional, in that his lo injection was derived from an IC402 (vxo) multiplied by 24, using a step-recovery device. Subtractive mixing to an i.f. of 21MHz was used: this posed problems in filtering, so that this was abandoned for the purposes of the experiment. A similar experiment with a synthesized rig showed that although the 10GHz output was adequately stable, the sideband noise and "jitter" (both multiplied by 24) were sufficient to make this an unattractive proposition. Michael reported that he is currently building his third version of the JVL, and Pauli his first! Both are intending to use an i.f. of 432MHz, with a local oscillator on 9,936MHz. He added that "experiments with GaAsfet amplifiers are commencing as soon as possible, probably this summer".

Photospot



The photograph reproduced here was sent in by John, G4BYV, It shows his antenna installation which can cover 432MHz and 1·3, 2·3, 3·4 and 5·7GHz. It is typical of current high-performance fixed station amateur practice, and shows what can be done if the operator is determined to exploit the microwave bands to the full. John has already "proved" the installation by working some quite remarkable dx, especially on the "middle" bands, and is high in the squares league on all the bands on which he operates. The dish is 2m in diameter, and the multi-band feed is that due to DL7QY, originally published in *Dubus*.

From another publication

Dubus 1/85 has just arrived and, on this occasion, has only one technical article of interest to microwave operators. However, this is a fairly comprehensive article on the construction of a low-cost 144 to 1,296MHz transverter comprising four pcb units and yielding approximately 2W output. The construction and alignment seems straightforward, and boards or kits of parts are available for the project: at the present

*"Woodstock", Gaze Bank, Norley, Warrington, Cheshire WA6 8LL.

rate of exchange (payment in Deutschmarks) the projected cost is around £90. The overall size is 100 by 160 by 30mm, and the spurious rejection claimed to be better than 60dB.

Microwave expeditions

Notice has been received of two expeditions, both timed to coincide with the August Perseids meteor shower, and both operating on the microwave bands as well as on the lower vhf/uhf bands. The "Square-Bashers Group" (GW8TVX, GW3NYY, GW4LXO, G8TFI and possibly others) will operate from The Lizard, Cornwall ("old" square XJ, "new" square IN79JX). Actual dates will be announced later. It is planned to operate on both 1·3 and 2·3GHz and, possibly, "home-brew permitting, some of the other microwave bands". It should be noted here that as a result of last year's highly-successful microwave operation, the group was awarded the Fraser Shepherd Award for their outstanding work in activating "rare squares" on the microwave bands. Further details from Richard Hope, GW8TVX, QTHR.

The Derbyshire Hills Group (c/o Dave Hardy, G8ROU, QTHR) are planning to operate between 3 and 15 August from North Ronaldsay (YT48f/IO89QO) on 1·3 and possibly 2·3GHz as well as on the lower bands. In this case, wide use will be made of the vhf net, especially for arranging ms skeds.

From here and there

Roy Humphries, G4WTV, sent in some details of the Worthing group's tv repeater, GB3VR, on 1·3GHz, following a year's successful operation. Located 3km northwest of Worthing at 90m above sea level, the coverage is along the coastal strip covering Brighton and Worthing. Most of the hardware is based on Wood & Douglas modules, and the antenna system consists of separate Alford slots for receive and transmit, fed with Andrew heliax. With an input/output separation of nearly 70MHz, a pair of simple inter-digital filters was found to give sufficient isolation. The receiver, using (nominal) 50MHz i.f. was again based on Wood & Douglas equipment—in this case the pll video board. Soon after switch-on, F1EDM (Le Havre) successfully accessed the repeater (QRB 150km) and despite a weak signal somewhat off frequency, the pll circuitry locked the signals and produced satisfactory pictures.

The building and design effort was spread between (among others) G8XEU, G8KOE, G8FQT, G8DHE and G4WTV. A large sae to the Worthing & District Video Repeater Group, c/o 106 Willow Crescent, Worthing, West Sussex BN13 2SY, will bring more detail than is possible here. Future developments include a move to a site 135m asl, and an increase in power, up to the currently permitted 25W erp. Roy records the cost of the repeater hardware as being around £250, almost half of which was the cost of the heliax and special connectors!

Last month I indicated that there would be some emphasis on 24GHz operation during this year's portable season. It has been agreed that it would be sensible to suggest that wideband operation should take place around 24·025GHz and narrowband on 24·048GHz: this can be derived from a local oscillator frequency of 24·192GHz subsractively mixed with 144MHz, the lo frequency being derived from 1,152MHz multiplied by 21.

Looking through the Microwave Directory (published in the *Microwave Newsletter*), there are some 350 entries in total, though I feel sure that this does not represent the total of UK operators interested in microwaves. There must be many operators, or potential operators, who, because they neither subscribe to the *Newsletter*, nor perhaps are even members of RSGB, are not included in this list. Of these 350 entries no less than 50 per cent have equipment for 10GHz: let us hope that these callsigns will be heard in this year's cumulatives. Perhaps the apparent popularity of the band arises from the ease with which the newcomer to microwaves can get going on the band, and the small expense involved in getting effective simple gear "up and running". If you wish to be included in the directory, please let the editors (G8AGN and G3PHO, both QTHR) have details for inclusion in the next revision. Many of the records need to be brought up to date: subscribers to the *Newsletter* will have already filled in a questionnaire which came with the renewal invitations. Can I remind those who have not yet returned the questionnaire to do so as soon as possible? For new subscribers, the *Newsletter* is obtainable from RSGB headquarters, the subscription for this year being £5, including postage.

It is, as I write, just a year since I took up duty as "scribe", and I would like to thank all those who have taken the trouble to write in with news and views. For several reasons it is not always possible to acknowledge receipt of information on each and every occasion, but the appearance of a "distilled" version of your news in this column should indicate that you have hit the target; my thanks particularly to the "regulars", and also to the occasional contributors—keep it up!

SWL News

*by Bob Treacher, BRS 32525**

VHF matters

It is at about this time of the year that this column begins to recognize the activity on 70,144 and 432MHz as we approach the summer dx season. I am hoping for even more contributions this season, as I know that a few more listeners have equipped their stations with uhf/vhf gear, or have improved or updated existing set-ups. With the new Maidenhead locator system, and hopefully far-better tropospheric and sporadic-E propagation than in 1984, the season offers much excitement. Entries for the table will be included as soon as sufficient are received. Where possible, they should refer to the new locator system. I have yet to venture on to these bands in 1985, so I have no experience as to how easy the table will be to adminster this year. If there are difficulties, they can be tackled when they arise.

Martin Parry, BRS52543, entered the March contest and heard stations in JO00 on 432MHz, and JO11 on 144MHz from his Blackpool QTH. On 432MHz he scored better than in 1984, but the 144MHz score was far worse. Martin also responded to the comments of Mick Toms, BRS31976, on the usefulness of the beacon network. He confessed to getting rather excited if he heard only one station from any dx area during any type of opening. Martin quite rightly said that there could be many reasons why stations were not heard once a beacon station in the same area had been heard: not being at home, other domestic commitments, worked it all before, being choosey about what is worked, looking around the band and not calling "CQ" on one frequency. These examples certainly go some way to proving Mick's point, but it is all rather frustrating for licensed amateurs and swls alike, who hear a good tropospheric opening but find no activity from that rare square because all the amateurs in the area are either otherwise engaged or cannot be persuaded to work into G-land! Such thoughts show why dxing on these bands can be so exciting, but also so frustrating!

David Whitaker, BRS25429, managed to listen to the 432MHz contest in February and got one new square, thanks to GM4MOX in YQ, and six new counties. On the QSL front, LA5IH (CU47j), PA3AGX (BN60e) and F6DDV (XI20c) provided new squares on 144MHz, while DG9YH (EK75g), DK9SU (EI18g), DC0DA (DL38e), GM4SDG (YR40d) and DK2PH (EL03e) were received for 432MHz reports. David now has 40 squares confirmed on 432MHz from 49 heard—a very good return indeed.

Michel Monteil, FE8957 (JN13WP, ex BD30e), commented on poor vhf conditions, but had heard stations in HB9 and I, in logging 9 Maidenhead squares.

Newcomers

Marcus Walden, BRS86996, hopes to take the RAE in December, but at the time of writing was involved with academic examinations. His receiving set-up is a DX302 with 20m and 30m long wires. He has been particularly interested in the QSL techniques series we have been running, and has been grateful to note all the do's and don'ts.

Dave Hasney, BRS86386, has been interested in amateur radio for five years, but only joined the Society last year. In December a Uniden CR2021 receiver was purchased which he uses with a 17m long wire at about 7m above ground. He had filled one 45-page log book in his first month of listening. Dx logged in March included AP2ZR, A71AD, HP3FL, VP2VA and 9Y4ME, all on 3·5MHz.

DX report

Pick of the month in review was the dxpedition to Desecheo Is (NR5M/KP5, K5LZO/KP5, etc). Our reporters caught them on all bands, except 28MHz. Close behind was the DJ6QT trip to 5V8. Rumour had it that he would be activating TY0ABD next.

The 1·8MHz band continued to provide good conditions. The Caribbean and Central and South America had again been audible, with good dx heard from around 0400 to just after sunrise. Although several reporters mentioned cw signals from stations mentioned last month, ssb came up with C6ANH, CO7AM, CP8HD, HI8LC, J87J, KP4BO, P42J, TI2CF, VP5HPX, XE1HHA, 6Y5IC and 9Y4VU. The NR5M/KP5 expedition and XE1HHA provided Dave Whitaker with countries Nos 99 and 100 on

*79 Granby Road, Eltham, London SE9 1EH.

1985 HF COUNTRIES TABLE

(No starting score required)

Station	DXCC	28	21	14	7	3·5	1·8	Total
BRS52543	161	4	47	82	111	130	61	435
BRS32525	143	1	34	79	84	110	70	378
BRS8841	159	3	56	101	79	101	34	374
BRS31879	132	1	46	76	85	85	51	344
BRS25429	134	4	38	56	75	107	62	342
BRS1066	131	0	46	88	88	66	48	336
BRS44083	68	0	7	45	6	46	4	108
FE8957	14	14	0	0	0	0	0	14

1·8MHz ssb; the first swl to amass 100 countries on the band just on ssb. Congratulations. Outside of the Caribbean, CT2CE, D44BC, RF6QAI, RL7GDR, 3A2GL, 3V8PS, 5V8WS and 7X5AB had all been reported on ssb.

At the time of writing, our reporters were anxiously awaiting the VK9X, KP1 and FO0 dxpeditions, which we all hope will be favoured with good conditions into Europe. The FO0 trip to Clipperton Is would have been the first trip there since March 1978, when good signals were heard on both 7 and 3·5MHz. Let us hope that by the time this piece is read, all three trips will have resulted in some new countries.

Conditions on 7 and 3·5MHz were good during most of March. VP2EAG, K8CV/VP2E, TJ1FF, KK9A/PJ7, J87J, HI0B and 8Q7AC found their way into the Robert Small, BRS8841, log on 3·5MHz. Most of our reporters copied the majority of these, although TJ1FF would have been a new one at this QTH. Dave Whitaker found 7MHz good, with P29PL for his first new one of 1985 on that band. Also heard were CE0DFD and CE0EEO, ZL7PO and VK0GC.

David Hunter, BRS84664, provided a comprehensive report on 14MHz, all in callsign order—which makes your scribe's job a little easier when trying to sort them out—A71BK, CE8DXY, D68WB, HH2JR, J28AB, J88BC, YI1BGD, W2KW/KV4, 3D6BD, 5V8WS and 9U5JB. Our reporters also noted BY1PK, BY4AA, VK9XJ and ZC4MR. Note that ZC4 now counts as a separate country to 5B4, if the stations are based at Akrotiri, Dhekelia or Episkopi. It is worth checking your logs because new country status is backdated to 16 August 1960. If you have a QSL from 5B4, that will count for Cyprus. ZC4 cards, if they have the Sovereign Base addresses given above, will count for ZC4. This change of status can be reflected in the all-time countries and 1985 table scores from now on.

Mike Dawson, BRS44083, reported poor conditions on 21 and 28MHz, but your scribe caught some good short-skip conditions on 28MHz on 24 March, with stations from DL, OE and I being heard. Mike had some good QSL returns from the bureau with VS6GZ, VS5GA, FB0ZQ, TT8BG and PY0ZSG. While on the subject of QSLs, Brad Bradbury, BRS1066, reported HV2VO, 3B9CD, DL1BA/3A and HZ1AB all safely received for 1·8MHz, and AD8J/KP2 (7MHz), DK9TH/4U and PY0FE (21MHz). Robert Small added TZ2XN, 3D6AN, BV0AA and ZD8LA. However, his best of the month was one from BY4AA. Robert now has a QSL from each of the BY stations which have been active.

Here and there

Mike Dawson, BRS44083, took part in several contests with pleasing results. He had 74 countries confirmed on ssb at the time of his March letter. He was also working towards several IOTA awards, which are now administered by G3KMA. IOTA Directories are available from G3KMA, QTHR, price £1.

Jean-Jacques Yerganian, ONL383, commented on the SWL Contest Calendar and passed on the exciting news that the WAE DX Contest (cw second weekend of August, and ssb second weekend of September) has an swl section. It seems that there has been a section for listeners for some time, but the DARC has not given it much publicity. The rules are the same as for the transmitting section, which will no doubt be publicised in *MOTA* in due course. I hope that with this information a few G listeners will send in an entry to show that there are many contest-minded listeners in the British Isles.

While on the subject of contest participation, it was disappointing to see so few British swls in the final results of the UBA's All-Year Round Contest. Hopefully there will be more entries from these shores this year. Congratulations to John Goodrick, BRS44395 (cw), and Dave Whitaker BRS525429 (ssb), for being placed so well in the final listings.

Douglas Johnstone, BRS54163, reports that his demi-quad loop at a height of 26m pulled in some good dx on the hf bands, including 3C1YL. Best QSL during the month of review was from 4S7VK.

Finale

Readers will see that I have included a score for the 1985 table for the first time. I hope it will act as an incentive for all those swls who are quite active but who never get around to submitting scores. Following my prediction last month, the scores for 1·8MHz are already quite high, with several listeners already close to their final 1984 score.

For those contest-minded listeners, please do not forget to take note of the Society's new swl only contest (Full details in "Contest News".). We look forward to many entries so that we can establish the event in the contests calendar.

News, views, table scores for the July issue should reach me no later than 13 May with late news to be received by 21 May. □

EPHEMERIS

Satellite news and views

*by R. O. Phillips, G4IQQ**

Oscar 10

By the time this column is being read the eclipse season for Oscar 10 will be over until the autumn. To cater for the varying conditions of solar illumination it is necessary to carry out occasional changes to the spacecraft operating schedule. One such change was due to be implemented on 15 April 1985, and as from that date the schedule will be as given below:

Mean anomaly	Time (minutes)	Mode
000-031	0-87	OFF
032-119	87-328	B
120-137	328-377	L
138-200	377-550	B
201-031	550-700	OFF

These mean anomaly figures refer, of course, to the 256-unit system, and the times indicated are from the perigee, ie m.a. = 0.

In fact, the extension of the off period from ma15 to ma32 was introduced on 15 March to provide the required energy for activation of the torquing magnets for spacecraft manoeuvres. The result of these attitude changes has been a dramatic improvement in performance with down-link signals increased by some 8 to 10dB.

The position of the perigee of the orbit of Oscar 10 has now moved round the plane of the orbit such that it occurs in the northern hemisphere. Consequently, the maximum elevation of the satellite has decreased, since the apogee will occur at increasingly southerly latitudes. The availability of

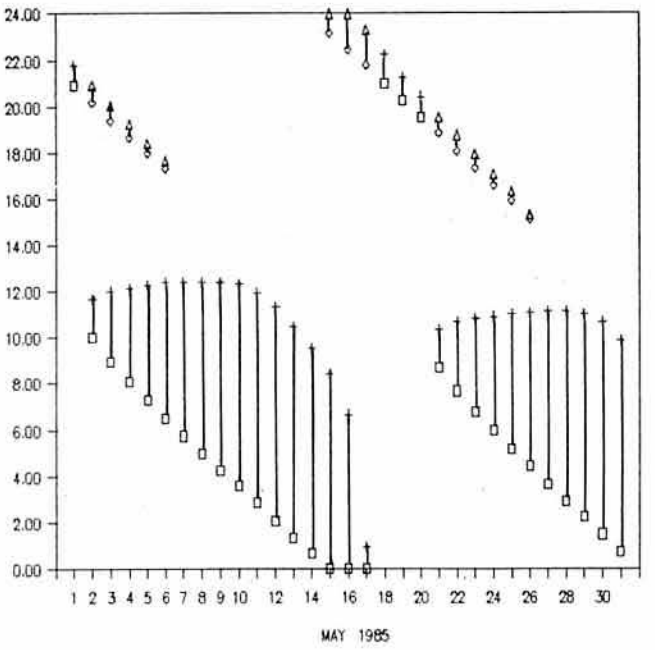


Fig 1. Availability of Oscar 10

*170 Shirehall Road, Hawley, Dartford, Kent DA2 7SN

the satellite for the month of May is given in Fig 1, which clearly shows that the useful windows at the beginning of the month are very limited. Maximum elevation occurs around the 13th and 14th when it reaches 43°.

RS satellites

Operation of RS5, RS7 and RS8 continues to be satisfactory, and it is still expected that all three will be functioning by the time of the planned activity period on 30 June 1985. The event is intended to demonstrate to an international group visiting Lithuania, the possibilities of satellite communications and will take place from 0320 to 0820gmt.

Reports from UA3CR, via Pat Gowen, G3IOR, indicate that good progress is being made on the construction of RS9 and RS10. Both payloads were undergoing tests at Kaluga, some 200km from Moscow, during March, and launch at the end of this year still seem a likely prospect. No additional technical information has been made available beyond that carried last month.

Other news

The meeting in Washington on 9/10 March to discuss the future PACSAT mission explored a variety of topics, including possible construction groups, if the necessary support can be obtained. The latest information is that the spacecraft bus would be designed and built by the University of Surrey, taking advantage of the experience gained with their earlier success with Uosats 1 and 2. The digital communication payload forming the major part of the mission is likely to be constructed by the AMSAT/VITA group in the USA. It was agreed at the meeting that the current experiments using the digital communication equipment on Uosat Oscar 11 should be accelerated, both to develop the necessary message protocols and to encourage support for the project.

The IARU Region 1 news bulletins via Oscar 10 continue to be provided by AMSAT-UK, although Ron Broadbent, G3AAJ, the Region 1 coordinator for use of the special service channels, is optimistic that other countries will also take part in the near future. The schedule for transmissions for the next two months is as follows:

May	Time (gmt)	June	Time (gmt)
5	No service	2	0600
12	0600	9	No service
19	0200	16	0800
26	0830	23	0130
		30	No service

If other groups come forward it may be possible to fill in the dates when the service cannot be provided from the UK either due to lack of visibility or unfavourable satellite angles. It should be noted that the service is intended for the whole Region 1, hence the decision to carry on even though the times may be somewhat unsociable from the UK point of view. My sympathies go out to the up-link stations who will need to get out of bed very early on the appointed days. □

RAYNET

*by Geoff Griffiths, G3STG**

Chairman, Raynet Committee

The Raynet Committee

Each one of the members of the Raynet Committee has a definite set of jobs to undertake within the day-by-day management of the network. It is some time since these roles were published and, as some of them have changed, as the committee members have changed, perhaps it would be a good idea to give some details.

Chairman and talkthrough permits	Geoff Griffiths	G3STG
Vice-chairman and technical information service	Bill Colclough	G3XC
Zonal Co-ordinator	Dave Lankshear	G3TJP
Group information officer and controller appointments	Mike Barker	G8CAC
VHF liaison and rallies shows	Dick Jeffries	G4KAR
Council matters	Henry Pinchin	G3VPE
Raynet at RSGB HQ	Brett Rider	G4FLQ
BARTG liaison	Peter Nicol	G8VYX

The committee is also supported by the three Society spectrum managers, and by Phil Howarth, G3YAC, our minutes secretary.

Please note that Graham Cluer has left the committee in order to concentrate on the job of zonal representative for the Greater London Zone, and publicity matters should be addressed via your zonal representative.

Emergency operations

In January several groups within Cornwall worked together to provide an invaluable information service to the county highways department on local conditions throughout the county. When conditions deteriorate in rural areas such information becomes very valuable, and over 250 separate messages were handled over a 36h period by three sub-stations.

In February the Plymouth & West Devon Group went on standby for a three-day period during heavy snowfall, and provided radio comms to a snow plough gritter for a period of 15h, with relays of operators being ferried out by fwd Landrovers.

But it's not only at times of bad weather that Raynet team members volunteer to provide emergency radio cover for the community. On 10 March Sussex Police asked for the assistance of South Sussex Raynet in the provision of communications for a missing person search. Within 90 min, 29 members from three groups had travelled to Seaford Police Station on the south coast and were briefed to take part in the search for a missing 13-year-old boy. The members worked all afternoon and covered the designated area. Fortunately, the boy was found later and reunited with his family. The police commented favourably on the team's "organized and professional approach". Is your group ready?

Membership news

Total membership of Raynet is now reported as 4,480, some seven per cent of the total amateur population of the UK.

In 1984 there were 457 reported user-service events, and 11 live emergency callout operations ranging from missing persons to fire and explosion. Sixty-two talkthrough permits issued during the year, and more groups are utilizing the data available through the technical information service to aid construction of talkthrough devices.

Dave Lankshear, G3TJP, our zonal co-ordinator, is producing a regular news bulletin of activities around the zones, so please make sure he knows about your operations. Please check with your controller or zonal representative to ensure that the membership details held for you on our records are up to date. There is no point sitting out there on your own thinking nothing is happening if no-one knows of your willingness to serve the community.

Zonal representatives

North East England. Mrs Sue Jebb, G6AJF, 30 Runnymede, Nunthorpe, Middlesborough, Cleveland TS7 0QL.

Yorkshire and Humberside. Ivor Shaw, G3KWT, 29 Highwood Avenue, Leeds LS17 6EW.

East Midlands. Geoff Griffiths, G3STG, 11 The Grove, Asfordby, Melton Mowbray LE14 3UF.

Greater London. Graham Cluer, G4AVV, 12 Bingham Road, Addiscombe, Croydon CR0 7EB.

East Anglia. Bill Holmes, G4TWT, 7 Parkland Crescent, Old Catton, Norwich NR6 7RQ.

Home Counties and South-East. Dick Jeffries, G4KAR, 84 Mill Road, Hailsham BN27 2HU.

SW England. Bill Colclough, G3XC, "Highview", Indian Queens, St Columb TR9 6LL.

Wales. Clive Trotman, GW4YKL, 19 Park View, Llanharan, Pontyclun CF7 8DL.

W Midlands. John Arrowsmith, G4IWA, 16 Mancetter Road, Mancetter, Atherstone CV9 1NZ.

NW England. Paul Gaskell, G4MWO, 11 Portico Court, Portico Lane, Eccleston Park, Prescot L35 7LP.

Northern Ireland. Danny Campbell, GI4NKD, 109 Drumgor Park, Craigavon, Co Armagh BT65 4AH.

Scotland. Eric Garrington, GM3RFA, 3 Sutherland Avenue, Fort William PH33 6JS. □

*11 The Grove, Asfordby, Melton Mowbray, LE14 3UF.

The Month on The Air

*by John Allaway, G3FKM**

SEVERAL COMPLAINTS have been received of what appears to be a misunderstanding of the IARU Region 1 band plan by some European stations. A number of UK amateurs have been criticised—some even deliberately QRM'd—by continental stations, when they have been operating in the 7,000–7,010kHz part of the 7MHz band and quite in accordance with the plan. There is no segment on 7MHz recommended for dx working, similar to that on 3·5MHz, and anyone who is asked to QSY should politely tell the caller that his information is not correct.

Another cause of concern to those not interested in contests is the non-observance of contest-free/contest-preferred segments. Most national societies specify parts of bands to which activity in their various competitions should be confined. In addition to these, IARU Region 1 recommends that (where no other limits are set, for example) contest activity should be confined on 3·5 and 14MHz to the following segments:
3,510–3,560kHz and 3,600–3,650kHz (for cw contests)
3,700–3,775kHz (for phone)
14,000–14,060kHz (for cw) and 14,125–14,300kHz (for phone).
NB. Where dx traffic is involved, the 3·5MHz cw segment goes down to 3,500kHz and phone up to 3,800kHz. These frequencies do not apply to rtty contests.

G4JLU requests information which might lead to the arrival of QSLs for contacts with FY7YO (1982), VP10 (1981) and 5N22ATT (1982).

G3LPS, QTHR, would appreciate information which would help him to confirm a QSO on 3·5MHz with 9L1GC in 1973. Any volunteers?

DX news

There is an official proposal by the Portuguese licensing authority to reorganize the amateur prefix system. In the new series the two prefix letters will identify the category of the operator, and the number the region where he or she is located. CQ will signify extra class (Category A), CR intermediate class (Category B), CS the same but Category C, and CU Novice class (Category D). The number will be, for example, 1 for Greater Lisbon, 9 for Maderia, and 0 for Azores. CT1OF, who has kindly provided your scribe with this information, says that the existing CT callsigns will be phased out but may be kept on request by their present holders. No date for the changes has been given. Jaime says that it is likely that CT0 for vhf/uhf repeaters and CT0 plus a number for listeners will be kept.

At the time of writing, 4U1VIC was appearing in the area 14,215–14,260kHz very frequently between 1200 and 1500. Interest in working this station, which is located at the United Nations Vienna International Centre, has increased since it was known that the USA proposes to allow US amateurs to handle third-party traffic through 4U1VIC, and that DXAC may be asked to reconsider its decision not to grant DXCC status to it.

DXpress reports that UA1OT will remain on FranzJoseph Land until 1988 with just one leave (in May next year). His QSL manager, UB5KW, tries to send out QSLs quickly and receives logs regularly. UA1OT is very active and has been on 1,830kHz and 3,640kHz, as well as in a daily net on 14,195kHz at 1200 when he meets RF0FWW. Top band allocations in the USSR are now 1,830–1,930kHz with all modes from 1,900–1,930kHz, cw and lsb from 1,860–1,900kHz, and cw only from 1,830–1,860kHz. All these on a secondary basis.

According to the *Long Island DX Bulletin,* which quotes G4SDJ, the following suffixes are currently assigned to amateurs in the Sovereign Base Area in Cyprus: AB, AM, AP, ASG, BI, BSG, CZ, EP1, ESB, FE, GH, HA, HMS, ID, JE, JH, JM, MR, PM, RP, RT, SM, SR, TN and WW. Not all are necessarily active at present. QSLs for ZC4 QSOs may be submitted for DXCC credit after 31 May.

9U5JB has been reported in the 14,165–14,185kHz area after 1815 and also on 3,745kHz after 0200. From Rwanda 9X5WB is frequently on 14,176kHz or near at 1900.

3B8DB is hoping to visit St Brandon, 3B7, for a period during June or July. 3D6AK returns to the UK in June and may not be returning to Swaziland.

DL7AH/3X has been on the air from Guinea and may still be there when this appears in print. He has been reported on 14,020kHz, 14,120kHz and 7,005kHz, and may now have rtty available and be on all bands 3·5 to 28MHz.

QSLs from PS7ART/S9 are now being accepted by ARRL for DXCC credit.

HV2VO is planning to be on the air on all bands with rtty at the end of June and in July. The station will be operated by I5FLN and I8AA.

According to *DX News Sheet,* G3LCS may not be returning to A6. His A61AA QSLs are being accepted for DXCC credit. There is a rumour that JY5SK and his brother have a station ready for use in the United Arab Emirates, but at the time of writing had not received permission to operate.

VK9XJ, on Christmas Is, joins in the DK9KE net on Tuesday, Thursday and Saturday on 21,157kHz at 1030. VK9XZ is also in the same net occasionally and also operates on cw. FW8AF is reported to have been worked at 2200 on 21, 290kHz in the USA, but there were no reports of European contacts being made.

G4JBH is visiting Sweden for three weeks commencing 24 May, and he will be on the air as G4JBH/SM and possibly also from OH0 and Morokulien, SK9.

Kris Partridge, G8AUU, has now obtained a two-year Polish licence thanks to help from PZK. His callsign is SO6AUU. It seems that Polish amateurs who saw active service during the second world war are currently being allowed to use the /V suffix.

Philatelic items

The French society, REF, together with IARU, will be celebrating the 60th anniversary of IARU during the national meeting at Chateauroux on 25–27 May. One feature will be a philatelic exhibition showing items with a thematic connection with amateur radio and telecommunications. Several souvenirs will be available for purchase: *(1)* an illustrated envelope with special postmark from Chateauroux post office; *(2)* another envelope with a large illustrated postmark available for two days only from a special post office located at the meeting; and *(3)* a de-luxe philatelic parchment (21cm by 15cm) stamped with the special postmark described in *(2)*. Each envelope costs six ircs and the parchment 15 ircs, and items will be despatched at the end of May. Information from, and orders to: M Raymond Aupetit, 14 Residence Bois Boutin, 16340 L'Isle D'Espagnac, France.

Welcome

The following overseas amateurs joined the Society during February: A4XKH, DL3HBX, N6ELD, OH6PN, SM6CQV, SM0PRY, V85PD, VE3WY, VS6EA and W3OG. Unlicensed new members included J. Broutin (F) and RS 87274 (PA).

Islands on the air award

This award has been devised and administered by well-known dx listener Geoff Watts for many years. However, for personal reasons Geoff is not able to continue and has kindly handed over the award programme to the RSGB. All claims, requests for IOTA Directories, and general correspondence concerning IOTA should now be sent to Roger Balister, G3KMA, La Quinta, Mimbridge, Chobham, Woking, Surrey GU24 8AR. Please note that Geoff will continue to deal with requests for his Prefix-Country-Zone lists. Your scribe would like to thank him for the very considerable amount of work that he has done in developing IOTA over many years.

The Golden Antenna Award

Once again the town of Bad Bentheim is making this award to an amateur who has performed an outstanding humanitarian achievement in the field of amateur telecommunication. The winner will receive his or her award during the "German-Dutch Radio Amateur Week" which runs from 22 to 25 August. Organizations of radio amateurs are asked to submit proposals for this award to Stadt Bad Bentheim, Schlossstr 2, D-4444 Bad Bentheim, FR Germany, by 15 May 1985. The organizers point out that only those nominees will be considered who have achieved an outstanding humanitarian feat in the field of amateur telecommunications. The decision

* 10 Knightlow Road, Birmingham B17 8QB

Martin East, G4IOF, visited Cape Town last Christmas and made contact with local amateurs. He is seen here with some of them during a visit to the club station ZS1SG. L to r: (back row) Dave, ZS1SG; Craig, swl ZS1013; Martin, G4IOF; Frank, ZS1IF; Peter, ZS1CH, and Arthur, ZS1LI; (on floor) Adrian, ZS 1AN, and Tony ZS1D (ex G4KLF)

on the winner will be made by a committee consisting of representatives from Bad Bentheim and the chairman of IARU Region 1 plus the presidents of VERON, VRZA and DARC.

Operation Raleigh

The January *RSGB News Bulletin* insert carried details of a proposed dxpedition to S Georgia, to be associated with Operation Raleigh. This has unfortunately had to be cancelled because the Operation Raleigh itinerary has been changed and no longer includes visits to the Falkland Is Dependencies. However, the good news is that there are still a number of opportunities for radio amateurs to join the expedition.

The organizers are now looking for a limited number of amateur radio operators to join the expedition vessel *Sir Walter Raleigh* to provide back-up ship-to-shore communication with field parties. One operator will be required for each three-month leg of the journey.

As these are staff posts, there is no upper age limit, but a certain minimum level of fitness will be required. The cost will be about £1,500 per person. Anyone interested should write directly to Capt J Masters, c/o Operation Raleigh, PO Box 370, St Katherine's Dock, London E1 9LB. The post holders will be based on board ship and will have ample time to operate GB0SWR/MM but little time for shore operating. The expedition finishes in December 1988.

Awards

Bayern-Ost-Diplom
Available to all who have confirmed QSOs or listener reports with or from stations in E Bavaria (DOK district "U") since 1 September 1973. Europeans need 15 points and dx five. Each QSO is worth one for every station in DOK "U" districts (every DOK may be used once) two if with a club station, three with a YL, four if on A1A, and five if on vhf (in which case only 10 points are needed). Send list of QSLs certified by an awards manager, plus DM5, US$3, or 10 ircs to: Diploma Manager, Ernst Noesner, DJ5VH, DIG 787, Spitalgasse 35, D-8458 Sulzbach-Rosenburg, FR Germany.

The UN at 40 Award
On 24 October this year the UN will celebrate the 40th anniversary of the UN Charter, and to celebrate the event and in the spirit of fostering friendly relations between nations the UN Staff Recreation Council ARC is sponsoring this award. It is available to those who have contacted (or who have confirmed reports from) two of the three stations using the UN prefix—4U1UN, 4U1ITU and 4U1VIC—during 1985. Send full details of QSOs and a signed statement vouching for the bona-fides of the application, plus US$5 or 15 ircs to: UN Staff Recreation Council ARC, United Nations Room DC1-0724, Box 20, New York, NY, 10017, USA. US$4 of each fee will be donated to UNICEF funds. All applications must be posted before 1 February 1986.

OH Awards
European applicants need to have made QSOs since 10 June 1947. For **OHA** 20 different Finnish stations with at least seven call areas represented and no more than 15 on any one band; for **OH-100,** 100 different stations are needed, and including all 10 call areas worked on at least two bands; for **OH-300,** 300 different stations with all call areas on three bands; and **OH-500** needs 500 different stations regardless of time/band/mode. The awards are issued for all cw, all-phone or mixed modes. The fee for each award is now eight ircs, and applications should be sent in the form of a list (certified by two amateurs or a notary public) showing the callsigns in alpha-numerical order to SRAL Awards Manager, Postbox 306, SF-00101, Helsinki 10, Finland.

1985 ALL BAND TABLE No 1

	1·8MHz	3·5MHz	7MHz	14MHz	21MHz	28MHz	Total
G4OTU	28	**43**	**82**	**67**	**51**	**5**	276 (all cw)
G3KDB	30	33	52	54	35	5	209 (All cw)
G4OBK	**66**	24	55	36	16	1	198
GM3YOR	0	38	69	9	3	2	121 (All cw)
G4GOF	12	17	15	21	21	3	89

Band leaders are printed in bold type. The next deadline (for 1985 Table No 2) is 15 May —to G3GIQ please.

10MHz TABLE

	All-time	1985
G4UZN	61	30
G3IGW	85	?
G4UYR	33	?

1985 28MHz TABLE

G3XQU	23	
G3XQU	14	
G4RAB	10 (ssb)	
G4DXW	5	
G4MUW	4 (ssb)	

The R-150-S Award
For confirmed QSOs/listener reports since 1 June 1956 with 150 countries on the R-150-S list and including all 15 republics of the USSR. They must be all cw or all phone. A list of QSLs, certified by the awards manager of a national society (RSGB is G3KDB), should be sent with 14 ircs to: Central Radio Club, Box 88, Moscow, USSR.

The R-100-0 Award
For confirmed QSOs/listener reports since 1 January 1957 with at least 100 oblasts. Class A is for all 3·5MHz, Class B for all 7MHz, and Class C for contacts on any bands. All cw or all phone. Apply as above.

The R-6-K Award
For confirmed QSOs/reception reports with Europe, Africa, Asia, N America, S America and Oceania, plus three with European and three with Asiatic USSR. All since 7 May 1962. Apply as above. These awards may be applied for when submitting logs for the CQ-M Contest if the requirements are fulfilled in the logs.

TARS 30 Award
Issued by the Torbay ARS to licensed amateurs and listeners who have worked or heard 30 members of the club since 1 January 1985. The basic award is mixed bands/modes and QSOs with G3NJA or G8NJA (the club's stations) count as for working five others. Endorsements are available for single-band, cw, ssb, mixed modes, fm, QRP and 144MHz mobile. Send detailed log extracts plus £1 or seven ircs to award manager: D. Hind, G3VNG, 4 Thoryville Villas, Oreston, Plymstock, Plymouth, Devon PL9 7LA. A TARS members list is available, please send sae or one irc.

The WIA 75 Award
Licensed amateurs (and listeners) may apply and need to contact or hear 75 members of the WIA between 1 March and 31 December this year. The WIA member's individual membership number must be logged, and no more than 30 may be in any one call area. Send details of QSOs plus Aust $2 to: WIA 75 Award Manager, WIA, 412 Brunswick St, Fitzroy, 3065, Vic, Australia.

Contests
Peace to the World Contest ("CQ-M")
2100 11 May to 2100 12 May
Phone and cw, 3·5 to 28MHz, plus Oscar and "RS" with downlinks on 28MHz from 144MHz (the last counts as a separate band), Single-operator, single- and multi-band, multi-operator multi-band and listener categories. Activity must be confined to the band segments 3,505-3,600, 7,005-7,100, 14,010-14,100, 21,010-21,160 and 28,010-28,200kHz (cw), and 3,600-3,650, 7,040-7,100, 14,150-14,350, 21,100-21,450 and 28,400-29,100kHz (ssb). Exchange RS/T plus QSO serial number, USSR stations send report and Oblast number. Each QSO with own continent counts one point and with other continents three. Listeners logging one end of a QSO score one point, both ends three. A station may be worked once on each band only, and QSOs with own country count as multiplier only. The multiplier is one for each country on the "R-150-S" list worked on each band. Final score is total QSO points multiplied by total of multipliers from all bands added together. First place in each category in each country will receive a diploma, and in first to third continental position also medals. All non-USSR stations working at least 10 USSR stations will be awarded badges. Post entries before 1 July to: CQ-M Contest Committee, PO Box 88, Moscow, USSR. Note that various USSR awards may be claimed on the basis of these logs if application is made when they are submitted. These are listed under "Awards".

Results of the **1984 IARU Radiosport Contest** have been published, and British scores were as follows:

Single-operator, mixed modes
G4VXE, 35,260 points; GD5AVF, 16,120 points; G4XRX, 15,946 points.

Single-operator

		CW				Phone	
G4BKI	–	190,120	points	G3NT	–	40,248	points
G3ESF	–	37,128	,,	G3ICG	–	32,856	,,
G3TXF	–	33,554	,,	G4XKR	–	29,374	,,
GW3MPB	–	28,116	,,	GM4ELV	–	16,011	,,
G4OKN	–	21,715	,,	G4XTM	–	8,985	,,
GW3JI	–	11,956	,,	GI4MWA	–	2,354	,,
G2AJB	–	6,672	,,				

The CQ WW WPX CW Contest
0000 25 May to 2400 26 May
Rules for the ssb section of this contest appeared in March *MOTA*. Please note that the number of points scored per QSO was given incorrectly and that in fact contacts within one's own continent count one point on 14, 21 and 28MHz, and two on 1·8, 3·5 and 7MHz. QSOs with other continents count three and six respectively. Photocopies of rules are available from G3FKM —sase please.

QTH CORNER

CT0BI	CT4UW, Circular Norte 13-D, 1-Dto, 1800 Lisboa, Portugal.
FG5DL/FS	F6ARI, J C Launois, Villa le Puistrou, Cite la Treille, F-34300, Agde, France.
JY9WR	G4ATS, 8 Pendas Way, Crossgate, Leeds LS15 8XH.
6Y0NR/KP1	6Y5NR, Riaz Ahamed, Box 54, Linstead, St Catherine, Jamaica.
6Y5FS/KP1	5 Broadparks Close, Pinhoe, Exeter EX4 9HB.
PY0FNI	Box 4411, Recife, 50000 Brazil.
SV0AC/SV9	WB4GCP, J Lennox, Rt 2 Box 234, Waxhaw, NC, 28173, USA.
TY0ABD	(see 5V8WS).
VK9XJ	PO Box 138, Christmas Is, 6798, Indian Ocean.
VQ9QA	N3QA, 903 May Lane, Stevensville, Md, 21666, USA.
VQ9RA	WD0GWQ, 10928 Bristol Tce, Kansas City, Mo, 64134, USA.
K5KG/VS6	K5TU, 8302 Clover Gardens, Houston, Tex, 77095, USA.
ZD8KM	G3IFB, Coppalex, North Rd, The Reddings, Cheltenham, Glos GL51 6RE.
5T5RY	only via F6FNU, J Baldek, 7 Res du Val, Ollainville, F-91290, Arpajon, France.
5V8WS	DJ6QT, W Skudlarek, an der Klostermauer 3, D-6476, Hirtzenhain 1, FR Germany.
5X5BD	DJ6SI, B Drobnica, Zedernweg 6, D-5010 Bergheim, FR Germany.
5X5WR	DJ5RT, W Ruppert, Riesenkopfweg 7, D-8209 Schloberg-Staphauskirchen, FR Germany.
6V1A	BP 971, Dakar, Senegal.

Around the bands

Yet another unexciting month on the hf bands, but perhaps by now things will be looking up a little. G3LPS takes special interest in 7MHz dx, and he is wondering by which path his signals are reaching Zone 19 at 1600. He is receiving listener reports from there but has never worked a UA0 at 1600, and has high ground between his QTH and JA via the short path which prevents him working into that area at that time.

The following kindly kept up the flow of logs from which this section is written: G2HKU, G3YY, G5JL, GJ3EML, G3s GIQ, GVV, IGW, KSH, LPS, G4s DXW, EHQ, GW4KGR, GM4KHE, G4s UOL, UYR, UZN, XKR, and RS 10906.

Stations listed in italics were using A1A.

1·8MHz 0500 *K5UR*, T77V, TK5BF. **0600** *W2ZZ/CT3, G6ZY/EA6, W2,3,4,5,8,9, KJ0D/VP2E, N8II/VP2E.* **2300** LX1EA, *UM8MLE.*

3·5MHz 0000 J28EI, *PZ1DV, ZB2EO, 6Y5HN.* **0500** *JY5IU.* **0600** *YN1CC, YV1AD, ZL1,3,4, 4Z4F.* **0700** HK5ISX, *VP5GEX, W7.* **0800** J87VV. **1700** *UL7AAI, UM8MFF.* **1800** VK4VC. **1900** VK2AVA. **2000** J28EB, TZ2XN. **2200** A92EB, *JAs 2AWL, 3FCY*, OD5SH, TL8CK, W1,2,3, ZD7CW, 5N8APE. **2300** FM4CL, HC5EA, K8CV/VP2, YB0JH, 3A2HB, 5V8MS.

7MHz 0000 *CE3IAP*, J73AH, VE3KFE/4U (Syria), *5T5RY.* **0200** *K4LTA/PJ7.* **0500** *6V1A.* **0600** *PY* (to 0900), *VP2VEG, ZL* (to 0900). **0700** DJ5SB/CP5, *VK*, XE3ARC. **0800** HH2MC, J87CJG, *K5NA/KP2, K5LZO/KP5, OY7ML, VP2MP*, 6W1CK. **0900** VK0GC, *N8II/VP2E.* **1600** *K5KG/VS6.* **1900** *VK6RD, ZL3GQ, 5Z4MX.* **2000** *8Q7RD.* **2100** *UH8EAA, ZB2EO.* **2200** *UJ8JA.* **2300** *K8CV/VP2E, 6Y5HN.*

10MHz. 0700 *VK3,4.* **0800** *JA6HW, VK5AWC, VK7RY.* **0900** *VK2,3, ZL3,4.* **1700** *J28EI, ZL1AH, ZS5BH.* **1800** *TA1MX, 4S7VJ, 9J2BO.* **2000** *FG5AM, OX3OA, XO1ASJ.* **2200** *J37XC, K5LZO/KP5, W1,2,3,4,8. ZD8KM.* **2300** *EA8AFB, EL2FJ, W1BIH/PJ2, 3B8FP.*

14MHz. 0800 EL2BA, JT1KAI, KL7U, T2ADE, VK2-VK6, VY1BD, ZL, 5W1EJ. **0900** A71BK, BY1PK, H44IA, JT1AO, KB6DAW/KH2, KX6DS, P29KS, PY0FNI, K5KG/VS6, YJ8RJ. **1000** JA, S79WHW. **1100** C21DX, HL9AA, J4ATC, KH0AC, *K8CV/VP2E.* **1200** *BV0AC*, BY4AA, *C30LEV*, DU1DBT, ZL2APM. **1300** HZ1AB *P29s JS, PR, VK6WT, VK0XJ*, YI1BGD. **1400** A71AD, *J28EI*, SU1ER, V85GA. **1500** OD5QI, VQ9DG, W7, 4S7VJ. **1600** J88AQ, *JY5CH*, V85GF. **1700** *F6/KK9A/FS, OX3UD*, KK9A/PJ7, S83H, YB6MF, ZF2FL, *ZS, 7X2ARA, 9V1TL.* **1800** J87TIY, S79WHW, *KC7UU/5N8*, 5V8WS, 7Q7LW. **1900** D68AM, HH2YF, KH6WU, SV0AC/SV9, V2AZL, *DL7AH/3X*, 5X5GK. **2000** *FM5WO, WA2LCO/J6L*, PY0FNI, VP8BDG, *ZD8RN.* **2100** *W7KZK, 5T5RY.* **2200** YV3AGG.

18MHz 0900 *ZS3QR.* **1200** *DL, F, HB, I, SM, Y2.* **1500** *J37XC, LU5DOW, ZS5AH.* **1700** *SM6LQG/MM* (Nr CT3).

21MHz 0900 VU2GTY. **1000** TR8CR, VK9XJ. **1100** TA1A, VQ9DG, OE3HGB/YK. **1200** *VQ9QA*, 3B8DB, *5B4QX*, 5V8WS. **1300** A24DM, PY, ZD8LA, 9U5JB. **1400** C6ADJ, J28ER, TL8CK, VP8BDO, *YC0DNK, ZS.* **1500** C53EX, TR8JC, VQ9YR, *ZD8KM, 3D6BU.* **1600** JY4MB, NR5M/KP5, VQ9CK, ZS3KC, 6AR8JLD (TR8JLD). **1700** TL8DC.

24MHz. No reports

28MHz. 1300 DL. **1400** OE.

The following are thanked for items obtained from their publications: *Long Skip* (VE3XN), the *Lynx DX Group Bulletin* (EA2JG/EA3CBQ), *DX'press* (PA0GAM), *CQ Magazine* (W1WY), *DXNL* (DL3RK), *Long Island DX Bulletin* (W2IYX), *DX News Sheet* (G4DYO), and the Ex-G *Radio Club Bulletin* (GI3OEN/W6).

Closing date for **July** issue—everything to reach G3FKM by **24 May** please. □

A TRIP TO ZL

Last winter R Baldwin, G3WZ, spent three months in New Zealand, with old friends in Masterton who had emigrated. A month was spent touring, and he was made very welcome by the Masterton amateurs, and the others he met while touring. The whole was an unforgetable experience, and a few of his photographs are reproduced here.

One photograph shows G3WZ with ZL1AH—the first time he had ever visited a station he had worked abroad since being licensed in 1938. ZL1AH has the distinction of having won the VK/ZL contest for 11 years running—a complete sunspot cycle. He also made contact with G6GM of Holsworthy, Devon, in 1953 for the first 1·8MHz contact between England and New Zealand—he was using his homebrew 120W maximum gear to an 829B valve.

G3WZ (r) with John Wightman, ZL1AH, in his station at Tauranga 5th Rural District. ZL1AH uses an Icom 720A (and can use a linear) and has triple cubical quads for 14, 21 and 28MHz. For other bands he has 3in spacing open wire feeders to a double inverted-V of the cone type

The station of Pauline Carr, ZL2QW, of Featherstone, North Island. Pauline, who makes herself heard worldwide, runs an FT101Z and a seldom-used 2100B linear. The main antenna is a Yagi TH3 Hi-Gain Mk3, with a dipole for lower frequencies

Bill Barnes, ZL2OD, who was licensed in 1933, in his station at Masterton. Bill's transmitter for 14MHz is homebrew with an RK20 final, and his receiver is a rare Drake 2B. He uses an end-fed Zepp antenna

HF propagation predictions for May 1985

Using the table

The time is presented vertically at two-hour intervals 00(00)gmt to 22(00)gmt for each band, ie $\frac{0}{8}$ = 0000, $\frac{1}{8}$ = 0200, $\frac{2}{8}$ = 0400 etc.

The probability of signals being heard is given on a 0 (indicated by a dot) to 9 scale; the higher the number the greater the probability, with 1 meaning 10 to 19 per cent of days, and so on. Additionally 50MHz F-layer and 1·8MHz openings are indicated by a dagger (†) sign in the 28 and 3·5MHz columns respectively. The higher probability figures are printed in BLACK, lower probability in RED and lowest probability in GREEN type.

	28MHz				21MHz				14MHz				10MHz				7MHz				3·5MHz			
GMT	000	001	111	122	000	001	111	122	000	001	111	122	000	001	111	122	000	001	111	122	000	001	111	122
	024	680	246	802	024	680	246	802	024	680	246	802	024	680	246	802	024	680	246	802	024	680	246	802
EUROPE																								
Moscow						11	11	11	2	566	656	883	546	554	445	788	764	222	222	578	53			24†
Malta						11	111	32	11	666	667	894	745	655	556	799	986	422	223	578	††	4		25†
Gibraltar								11		265	445	783	522	666	556	798	986	543	333	589	††	4	2	25†
Iceland										23	333	452	411	355	556	677	766	543	333	467	554	2		34
ASIA																								
Osaka						1	1		1	243	334	241	1	121	112	463				241				
Hong Kong						11	111		1	234	335	532	1	11	113	575				253				2
Bangkok						122	111		1	224	345	531	21	1	113	575	1			256				23
Singapore						122	11		1	234	344	31	31	11	113	561	1			255				23
New Delhi						222	112	2	2	223	345	763	421	1	113	577	41			257	2			24
Teheran						223	223	53	114	433	345	785	643	1	113	588	731			257	4			24
Colombo						223	221		12	223	345	1	32	1	113	355	51			257	2			24
Bahrain				1		333	334	53	214	323	345	786	753	1	113	588	741			257	5			24
Cyprus				1		344	435	65	425	666	667	897	876	433	334	689	873	111	111	368	†4			35
Aden			1	1		334	446	6	424	322	345	776	864	1	113	588	851			257	52			24
OCEANIA																								
Suva (S)									1	133	32	441	2	331	111	431	1	2		21				
Suva (L)								1	111	5		63	113	421	1	342	1	2		21				
Wellington (S)									1	221	11	42	113	421	112	252	1	1		22				
Wellington (L)								1	221	2		25	233	41		43	12	2		121				
Sydney (S)						11			2	552	1	212	112	421	12	454		1		252				2
Sydney (L)								1	3	2		16	211	42		54		2		151				2
Perth						232			113	454	1	1	321	121	1	351	2			255				23
Honolulu										23	1	3 421	13	331	112	31		2	2					
AFRICA																								
Seychelles			1			334	446	4	1	4 323	345	774	743	1	113	588	851			257	52			24
Mauritius			112			334	456	4	1	3 433	345	754	7	4	1	1 112	578	841			257	52			24
Nairobi			112	3		334	567	81	4	3 532	345	787	855	2		12	588	873			257	54			24
Harare			123	3		233	567	8	5	1 633	345	767	945	31		12	588	875	1		257	542			24
Capetown			131			143	565			654	335	5	54	421		12	534	872	2		257	552			24
Lagos			134	5		142	468	95	331	653	235	793	885	42		2	578	875	2		257	552			24
Ascension Is			13	52		42	347	87	1	54	234	797	72	31		1	478	87	1		257	552			24
Dakar			12	42		42	356	881	421	453	233	697	885	531		1	378	885	2		157	552			24
Las Palmas				11		33	234	671	521	576	666	898	976	654	334	589	886	421	111	368	††	3		3†
S AMERICA																								
South Shetland			1				146	3		2	335	761	324	111	12	476	775	2		247	552			4
Falkland Is			11	31			246	86	1	3	335	681	435	311	12	465	775	2		136	552			3
Rio de Janeiro			1	32		2	245	772	521	14	333	588	875	221	1	268	885	2		37	552			4
Buenos Aires			1	22		1	245	772	521	2 4	334	578	975	4 1	111	248	885	2		26	552			3
Lima				1			122	353	61	121	333	357	863	431	11	25	775	2		2	452			
Bogota							112	242	61	13	332	247	863	321	11	14	675	2		2	352			
N AMERICA																								
Barbados				1		2	122	353	61	124	332	257	963	331	1	26	775	2		3	552			
Jamaica							111	132	5	2	332	236	752	211	11	13	575	21		1	242			
Bermuda						1	111	132	6	4	332	256	852	221	1	24	675	21		2	342			
New York							1	11	4	3	332	246	642	111	11	14	475	21		1	42			
Mexico								21	4		232	224	442	1	11	1	265	2			32			
Montreal							1	11	4	3	333	246	642	111	11	24	475	21		1	42			
Denver									2		122	223	332	1	111	1	144	2			2			
Los Angeles									1		22	222	223	2	12		34	2			2			
Vancouver									1		12	122	223	211	12	111	24	2			2			
Fairbanks										121	112	111	113	321	112	221	1	2						

The provisional mean sunspot numbers, issued by the Sunspot Index Data Centre, Brussels, for January and February were 16 5 and 16 1 respectively. The maximum daily sunspot numbers were 63 on 20 January, and 27 on 20 and 21 February; the minimum numbers were 0 on 1–7, 10, 11, 26 and 30 January, and 7 on 7 February. The predicted smoothed sunspot numbers for May, June, July and August are, respectively: (classical method) 27, 25, 24 and 22; (S1DC adjusted values) 22, 20, 17 and 15.

Contest News

28MHz Cumulative Contests 1984 results

The phone contests held in September were experimental, but judging from the enthusiastic comments from the 43 entrants who sent in logs, it seems the HF Contests Committee got it right the first time round. It would appear that the phone sessions wetted the appetite of many who had not previously tried 28MHz for inter-UK working, and there were over 300 different stations active and a total of 70 entrants in the five cw sessions later in the year.

Phone sessions. Most competitors expressed their delight in being able to make a number of "long-haul" inter-UK contacts via tropo propagation. There were a few openings to South America, Africa and the Middle East and a number of short "E" sessions to Europe.

The winner of the certificate of merit for the best log was also the highest scoring station, G4UKN/P, who operated from a site in Nottinghamshire. He was also a contender for the merit award, as he worked in the open in quite bad weather conditions. Only a few submitted details for this award, and after due consideration the committee has awarded the certificate to G4SOF for his efforts from a remote site in North Devon.

There was only one entrant in the multi-operator section, although a number were active. GW5NF/GW4TTV receives a merit certificate in this section. There were three useful listener logs which helped the checking process. In this section RS44395 wins the receiving certificate.

CW sessions. Conditions were generally poor during the five evenings of the contest, and many stations reported high noise levels and very weak signals. In spite of this there were many very-good long-distance inter-UK contacts with stations from all over the UK in the fray. GI, EI, GD, GM and GW were contacted by a number of stations in the south of England and the Midlands.

As all three leading stations, G6LX, G4PIE and G3WYK, submitted error-free logs, the committee decided to award each a certificate. The merit certificate for the longest licensed entrant goes to G2WS, who received his first full licence in 1930. The committee had no difficulty in deciding that the certificate for the best effort by a newcomer should go to G0AAR, who received his Class A licence the day before the first session of the contest.

There were four entrants in the multi-operator section, with the best performance (and another faultless log) from the Leicester group, G3LRS/A. There were three good receiving logs, and in this section RS20249 submitted an error-free log and wins a certificate for his efforts.

Almost every entrant in both the phone and cw contests commented most favourably on the events and asked that they continue as an annual feature in the RSGB calendar. As space in *Radio Communication* is at a premium, it is not possible to list individual comments and suggestions for future 28MHz events. A number of entrants asked if the equipment and antennas used by the leading stations could be listed, while others suggested that the phone and cw sections should be alternated so that there are two sessions each week over, say, a three-month period. The committee will consider all these suggestions when the rules for the 1985 cumulatives are considered. To satisfy the curious, the majority of leading entrants in both parts of the contest used more than one antenna. Yagi and quad beams in conjunction with a dipole or vertical were the standard, although phased or colinear fixed arrays were also popular with some entrants.

The committee was very pleased with the standard of logs and is glad to report that there were no unmarked duplicates and very few errors. With the problems of QRM, weak signals and high noise levels (particularly in the cw sessions), this is no mean achievement and all entrants are to be congratulated. The next set of 28MHz cumulative contests will be in the late autumn. The committee looks forward to a bumper entry.

G4RWW

PHONE SESSIONS

SINGLE-OPERATOR SECTION

Callsign	Cnty	3 Sep	11 Sep	19 Sep	27 Sep	Total*
G4UKN/P	NOT	ck	186	180	ck	366(Cert)
G3YPZ	ESX	—	—	126	144	270
GW4HSH	GNW	ck	168	93	ck	261
G4RCG	YSW	126	129	ck	ck	255
G3IMW	LDN	—	99	114	ck	213
GW4BLE	GWT	—	102	ck	75	177
G4UMS	LDN	—	87	81	—	168
G4PEL	LIN	48	—	—	108	156
G4RAB		ck	90	ck	66	156
G4SZI	HFD	—	81	75	ck	156
G4SOF	DVN	—	78	51	—	129(Cert)
G4TMI	HPH	—	81	—	42	123
G4BUO	KNT	ck	63	57	—	120
G4MET	MCH	63	ck	54	ck	117
G4OKN	LDN	ck	ck	60	51	111
G4OTU	DOR	54	57	ck	ck	111
G3MCX	LDN	ck	—	54	45	99
G4PGW/P	DVN	ck	45	51	—	96
GW4UZL	DFD	54	ck	42	ck	96
G4VCO	BFD	21	72	—	—	93
G4JBR	DVN	48	42	—	—	90
G4OBK	LNC	48	36	ck	—	84
GW3NNF	GDD	51	27	—	—	78
G3WBM	ESX	36	—	42	—	78
G4RMC	HFD	—	24	48	—	72
G4NVQ	SXE	39	30	ck	—	69
G2HLU	BKS	—	39	27	—	66
G3IGU/P	YSW	ck	ck	36	30	66
G3KSH	YSN	—	21	42	—	63
G4WCS	LNC	48	—	15	—	63
G3UHU	ESX	ck	ck	36	24	60
G4IDF	HWR	—	30	ck	24	54
G4SBD	KNT	—	—	30	24	54
G4BEE	LNC	—	27	—	21	48
G3TGR	DVN	ck	24	18	ck	42
G4PTE	KNT	—	—	21	21	42
G4ILK	DVN	ck	15	21	ck	36
G4XTM/M	YSW	ck	ck	21	9	30
G6LX	LDN	ck	ck	ck	ck	—

MULTI-OPERATOR SECTION

Callsign	Cnty	3 Sep	11 Sep	19 Sep	27 Sep	Total*
GW5NF } GW4TTV }	GNT	—	120	72	ck	192(Cert)

RECEIVING SECTION

Callsign	Cnty	3 Sep	11 Sep	19 Sep	27 Sep	Total
RS44395		ck	39	—	21	60(Cert)
RS32525		—	—	48	—	48
RS62088		—	—	27	—	27

* Best two sessions

CW SESSIONS

SINGLE-OPERATOR SECTION

Callsign	Cnty	12 Nov	20 Nov	28 Nov	6 Dec	14 Dec	Total*
G6LX	LDN	162	165	156ck	—	168	495(Cert)
G4PIE	BKS	132ck	138ck	150	159	144	454(Cert)
G3WYK	BRK	126	144	—	—	138	408(Cert)
G4RCG	YSW	132	120	120ck	147	111ck	399
G4BLX	SXE	—	153	198	—	—	351
G3TCT } G8JM }	SRY	—	—	117	129	102	348
	LDN	—	102	126	120	96ck	348
G4UMS	LDN	—	—	132	108	105	345
G3TCU	SRY	102	—	117	114	—	333
G4VCO	HFD	—	—	123	108	96	327
G2PA	HFD	102	99	99ck	117	93ck	318
G3SYA	LNH	90ck	102	105	108	96ck	315
G3GVM	HPS	—	102	96	90	—	288
G4BJO } G4SFO }	SRY	93	90	—	—	84	267
	WKS	—	—	93	87	87	267
G3SDC		63ck	96	36ck	87	78	261
G4OTU } G4NLZ }	DOR	ck	78	90	87	ck	255
	DYS	—	90	—	84	81	255
G3KDY } G3LIK }	LEC	—	93	87	72	—	252
	LDN	75	69ck	90	87	—	252
G4PUR }	HFD	60ck	75ck	87	87	78	252
G2HLU	BKS	ck	ck	75	90	84	249
G3MCX	LDN	84	72ck	78	84	75ck	246
G3ICH } G4XFB }	DVN	78	63	78	57ck	57ck	234
	DOR	—	84	84	—	66	234
G3RZI	HWR	69	84	—	ck	69	222
G4BUO	KNT	57	42	120	—	—	219
G4NFX } GW4HSH } G4VOW }	HBS	60ck	63ck	69	78	66	213
	GNW	ck	84	69	—	60	213
	NOT	75	69	69	69ck	63ck	213
G3BWN		51ck	60ck	72	72	66	210
G3URA	HFD	63ck	72	69	66	12ck	207
G3GHY	HPH	57ck	63	69	72	51ck	204
G3OSJ	SOM	42ck	66	48ck	54	75	195
G3CHN	HPH	52ck	—	63	66	63	192
G4UZN	YSW	57	72	48ck	57	45ck	186
G3KDB	SFD	—	—	93	—	84	177
G2WS } G4MPK } G3RNF } G3ZGA }	AVN	66	60	—	42	42ck	168(Cert)
	SRY	51	—	45	72	—	168
	LNH	51	60	—	—	45	156
	HPH	48	45ck	54	42ck	54	156
G4OCU	HBS	45	54	48	—	—	147
G4DFV	NOT	—	—	36	51	51	138
G3WYW	BRK	30	51	48	—	—	129
G3KSH	YSW	33	36	45	—	—	114
G4KKZ	CNL	42	36	33	—	—	111
G4ZFQ	IOW	—	ck	42	39	24	105
G8LY	HPH	30ck	24ck	36	30	36	102
G3YBT	WLT	—	42	—	—	48	90
GW4GXG	GNW	18ck	33	27	18	15ck	78
G3VNC	SOM	—	39	33	—	—	72
G4BEE	LNH	30	21	18	9ck	9ck	69
G0AAR	SFK	18	24	—	—	12	54 (Cert)
G3XLU	CNL	24	—	—	15	12	51
G3YBT	WLT	ck	—	48	—	—	48
G2DHV	KNT	15	6	—	3ck	21	42
GW3POM	GNM	15	6	18	—	—	39
G3BFP	LDN	ck	—	—	ck	—	—
G3BUF	HFD	ck	—	—	—	—	—
G3KXT	LDN	ck	ck	—	—	ck	—
G4ALG/A	CNL	—	—	—	ck	—	—
G4CGW	HPH	ck	—	ck	ck	ck	—
G4QK	SOM	ck	—	—	—	ck	—

MULTI-OPERATOR AND CLUB SECTION

Callsign	Cnty	12 Nov	20 Nov	28 Nov	6 Dec	14 Dec	Total**
G3LRS/A	LEC	93	84	57	54ck	ck	234 (Cert)
G3BLS/G4PNJ		21	33	9ck	15ck	39	93
GW4ULG	GWT	24	24	—	3	—	51
G4AYM	GLR	—	—	42	—	—	42

RECEIVING SECTION

Callsign	Cnty	12 Nov	20 Nov	28 Nov	6 Dec	14 Dec	Total**
RS20249		57	75	51ck	—	60	192(Cert)
RS44395		57	57	63	57ck	36ck	177
RS53544		ck	ck	24	39	48	111

** Best three sessions.

21MHz CW Contest 1984 results

Awful, lousy, dreadful, terrible, bad and abysmal! Just a few of the comments which accompanied an uncommonly-small number of logs for this usually well-supported contest. The reason? Extremely bad propagation conditions. Few entrants stayed within the contest for its duration; two of those who did took the top honours. 9J2BO worked 125 British stations.

No W or VE stations were worked, and only a couple of VKs were worked by a handful of stations. Africa was well represented with TR8JLD, 3D6AK, KC7UU/5N6, various ZSs and 9J2 appearing in most logs. From the near-East, ZC4BI and 9K2BE fared well. South America was represented by a few PY and LU stations; PY2RRG doing particularly well with his triband beam and 100W.

Logs were of an acceptable standard, but some G entrants were under the wrong impression that GI, GW and GM stations counted as multipliers. There also seems to be confusion as to whether stations who are heard/worked but are not themselves in the contest can be counted for points. The rules (general rule 6) state that if a participating station gives out a serial number he can count the contact for points in the contest irrespective of whether that station sends a serial number back in return.

The T E Wilson, G6VQ, Cup, together with RSGB publications to the value of £10, will be awarded to Dave Lawley, G4BUO. At the discretion of the HF Contests Committee, certificates have been issued only to those indicated.

BRS32525

G-LISTINGS

Posn	Callsign	Points	Posn	Callsign	Points	Posn	Callsign	Points
1	G4BUO	9,396*	11	G3ZRH	2,583	20	G3RXP	1,050
2	G3JKS	5,508*	12	G5MY	2,538	21	G3BWN	780
3	G3SYA	5,325*	13	G2QT	2,496	22	GW3JI	702
4	G4EOF	5,226	14	G3LRS	2,268	23	G4WYG	660
5	G4UPS	4,956	15	G3YEC	2,244	24	GM4EJI	360
6	G4OTU	3,975	16	G3CCZ	2,166	25	G3AWR	336
7	G3KSH	3,168	17	G4RHS	2,160		G4SMN	336
8	G3TXF	2,880	18	G4OBK	1,998	27	G3SJX	150
9	GW3MPB	2,760	19	G3SXW	1,632	28	G3ILO	48
10	G3SWH	2,736						

G-QRP LISTINGS

Posn	Callsign	Points
1	G4ELZ/P	1,890*
2	G3UJV	150
3	G3VMY	72

G SWL LISTINGS

Posn	Callsign	Points
1	BRS44395	2,520*
2	BRS1066	2,394
3	BRS52868	1,050

DX LISTINGS

Posn	Callsign	Points	Posn	Callsign	Points	Posn	Callsign	Points
1	9J2BO	4,524*	10	UH8EAA	405	18	HA5LZ	180
2	YU4EMA	3,102*	11	YU7SF	372	19	LZ2KCS	144
3	PY2RRG	1,890*	12	PT7ACZ	348	20	OK1TW	108
4	YU3TE	1,752	13	UJ8JA	345	21	DL2EBO	72
5	3D6AK	1,680*	14	SM6EUZ	315	22	UD6DF	42
6	ZC4BI	1,491*	15	YO5BAT	312	23	LZ2TU/P	36
7	I5YDI	846*	16	YO3CR	284	24	UL7TT	27
8	9K2BE	705*	17	PA0GT	192	25	Y21TL	25
9	EC2AJU	672*						

DX SWL LISTINGS

Posn	Callsign	Points
1	UB5-078-306	12

DX QRP LISTINGS

Posn	Callsign	Points
1	OK2BTI	120*
2	OK2BMA	18

*Certificate winners

Check logs were gratefully received from G3GMM, OZ2E and SM0KV.

1985 Cumulative Contests results

The six contest periods in January attracted the highest number of participants ever for these popular activity events. Nearly 500 different stations were active, and 183 logs were sent for checking: 53 on 1·8; 78 on 3·5 and 52 on 7MHz. Apart from one entry, all were in the single-operator category. There were two excellent swl logs from non-RSGB members, which were most useful for checking purposes.

The entries are shown in the table in alphabetical order for the sake of clarity, as each band grouping has a different winner and different individual placings. Certificate winners are shown starred and it will be seen that there are separate awards for each band. The rules stated that a certificate would be awarded for the best log in each "section" but this was an error as it should have read each "session". On this basis the certificates go to G3XWZ for his efforts in both the 1·8MHz sessions, G4OBK and G3SYA for 3·5MHz, and to GM4SID and G3OLB for 7MHz. The only multi-operator entrant was the West Kent ARS, G3WKS, operated by G4FDC, and they also receive a certificate for their 3·5MHz entry. The two swl logs do not qualify for an award. All these logs were completely error free, so under the rules the highest score criterium was used to decide the certificate winners. Unfortunately some of the other logs were not to the same high standard, and several contained unmarked duplicates, callsign and other errors or were unscored. One entrant would have qualified for a certificate on claimed score, but the log contained two duplicates and seven errors. There were a number of check logs, with one from G6ZY/EA6 on 1·8MHz. The thanks of the HF Contests Committee go to all those stations who participated and sent in logs.

Once again, entrants queried whether contacts with overseas stations qualified for points. The rules permit any contact to count, so there is no problem, and many logs contained QSOs with European and dx stations, including HZ and VE on top band. It has become the custom for cumulative contest entrants to comment in some detail, but this year the space available for this report is limited. To summarize, while most seem very happy with the concept of the cumulatives and the timings, there is a majority of entrants who prefer the earlier format of three sessions on each band with the total of the best two to qualify for the band award. The committee will make the change for the 1986 contest. There was a complaint about the rules for the swl section, as one regular entrant felt that it was unfair to ask for both sides of the contact to be recorded. Others asked that the rules be commoned with those for the 28MHz Cumulatives, and that the county code is added the to the exchange. There were several requests for a series of phone contests along the lines of the 28MHz phone events. All these proposals will be considered by the committee for the 1986 event.

G4RWW and G6LX

Callsign	Date (January) 15	24	6	12	19	27	Club
G2HLU	81	84	165	192	111	87	
G2VJ	—	—	192	207	—	—	Central ITV
G3AWR	84	89	117	135	114	81	RNARS
G3BFP	78	96	—	—	—	—	SRCC
G3BPM	129	138	150	137	24	—	TVARTS
G3DZW	—	—	78	117	—	—	Lincoln
G3GHY	111	126	126	156	87	102	
G3HQH	—	—	150	198	—	—	
G3JJG	63	165	195	222	153	168	CARA
G3JKS	—	—	150	—	—	—	
G3KDB	—	144	—	144	120	—	Lichfield/HFCC
G3MCX	108	117	123	120	78	54	SRCC
G3MUO	—	—	174	165	—	—	Stockport
G3OLB*	—	189	—	—	—	255	Farnborough
G3ORY	—	—	204	237	—	—	
G3SB	9	36	138	168	96	108	
G3SJX	—	—	201	—	—	—	Addiscombe
G3SND	—	—	108	150	69	90	Kidderminster
G3SWH	156	183	204	225	135	214	
G3SXW	—	—	84	—	—	99	HFCC
G3SYA*	156	153	222	246	159	150	Preston
G3TUX	—	—	126	150	—	—	
G3TXF	—	—	—	—	—	96	HFCC
G3UOF	159	204	—	—	159	204	RNARS
G3VYI	—	141	—	—	—	—	Addiscombe
G3WKS*	—	—	153	165	—	—	West Kent Soc.
G3WYK	—	—	202	215	—	—	Maidenhead*
G3XFB	123	54	141	177	153	114	
G3XNG	—	—	CK	—	—	—	
G3XWZ*	225	211	—	—	—	—	Mansfield
G3XYC	147	150	—	—	123	141	Melton Mowbray
G3YMC	—	147	—	132	—	—	Bracknell
G4BOU	—	—	201	186	—	—	
G4ECI	CK	—	117	—	—	—	
G4HVC	—	—	183	201	—	—	Newark
G4KGK	—	—	—	—	144	144	Ainsdale
G4OBK*	219	186	246	231	180	—	Stockport
G4ODC	—	—	—	—	183	—	
G4OGB	153	177	174	174	111	123	Scunthorpe
G4OTU	126	132	201	213	153	231	
G4PDQ	129	144	51	207	102	—	CARA
G4RPW	27	36	87	87	102	93	Preston
G4RWW	—	CK	—	—	—	—	CATS/HFCC
G4SLE	63	78	—	117	—	69	
G4UML	—	—	192	198	—	—	Stockport
G4UZN	—	—	204	204	132	—	
G4WZU	—	—	108	141	—	—	Scunthorpe
G4XPE	—	—	69	87	45	57	Derby
G4XTM	—	—	60	72	66	36	
G5LP	153	162	228	240	201	192	Nene Valley
G5MY	—	—	—	—	—	147	
G6LX	CK	CK	CK	CK	CK	—	SRCC/HFCC
G6ZY/EA6	—	CK	—	—	—	—	
GM4SID*	150	138	63	135	207	198	RNARS
GW4PXQ	—	—	CK	CK	—	—	
J. Ash	—	—	—	—	CK	—	G-SWL
P. Ash	CK	CK	CK	CK	—	CK	G-SWL

* Certificate winners

432MHz Fixed Station Contest Results

It was pleasing to see a large increase in the number of entries for this year's February 432MHz Fixed Contest. Conditions were generally described as "Flat, very poor, deep QSB"—*G8TFI*, and "Very poor from this location, virtually no Continental activity"—*G4LOJ*, being typical comments. Contacts made with G4FDX/LX/P provided the highlights of the contest for many stations.

Logkeeping was generally good and extremely accurate, with few points being lost. The new locator system caused no problems—virtually all stations on the band knew their locator and obviously understood the system (despite adverse comments from entrants).

Congratulations to the winners and runners-up in each section, particularly G8TFI for repeating last year's success.

SINGLE-OPERATOR

Posn	Callsign	Points	QSOs	Locator	Antenna	Best dx	Km
1	G8TFI	1,148	174	IO81UQ	16Y	DJ9DL	656
2	G3NNG	803	136	IO91EP	21Y	DJ9DL	610
3	G4CQR	723	129	JO01BB	21Y	G8PNN	478
4	G4SHC	636	109	IO83WO	21Y	GJ4ICD	487
5	G3TA	460	100	IO81XS	21Y	GM6MGS/P	593
6	G4JLG	395	76	IO83TM	88MBM	G4RPQ	330
7	G3WHK	353	95	IO91VJ	2×21Y	PA0RDY	368
8	G4JSX	343	85	IO92LJ	2×18PBM	G4FDX/LX/P	552
9	G8PNN	318	32	IO95EF	2×21Y	G4RFR	496
10	G6OYL	316	64	IO90AS	21Y	G4RFR	300
11	G8CRN	304	71	IO92SA	48MBM	G4FDX/LX/P	500
12	G4NVA	264	71	IO83UF	21Y	G4MDZ	335
13	G6HYR	248	44	IO93FR	21Y	G4CQR	317
14	G4HAY	241	73	IO91VR	48MBM	G4MGR	227
15	G6HKM	230	54	JO01FT	21Y	GU8FBO	342
16	G6WZO	216	50	IO83LO	21Y	G4CQR	355
17	G1DOX	197	56	IO82SQ	24Y	GM6MGS/P	492
18	G5UM	183	51	IO92MP	14Y	G4CQR	178
19	G4ULS	179	53	IO82TI	19Y	G4MDZ	287
20	G4DDL	178	50	IO91OJ	19Y	G4MGR	266
21	G4VXE	169	45	IO81WV	21Y	G8PNN	372
22	G0AHQ	156	49	IO83UB	2×21Y	G4CQR	277
23	G6HLL	103	35	IO83RE	48MBM	G4FUF	271
24	G8XPZ	89	23	IO93IA	48MBM	G4CQR	239
25	G6XDI	72	36	IO91TM	19Y	G4LOJ	156
26	GW1JSH	59	15	IO81LN	48MBM	G4SHC	235
27	G6HXU	54	26	IO83RF	14PBM	G8TFI	172
28	G6BDV	42	22	IO91TT	32MBM	G4SIV	102
29	G6CSY	7	3	JO01BJ	HB9CV	G8FUO	—

MULTI-OPERATOR

Posn	Callsign	Points	QSOs	Locator	Antenna	Best dx	Km
1	G4MGR	755	125	IO83KH	21Y	G4FDX/LX/P	726
2	G4SIV	570	88	IO92TR	2×21Y	DB8KJ	515
3	G4LOJ	524	62	JO02QN	27LQ	G4DGU	437
4	G4NUT	515	106	IO92PC	24PBM	G4FDX/LX/P	519
5	G4WYJ	481	119	IO91VH	24PBM	PA0WWM	336
6	G8OHM	447	98	IO92AJ	24PBM	PE1EWR	390
7	G3WOI	395	86	IO91JK	21Y	DJ9DL	580
8	G4WET	366	92	IO92CA	19Y	G8PNN	356
9	G4NAC	325	68	IO92PJ	19Y	G4FDX/LX/P	920
10	G3GJL	320	90	IO82SI	2×19Y	G1LSB	269
11	G4RPQ	293	67	JO01FC	48MBM	G6OYL	496
12	G4TBR	230	72	IO91QQ	19Y	G4FDX/LX/P	495
13	G6LMV	137	36	IO91VT	21Y	G4MGR	258
14	G8UUP	122	60	IO91UM	18PBM	G4LOJ	163
15	G1FBH	114	27	JO00DT	19Y	G8XVJ	346
16	G4VUA	52	20	IO92QW	18PBM	G4MGR	172
17	G6PNB	44	24	IO81RM	17Y	G8FUO	133
18	G6CJA	32	9	JO01GU	19Y	G4SIV	159

Checklogs received from G8VPE, G6MEN, G1DWI/P, PE1EWR.
Entry from G4RFR disallowed (rule 2a).

144MHz Fixed Station Contest, December 1984, Results

Once again this event proved to be one of the most popular of the year, and although conditions were not particularly good, most stations managed some reasonably good scoring contacts. Several callsigns that have become part of the contest scene were not to be heard during the event, but in most cases these were to be found on the cover sheets where local groups were formed "to avoid the mutual QRM". This policy may have had some bearing on the very low level of "poor signal" reports, although the adjudicator is more inclined to feel that conditions were such that receiver overload was much reduced compared with events earlier in the year.

In the multi-operator section, G4NXO, the South Bucks Contest Group (G8TFI, G4NBS and GW4LXO) emerged the winner, closely followed by G4ANT, the Norfolk VHF-UHF Contest Group (G3JOC, G3ZIG, G8VLL). The single-operator leaders were more separated by both points and distance; G4MDZ in Kent and GM4YXI in SW Scotland. Congratulations to the leaders and to the stations who claimed zone awards.

G3LCH

SINGLE-OPERATOR SECTION

Posn	Callsign	Points	QSOs	QTH	Zone	Best dx	Km
1	G4MDZ	4,201	392	AL76		DJ9BV	657
2	GM4YXI	3,831	365	YO05		F6FLB	545
3	G4KUX	3,096	335	ZO21		PE1AAP	555
4	G4MJC	2,012	144	AK12		DG6SAK	694
5	G4SHC	1,817	270	YN40	A	F1FHI	–
6	G4WFR	1,620	182	AL07	C	DJ8ID	619
7	G8IEM	1,390	200	ZK16		DL2OM	613
8	GW4ALG	1,164	186	YL27	E	DL2OM	739
9	G6HKM	883	143	AL13	C	DG4NAE	641
10	G6XYH	771	106	ZO03		GJ4ICD	641
11	G4HLX	745	157	ZL23		DL0UD	601
12	G6TEP	719	105	AL47		GD4IOM	506
13	G1CDO	667	153	ZN24		G1FOM	375
14	G6WJY	574	92	ZO13		G6GLP	500
15	G6IAT	484	107	ZL09	B	G6IAT	467
16	G8ZRE	479	101	YN66	A	G8IEM	295
17	G6HXU	477	97	YN68		GM4ZUK	427
18	G3GDU	470	104	ZL80	C	GM4YKI	472
19	G4FVK	450	78	ZM39		F1CYM	600
20	GI6ATZ	438	34	XO31		G8PUB	542
21	G6WYZ	434	100	ZM77		DL0UD	554
22	G0AAO	404	85	ZN32		GM4ZUK	370
23	G6NQX	392	70	AL47	C	GW6KQC	365
24	G3JMB	360	88	ZL80		F1CYB	458
25	G1DVU	353	73	ZK10	C	GM4YXI	490
26	G1JJA	306	82	ZM51		PE1FIG/P	421
27	G8XTJ	302	101	ZL27	D	GM4YXI	393
28	G4RYV	256	64	ZL56		GD4IOM	402
29	G6DCF	250	50	YN38		G4MDZ	370
30	G4KVI	249	112	ZL37		F6BBD	358
31	G8UCN	233	81	ZN43	A	GM4ZUK	399
32	G3SYA	226	30	YN17		G4RIS	365
33	G6ZDV	223	66	ZL35	D	GM4YXI	399
34	G8UYD	200	56	ZN64	B	G4RFR	275
35	G1FXG	184	32	AM64	C	G4KUX	319
36	G6ROD	175	53	YN50	A	GM6LNM	318
37	G2DHV	108	45	AL41		GW6OSM	210
38	G4VRC	57	31	ZL68		G4NXO	198
39	G1GWS	52	20	YN66		GM4YXI	192

MULTI-OPERATOR SECTION

Posn	Callsign	Points	QSOs	QTH	Zone	Best dx	Km
1	G4NXO	4,422	452	YM75		DL2OM	756
2	G4ANT	4,417	363	AM27	C	F1BRV	758
3	GW6OSM	3,216	381	YL17	E	DL3EBW/P	702
4	G8ZHP	3,123	273	ZM29	B	F6DCD	731
5	G4BWG	2,964	412	ZL60		DG4NAE	660
6	G4ZAP	2,941	403	ZN72		DC3VW	729
7	G4MHC	2,746	323	YM79	B	DL2OM	720
8	G8DVK	2,657	359	ZL34		—	—
9	GD4IOM	2,438	226	XO67	A	F1FHI	810
10	G8PUB	2,259	337	AL32		DK5LB	651
11	G6DOD	2,221	330	ZL09		DG4NAE	696
12	G4NUT	2,211	336	ZM77		DK0MR	619
13	G4RNL	2,082	335	YN48		F1FHI	704
14	G6HH	2,041	231	AK03		GM4CXM	640
15	G4RFR	1,981	241	ZK11	D	GM4JUK	769
16	G3WOI	1,945	287	ZL44	D	DG4NAE	749
17	G3KFT	1,864	290	ZL01	D	DL2OM	687
18	G4XDZ	1,830	262	AL43	C	DG4NAE	628
19	G4MGR	1,637	250	YN55	A	PE1ML	553
20	G3WSC	1,482	260	ZL79	C	DL2OM	562
21	GM4ZUK	1,477	112	YR80	G	G4RFR	700
22	GI1BM	1,433	251	ZL39		DG4NAE	687
23	G3UKC	1,353	185	AL56	C	DG4NA	583
24	G4NWZ	1,350	233	ZM57	B	F1CYB	594
25	G8OMR	1,276	218	ZK20		DG4NAE	657
26	G4WET	1,255	291	ZM71		DL2OM	685
27	G8HGN	1,199	127	AL31	C	GM4CXM	570
28	G4XEN	1,151	195	ZM57		DL8EBW	554
29	G6ZME	1,142	244	YM28		PE1EWR	694
30	G4VAT	1,122	243	ZM80		DL2OM	566
31	G1KAR	1,107	125	AK12		HB9AEN/P	678
32	G6WBP	1,010	218	ZL38	C	DG4NAE	675
33	G1ASP	1,007	212	ZN55		F6CKZ	468
34	G3TAD	977	177	YL48	D	DJ9UX	672
35	G8TPR	970	206	ZL39			621
36	G3BZU	927	193	ZK05	D	GM4ZUK	616
37	G3CXX	913	182	YN49		F6FLB	182
38	G8GHU	884	140	YK38	D	GM8LJE	480
39	G6VGG	856	184	YM60	B	DB0HC	611
40	G6TPL	820	110	AM44	C	DC6EL	490
41	G4YVZ	781	167	ZK07		DJ0MN	560
42	G4TZM	769	128	AL15	C	DG4NAE	603
43	G3GJL	766	242	YM58		F1BBD	924
44	G6BBG	749	165	YM79	B	DF7KF	682
45	G8LWU	746	174	ZM43	B	PE1IML	444
46	G4ZAZ	735	144	ZL32	D	PE1JAN	465
47	G4IHO	727	174	ZN61	B	GM4ZUZ	426
48	G6GS	713	179	ZL68	C	GM4CXM	580
49	G4NVA	693	141	YN69		GM4ZUK	426
50	G4HVC	679	142	ZN78		—	—
51	G4RKF	664	140	ZL24		I5KWW	1331
52	G4TXT	655	141	ZL08		DL2OM	589
53	G6APD	649	124	ZK15		DL2OM	621
	G3IGQ	649	159	ZL68		DL2OM	586
54	G8HAC	585	143	YM60	B	ON7KX	398
55	G2BRS	581	149	YK19	D	EI5BUB	540
56	G6GLP	560	71	YK32	D	—	—
57	G6PNP	547	120	YL48		GM4CXM	509
58	G8ZK	507	151	ZM04		GM4ZUK	480
59	G2BBC	483	157	ZM41	B	GM4YXI	493
60	G8ZKE	445	127	ZM41	B	GM4ZUK	514
61	G1GRT	420	100	YN45	A	G4MDZ	385
62	GW4EZW	333	89	YN35		F1GJP	515
63	G1JVQ	312	69	ZK20		GM4YXI	500
64	G1AZQ	274	86	ZM21		GM4YXI	274
65	G4XPE	273	77	ZM13		G6TEP	263
66	G4JBH	271	68	YK07	D	F1BBD	465
67	G8OLI	260	88	ZL38		GM4YXI	415
68	G4ZMO	206	60	ZL27	D	GM4YXI	403

Zone certificates. Entrants were requested to show the RSGB zone from which the station was operated on their cover sheets. As can be seen from the results table, a number of contestants did not do so. In this instance, certificates for zone leaders have only been awarded to stations where the RSGB zone (or region) was shown. In the case of club stations, it would be helpful if the address of the station could be given, particularly if this differs from the correspondence address.

Zone	Multi-op section	Single-op section
A	GD4IOM	G4SHC
B	G8ZHP	G6IAT
C	G4ANT	G4WFR
D	G4RFR	G6WYR
E	No claim	GW4ALG
F	No claim	No claim
G	GM4ZUK	No claim

Check logs. The adjudicator was grateful for the high number of check logs received for this event. There were, however, included in the following list, a number of entries that did not conform to the rules of a fixed station contest or had incomplete paper work. BRS25439, PE1EWR, G3YKP, G4NVF, G4UIP, GM4WDO/A, G4ZRS/A, G6AXO, G6CSY/P, G6GVI/A, G8CNH/P, G8JCV, G8PGM, G8RAF, G8XWA, G1DTV, G1FON, G1ISR/P.

1,296MHz Cumulative Contest 1984 results

This year's Cumulative contestants experienced generally flat conditions and low activity compared with last year. This was borne out by the number of logs, down from 18 last year. A number of entrants complained of the lateness, too near Christmas, of the last session on 20 December. The addition of Rule 4, single-operator, brought some adverse comments which, together with other comments, will be reviewed before the rules are set for the 1985 Cumulatives.

Equipment used varied in power from 2W-15W solidstate to 160W using 7289 valves. A number of stations now use GaAsfet preamps in their front-ends, either masthead or shack-mounted in front of their transverters. Antennas were used in different configurations; single and multiple 23-el Yagis, and 26-el quad loops, in addition to 38-el and 52-el antennas.

Congratulations to the leading fixed and portable stations and the overall runner-up who receive certificates.

G4HWA

Posn	Callsign	Points	QTH	Pwr	Ant	Best Dx	Km	Session
1	G8TFI	502	YL29J	160w	4ft dish	F6DWG	395	1,3,4
2	G4NVA/P	420	ZN61F	20w	26QLY	G4PRJ	306	1,4,5
3	G6SNO/A	281	YN55J	90w	23Y	G4CQR	335	1,3,4
4	GW8AAP/P	271	YN65H	20w	38QLY	G4CQR	319	1,3,4
5	G8GDZ	255	ZM41G	80w	4×23Y	G4PRJ	241	3,4,5
6	GW8ACG/P	205	YM05J	40w	2×25QLY	G4CQR	305	1,3,4
7	G4ZTR	131	AL13E	100w	23Y	G4CBW	234	1,4,5
8	G1DGL/A	122	ZL68H	15w	26Y	G4NVA/P	233	1,2,3
9	G4PRJ	110	AK12E	2w	23Y	G4CBW	308	1,3,4
10	G8ZQB	108	ZM35G	40w	4×27QLY	G3JVL	200	3,4,5
11	G8GTP	64	YN39J	9w	2×15/15	GW4ERP/P	182	1,2,4

Summer 1·8MHz Contest 1985 rules

1. **Eligible entrants.** Single or multi-operator. British Isles entrants must also be members of the RSGB.
2. **Period.** 2100gmt Saturday 22 June to 0100gmt 23 June 1985.
3. **Sections.**
   (a) British Isles stations
   (b) Overseas stations (including EI).
4. **Frequency/mode.** 1,820-1,870kHz cw only.

5. Contest call and exchange. CQ test, RST plus serial number starting at 001. British stations must also give their county codes, published in the "*Rad Com* Operating Guide" supplement, *Rad Com* January 1985.
6. Scoring.
(a) British Isles section. Three points for each contact, with a bonus of five points for the first contact with each new British Isles county/region and the first contact with each new country outside the British Isles.
(b) Overseas section. Three points for each contact with a station in the British Isles (not EI), with a bonus of five points for the first contact with each new county/region.
7. Logs. Log sheets to be headed: date/gmt; callsign; RST/number sent; RST/number received; code received; bonus; points.
9. Declaration. Each entry must be accompanied by the following declaration, signed and dated: "I declare that this station was operated strictly in accordance with the rules and spirit of the contest, and agree that the decision of the Council of the RSGB shall be final in all cases of dispute."
9. Address for logs. HF Contests Committee, c/o Roger Western, G3SXW, PO Box 73, Lichfield, Staffs WS13 6UJ.
10. Closing date for logs. Logs must be postmarked not later than Monday 8 July 1985.
11. Awards.
Certificates of merit will be awarded as follows:
(a) The leading score and runner-up in each section and, at the discretion of the HF Contests Committee, the leading entrant from each overseas country.
(b) The highest placed entrant in the British Isles section who has not reached 18 years of age by the date of the contest. Candidates should mark their entries "Under-18 Award".

21MHz CW Contest 1985 rules

Special note for both sections: entrants are particularly requested to use standard size (A4) log sheets.

TRANSMITTING SECTION
1. The general rules for RSGB hf contests, published in the "Operating Guide" supplement, *Rad Com* January 1985, will apply.
2. Eligible entrants. Single operator stations only. British Isles entrants must be members of RSGB. Overseas entrants, all licensed amateurs.
3. Period. 0700 to 1900 gmt, Sunday 20 October 1985.
4. Sections.
(a) British Isles section.
(b) QRP British Isles section. British Isles stations using less than 10W input.
(c) Overseas section (including EI).
(d) QRP Overseas section. Overseas stations using less than 10W input.
5. Frequency/mode. 21MHz. CW only. Entrants are requested **not** to operate in the band 21·075 to 21·125MHz.
6. Exchange. RST report plus a progressive QSO number starting with 001.
7. Scoring.
(a) British Isles stations. Only contacts with overseas stations will count for points. Each contact shall score three points. The final score is the number of countries worked multiplied by the total number of points. The ARRL Countries List will apply with the exception that VO1, VO2, VE, VK, ZL and USA and Japanese call areas, irrespective of prefix, will count as separate countries. Contacts with British Isles stations will not count for points or multipliers.
(b) Overseas stations. Each completed contact with a British Isles station will score three points. The final score is the number of British Isles prefixes multiplied by the total number of points. British Isles prefixes are; G0, G2, G3, G4, G5, G6, G8, GD0, GD2, GD3, GD4, GD5, GD6, GD8, GI0, GI2, GI3, GI4, GI5, GI6, GI8, GJ0, GJ2, GJ3, GJ4, GJ5, GJ6, GJ8, GM0, GM2, GM3, GM4, GM6, GM8, GU0, GU1, GU2, GU3, GU4, GU5, GU6, GU8, GW0, GW2, GW3, GW4, GW5, GW6 and GW8. Contacts with GB stations will not count for points or multipliers.
Duplicate contacts. Unmarked duplicate contacts for which points have been claimed will be penalized at 10 times the claimed points. Entries containing more than five such duplicates will be automatically disqualified.
8. Logs. Log sheets to be headed: Date/time gmt; station worked; RST and serial number sent; RST and serial number received; multiplier; points claimed. They should be submitted with a cover sheet indicating antenna, equipment and power used and must include a separate list of countries worked as specified in rule 7 above.
9. Declaration. Each entry must be accompanied by the following declaration signed and dated: "I declare that this station was operated strictly in accordance with the rules and spirit of the contest and agree that the decision of the Council of the RSGB will be final in all cases of dispute".
10. Address for logs. RSGB HF Contests Committee, c/o J Bazley, G3HCT, "Brooklands", Ullenhall, Solihull, Warks B95 5NW.
11. Closing date for logs. British Isles entrants, 26 November 1985: overseas entrants, 31 December 1985.
12. Awards. The leading British Isles station will be awarded the T. E. Wilson G6VQ Cup, and will also receive RSGB publications to the value of £10. Certificates of merit will be awarded to the leading three stations in each overseas country.

RECEIVING SECTION
Rules as transmitting section except where specified below.
2. Eligible entrants
(a) British Isles. RSGB members only.
(b) Overseas (including EI) all swls.
Holders of transmitting licences for frequencies above 30MHz may also enter the receiving section.
7. Scoring. British Isles swls should only log overseas stations in contact with British Isles stations participating in the contest.
Overseas swls should only log British Isles stations in contact with overseas stations participating in the contest. Scoring and multipliers as in transmitting section.
11. Logs. Log sheets to be headed: date/time gmt; callsign of station heard; report and serial No sent; callsign of station being worked; multiplier; points claimed.
Note. In the column headed station being worked, the same callsign may only appear once in every three contacts except when the logged station is a new multiplier for the receiving station.
Each entry should be accompanied by a completed declaration: "I declare that this station was operated within the rules of the contest and that I do not hold a transmitting licence for frequencies below 30MHz".
12. Awards. Certificates of merit will be awarded to the leading three entries from the British Isles, and to the leading entrant from each overseas country.

Contests Calendar

May-September	10GHz Cumulatives *(Rules in April issue)*
May-September	Microwave Cumulatives *(Rules in April issue)*
4, 5 May	432MHz-24GHz
11-12 May	Peace to the World *(Rules in May* MOTA)
12 May	WAB LF *(Rules in February* MOTA)
18, 19 May	144MHz
19 May	Region Round-up *(Rules in April issue)*
19 May	DF Qualifying Event, Chelmsford/Colchester *(Details in May issue*
1, 2 June	HF NFD *(Rules in February issue)*
8 June	GARTG-RTTY 1985 *(Rules in April* MOTA)
8 June	1,296MHz Trophy *(Rules in April issue)*
9 June	432MHz Trophy *(Rules in April issue)*
9 June	DF Qualifying Event, Dartford Heath
16 June	BATC Summer fun ATV (*Rules in* CQTV129)
22, 23 June	Summer 1·8MHz *(Rules in May issue)*
23 June	DF Qualifying Event, South Manchester
6, 7 July	VHF NFD *(Rules in April issue)*
13, 14 July	SWL *(Rules in May issue)*
14 July	DF Qualifying Event, Mid-Thames
21 July	Low Power Field Day
27 July	432MHz Low Power
28 July	144MHz Low Power
4 August	DF Qualifying Event, Salisbury
18 August	1,296/2,320MHz
18 August	DF Qualifying Event, Coventry
25 August	ROPOCO 2
25 August	GARTG-RTTY 1985 *(Rules in April* MOTA)
7, 8 September	IARU Region 1 FD
7, 8 September	144MHz Trophy and IARU
8 September	DF Qualifying Event, Slade
2, 10, 18, 26 September	28MHz Phone Cumulative
14/15 September	International ATV *(Rules in April issue)*
22 September	70MHz Trophy
29 September	DF National Final, Northampton
5, 6 October	432MHz-24GHz and IARU
5, 6 October	GARTG-SSTV 1985 *(Rules in April* MOTA)
8 October	432MHz Cumulative
12 October	GARTG-RTTY 1985 *(Rules in April* MOTA)
12 October	DF Double Night Event, Slade
13 October	21/28MHz Phone *(Rules in May issue)*
16 October	1,296/2,320MHz Cumulative
20 October	21MHz CW *(Rules in May issue)*
24 October	432MHz Cumulative
26 October	DF Treble Night Event, Mid-Thames
27 October	70MHz Fixed
1, 17 November	1,296/2,320MHz Cumulative
2, 3 November	144MHz CW
3 November	WAB CW *(Rules in February* MOTA)
9, 25 November	432MHz Cumulative
9, 10 November	2nd 1·8MHz
11, 19, 27 November / 5, 13 December	28MHz CW Cumulative
1 December	144MHz Fixed
3, 19 December	1,296/2,320MHz Cumulatives
11 December	432MHz Cumulative
15 December	70MHz CW

21/28MHz Telephony Contest 1985 rules

TRANSMITTING SECTION
1. The general rules for RSGB hf contests, published in the "Operating Guide" supplement, *Rad Com* January 1985, will apply.
2. Eligible entrants
(a) British Isles. RSGB members only.
(b) Overseas (including EI). All licensed amateurs.
3. Period. 0700 to 1900gmt Sunday 13 October 1985.
4. Sections
(i) British Isles single-operator
(ii) British Isles multi-operator
(iii) Overseas single-operator
(iv) Overseas multi-operator
5. Frequencies/mode. 21 and 28MHz, phone only. Entrants are requested not to operate in the bands 21·400 to 21·450MHz; 28·200 to 28·400MHz and 29·100 to 29·700.
6. Exchange. RS report and serial number starting at 001.
7. Scoring.
(a) British Isles entrants: Three points for each completed contact with a

station in the rest of the world. Multipliers will be countries on the ARRL Countries List except that VO1, VO2, VE, VK, ZL call areas and USA and Japanese call areas irrespective of prefix, will count as separate countries. Contacts with British Isles stations will not count for points or multipliers.

(b) Overseas entrants: Three points for each completed contact with a station in the British Isles. Multipliers will be British Isles prefixes which are: G0, G2, G3, G4, G5, G6, G8, GD0, GD2, GD3, GD4, GD5, GD6, GD8, GI0, GI2, GI3, GI4, GI5, GI6, GI8, GJ0, GJ2, GJ3, GJ4, GJ5, GJ6, GJ8, GM0, GM2, GM3, GM4, GM5, GM6, GM8, GU0, GU2, GU3, GU4, GU5, GU6, GU8, GW0, GW2, GW3, GW4, GW5, GW6, GW8. Contacts with GB stations will not count for points or multipliers.

For all entrants the total score will be the number of points on each band added together times the number of multipliers on each band added together. Unmarked duplicate contacts will be penalized at 10 times the points claimed. Entries containing five or more such duplicates will be automatically disqualified.

8. Logs. Log sheets to be headed: date/time gmt; station worked; RS and serial number sent; RS and serial number received; multiplier; points claimed. Separate logs must be submitted for each band and a summary sheet showing the multipliers worked on each band must be included.

9. Declaration. Each entry must be accompanied by the following declaration, signed and dated: "I declare that this station was operated strictly in accordance with the rules and spirit of the contest and agree that the decision of the Council of the RSGB shall be final in all cases of dispute".

10. Address for logs. RSGB HF Contests Committee, c/o Mr M Harrington, BRS20249, 123 Clensham Lane, Sutton, Surrey SM1 2ND, England.

11. Closing date for logs. British Isles entries must be received by 3 November 1985. Overseas entries must be received by 9 December 1985.

12. Awards.

(a) British Isles. The Whitworth Trophy will be awarded to the leading British Isles single operator entrant and the Powditch Trophy will be awarded to the leading British Isles single operator entrant on 28MHz. Certificates of merit will be awarded to those placed second and third overall and to the leading station in the multi-operator section.

(b) Overseas. Certificates of merit will be awarded to those placed first, second and third overall, and to the leading station in the multi-operator section. Certificates of merit will also be awarded to the leading station in each country.

RECEIVING SECTION

Rules as for the transmitting section except as varied below.

2. Eligible entrants.

(a) British Isles: RSGB members only.

(b) Overseas (including EI): all swls.

Note that holders of transmitting licences for frequencies above 30MHz may enter the receiving section.

7. Scoring/multipliers. British Isles swls should only log overseas stations in contact with British Isles stations taking part in the contest. Overseas swls should only log British Isles stations in contact with overseas stations taking part in the contest. Scoring and multipliers as the transmitting section.

8. Logs. Logs to be headed: date/time gmt; callsign of station heard; callsign being worked; RS and serial number sent by the station heard; multiplier; points claimed. A summary sheet showing multipliers heard on each band must be included.

Note: In the column headed station being worked, the same callsign may only appear once in every three contacts logged except when the logged station is a new multiplier for the receiving station.

9. Declaration. Each log must be accompanied by the following declaration: "I declare that this station was operated within the rules of the contest and I do not hold a transmitting licence for frequencies below 30MHz".

12. Awards. The Metcalf Trophy will be awarded to the leading British Isles entrant. The Powditch Receiving Trophy will be awarded to the leading British entrant on 28MHz. Certificates of merit will be awarded to those placed second and third overall and to the leading entrants in each overseas country.

First Short Wave Listener Contest rules

The RSGB, being keen to encourage contest participation by its listening members, has now put its name to a contest just for listeners. The contest has the support of the Society's HF Contests Committee, which will review the staging of the event in the light of the success, or otherwise, of this year's experiment, the rules of which are below.

1. Eligible entrants. Open to short wave listeners all over the world. There will be separate sections for British Isles swls, who must be RSGB members, and for overseas swls. Transmitting amateurs holding Class B licences may also participate.

2. Date and time. From 1400gmt 13 July to 1400gmt 14 July 1985.

3. Sections and bands. There will be two sections, phone and cw. The 28, 21, 14, 7, 3·5 and 1·8MHz bands may be used.

4. Special rules. The object of the contest is to log as many stations in as many countries as possible. The station in the "Station heard" column may only be logged once on each band. The station in the "Station worked" column may not appear more than once in every three contacts logged. The call areas of the USA, Canada, Australia, New Zealand and Japan will each count as a separate country, ie W1, W2, VE1, VE2, etc. All other countries will be determined by the ARRL Countries List. No "CQ", "QRZ" or similar call will be allowed to count for points. Only stations in QSO may be logged for points. /MA and /MM stations will not count for points.

5.Scoring. One point for each different station logged on 28, 21 and 14MHz, and three points for each different station logged on 7, 3·5 and 1·8MHz. The final score is total points multiplied by the number of different countries heard on each band added together. A list of countries heard on each band must be provided, and a separate log submitted for each band.

6. Documentation. Log sheets, preferably on RSGB HFC1, should show the following: date, time (gmt), band, station heard, station being worked, report of station heard at swl QTH, multiplier, points claimed. If points are claimed for both stations heard in QSO, the callsign of each must appear in the "Station heard" column.

7. Entries. To be sent to R A Treacher, BRS32525, 79 Granby Road, Eltham, London SE9 1EH, England, to arrive no later than Monday 12 August 1985.

8. Awards. Certificates will be awarded to the leading three entrants in each section in the British Isles section provided there are a minimum of 10 UK logs. A certificate will be awarded to the leading station in each country in the overseas section provided that station scores at least 50 per cent of that section's winner's score.

Chelmsford and Colchester DF Qualifying Event

Date: 19 May 1985
Map: OS sheet 168 1, 50,000 series Colchester and the Blackwater
Assembly: 1300bst for start at 1320bst
Location: Tiptree Heath, ngr 884 148

Competitors requiring tea should notify Mr R. A. Brocks, 30 Rowan Drive, Heybridge, Maldon, Essex, tel 0621 55707, home, or 0245 353221 ext 3086, office, not later than 12 May 1985.

Club News

The following is the latest information received by RRs from RSGB affiliated societies, clubs and groups in time for inclusion in this issue. Basic unchanged information on other affiliated organizations will be published again in the July 1985 issue.

RSGB affiliated organizations are requested to report all programmes and new items to their regional representatives regularly. Information for inclusion in the **July** issue should reach them by **13 May** and for the **August** issue by **10 June**.

Club programmes are given in order of date, subject, time and place of the meeting. All callsigns of club secretaries and other contacts are QTHR (correct in the current *RSGB Call Book*) unless otherwise stated.

All clubs welcome visitors and would be pleased to hear from potential new members.

REGION 1—RR B. Donn, G3XSN, 7 Thurne Way, Liverpool L25 4SQ. Tel 051-722 3644.

Ainsdale (AARC)—7, 21 May (Normal meetings). 8pm. Scout HQ, Marine Drive. 14, 28 May (DF hunts) 7.30pm start at Mere Brow OS squares. During the Summer various special event stations will be held. Sec G4TUP, tel Southport 35947.

Barnoldswick (Rolls-Royce ARC)—1 May (Talk by Rev George Dobbs). 8pm. Rolls-Royce Sports & Social Club, Barnoldswick. Morse classes Mondays, 7.30pm. Sec G4ILG, tel 0282 812288.

Blackburn (ELARC)—7 May ("The Tornado fighter aircraft"), 28 May (Informal), 4 June (Japanese morse). 7.30pm Conservative Club, Cliffe Street, Rishton. On Tuesdays when no meeting a club net operates on 145·400MHz at 7.30pm. Pro G6LXU.

Bury (BRS)—14 May ("So you want to build a power unit", Laurence Jones, G4KLT). 8pm. Mosses Community Centre, Cecil Street, Bury. Sec G4TBT, tel Burnley 24254.

Carlisle (C&DARS)—Meetings every Monday, 7pm. Scout Hut, Trinity School, Strand Road, Carlisle. At 9pm QSY to Grosvenor House Hotel, Warwick Road, for any other business. Sec G4ISS, tel 45182.

Chester (C&DRS)—14 May ("Secret Listeners" and "Dr Tony England, W0ORE, next amateur in space"), 21 May ("Northern Amateur Radio Association", Peter Denton), 28 May ("Coaxial cables", by Peter, G2JT). Morse classes 7.15, before main meeting, by G4MOU, so bring your headphones. Contact G4EZO, tel Chester 40055.

Crewe (South Cheshire ARS)—13 May ("What causes Aurora", 2nd part). Victoria Club, Gatefield Street, Crewe. Club net Sunday 8pm on 145·350MHz. Pro Chris Wiseman.

Fylde (FARS)—7 May ("News and gossip", Bert Donn, G3XSN, RR 1), 21 May (Equipment sale), 4 June ("Gliding as a sport", by John Gibson, chairman, Blackpool & Fylde Gliding Club). 7.45pm. Kite Club, Blackpool Airport. Sec G8GG, tel 725717.

Isle of Man (IoMARS)—Mondays, 8pm. Howstrake Hotel, Harbour Road, Oncham. Sec GD4GWQ, tel 0624 22295.

Kendal (Westmorland RS)—14 May (AGM). 8pm. Strickland Arms, Sizergh, Nr Kendal. Sec G1IIE, tel 0539 28491.

Manchester (South Manchester RC)—3 May (Talk by winner of home-built equipment contest), 10 May ("An introduction to microwaves", Mike Dixon, G3PFR), 17 May (Contest preparations and natter nite), 24 May (AGM 8pm **prompt**), 31 May (10GHz microwave cooking", Mike Duckworth, G6EAO, and J Armitage, G6ROD). 8pm. Sale Moor Community Centre, Norris Road, Sale. Sec G3WFT, tel 061 973 1837.

Preston (PARS)—9 May (Discussion on antennas and propagation), 23 May (Preparations for HF NFD and natter night). 8pm. Lonsdale Club,

Members of the Wirral & D ARC on a site visit to the Boat Museum, Ellesmere Port, from where GB2IWF will be operational this month (See "Special event stations"), together with two girls in period costume who are friends of the Boat Museum. Club members, l to r: (standing) John, G1DBC; Paul, G6JZP; Phil, G6SNO; Frank, G4DBG; (sitting) Eddie, G6XHG; Dave, G6XFF; Gerry, G8TRY. *Photo:* **G8TRY**

Fulwood Hall Lane, Fulwood, Preston. Sec G3ZXC, tel 0772 718175.
Rossendale (RVARC)—Thursdays, 8pm. Bishop Blaize Hotel, A56, Rawtenstall. Sec G1EIU, tel 0706 214411.
Stockport (SRS)—22 May (Visit by Bert Donn, G3XSN, RR1). Every third Wednesday, informal meetings and morse class. Magnet Inn, Wellington Road, Stockport. Sec G4FFW, tel 061 224 7880.
Tarporley (Mid-Cheshire ARS)—6 May (Mobile rally at Winsford Civic Hall, High Street, Winsford). Details G4VOH, tel 06065 4719.
Thornton Cleveleys (TCARS)—6 May (No meeting), 13 May ("Alignment of transmitters and receivers", Mick, G4EZM), 20 May (NFD discussion and planning), 27 May (Informal evening/preparation of equipment for NFD). 7.45pm. 1st Norbreck Scout HQ, Carr Road, Bispham, Blackpool. Sec G4WIC, tel 0253 821827.
Wirral (WARS)—1 May ("DF techniques". Start of df hunts for the year), 3 May (annual dinner dance, Heatherland Restaurant, Thurstaston). 15 May (Display of member's home-brew equipment), 5 June ("Amtor", George Metcalfe, G6VS). 8pm. Heswall Parish Church Hall, Heswall. Sec G4KPY, tel 051 625 7311.
Wirral (W&DARC)—1 May (D&W, The Eastham Ferry Hotel, Eastham), 4, 5 May (432MHz-24GHz Contest, club entry), 8 May (On-the-air night. Running club station plus discussing final plans for GB2IWF), 12 May (Sunday series df hunt No 2), 15 May (D&W, The Basset Hound, Thingwall), 22 May (TBA), 29 May (Pre-season practice df hunt. 8pm, Heswall lay-by), 25/26/27 May (Special event station GB2IWF to mark the International Waterways Festival at Ellesmere Port Boat Museum). Irby Cricket Club, Mill Hill Road, Irby. Sect G8TRY, tel 051 630 1393 or 227 1018.

If your Club does not appear here it is because I am without current news or information. There are still a number of clubs who have not bothered to contact me and you must accept that no news means no publicity. I would like to thank Chester &DARS, Thornton Cleveleys ARS, and Preston ARS for their kind hospitality on my recent visits and I enjoyed meeting you all. *RR1*

REGION 2—(RR to be elected)
Goole (GR&ES)—3-5 May (Trip round Britain by club members), 7 May (Natter night), 14 May ("Vintage radio", Dennis Lockwood, G6REL), 21 May (Mini df night), 26 May (G3XAY Trophy df event), 28 May (Video night). 7.45pm. Goole Junior Chamber, Boothferry Road, Goole. Details G8VHL or G8IOH.
Hull (H&DARS)—3 May (Repair night), 10 May (Holiday operating), 17 May (Visit to police operations room), 24 May (DF hunt), 31 May (Construction contest), 7 June (Club members' bring-and-buy). West Park Recreation Centre, Walton Street, Hull. Details G4PEP.
Wakefield (NWRC)—2 May (On-the-air, G4NOK, G6WRS. Worth 10 points towards NWRC Award), 9 May (Natter night), 16 May (Visit to Royal Observer Corps, York), 23 May (Social night), 30 May (Monthly meeting). New meeting place: White Horse ph, Thorpe Lane, off Bradford Road (A650), East Ardsley (half-a-mile from Carr Gate). Details G4YJM.
York (YARS)—11 May (GB3YCS operating from York Scout Council's HQ camp, Snowball Plantation, Stocton on Forest, York). Other special event stations are planned. Meetings Fridays, 7.30pm. United Services Club, 61 Micklegate, York.

REGION 3—RR G. Ross, G8MWR, 81 Ringwood Highway, Coventry CV2 2GT. Tel 0203 616941.
Birmingham (Midland ARS)—Mondays (Construction night), First Tuesday (Committee meeting), second Tuesday (Computer night), third Tuesday (Lecture), fourth Tuesday (Raynet group meeting), Wednesdays (Morse and natter night), Thursdays (Night on the air), Fridays (RAE class), Weekends (Contests), 21 May ("Antennas for the small garden", G3BA). 294a Broad Street, Birmingham B1 2DS. Sec G8BHE, tel 021-422 9787.
Coventry (CARS)—10 May (Night on the air), 17 May ("Starting on 10GHz", G8MWR), 24 May (Night on the air), 31 May (VHF df contest). 8pm. Scout HQ, 121 St Nicholas St, Radford, Coventry. Sec G4JDO, tel 73999.
Droitwich (DARC)—1 May (Visit to Pebble Mill), 13 May ("Waves and resonance", G3LBS). 8pm. Scout HQ, Droitwich. GB3PWB will operate during June to celebrate Prince William's birthday (a special award is available); details from G4HPH. The first edition of the newsletter is out. Sec G4HFP, tel 02993 3818.
Halesowen (MEB Sports & Social Club RC)—14 May (General meeting). 8pm. MEB Social Club, Mucklow Hill, Halesowen. Sec G4RWH, tel 021-747 884.
Hereford (HARS)—3 May (Constructors evening), 17 May (NFD arrangements). 8pm. The Old Gaol, Gaol St, Hereford. Sec G3WRQ, tel 0432 54064.
Redditch (RRC)—9 May (RTTY demonstration, G4SMU), 23 May (Natter night). 8pm. WRVS Centre, Ludlow Rd, Redditch. Sec G3EVT, tel 0789 762041.
Shrewsbury (Salop ARS)—9 May (Junk sale), 23 May (Fox hunt). 8pm. Old Bucks Head, Frankwell, Shrewsbury. Sec G6DQY.
Solihull (SARS)—21 May ("Cellular radio", British Telecom). 7.30pm. Manor House, High Street, Solihull. Sec G8AYY, tel 021-783 2996.
Stafford (S&DARS)—7 May (Natter night), 14 May ("The G2DXK tx/rx", G4ZZS), 21 May (Night on the air), 28 May (Class B morse night). Morse classes every Tuesday. 8pm. Coach & Horses, Pasturefields, Staffs. Sec G4RWQ, tel 0785 714963.
Stratford-upon-Avon (S-u-A&DARC)—13 May ("Experiences in a Jap pow camp", G3BA), 27 May (Informal meeting). 7.30pm. Control Tower, Radio Station, Bearley, Nr Stratford. Sec G8OVC, tel S-u-A 750584.
Sutton Coldfield (SCARS)—13 May ("Direct-conversion rx", G4HOM). 7.30pm. Public Library, Sainsbury Centre, Sutton Coldfield. New sec G3CNV, tel 021-354 4369.
Tamworth (TARS)—Mondays, 8pm. Rugby Club, Cotton Green, Tamworth. New sec G4SRI, tel 0827 68137.
Walsall (WARS)—A lot of activities are planned, please join in. Wednesdays, 8pm. Forest Comprehensive School, Bloxwich. Sec G6HZI, tel 0922 32607.
Warwick (Mid-Warwickshire ARS)—28 May (Natter night). 8pm. 61 Emscote Rd, Warwick. Sec G4TIL, tel Southam 4765.
West Midlands Police ARC—This is a new club. 26/27 May (Special event station GB2WMP will be working all bands all modes (including rtty). Special QSLs will be issued. Sec D Mytton, tel 021-458 3236.
Wolverhampton (WARS)—12 May (144MHz df hunt), 14 May (General meeting), 21 May (Committee meeting). 8pm. Electricity Sports Club, St Mark's Rd, Chapel Ash, Wolverhampton. Sec K Jenkinson, tel 0902 24870.
Worcester (W&DARC)—20 May (Informal night). 8pm. Oddfellows Club, New St, Worcester. Informal meetings are held at the Old Pheasant, New Street. Sec G4RBD.

REGION 4—RR M Shardlow, G3SZJ, 19 Portreath Drive, Darley Abbey DE3 2BJ Tel Derby (0332) 556875.
Bolsover (BARS)—1 May (Natter night), 8 May (TBA), 15 May, (Natter night), 22 May ("Contest operating", G4PRR), 29 May (2nd Cumulative df hunt). 7.30pm. The Angel Hotel, Bolsover. Sec R Evans, G4AGE.
Buxton (BARS)—14 May (Open forum), 28 May ("Secret Listener", G4MHB). 8pm. Haddon Hall Hotel, London Road, Buxton, Sec G6MIF, tel Buxton 6174.
Derby (D&DARS)—1 May (Junk sale), 8 May (TBA), 15 May (Technical topics), 22 May (Lecture on cw), 29 May (TBA), 5 June (Junk sale). 7.30pm. 119 Green Lane, Derby. Sec G4EYM, tel Derby 556875.
Grantham (GRC)—14 May (Junk sale/bring & buy). 8pm. Shirley Croft Hotel, Harrowby Road, Grantham, Sec G8WWJ, tel Grantham 65743.
Grimsby (GARS)—2 May (Treasure hunt), 16 May (Natter night). 7.30pm. Cromwell Social Club. Cromwell Road, Grimsby. Sec G4EBK, tel Grimsby 887720.
Lincoln (LSWC)—1 May (CW/RAE/Hamfest meeting), 5 May (Committee meeting), 8 May (Activity night/night on the air), 15 May (CW/RAE), 22 May (AGM), 29 May (CW/RAE). 8pm. City Engineers Club, Waterside South, Lincoln. Sec G4STO, tel Gainsborough 788356.
Loughborough (LFalconARC)—3 May (Committee meeting), 7 May (Constructors group), 10 May (RTTY evening), 14 May (Constructors group), 17 May (Social evening), 21 May (Constructors evening), 24 May (1·8MHz df), 28 May (Constructors evening), 31 May (TBA). 8pm. Brush Sports & Social Club, Fennel Street, Loughborough. Details G4DZL, c/o The club.
Louth (LARC)—1 May (DF starts at club), 15 May (Operating night). Information from G1IZB, tel Marshchapel 595.
Melton Mowbray (MMARS)—17 May (DF fox hunt). St John Ambulance Hall, Asfordby Hill, Melton Mowbray. Sec G3NVK, tel Melton Mowbray 63369.
Mansfield (MARS)—3 May (AGM). Victoria Social Club, Princes Street, Mansfield. Sec G1DZH.
Nottingham (ARCON)—2 May (Forum), 9 May (144MHz df foxhunt), 16 May (Activity night), 23 May ("Measurements", G1EUP), 30 May (432MHz foxhunt). 7.30pm. Woodthorpe House, Sherwood Community Centre, Mansfield Road, Nottingham. Sec G4PJZ, tel Nottingham 624764.
Skegness (SADARS)—4 May and first Friday in each month. 7.30pm. White Swan, Burgh le Marsh. Sec G6HYF.
Spalding (SADARS)—10 May ("Worked all Britain Award", G4FQO. Rally preparation). 7.30pm. The Ship Albion, Albion Street, Spalding. Sec G4ZGT, tel Spalding 2781.
Stamford (SADARS)—8 May (Social evening). 8pm. The Anchor Hotel, Stamford. Club net alternate Wednesdays 9pm on S9. Sec G4OSM, tel Stamford 54433.
Worksop (WARS)—2 May (VU7 dxpedition video), 16 May ("Microwaves", G8AQN), 30 May ("Homebrew vhf amplifiers", G4RUD). 7.30pm. The Unicorn Hotel, Bridge Street, Worksop. Sec G4ZUM, tel Worksop 486614.

REGION 5—RR J S Allen, G3DOT, 77 Rosslyn Crescent, Luton LU3 2AT. Tel 0582 508515, or at work on 0582 21151.

Bedford (B&DARC)—Now meets at Queens Engineering Works Social & Recreation Club, Hurst Grove, Bedford. Sec G8ATI.

Cambridge (C&DARC)—3 May (Informal evening), 10 May ("HF beacons", Alan Taylor), 17 May ("In your shack", a video of some of the members' radio rooms), 31 May (Informal evening). Visual Aids Room, Coleridge Community College, Radegund Road, Cambridge. Sec G8JKV.

Dunstable (DDRC)—10 May (DF hunt on 1·8 and 144MHz), 18/19 May (144MHz contest on the Downs), 24 May ("Weather satellites", G8LOK). 8pm. Chews House, High Street South, Dunstable. Sec G6EES.

Kent Process Control ARC—Due to retirements and members leaving, this club has gone into "mothballs". The licence and affiliation fees will still be paid, and G4KPC can still be heard on the air. For further info please contact RR5.

Leighton Buzzard (Leighton Linsdale RC)—6 May (May Day Bank Holiday df hunt), 20 May ("Antennas for 934MHz", Dave Hodges, G6IXH). 7pm. Vandyke Community College, Room A64, Vandyke Road, Leighton Buzzard.

North Cambridgeshire Repeater Group—Maintains GB3WI on RB15. Due to ill-health John Wheatley, BRS53921 has resigned as secretary/treasurer. Many thanks for his invaluable work on behalf of all local amateurs. New sec G4NPH, treasurer G6XMU.

Peterborough (Greater Peterborough RC)—23 May (Preparations for VHF NFD). 7.30pm. Southfields Junior School, Stanground, Peterborough. Sec G4NRJ.

Wellingborough (Nene Valley RC)—1 May (Technical topics), 8 May (Ladies night-buffet), 15 May (Natter night), 22 May (TBA), 29 May (Technical topics). 8pm. Dolbin Arms ph, Finedon, Near Wellingborough. New sec G4XEN.

REGION 6—RR F. S. G. Rose, G2DRT, 84 Cock Lane, High Wycombe, Bucks HA3 7EA. Tel Penn (049481) 4240.

Aylesbury (ARVC)—Details of May meeting from G1GQT, tel Kingston Blount 0844 51661.

Vale of White Horse ARS—7 May (Planning GWR exhibition station GB4GWR at Didcot Railway Centre, 18 May-2 June), 21 May (Meeting in the GB4GWR operating shack—a 'thirties saloon coach). Details Ian White or Roger Blackwell, tel Abingdon 831600 extn 455 (day) or Wantage 69440 (evng).

REGION 7—RR R. Sykes, G3NFV, 16 The Ridgeway, Fetcham, Leatherhead, Surrey.

Ashford (Echelford ARS)—13 May (Brains trust), 30 May ("The Aurora"). 8pm. The Hall, St Martin's Court, Kingston Crescent, Ashford, Middx. Sec G4PHS, tel 01-977 4157.

Biggin Hill (BHARC)—21 May ("Getting going in the early days", G2MI). 8.30pm. St Marks Church Hall, Church Road, Biggin Hill. Sec Ian Mitchell, tel 09598 376.

Coulsdon (CATS)—13 May ("Basic test equipment", G6MFM), 30 May (Morse tuition). 8pm. St Swithun's Church Hall, Grovelands Road, Purley, Surrey. Sec G6HC, tel 01-684 0610.

Cray Valley (CVRS)—2 May ("By rail to the Orkney Islands", G3VLX), 16 May, (Natter night). 8pm. Christchurch Centre, Eltham High Street, Eltham SE9. Sec G4FUG.

Crystal Palace (CP & DRS)—18 May ("Basics", G4AVV). 8pm. All Saints Parish Room Upper Norwood, SE19. Sec G3FZL, tel 01-699 6940.

Farnham VHF Group—13 May (Computer night). 8pm. Farnham Central Club, Farnham. Contact G4EPX, tel 0734 787298.

Guildford (G&DRS)—10 May (Group photograph). 8pm. Model Engineers HQ, Stoke Park, Guildford. Sec G4BHQ, tel Guildford 576375.

Sutton (S&CRS)—17 May (AGM). 8pm. Downs Lawn Tennis Club, Holland Avenue, Cheam, Surrey. Sec G4BOX.

Wimbledon (W&DRS)—10 May ("Home brew equipment", G4ILP), 31 May (HCJB Voice of the Andes). 8pm. St John Ambulance HQ, 124 Kingston Road, Wimbledon SW19. Sec G3DWW.

REGION 8—RR M. Elliott, G4VEC, 20 Haysel, Sittingbourne, Kent ME10 4QE. Tel 0795 70132.

Chichester (CARC)—7 May (24cm atv; presentation by members active on this mode. Long Room), 16 May (Meeting. Green Room). 7.30pm. Fernleigh Centre, 40 North Street, Chichester. Details G4EHG, tel Chichester 789587.

Crawley (CARC)—10 May (CARC annual dinner, Goffs Park Hotel), 19 May (Top band df hunt), 22 May (Junk sale). 7pm. Trinity Church Hall, Ifield. Details G4IQM, tel Crawley 882641.

Dartford (DDFC)—3 May (Friday. AGM), 7 May (Pre-hunt meeting, Horse & Groom ph, Leyton Cross, Dartford Heath, after 9pm), May (Club hunt). Details Pete G8DYF, tel Greenhithe 844467.

Dover (SEKYMCARC)—1 May (Natter nite and committee meeting), 8 May (White-stick operating), 15 May (Causes and cures of tvi), 22 May (More on "anything" (brass pounding?), G3LCK), 29 May (Club project). 8pm. Dover YMCA Centre, Leyburne Road, Dover. Details G3VSU, tel 0304 822738.

Eastbourne (Southdown ARS)—6 May Telex Over radio (Amtor, rtty). The new club rooms at Hailsham are now in full swing, Tuesday & Friday evenings. Details from new sec G4XNL, tel Eastbourne 638653. Also meets first Monday in each month, 7.30pm, Chaseley Home, South Cliff, Eastbourne.

Hastings (HERC)—15 May "Loudspeakers", KEF, Maidstone). 8pm West Hill Community Centre. Details G4NVQ, tel 420608.

Horsham (HARC)—2 May "HF propagation", Ray Flavell, G3LTP). 8pm. Guide HQ, Denne Road, Horsham. Details G4LKW, tel Horsham 64580.

Maidstone (MYMCAARC)—3 May (Pending), 10 May (Natter nite/beginners nite), 17 May ("Antennas and earths", Peter Pickering), 24 May (Final arrangements for rally), 26 May (Mobile rally). 8pm. YMCA Sports Centre, Melrose Close, Maidstone. Details G6FZD, tel 0622-50709.

Margate (Radio Club of Thanet)—Second and fourth Tuesdays in each month, 8pm. Grosvenor Club, Grosvenor Place, Margate. Details G4SBD, tel 0843-33213.

Medway (MARTS)—Every Friday, 7.30pm. St Luke's Church Hall, King William Road, Chatham. New sec Tony Faram, tel 0634-578647.

Tunbridge Wells (West Kent ARS)—3 May (Construction contest). 8pm. Adult Education Centre Annexe, Quarry Road, Tunbridge Wells. Details G4MXL, tel 0892 32877 after 7pm.

Worthing (W&DARC)—Wednesdays from 7.30pm. Lancing Parish Hall, South Street, Lancing. New sec Roy Jones, G4SWH, Wadarc, PO Box 599, Worthing, BNI4 7TT.

REGION 10—RR E J Case, GW4HWR, 2 Abbey Close Tyrhiw, Taffswell, Mid-Glam CF4 7RS. Tel 022 810368.

Aberystwyth (A&DARS)—14 May (Annual flea market). Bay Hotel, on seafront opposite bandstand. Sec GW4JXB, tel 0970 828446.

Cardiff Bristol Channel Repeater Group—GB3BC—19 May (AGM). 2.30pm. Tyrhiw Community Centre, Abbey Close, Tyrhiw, Taffswell. From M4 at junction 32, take A470 towards Merthyr Tydfil, leave for Taffswell at next junction, after 100m turn right to Tyrhiw, Abbey Close is first right turn at top of hill. Talk-in on S22 or GB3BC. Sec GW6MBU, tel Barry 711146.

Cardiff (CRSGBG)—13 May (Quiz competition with Newport ARS). 7.30pm. Pantmawr Hotel, Tyla Teg, Pantmawr Estate, Whitchurch, Cardiff. Sec GW6ZHP, tel Cowbridge 3212.

REGION 11—RR B H Green, GW2FLZ, 1 Clwyd Court, Tan-y-Bryn Road, Colwyn Bay, Clwyd. LL28 4AH. Tel 0492 49288.

Colwyn Bay (Clwyd County Raynet Group)—Second Tuesday in each month. Green Lawns Hotel, Bay View Road, Colwyn Bay. Sec GW4UWI, tel 0492 2149.

Colwyn Bay (Conwy Valley ARC-GW6TM)—9 May (Annual talk by David Last, GW3MZX, subject tba). 8pm. Green Lawns Hotel, Bay View Road, Colwyn Bay. Sec GW4KGI, tel 0745 823674.

Deeside (Alyn & Deeside ARS)—6 May (D and W), 13 May (Contest arrangements and slide show), 20 May ("RAE electronics and beyond", George, GW1KMV), 27 May (D and W). 8pm. Shotton Social Club, Shotton Lane, Shotton, Deeside. Sec GW4RKX, tel 0244 660066.

Porthmadog (P&DARC)—16 May (Ladies night demonstration of spinning by GW4WKQ). 8pm. Harbour Cafe, Ffestiniog Railway, Porthmadog. Sec GW4WKQ, tel 0758 740445.

Rhyl (R&DARC-GW4ARC)—6 May ("ATV demonstration", GW8XLL), 20 May (Activity night). 7.30pm. Mona Hotel, Market Street, Rhyl. Sec GW1AKT, tel Nantglyn 469.

Wrexham (WARC)—1, 15 May. 7pm. Friends Meeting House, Holt Road, Wrexham. Sec G4HRH.

REGION 12—RR M R Hobson, GM8KPH, 17 Well Brae, Pillochry, Perthshire PH16 5HH.

SARCON 85, the 1985 Scottish Amateur Radio Convention, to be held in Dundee this year on 2 September, is now in a position to offer overnight accommodation and breakfast at £10 per head. single and twin rooms are available. Rooms are limited, so please book now. reservations for the dinner after the convention (£10 per head) are also being taken. RR12 will forward your letters to the organizing committee.

Aberdeen (AARS)—3 May (Junk sale), 10 May ("Surface-mounted components", GM4SID), 17 May (Review of VHF Field Day 1984), 24 May ("HF operating practice", GM3VEY), 31 May (Preparations for HF NFD), 1/2 June (HF NFD), 7 June (Junk sale), 14 June (Building competition, senior and junior sections), 21 June (Building competition results. Display of entries). 7.30pm. 35 Thistle Lane, Aberdeen. Sec GM4GXD, tel Pitcaple 251.

Black Isle Repeater Group—At the recent agm, Sue Maclennan, GM4UMA, was re-elected secretary, and will be pleased to attend to enquiries about the group. Brian, GM40IJ, one of the founders of the group, was elected a life member in recognition of the considerable work he undertook in getting the repeater on the air.

Caithness (CARS)—Second Wednesday in each month. 7.30pm. New sec GM1AHC, tel 0847 63638.

Dundee (Kingsway Tech ARC)—21 May (RSGB video "Space shuttle"). 7.30pm. Annexe to Kingsway Tech, Grayham Street, Dundee. Details GM4WEQ, tel 0382 552362.

Elgin (Moray Firth ARS)—First Wednesday in each month. Spey Bay Hotel, Fochabers. Details acting sec GM4IZY, tel Elgin 41549.

Forfar (F&DARC)—6 May (Visit to Perth Post Office), 20 May (Talk on NOSHEB by GM4AWA), 1/2 June (HF NFD), 3 June (Jaycee Electronics), 17 June ("Interference"). 7.30pm. 91B West High Street, Forfar. Details GW4WMN, tel 0575 81222.

Inverness (IARC)—Thursdays, 7.30pm. Cameron Youth Club, Planefield Road, Inverness. New sec GM1GFX, tel 0463 24263.

Perth (P&DARG)—Tuesdays, 7.30pm. Perth City Sports & Social Club, Leonards Street, Perth. New contact GM8UGO.

REGION 13—RR A Givens, GM3YOR, 41 Veronica Crescent, Kirkcaldy, Fife KY1 2LH.

Berwick-on-Tweed (BARS)—3 May (Antennas demonstration), 12 May (Cubical quads), 7 June (Lecture by Royal Observer Corps). 8pm. Tweedview Hotel, Berwick-on-Tweed. Details G1IUK, tel 305465.

Glenrothes (G&DARC)—19 May (Lecture by RAF Leuchars Air Sea Rescue Flight), 16 June ("Repeaters", GM8LBC), 7.30pm. Provosts Land Centre, Leslie, Fife. Details GM4TNP, tel 755958.

REGION 14—RR T G Wylie, GM4FDM, 3 Kings Crescent, Elderslie, Strathclyde PA5 9AD.

Note to all secretaries. Please advise RR of any changes in committee after agm etc, and a list of forthcoming events would be appreciated.

Ayr (AARG)—3 May (AGM), 17 May (Field Day planning), 31 May (Natter night). Sec GM3THI, tel Ayr 42313.

Motherwell (Mid-Lanark ARS)—10 May ("Fire Brigade communications", GM8BBA), 19 May (MLARS foxhunt contest on 144MHZ, open to anyone. Can you find two foxes using df techniques? Home-brew antennas only. £1 entry per team. Assemble at 1pm, Wrangholm Hall, for issue of maps and instructions. Prize for winner).

REGION 15—RR R Parsons, GI3HXV, 45 Erinvale Avenue, Belfast BT10 0FP.

Antrim (A&DARC—GI4SIW)—Participation in the Antrim festival Fortnight in June. Sec GI4KIS.

Ballyclare (E Antrim ARC—GI4KKK)—Second Tuesday in each month. 14 May (Preparations for Ballyclare May Fair Event station), June: df hunt. Fairview Primary School, Ballyclare. GI4PRH.

Ballymena (BRC—GI3FFF)—Every Thursday 8pm and Sunday 3pm. 10 Nursery Road, Grace Hill, Ballymena. RAE class Wednesday evenings —GI4OZT. Sec GI4HCN.

Banbridge (Mid-Ulster ARC)—GI4BAC)—Second Sunday of each month, 19 May (Annual Parkanaur Rally). 3pm. QTH of GI4BAC. Sec GI4BDL.

Bangor (B&DARC—GI3XRO)—First Friday in each month, 10 May (Annual dinner). 8pm. Royal Hotel, Bangor. Note new venue. Sec GI4OCK.

Belfast (City of Belfast YMCA ARC—GI6YM/GI6YMC)—Tuesdays 7pm and Saturdays 2.30pm. Club Room, 4th Floor, YMCA, Wellington Place, Belfast.

Coleraine (North-West ARC—GI4DBB)—First Tuesday in each month, 8pm. Scout Hall, The Crescent, Coleraine. Sec GI4KIG.
Larne (L&DARS—GI4PHA)—First and third Wednesdays in each month, 8pm. 100 Glenarm Road, Larne, RAE class each Thursday by GI4UUC. Programme not finalised. Sec GI4CPP.
Lisburn (Lagan Valley ARS—GI4GTY)—Second Monday in each month, 7.30pm. Rathvarna Teacher's Centre, Pond Park Road, Lisburn. Sec (temporary) GI4PSK.
Londonderry (NW of Ireland ARC—GI3CFH)—First Monday in each month. 6 May ("Inter-club quiz), 3 June ("Satellite demonstration and RSGB Oscar 10 video"). 7.30pm Prehen Municipal Boathouse, Victoria Road, Londonderry. GI4OUN. GB3LY Repeater Group—contact GI2DHB QTHR.
Moneymore (Magherafelt ARC—GI4OMA)—Third Tuesday in each month, 8pm. Manor Hotel, Moneymore. Sec GI3SOO.

REGION 16—RR Alan Owen, G4HMF, 102 Constable Road, Ipswich, Suffolk IP4 2XA.

Bury St Edmunds (BStERS)—21 May ("Propagation", G3BJO). 7.30pm. Guildhall, Guildhall Street. Contact John Munro, G3GBB, 29 Angel Hill, Bury St Edmunds.
Colchester (CRA)—2 May (NFD and Anglia Rally planning), 16 May ("A quick look at the USA", G4PAY). 7.30pm. Colchester Institute, Sheepen Road, Colchester. 3, 21 May; 28 June; 3, 30 August; 20 October; (DF contacts). Sec G3FIJ, tel 0206 851189.
Ipswich (IRC)—8 May (DF hunt), 22 May (Planning for ESWR), 29 May (Bring-and-buy, Barrack Corner Church Hall). 8pm. Rose & Crown, Norwich Road, Ipswich. Sec G4IFF, tel 0473 44047.
Leiston (LARC)—7 May ("Building a multimeter", G8AXO), 4 June ("Maritime radio", John Taylor). 7.30pm. Sizewell Sports & Social Club, King George's Avenue, Leiston. Practical evening on third Tuesday in each month at 5 Main Street. Sec G6ORK, tel Leiston 831597.
Loughton (L&DRAS)—10 May (G4ONP on the air), 24 May (Informal evening), 7 June ("Homebrew transverters", G8DBR). 8pm. Loughton Hall, Rectory Road, Loughton. Contact G6FWT, tel 01-508 7190.

REGION 17—RR T Emery, Wilverley, Old Lyndhurst Road, Cadnam, Southampton SO4 2NL.

Andover (ARAC)—First Tuesday and third Wednesday in each month, 8pm. Wolversdene Club. Club net 145·450MHz Sundays 2pm. Sec G0AMO.
Basingstoke (BARC)—6 May (Technical questions and answers forum) 8pm. First Monday in each month at Forest Ring Community Centre, Sycamore Way, Basingstoke. Please note change of day and location. Sec G4WIZ, tel Tadley 5158.
Blackmore Vale—14 May (Natter night, possibly with films. 7.45pm. Bell & Crown, Zeals (on the A303). Sec M Bailey, tel 0963 70969.
Bournemouth (BRS)—3 May (Natter night), 17 May ("Amtor", G6BEP). 7.30pm. Kinson Community Centre, Kinson, Bournemouth. Sec G4EKE, tel 0202 877945.
Devizes (D&DARS)—Friday, 8pm. Football Club Social Club, Nursteed Road, Devizes. Sec G3MDQ.
Eastleigh (Itchen Valley ARS)—("Planning matters", by a member of Eastleigh Borough Planning Department), 24 May (Junk sale. 7.30pm. Scout Hut, Brickfield Lane, Chandlers Ford. Results of recent agm: chairman, G3ABA; treasurer, G4KSI; secretary, G6DIA, tel 0703 863039.
Farnborough (F&DARS)—8 May ("HF contest operating"), 22 May (HF preview), 12 June (VHF/UHF antennas", G8CKN). 7.30pm. Railway Enthusiasts Club, Access Road, off Hawley Lane, Farnborough. PRO G4MBZ, tel Farnborough 837581.
Fareham (F&DARS)—1 May, 15 May and 29 May (Natter nights), 8 May ("Use of computers in radio", G6UXW, 22 May ("The GB3PH repeater", the engineering group). 7.30pm Portchester Community Centre, Portchester. Sec G4ITG, tel Fareham 234904.
Gosport (Rowners & DARS)—8 May and every alternate Wednesday thereafter. 7.30-8pm. Morse tuition followed by meeting at Scout Headquarters off Grange Road, Rowners. Talk-in on S22 or nearest available fm channel. Chairman, G6NAK; sec G6OTY, tel Locks Heath 2541.
Horndean (H&DARC)—6 May ("Salvage of *ss Great Britain*", G4DIU. 8pm. Merchiston Hall, London Road, Horndean. PRO G4BEQ.
Liphook (Three Counties ARC)—1 May ("Horizontal fm", G4RRA), 15 May (Junk sale), 29 May (Home computer night—bring your own micro). 8pm. Railway Hotel, Liphook. Sec G3TBT, tel Passfield 368.
Plessey (Christchurch) ARS—A new club which meets on the first Thursday in each month at the Plessey Social Club, Christchurch. Contact G6WQU, tel 0425 72108.
Portsdown Hill Repeater Group (GB3PH)—For information, or to join the group and help support the repeater, contact G4VNM, tel 0329 239702.
Salisbury (SRES)—Tuesdays 7.30pm. Grosvenor House, Churchfield Road, Salisbury. Sec G4LDR, tel 0980 22809.
Southampton (SARS)—First and third Wednesday of each month, 7.30pm. Hall of Aviation, R J Mitchell Museum, Albert Road, Southampton. Note change of meeting days. 144MHz fm net on second and fourth Wednesday, 7.30pm. Sec G6CPE, tel Romsey 514811.
Swindon (S&DARC)—2, 9 May (Rally planning meetings). 12 May (Swindon Radio and Electronics Rally, 10am, Oakfield School), 16 May ("Weather satellites", G4MUF), 23 May (Natter night), 30 May ("Amtor, Packet radio and data communications", G8SFM) 7.30pm. Oakfield School, Marlowe Avenue, Swindon. PRO G4ZAZ, tel 0793 37489.
Trowbridge—Fourth Tuesday in each month, 8pm. Southwick Village Hall, Trowbridge. Sec G4SPE, tel Trowbridge 4532.
UK FM Southern Repeater Holding Group (GB3SN)—For information, or to join the group and help support the repeater, contact Mrs Jan Steele, tel Fleet 3311.
Waterside (WSWC)—Second and fourth Tuesdays in each month 7.30pm at Fawley & Blackfield Community Centre, Blackfield, Southampton. Sec G6DLJ.
Weymouth (SDRS)—7 May (Natter night). 7.30pm. Army Bridging School, Wyke Regis. Sec G6HKD.
Wimborne (FRARS)—5 May ("Italy travel log", G6CML), 12 May ("Repeaters in the 'fifties", G6NA), 19 May ("Nick's rambles", G4WHO), 26 May (TBA). Local affiliated clubs are invited to contact G8ZLH if they would like to stage a demonstration of amateur radio at this year's Hamfest on 11 August. 7.30pm. Flight Refuelling Social Club, Merley, Wimborne. Sec G8ZLH, tel 0202 570894.
Winchester (WARC)—18 May ("The sands of time", G3KWU). 8pm. The Log Cabin, Stockbridge Road, Winchester. AGM/EGM results: chairman, G3NWL; treasurer, G4CEW; sec G4FPC, tel 0962 64747.

REGION 18—RR Ian Gibbs, G4GWB, 61 The Gables, Widdrington, Morpeth NE61 5QZ.

Berwick on Tweed (Borders ARS)—3 May ("Demonstration of antenna"), 5 May (Kelso rally), 17 May ("Cubical quad antennas"). Tweed View Hotel, Berwick. Sec G1IUK, tel Berwick 305465.
Consett (Derwentside ARS)—6 May (No meeting), 11 May (Special event station, Moorside Comprehensive, Consett), 13 May ("Microwaves", G3NWU) Consett Association Football Club, Belle Vue Park, Consett. Sec G1AAJ, tel 0207 520477.
Easington (EARS)—Tuesday and Thursday evenings. RAE and morse tuition by request. Sec G4LOM, tel Seaham 815706.
Shildon (Aycliffe & Shildon ARC)—7 May ("Moonbounce"), 14 May ("TVI", G3YNB), 21 May ("Computers", G3GUV), 28 (Informal). Sunnydale Leisure Centre, Shildon. Sec G3LUC, tel 0388 774466.

REGION 19—RR R J C Broadbent, G3AAJ, 94 Herongate Road, Wanstead Park, London E12 5EQ.

Borehamwood (B&EARS)—This is a new club. For full details contact david Gough, RSGB HQ.
Bishop's Stortford (BS&ARS)—This is a new club. 20 May, 8pm, and every third Monday in each month. British Legion Club, Wind Hill, B/Stortford. 6 May (Informal meeting at Nags Head ph). Information from G6HKK, tel 0279 52297.
Cheshunt (C&DARS)—1 May (RSGB Zone C Council member W McClintock), 8 May (Natter), 15 May ("Radio paging", G6AXO), 22 May (Natter), 29 May (Contest primer). 8pm. Church Rooms, Church Lane, Wormley. Sec G4OAA, tel 0992 464795.
Chiswick (ABCARC)—21 May ("A modified all-band atu", G4GD). 7.30pm. Chiswick Town Hall, High Road, Chiswick W4. Contact G3GEH, tel 01-992 3778.
Ealing (EDARS)—14 May ("Radio operating in Scandinavia", G4ROM). 8pm. Northfields Community Centre, 71A Northcroft Road, London W13. Sec G4SCR, tel 01-997 1416.
Edgware (E&DARS)—9 May (Informal and cw practice), 23 May (Constructors contest), 30 May (Straight key evening on 3·5MHz). 8pm. 145 Grange Hill Road, Burnt Oak, Edgware. Details G4SYI, tel Stanmore 01-958 9868.
Grafton (GRS)—This club is back at its old QTH: Five Bells, East End Road, E Finchley, and meets on second and fourth Fridays in each month. Information G4RPK.
Havering (H&DARC)—1 May ("KW past and present", G8KW), 8 May (Pre-contest briefing), 15 May ("The master travels", G4YHD), 22 May (Pre-contest briefing), 29 May (G4MYO df hunt). Fairkytes Art Centre, Billet Lane, Hornchurch. Sec D S Gray, tel Hornchurch 41532.
Harrow (RSH)—3 May (Activity night). 8pm. Harrow Arts Centre, High Road, Harrow Weald. Details G8XBZ, tel Rickmansworth 779942.
London (Civil Service ARS)—20 May ("Dxpedition to Lord Howe Island", G3ZAY). Recreation Centre, Monck St, Westminster SW. Lunch-time. Details G6IMM, 195 Conisborough Crescent, London SE6.
St Albans (Verulam ARC)—14 May (Informal workshop), 28 May ("Clandestine wireless (SOE)", John Brown, G3EUR). 7.45 for 8pm. RAFA HQ, New Kent Road, St Albans. Details G4JKS, tel St Albans 59318.
Southgate (SARC)—9 May ("Wind loading and safety of towers", G3UDO of Allweld Engineering). 8pm St Thomas's Church Hall, Prince George's Avenue, Oakwood, London N14. Sec G4OBE, 12 Borden Avenue, Enfield EN1.

REGION 20—RR N F O'Brien, G3LP, 26 Southfield Road, Gloucester GL4 9UD. Tel 0452 34890.

Bath (B&DARC)—15 and 29 May. 8pm. Englishcombe Inn, Englishcombe Lane, Bath. Club station G4TMH regularly operating. Details G4UMN, tel Frome 63939.
Bristol (BRSGBG)—27 May. 7.30pm. Small Lecture Theatre, Bristol University. Details G4FRG, tel 0272 848140 or G4ROX, tel 0272 513573.
Bristol (South Bristol ARC)—1 May ("Slow-scan television", Bert, G2BAR, 8 May (14MHz activity night, Alf, G4TXW), 15 May (QSL card rally, Les, G1HFJ), 22 May (cw night—a CQ call marathon?, David, G4WRW), 29 May (Bring-and-buy night, Len, G4RZY), 5 June ("Bristol 70cm Repeater Group" G4KUQ/G4MCQ). 7.30pm Whitchurch Folk House, East Dundry Road, Whitchurch, Bristol, BS14 0LN. Details G4RZY, tel 0272 834282.
Cheltenham (CARA)—3 May (Natter night), 17 May ("The Bermuda Contest and operating from VP9AD in the 1984 WW SSB Contest", G4CNY), 7 June ("Moonbounce operation", G4ASR). 7.30pm. Stanton Room, Charlton Kings Library, Cheltenham. Details G4VXE, tel 36723.
Cheltenham (Smiths Industries RS)—2, 16 and 30 May, 8pm. Club House, Newlands, Bishops Cleeve. Details G8UJG, tel Bishops Cleeve 2175 or Bishops Cleeve 3333 ext 2511.
Gloucester (GARS)—Wednesdays, 7.30pm. St John Ambulance Headquarters, Heathville Road, Gloucester. Details G6AWT.
Portishead (Gordano ARG)—22 May, 7.30pm. Ship Hotel, Down Road, Portishead. Details G3LJD.
Shirehampton (SARC)—May programme includes HF Field Day techniques, British Aerospace films, and open forum. Fridays, 7.30pm, Twyford House, High Street, Shirehampton, Bristol. Details G4GTD.
South Cotswold ARS—15 and 29 May. Nelson School, Stratford Lodge, Stroud. Sec P R Gainey, G1DCT.
Street (S&DARS)—7 May (Question & Answer session, G3TSK, and construction competition), 4 June ("The Work of RAIBC", Mrs F E Woolley). Wessex Hotel. Details G4SCD.
Weston-super-Mare (WsMARS)—13 May ("Experiences in Southern Africa", Dave Restrick). 7.30pm. Rugby Club (off Drove Road), Weston-super-Mare. Club net Thursdays 8pm, 28,725kHz, G3GMC net control New sec John Wills, G1DJW, tel 0934 514429.
Yeovil (Y&DARC)—2 May ("The Yagi antenna", G3MYM), 9 May ("Oscillators", G3MYM), 16 May (Video "Electromagnetic Waves"), 23 May ("Demodulators", G3MYM), 30 May (Natter night), 6 June (Video "The Space Shuttle"). 7.30pm. Recreation Centre, Chilton Grove, Yeovil. G3GC, tel 0935 75533.

Members' Ads

CONDITIONS OF ACCEPTANCE

These subsidized flat-rate advertisements are accepted as a service to members of the RSGB only. They must be submitted on the Members' Ad form printed on the back of a *recent* address label carrier used to mail *Rad Com* to the advertiser: this will automatically provide proof of membership and should not be more than two months old. No acknowledgement of receipt will be sent, and advertisements not clearly worded or punctuated, or which do not comply with the conditions of acceptance, will be returned. No correspondence concerning this service will be entered into.

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. Traders who are members must enclose a signed declaration that the items for sale or wanted are part of, or intended for, their own personal amateur station.

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. Advertisements for citizens band equipment will not be accepted.

Warning. Members are advised that they should, as far as possible, ensure that the equipment they intend to purchase is not subject to a current hire purchase agreement. The "purchase" of goods legally owned by a finance company could result in the "purchaser" losing both the goods and the cash paid.

The current rate is £2.30 for 40 words or less: advertisements containing more than 40 words will cost an additional £2.30 for every additional 40 or less words. Each advertisement must be accompanied by the correct remittance, either as a cheque or postal order made payable to Radio Society of Great Britain.

The closing date for the **July 1985** issue is **Wednesday 15 May**

Post to: MEMBERS' ADS, RSGB, 88 BROOMFIELD ROAD, CHELMSFORD, ESSEX CM1 1SS
Do not post to RSGB HQ or Advertising officer.

As a result of the imposition of VAT on advertising, the basic rate is now £2.30 for 40 words or less on all Members' Ads received on or after 1 May 1985. See *RSGB News Bulletin* insert, April 1985, and page 340 of this issue.

FOR SALE

B41A Admiralty rx, 14·7–720kHz rt, cw, fsk, five bands, very heavy 114lbs, vg manual for AP57141 series B41 tx, £30 ono. G1EFK not yet QTHR. Tel Coningsby 0526 42279.

Scope Solatron CD1400, 15MHz dual beam, but one beam u/s, with manual, would split for plug-ins. CX1441 Y-amp, CX1442 differential Y-amp, CX1443 timebase, offers. Muffin fans, various sizes from £2. 2N3055's on heatsinks, from £1.50. G8ISI, QTHR. Tel Liphook 0428 723168.

Trio 2300 gd cond, mobile mount, all accessories, orig packing, £100. Microwave Modules 500MHz frequency counter, unused, £50. Homemade psu 13·8V, 5A continuous 8A peak, £20. G6BGW, QTHR. Tel 061 655 1722.

Trio TR2500 complete with base unit ST2, spkr/mic SMC25, nicad packs, rubber duck, 1λ/4 wave flexible, soft case/belt clip, mag mount with 4m coaxial, all immac, manual, £200. GM3HBT, QTHR. Tel Larkhall 883306 after 6pm.

FT902DM with FC902 tuner, fitted cwn/fm filters, exc cond, £650 pair, will split. Racal RA117, fair cond, with manual, £125. FT480R, mint, £300. MM transverters, 144/28, new, £115. 432/28, old but recently serviced, £75. G3SCZ, QTHR. Tel Reading 700041 evenings.

Racal RA17, 0·5–30MHz, c/w manual, gd cond, £150 ono. 800g (approx 4ft diameter), met balloon, brand new and perfect, as used for Radiosonde, £15. Wilson WE800 144–148, 2m handheld/mobile rig, 1W/12W c/w nicads, mobile-mount, handbook, £120, G4AAQ, QTHR. Tel 0977 791071.

Mosley Elan beam, 10/15m, 3-ele improved boom, £50. Buyer collects. G3JLB, QTHR. Tel 0474 534694.

TS120V, mic, PS20, £275. Heathkit OS12/U oscilloscope, with probes, £10. Complete set *Radio Communication* 1969–82, offers. *Wanted:* FT790R, G4ADJ, Drybank Farm, Ettington, Stratford-upon-Avon. Tel 0789 740248.

Welz SP350 hf-vhf swr power meter, cond as new, with packing, £50. 10m 3-ele mini-beam, gd cond, £20. Possible p/exch meter for MMT144/28R. Steve, G4VRR not QTHR. Tel Staines (0784) 51126 evenings.

FT225RD complete with Mutek front-end board, £425. Parabolica 2m–23cm transverter, £150. A whole 3W o/p. You too can work Y23 with it. OZ9CR ring-of-six pa (this is the real thing not a modified UPX9), complete with six Eimac 7289 valves, and large snail blower, but minus HT supply. Peter Crosland, G6JNS, QTHR. Tel 0905 620041 evenings/weekends.

Silent key, late G4ZQU: FT101E, FC707 atu, and Kenwood LF30A low-pass filter, all items in vgc, the lot or might split, £400. G1EYN. Tel Southend (0702) 202216.

Yaesu SP901P phone patch spkr, Heathkit RF sig gen, (valve type), both in exc cond, will exch for audio notch filter, Daiwa or similar rtty rx equipment, or anything useful for swl station. No rubbish please. Tel Alan, 0946 62122 day, 821111 evenings.

Yaesu FT101ZD, £350. FV101DM, digital, vfo, £100. Icom AT500 atu, £175. TH3 Mk3 beam, £100. FL2100Z, £325. Versatower SP60, £350 ono. G3UUI. Tel 01-480 3938 day, 0702 64485 after 8pm.

IC720, matching psu, SM5 mic, extra filters added, operation perfect, £650. G4FBY. Tel 0799 86356.

IC02E, IC04E, chargers, headset, cases etc, used little, £175 ea or split. FT290R Mutek fitted, case, £175 ono. Jon, G4UXG, QTHR. Tel Bracknell (0344) 483631.

Pye 4-ch rx, low band, £8. Class D wavemeter, ex-wd, £5. Icom 1050, £25. RCA 813 with base, £18. Pye base tulip mic, £3. Three soldering irons, £8. Tandy DTMF encoder, £10. Tel Mr McCarthy, Ipswich 215047.

Yaesu FT290R, nicads, charger, case, cw foot switch, stand, mint cond, £220. Heather Lite mobile boom mic, up/down buttons, used little, wired 290R, £16. *Wanted:* morse keys, any type or cond for collection. G4VZD, QTHR. Tel Leeds (0532) 585806.

IC120 23cm fm, 1·5W, mint cond as new, includes 23-ele Tonna, 10m H100, r/s plugs, will deliver within reasonable distance, £350 ono. G3WDN, QTHR. Tel Lowestoft 62161 ext 422, 8.30am–4pm only.

Mobile shack, mirror trailer tent with extension 13ft × 10ft overall, old but sound, £200 ono. Disc drives 8in Shugart 801, offers around £50. Unit with two roller coasters, offers. 11ft dinghy, trailer, £140. 2–8MHz ex-wd tcvr, £35. G4TTZ, QTHR. Tel 0252 871077.

Trio TS830S, cw filter, low-pass filter LF30A, dummy load, AT230 atu, all as new with very few hours use, £650. GW4PFW, QTHR. Tel Crawley 35002 after 6pm.

FRG7700/M, FRT7700 atu, both as new cond, £250. Buyer collects. Brian, G1HLL. Tel 01-515 5517.

Yaesu FRT7700 antenna tuner, £35. Datong morse tutor, £35, or exch for Bencher paddle or keyer electronic, W.H.Y.? Eddie, G0AQI not QTHR. Tel 01-445 0528/01-794 8967.

Trio TS930S and Trio 430S, new cond. Drake L4B linear amp, very nice cond, new tubes. *Wanted:* Collins KWM 380, must be gd cond, and Alpha linear amp. Tel Derby 557705.

Yaesu FT101 ZD (Sommerkamp 277ZD), mic, fan, dc psu, nb cw filter, fm, nine bands etc, with FC902 atu, both boxed and perfect, £500. G4KLB, QTHR. Tel Bournemouth (0202) 519543.

Ferguson Videostar colour sound camera, Makro auto zoom, ideal atv, cw pan tilt tripod, £230 ono. Video lamp, 500W, 1000W or 2500W with blower and barn doors, £50 ono. G4ULT, QTHR. Tel Houghton-le-Spring 841897.

35ft angle iron tower, h/brew, heavy-duty, drilled for CDE type rotators, buyer collects, £50 ono. G3NAS. Tel Lichfield 55992.

FT708R NCB charger. YM24A spkr/mic, nicads. Lowe UL1000 aut. Altai dip meter 1·5/250MHz. D70 tutor. MMC 435/600, DC144/28 converters. Datong RFA preamp. MM1 432/50 linear. Western PM2001 50/150MHz, 0–200W meter. MBA/RO reader, cw stand. Datong FL3 filter. Reasonable offers or exch for FT290R, Meteor 600 frequency counter, Spectrum plus, or W.H.Y.? All specs and vgc. G6WZR, QTHR. Tel Gosport 524763 weekends.

TS700 2m multimode, never used, mobile, £240. YW3 swr meter, £5. Airmec 714 VTVM, £25. G8YTK. Tel Braintree 40263 evenings.

Realistic DX200 as new, 200kHz to 30MHz rx, £80 ono. G3KIP, QTHR. Tel 04352 6575.

Datong D70 morse tutor, as new cond, £40. G6OIK not QTHR. Tel 0793 727369.

General Radio sig gen, Marconi gigahertz gen, the two, £15 ono. Yaesu FT101, Yaesu FV101B, vfo, Yaesu monitor scope Y0100, the lot, £250 ono. G3LVO. Tel Royston 41380.

FT290R case, nicads, charger, helical whip, mint, including postage, £220. G4UNM. Tel 0983 402273.

Trio 130S cw filter, new bands, immac cond, one owner, genuine reason for sale, £395. G4TGK, QTHR. Tel 0679 62295.

FT227R 2m fm mobile or base, 10W/1W memory, ± repeater shift, £125 ono. Prefer buyer inspect and collect. G3AAH, QTHR. Tel Birmingham 021-451 3369.

Two rx's, R1000 with SP100 and UL1000 RF amplifier, boxed, £235. Grundig Satellit 2100 with ssb, £150. Crofton 12in CCTV monitor (video i/p), £40. Bird elements 50H and 1000H, offers. Exch any above for 70cm multimode. Tel Mike, Preston 635560.

Drake TR4CW MS4 psu, Astatic fist mic, recent check all ok, £180 plus carriage. Datong auto notch filter, £30. G4UEK, QTHR. Tel Plumtree 4344.

SSTV colour Robot 400, with interface three memory board professionally fitted, best offer over, £500. Robot 800 sstv character gen, with rtty 45—100BDS Ascii, 110 bauds and cw, 0–100wpm, tx/rx, £250. Link colour decoder, £85. G3CDK, QTHR. Tel 01-647 1866.

AVO No 1 sig gen, 60kHz–80MHz, £20. AVO resistance capacity bridge, £15. Both gd cond for age, buyer to collect or pay carriage. Tel 01-647 6157.

Trio TR2400 2m, fm, 1·5W handheld tx/rx, mint cond, orig carton, cw, manual, charger, case 5/8 magmount, £150. G3PAX, QTHR. Tel 0903 40513.

Racal RA17, exc wkg order, £140. 18AVT hf vertical antenna, £75. 19in rack enclosed sides, £20. Telequipment D43R oscilloscope, faulty, £10. Bush dual standard bw tv, made for German market, ideal dx-tv, £20. All items ono. G4UEN, QTHR. Tel Southampton 433837.

FT690 6m multimode, nicads, boxed, £275. FT480 2in multimode, used as base only, boxed, £275. Robot 400 slow scan converter, used little, mint, boxed, £450. Sensible offers, going QRT. G6JEL, QTHR. Tel Dawlish (0626) 864405.

FT707 as new, £375. Icom IC2E with accessories, £130. Drae 13·8V, 24A psu, £95. SEM Tranzmatch with ezitune, £75. Bencher paddle key, £25. Welz coaxial switch, £15. Yaesu antenna filter, £15. All ono. G4TQJ. Tel Tadley (9336) 2594 after 6.30pm.

PSU and linear hf PA 6146s, abandoned project. Speech processor four pin 12V DC atu, plus professional swr/pwr meter, transistor tester with write-up, all homebrew, *Rad Coms* 1982/3/4, assorted resistors, capacitors etc, the lot, £30. Buyer collects. G4KJN, QTHR.

Trio JR310 amateur band rx, £90. PR30 Codar preselector, mains, £10. Mobile car antenna for 10/15/20m, no base available, £25.50p. Tel Wood, Clochen 378.

Creed 444 teleprinter, pristine cond, 45/50 bauds with PAG terminal unit, and all leads (better copy than most computer systems), £75. G4PQP, QTHR. Tel 0263 511978 after 6pm.

IC260E 144MHz multimode tx/rx, with Mutek TVHF 230C hf bands transverter, £450 the pair, or can split. Yaesu FT77S hf tx/rx, with fm marker, cw filter, and mic, £350. Chris, G3TUX. Tel 0428 56255 (office hours).

Telequipment D61a dual-trace oscilloscope, probes etc incl, £150 ono. Technicolour V212E microvideo, portable video recorder/player, leads, psu/charger, tapes, manual, adapters etc, £300 ono. Matthey low-pass video filters, new, 1/2MHz, £50 ea, offers considered. Tel Paul 0224 895395.

AT500 atu, unused, £320. AMT1 with software for Comm 64, incl tape recorded, Amtor rtty cw 10 months old, £375 or split. Tel 0509 843830 after 4pm.

Lunar 144MHz linear amplifier, 10W i/p, 80W o/p, preamp as new, ssb/fm/cw, £75. 27/28MHz Microwave Modules linear amplifier, 100W o/p for 4W i/p, as new, £75. Both items small transistorised. GM3WCS, QTHR. Tel 0383 726456.

Icom IC260A, 2m fm/ssb, 143·8–148·2MHz, 10W o/p, with HM10 scan, mic, £250. MM2000 rtty to tv converter, slight fault hence, £75. *Wanted:* TR9130. G6HQK not QTHR. Tel Wolverhampton 69285 after 7pm.

FT225RD, offers, Microwave Modules MM4000 rtty unit, with RCA keyboard, £185 or W.H.Y.? Have no time for 2m, spend 95% on hf bands. GI4LXL not QTHR. 18 Kincora, Ballymena, Co Antrim BT423EX. Tel Eamon, Ballymena 41353

Yaesu FC902 atu, vgc, £95. G4WYM, QTHR. Tel Hatfield 73879.

Racal RA117E 0·5—30 MHz ssb/cw/a.m. gen cov rx, cased, £200 ono. Matching RA218 sideband converter/fine tuner, £30 ono. Marconi TF801D sig gen, 10–480MHz in five ranges, calibrated o/p dBm/μV, mint cond, £140 ono. G4PXW. Tel Maidstone (0622) 51844 after 8pm.

NRD515 synthesized hf rx, exc cond, £700 ono. G4CNY, QTHR. Tel 0432 273237 evenings.

Icom IC4E, £150. Sony ICF7600D, £130. Belcom liner 430, £100. Hansen SWR3 2KW bridge, £25. Vfo/psu for KW Atlanta (xcvr nicked), £75. All immac. *Wanted:* Atlanta xcvr, £100 offered dependent on cond. Steve, G3YDV. Tel Windsor 51056 daytime.

Trio TW4000A with voice (save over £150 on very clean rig), £395. Yaesu MD1B8 mic, £39. YM48 mic, £20. Jaybeam C5 colinear, £38. Freq/swr/power meter, hf–2m, £45. P/exch possible. Tel Rayleigh (0268) 774089 after 3pm.

480R, £200. Mirage amp 80W o/p, £75. 8-ele × Yagi, £15. 70cm vertical, £15. Tono 150W amp, £150. Kenwood world clock, £30. Drae 24A psu, £100. FT107R converter, 28–432MHz, £150. Bearcat 220FB scanner, £110. Monitor phone coster, £10. Mike, G4TIJ, QTHR. Tel Maidenhead 31377, between 3–5.30pm.

Thandar equipment multimeter DM450, frequency meter TF200, pulse gen TG10S, £50 ea. Portable oscilloscope SC110, £75. All items as new. Multicell nicad chargers, £2.50ea. Roland, G6PNS, QTHR. Tel Hitchin (0462) 811566.

Clearance, Yaesu VFO 5-5·5Mc/s XF9 filter 8-pole, with xtals. Xtals for 40/15/10m, £15 ea. Pair matched 6JS6C, unused, £10. LAR 7MHz traps, unused, £10. Jaybeam 8-el Yagi, £12. *Wanted:* Clean HF5V vertical, part exch any above. G4HWB not QTHR. Tel 061-653 8535.

Yaesu FT101E, 160m to 10m, ac/dc, cooling fan, clarifier, cw filter, vgc and performer, professionally maintained, used little, £350. Consider offers. Phil, G4WOH, QTHR. Tel 0472 694086.

Drake TR7 c/w PS7, immac cond, with full gen cov tx/rx, a.m. filter and If cov proms, all orig cartons, and workshop manuals, £700 no offers. G3ZYC, QTHR. Tel 0773 44031 9am–5pm.

Teletype CORP 33, with stand, incl electronics for RS232 drive, 110 baud, £30 ono. G4JUW, QTHR. Tel Danbury, Essex 5748.

Lattice tower etc, details as my advertisement on Page 62 "*Rad Com* Jan 85", when heavy snow everywhere put off all 17 interested enough to phone me, price £175 ono, buyer collects. G4PZX, QTHR. Tel Colchester, Essex 0206 28856.

TS700G 2m multimode, fitted extras, Mosfet pre-amp, variable power o/p, ideal driving linear, orig packing, mic, both handbooks, fixed channels, fully xtalled, £270 ono. G4DBI, QTHR. Tel 06845 68627 after 5pm weekdays.

Trio TS780 dual bander, mint cond, £725. Trio TW4000 dual bander, as new, £425. Trio TR2500, mint, £200. ST2 base charger, £45 (sold together). MET 2m 14-ele, £22. 7-ele, £14. Sycamore, 50 Hillcross Avenue, Morden. Tel 540 3959.

Yaesu FLDX400 tx, FRDX400 rx, hand mic, desk mic, ext spkr, spare valves, Datong RF clipper gd cond, £300 ono. G4UUI, QTHR. Tel 0233 25090.

AMT1 Amtor rtty cw Ascii terminal by ICS, modified to give normal reverse receive/transmit wide/narrow shift 2125/2295 tones, lead plugs, manual, £125. ICS software for BBC computer split screen, £30. Postage extra. G3RDG, QTHR. Tel 01-455 8831.

Radio Shack TRS80 level 2 monitor, printer, two computers, ZX80, £120 the lot, or exch IC202S. AEA MM2 memory keyer, £70. Tel Dave, Marlow 06284 72086 evenings.

Generator diesel 240V 1·5KVA, wheels and handles, first class cond, £325. Dynamometer, type 3206 by H Tinsley & Co, £150 or offer. Drawing board, Reiss ordinat 3, 36in by 60in, draughting head and stand, 360 deg, £250. G6DMS, QTHR. Tel Great Easton (Essex) 250.

Racal RA98 independent sideband adapter, £25 or exch for 1930s valves' books, mags etc. G4OOW. Tel Hinckley 0455 612091 after 7pm.

Trio TS700S 2m multimode, a.m./fm/cw/ssb base stn, 12/240V, superior digital readout version with preamp, n/blanker, vox etc, continuously tunable and fully loaded with xtal options, external VFO 700 and SP70 incl, all mint, £395 ono. G1EAB not QTHR. Tel Nottingham (0602) 612295.

Mutek TLNA432S switched preamplifier, £37. G8WXU, QTHR. Tel Billericay 3019 evenings.

Racal gen cov tx/rx system, comprising RA117E, new cond in wooden crate, MA79 drive unit, vgc, TA940 linear amplifier, RA218 ssb unit, Redifon SD1 drive unit (current cost of Redifon around £3000), offers. Tel 0254 823038.

Microdot rtty/cw communication terminal, with built-in keyboard and video display, requires 13·8VDC 2·5A, as new, £250 ono. Inspect collect South Manchester, letters only please. G5ZK, QTHR.

TR2300 LAR psu/charger, nicads, rubber duck, never used mobile, cost new £210, sell for, £110. Prefer inspect collect. Dave, G4EZF. Tel Mottram, Cheshire 62799.

Icom IC25E 2m fm scanning mic, 25W, five memories, as new, orig packing, £195. G4IOF, QTHR. Tel 01-486 8286 daytime, 01-722 7040 evenings.

ST5 computer terminal unit, all high class components, immac cond and wkg perfect, psu built-in, din sockets, scope o/p on phono sockets, £40. G3SVH, QTHR. Tel 0922 414524.

144MHz single 4CX250B amplifier and psu, 250W rf, offers. W1SL constructed metal work chasis, blower, silver plateline, in fact everything except bases, offers around £95. Case to BNOS style, perfect for 30A and psu, £10. G6HKS, QTHR. Tel 0945 584640.

Trio Kenwood comm rx, a.m. usb, lsb, cw, digital readout, mint cond, £165. Tel 01-467 7267.

Yaesu FRG7 modified, plus homemade 2m converter, £95 ono. *Wanted:* FT790R or similar, also 70cm antenna. G6FVH, QTHR. Tel Malvern 61707 after 5.30pm.

FT480R with desk mic, vgc, £300 ono. Channelmaster rotator, with new upper support bearing, and 20ft 2in aluminium polo, £70 ono. Tel Norwich 0603 614167.

Yaesu FT200, with psu, mic and manual, vgc, £150. Pye W15AM complete, as new, £20. Buyer collects. G4NZE, QTHR.

EG3008 Genie 2 16K computer. EG3014 32K expansion unit. 48K total. EG401AT dual 40 track disc unit, plus DOS, all connections. Word processor, AJEDIT and manual, offers. G4ERT, QTHR. Tel Markfield 242079.

TW4000A Kenwood Trio, dual band, fm, 2m/70cm, one year old, used little, none mobile, over 25W ea band, £450 ono. Standard C110E 144Mcs, handheld, £125. Mizuho SB2M ssb portable, £65. Both with nicads. G2ATK, QTHR. Tel Pershore 553735.

Sony, Hitachi, Scotch, Shiba, 0·5in video tapes, approx 40 reels, used little, vgc, recordings of broadcast air displays, from 1972, made on Shibaden SV700, the lot, £10. Buyer to collect or convey. G3UYG, QTHR. Tel 061 491 0688.

Collins 32V tx, wkg, collectors item, offers. US Military exciter/freq meter, PM05 (0–459A/URT), 19in ovened unit, 2–8MHz, 50Hz readout, handbook £50. Advance CVT MT140A (150W), £5. 115V 6A Variac, £10. Buyer collect. G3RFI, QTHR. Tel 0767 260800.

Twenty IRCs, inc p&p, £5.75. Mr Parkes, 6 Hazeley Close, Hartley Wintney, Basingstoke RG27 8QS.

Yaesu FT230 2m mobile fm rig, 25W, less than one year old, exc cond. GM1MTS. Tel Aberdeenshire 03586 438.

Strumec Versitower 60ft galvanised. KR440 rotator. TA33J 10-ele 2m. All vgc, buyer to collect 50 per cent list. G3MVU, QTHR. Tel 0702 203239.

JIL SX200N scanning rx, one year old, orig box, psu, manual, £195. G4GPX, QTHR. Tel Lancing (0903) 753893.

IC251E, 2m all mode base stn, Mutek, manual, complete and boxed, mint cond, £450. John, G4XHU. Tel Brentwood 0277 224466 daytime, or Maldon (0621) 740773 evenings.

Murphy TR807 low band mobiles set, controller and rack, complete but cut cables should work, 15 units, with all valves (QQV03-20A), plus spares, £100. Or £10 per unit, buyer collects. G1JFU, QTHR. Tel Stockport 061 442 0244.

Pye Europa R7 xtals, pair, £5. Discone receive antenna, smc vhfl, unused, £12. GW4HAT, QTHR. Tel Swansea 0792 290770 evenings.

FT101ZD, £400. SEM Z-Match with Ezitune, £50. Daiwa CN620A, £35. Standard C58, £165. MM 144/30LS amp, £40. Trio SW100, £25. SEM vhf Z-Match, £10. DNT M-forty fm cb, £15. EK150 key, £35. G4UMN, QTHR. Tel Frome 63939 evenings/weekends.

Hi-mound keys, as new, half price, HK704 straight, £8. BK100 mechanical bug, £12. G3GIB. Tel Berkhamsted 2814.

TS780 2m/70cm multimode, £700. FRDX400 hf/2m/4m rx, £100. Zetagi 2m linear, 100W, £45. 17-ele 2m Tonna, two months old, £25. 11-ele 2m Cushcraft, £20. Mutek SNLA 144S preamp, £25. Going QRT. G8YTF not QTHR. Tel 0706 350650.

TS430S with FM430 and filters, £650. FC102 atu with optional switching unit, £150. MC60 desk mic, £30. HF5V with radial kit, £60. Alinco ELH710 linear, £50. Binatone 3900 telephone answering machine, £50 MET432-5B antenna, £12. G4VET, QTHR. Tel 01-647 1879.

Drake TR7A with psu, accs believed unused, £800. R7A, mint, £500 ono. MN2700, new unused, £180. All located at late G3SU, QTHR. Nr Egham. Buyers collect. G6CJ, QTHR. Tel 074 785 471.

Microdot 2 tx/rx data comm unit, rtty/cw, with own 5in Green monitor, as new cond, complete with connectors and parallel printer cable, exch for 25W 2m mobile rig eg FT230R. G13VAW, QTHR. Tel Limavady 62946.

R1475 wkg, TR1133 gen, APN1 altimeter, APX6 transponder, rx indicator APN9, ABK IFF rx. *Wanted* Generators: PE94C, PE98A. Junctions, JB29A, type 17. Jackboxes, BC629A, BC630A, BC631A. Wartime connectors, USA, British, tuning draws TU5B etc. Mr Parsonage, 52 Bramble Lane, Mansfield, Notts.

Microwave Modules 2m/1268MHz converter, for mode L Oscar, 2W o/p, as new, £105. Metalfayre 2m 6-ele cross Yagi, new, £30. TEAC FD55E 200K disk drive, cased, as new, £120. Paul, G4XHF. Tel Crawley (0293) 515201.

Racal RA117E, in cabinet, £225. Eddystone 830/9, £150. Eddystone EA12, £150. SX200, mint, boxed, £150. All with manuals. *Exchange* £450 Hornby OO 17 locos, coaches, wagons, all boxed, tracks, points, want ICR70 rx, gd cond. Nelson, RS85441. Tel Thetford 810879.

Yaesu FT480R, £285. Jap car cassette player, unused, £15. Personal cassette player, boxed, £10. 5-ch graphic equaliser, car, £10. All pwo. Cordless phone, wkg but ringer needs attention, £15. *Wanted* manual Mirage B1016. G6IAT, QTHR. Tel 0582 23750.

FT101ZD Mk 2, FV101, SP901, cw filter, mic, used little as new, SB200, new spare valves, all reasonable offers considered. G3PSV, QTHR. Tel 0276 65615 after 7pm.

Hammarlund HQ170A rx, amateur bands from 1·8MHz to 50-54MHz, without needing converter, recently re-aligned by an experienced old timer, reason for sale, just bought FT757GX plus awaiting Class A arrival, £200 ono. G6JCN, QTHR. Tel 0429 222865.

Trio Kenwood 830M, has a.m. otherwise as S model, exc cond, two years old, superb audio quality, all bands incl WARC superb audio, has variable band width and notch, new price, £832—first £575. Brian, G4UML. Tel 061 904 9853.

Spring clearout unused equipment, Heathkit

SB104 80-10m solid state tx/rx, 100W o/p, with matching 20A psu, unused 5 years, £200. QM70 solid state 70MHz transverter, as new, £25. MM144/28 transverter, used little, £50. Video Genie EG3003, with CT600 rtty terminal board, rtty transceive and cw receive programs, £110. BBC machine code cw transceive programs, tape, £7. Disc, £10. G4GRV, QTHR. Tel 0603 620658.

Racal RA1217 communications rx, ex maritime service, all filters etc, wkg order, £110 ono. G4DEP. Tel Langport (0458) 250629.

FT101B, new pa's, fan, mic, dc lead, cw filter, £325. G4VPR. Tel Tunbridge Wells 28947.

FT101Z with ssm, vhf trans, £350. FRG7700, FRT7700 atu, boxed, £250. 8-ch vhf rx, £20. Trio PS10, as new, boxed, £25. Trio SP930, with filters, boxed, £30. Katsumi active cw filter, £7. G4UPV, QTHR. Tel 0705 501718.

TS520, MC50, £300 or exch with other amateur gear for portable video, Sony F1 or similar. GW4NQJ, QTHR. Tel 0686 88510.

Ricoh KR10 SLR with standard lens, Helios 28mm lens cable release, Prinz 600, and Topman 230B computer flashguns, 2m flash remote lead, complete with gadget bag, £150 or exch 70cm tx, W.H.Y? Puma linear amp, 3W i/p, 21W o/p, mint, boxed, £27. Charger for FT290, £6. Yaesu YM38 desk mic, £16. Micronta 3-30MH triple meter for power modulation and swr, boxed, as new, £12. Mike, G6MNX, QTHR. Tel York (0904) 53173.

Racal MA79 tx, 1-30MHz ssb/cw/dsb/a.m./fsk, adjustable carrier etc, late production example with very clean chassis, £200 ono. Racal MA152 vswr meter with adjustable vswr HT trip, £20 ono. G4PXW. Tel Maidstone (0622) 51844 after 8pm.

TS520 tx/rx, with matching spkr and vfo, complete stn, recent overhaul, new PA tubes, in fb cond, £350 ono. G3KYF, QTHR. Tel 0533 778279.

Yaesu FT230R 25W mobile, with gutter clip, cable and connectors, also Whip-fold Ant for above, all as new, £200. Buyer collects. *Wanted* KW109 supermatch ATLL. G4PJY, QTHR. Tel Oakham 2721.

Westminster spares. Various PCB and transistors, at half price. SAE for details. GU3HKV. Tel 0481 47278, Tuesdays-Fridays, 6/7pm.

Icom IC720A, cw filter, mic etc, mint cond, bargain, £500. IC2E, spkr/mic, charger, two antennas, £110. Pye pocketfones, RB0, £25. Fraser, G4BJM. Tel 0908 567362 evenings.

H/B hf linear (2 × 813), c/w psu, photo available, very heavy, buyer to collect, £250. Memory keyer 1024 bits c/w stabilised mains power supply, £50 plus postage. G3RB, QTHR. Tel Tyneside (091) 2530504.

Western 30ft telescopic ulti-mast, requires approx 12in to be welded to base post, £125. Yaesu FT708 70cm handheld, £120. Tono 2m 90W linear, with preamp, £80. 2m 7-ele MET beam, four months old, £10. Mike, G8VHK. Tel 0903 208077.

Heathkit HW12A 200W 80m ssb tx/rx, in absolutely unmarked cond, complete with psu, spkr, spare PA valves, manuals and mobile mount, £85. G3UEG, QTHR. Tel Harlow (0279) 27788.

SSTV Venus SS2 monitor, £75. Datong indoor active antenna, AD270 CPTE psu, £40. Mutek scanner amplifier BBA500U, with plugs, perfect, £15. R J Newey, 1 Barlow Close, Olbury, Warley, West Midlands B68 8ND. Tel 021 544 4185 after 6pm.

DX160 rx, ssb filtering, beautiful cond, spkr, manuals, £65. Stephen James atu Mk2 multi tuner, £12. VLF rx, Murphy B41, 15kHz-700kHz in five bands, covering submarines through atomic clocks to medium wave, ideal for tunable IF. G4XWD. Tel Kidderminister 3674.

Collectors items. WW2 army rx, type PCR2 unmodified, with separate psu, gd cond, £30. HMV type 1127 clock radio, 1954 vintage with service sheet, £15. Pre-WW2 Avominor, £15. All in wkg order, buyers collect. G3TJC, QTHR. Tel 0274 582781.

Icom IC730 hf tx, fm board fitted, PS20 psu, Yaesu FC700 atu, £590 ono. May split. John, GM6YJS, QTHR. Tel 08662 243.

Trio 2300. 145MHz fm, portable tx/rx, 80-ch plus repeater shift, £95 ono. Microwave Modules MMC 432-144MHz receive converter, £15 ono. Both carriage and insurance paid. G3TDJ, QTHR. Tel Bude 0288 3701.

Drake R4C, T4XC, NB4, all cw filters and band xtals, fan, spare valves etc, £550. HO10 scope, £35. DX6V vertical, £30. Datong RFA preamp, £15. 9-ele Tonna, £10. All ono, post extra. G4JBH, QTHR. Tel Yeovil 23873.

FRDX 400, with 6m, 2m converters fitted, manual, some spare valves, vgc, £110. Datong UC1 full hf plus 2m into 28-30MHz, exc cond, £80. AVO model 40, £20. Stentorian HF101Z spkr, £6. Cooper, 11 Radical Ride, Wokingham, Berks. Tel 0734 734312.

W/S No19 Mk2 complete morse key, spare valves, leads, mic, headset, operating board etc, handbook, £99.99. Digital voltmeter, type DM2025, gwo, £45. Solartron electronic LF phase sensitive voltmeter, model VF253, £7.99. Tel Bicester 246389.

TS120V 270Hz, cw filter, service manual, mic, exc cond, £310. DFC230 digital vfo for TS120/130, TS830S, four memories, incl up/down scan, mic, mint, £75. BNOS 13·8V, 12A p/supply, unmarked, £60. SEM Tranzmatch 160-10, matches almost anything, built-in balun, immac, £60. 10m fm converted DNT narrow filter, as new, £33. 10m 30W ssb/fm linear, £15. Chris Mouldings Iambic keyer module, boxed, exc Kentec paddle unit, adjustable magnetic bias, £35. MM15dB attenuator, £6. All items boxed, ono, carriage extra. G4ABF, QTHR. Tel Malvern 06845 66202.

Amtor Mk2 board, from ICS, still in original packing and unused, complete with instructions and original connectors, offers around £100. Jeff, G4WAX. Tel Tyneside (091) 4875973.

TS520, mint cond, £300. Yaesu FL400 and FR400, £300 the pair. TH33JNR, £100. G3DVY not QTHR. QTH in Northumberland. Tel 0434 603279.

KDK2033 2m fm, 25W lcd display, as new, boxed, £185 ono. Kenwood Trio TR8400 70cm 10W fm, hardly used, complete, boxed, £180 ono. Drae 4A psu, as new, £25 ono. G1GQL, QTHR. Tel 0425 54946.

FT290R, boxed, as new, still under guarantee, with homebrew mobile mount and 5λ/8 L antenna, £230. Would exch for AR2001. G1JXZ not QTHR. Tel Aylesbury 81624.

Drake T4XB and R4B separates with SPR4 spkr/psu and matching MN4 atu/wattmeter, 160-10m, incl WARC bands, 2·3/1·2, 10·5kHz filters, plus notch facility, Shure 444 mic, many spare valves, £340. G3ZZD not QTHR. Tel 01-348 9780.

Hy-Gain Galaxy R1530 rx, continuous 10kHz-30MHz in 500kHz bands, 2·1kHz, 6·0kHz, analogue dial, bandwidths 0·5kHz, incorporates pre-selector, exc electrical cond, gd used cond externally, £350 ono. Tel Llandovery (0550) 20201.

TS830S with cw filter VFO240 and SP230 spkr, all in perfect cond, boxed with with manuals, £760 ono. GI3YDH, QTHR. Tel Belfast 793913.

IC701, IC701PS, used little, £400. Newbrain computer model AD, 27K rom 32K ram, 16 char display plus books, tapes, £75. Can deliver 50 miles from Portsmouth. G3XVR. Tel Emsworth 77641 after 6pm.

Trio TR7800 2m fm 25W tx/rx, 15 memories, with mobile mount and manual, orig packing, very fine cond, 5λ/8 whip with gutter mount, £160. Eddystone EC10 Mk2, with manual, £40. G2ARU, QTHR. Tel Eastergate 3488.

Collins KWM2A round emblem 516F2P/S, £400. Heathkit SB303/SB401 tx/rx with spkr and some spare valves, £250. *Radio Amateur callbooks* 1981 US/FGN editions, offers. G4BFM not QTHR. Tel Bampton 0398 31873.

Drae morse tutor, exc cond, £35. Tel Frank 021 354 4125.

KW2000B with matching psu, Shure 201 mic, Datong RF clipper, extra xtals for 10m, overhauled by KW, £200. Buyer collects. G8KJ, QTHR. Tel Reading 0734 693173.

TS530SP, June 84, used little, as new, £550 ono. G4JQY, QTHR. Tel 061-432 7310.

FL2000B, very clean, neatly fitted with pa heater s/by relay and variable rx mute, has outboard psu (transformers guaranteed till doomsday), FRDX400, used daily on hf bands, recently revalved, no 2m or fm, £85. Buyer inspect/collect. G3VRU QTHR.

MMC 144/28MHz, immac cond, £12. Jaybeam 15/15 23cm Yagi, £10. *Practical wireless* 1979-82, £4 per year. Wood and Douglas 2m 10W linear, £10. TV/DX equipment, uhf 91-ele Yagi, £15. Labgear uhf group B Masthead PA (CM7025), £8. PSU, £5. Wolsey distribution amp uhf, £5. B2 11-ele Yagi, £8. B2 6-ele Yagi, new, unused, £8. MML 144/100LS, £110. 30A Alinco psu, 13·8V, £60. MMT 144/432R, £110. Hansen FS7 swr 2/70cm (200W), £25. 16-ele Tonna, £15. 19-ele (70cm) £10. G6GGE. Tel 01-747 1306.

Pye tulip mics with PTT, £15. Insulated 10 strand antenna wire, tinned copper, 500ft coil, £5. U450L rx on RB10, £25. Variac 0-270V 20A, £35. 80AH 14V batteries, £25. Pye T30AM on 145MHz, £50. A200 60W linear amp on 145MHz, £38. Elliott ET628 (valved) tx, 10W 433MHz fm, £25. Airtech cavity 430MHz diplexers, 3 Stage £30, 4 Stage £38, 3 phase input, mains to 12V 50A dc supplies, £25. Lots of electrical, electronic and mechanical components, sae for list. Mr Sandall, Amber Croft, Higham, Derby, DE5 6EH. Tel 0773 833142.

Hewlett Packard 431C microwave power meter, £120. Marconi 995B/5 a.m./fm sig gen, 0·2-220MHz, immac, £395. Mr Sandall, Amber Croft, Higham, Derby DE5 6EH. Tel 0773 833142.

Saturn Base antenna, PL259 socket, 500W capability, still under makers guarantee, £17 ono. P&P extra. Yaesu spkr/mic, YM24A SP8Ω mic-2KΩ, £10. P&P, £1.50. Mr Marsden, 205 Moss Lane, Burscough, Ormskirk, Lancs L40 4AS.

WW2 collectors items. Airborne radio and radar equipment R1155, T1154, R1082, TR1133, SCR522, AYF radio alt. H2S and ASV indicators and rxs etc. Details Keith Strong, 20. Coolgardie Road, Ashford, Middx TW15 1ES. Tel Ashford 53990.

MM 2m to 70cm tripler, £20. Yaesu FF50DX low-pass filter, £10. Partridge Joymatch, £5. MM 2m preamp, £10. High band Pye Cambridge, needs attention, £25. Pair stereo spkrs, £30 ono. *Wanted* 70cm multimode tx/rx. Cris, G4FAM. Tel 01-658 5197 evenings.

Four metres, 100W linear MMT70/100, £120. *Wanted* EHJ transformer for Tektronix 545B, also plug-in type TU7 for 545 series. Bird thruline element 250H. Microscope slides. Manual for Eddystone EC10 Mk2. Buy or borrow. G3AZI, QTHR. Tel 0772 37815.

Superb TS7200G xtal controlled 2m fm, with mobile mount, manual etc, £70. Old wind-up gramophone in cabinet, beautiful cond, exch for best 2m ssb/cw rig offered. G4VKA. Tel Lichfield 52646.

KW1000 1·2KW hf linear, gd cond, buyer to inspect and collect, £220. 43m 5 core rotator cable, £13. G3TKN. Tel Waterlooville 265101.

FT707, £325. Yaesu 355D counter, gd to 600MHz, £75. 851B scope, £30. Shure 444, £15. 2m 7λ/8 whip, £5. Heathkit GDO, £10. All plus carriage. G8HED not QTHR. Tel Somerset 074988 609.

SSB filter YR88S for TS180S, £10. Microwave Modules 144MHz down to 28MHz, ssb transverter, £69. G3SED. Tel 0705 591057 after 6pm.

Trio 7730 25W fm 2m tx/rx, immac, £190. *Wanted* Good 2m multimode and hf linear 2100 or similar. G4VIO, QTHR. Tel 0388 763501.

Stephens James Mk2 rx multi tuner atu, £32.50. G3WPO fet dip oscillator kit, partly built, £10. GW4RZU, QTHR. Tel 0437 710544.

Gould OS4000 digital storage scope, soft case probe, handbook, £600-£700. Exch for either TL922, beeb and disc, CBM64, disc and printer, FT757GX, TS430S, TS770E, £600 ono. G4NVD, QTHR. Tel 0472 71999.

KW2000B, exc cond, with ac psu, additional vfo and Q-multiplier, unused since recent service, some spare valves, mic and handbook incl, £250. G3WHC, QTHR. Tel Dorset (0300) 20675 weekends.

Shimizu 105S hf tx/rx, all options, £275. HQ1 minibeam, £65. G4TZX, QTHR. Tel Dymchurch 872060.

Trio 120S hf tx/rx 200W pep, Trio 35S, mic, Trio PS30 matching psu, mobile connecting lead, with manuals and boxes, bargain for someone wanting compact hf st, £370. Trio 2200GX 2m fm tx/rx, 12-ch fitted, telescopic and helical antennas, ever-ready case and shoulder strap, nicads, mains charger, with manual and box, as new, £110 ono. G3XFB, QTHR. Tel 0902 850033.

Trio 3200 70cm fm, with nicads/charger, 12-ch (full), 10W W&D amp, 5λ/8 over 1λ/4 colinear, £135. SX200N scanning rx, 26-28, 108-180, 380-514MHz, boxed, as new with auto tape recorder, £160. G8GMT, QTHR. Tel 0992 414927.

70cm fm TH41E mini h/held, incl spkr, mic, £205. HC1400 25W 2m fm mobile, £185. Liner 2 ssb, £70. SB2M 2m ssb h/held, £70. AR240 2m fm h/held, £70. Incl charger. Letters only. Graham, G8WVI, QTHR.

Heathkit valve voltmeter V/7AU, with RF probe 309CV, £25. Heathkit R/C bridge, C/3U, £20. Shure Unidyne B high-imp mic, £15. YU Brother electret condenser mic, £8.50. 100 mixed boxed valves, £25. CTR60 cassette recorder, mains/battery, as new, £18. Tel Stoke Mandeville 2672.

Linear amplifier KW1000, recent new bottles, £220. Kenwood AT230 atu, almost new, £110. Norman, G4SFO, QTHR. Tel Rugby 810344.

Commodore model 8096 computer and 8050 dual disk drive unit, complete with leads and covers, £650. Norman, G4SFO, QTHR. Tel Rugby 810344.

FT77S immac fitted fm, cwn marker, £350. G4FKL, QTHR. Tel Sunderland 673350.

TS120V with cw filter, £260. *Wanted* FT290R with Mutek board, FT790R. Tel 01-688 4061.

HF gamma matched 3-ele Yagis, made by Bristol

company, 15m, £40. 10m, £25. Complete with mounting plates, very rugged. CDE AR40 rotator 2 years old, works perfectly, £40. Yaesu base scanning mic YM38, £15. G4OBK, QTHR. Tel Chorley 74451.

Datong D70 morse tutor, £37. Post paid. Tony, G0AHB. Tel 0992 466889.

Two 4CX250B valves, complete with bases and chimneys, unused in orig packing, £40 ono. G3BKV, QTHR. Tel 0305 785729.

Leak stereo 30 amplifier and matching Leak troughline vhf stereo tuner, £40. G3TEK, QTHR. Tel Basingstoke (0256) 20991.

Datong D70 morse tutor, as new, £37.50. Money back if not delighted. G4UHS, QTHR. Tel Fareham 289662.

Pye pocketfones tx/rx RB10, £35. Datong speech processor, £15. Beltek 2m tx/rx, £50. Pye Cambridge, converted to 2m fm, £20. Colour Geni, 32K, new roms, £90. G0ACZ, QTHR. Tel 0629 4789.

TS530S, £420. ATU AT230, £90. Trio R1000 and fm, £170. Heath VTVM IM5218, £35. Psu 13·8V 12-04-06, £12. Filter MFJ CWF2, £18. Key Himound HK704, £12. SWR meter SWR25, £15. Atlas 215X tx/rx 1·8-21MHz, cw/ssb, £150 ono. G4CEW. Tel 0962 62312.

Mast 40ft tiltover, plus 40ft dipole, included with 7yr old house, three good size bedrooms, 7ft 6in × 12ft shack/fourth bedroom, detached garage, large garden, end of cul-de-sac, close all amenities, neighbours one side only, £42,000. G4ISK, QTHR. Tel Crowthorne 771141.

Icom 730 hf tx/rx, exc cond, twin vfo and memories, new bands, VOX, preamp, processor, Ichmio scanning, mic and much more, £450 ono. G4WOX not QTHR. Tel 0670 851528.

JIL SX200N scanner, 26-514MHz, all accessories, vgc £175 ono. Incl p&p or exch with cash adjustment for Trio TM201A 2m mobile. Yaesu 757GX rig, matching auto atu, £775. P/exch 902DM and atu, adjustment either way. G6MUK not QTHR. Tel 0837 3207.

Eddystone rx 940, immac cond, handbook, original packing, 500kHz-30MHz a.m./cw/ssb, IF selectivity crystal filter, a fine comm rx, £125. Sinclair pocket tv with mains psu, works perfectly, £50. *Wanted* Yaesu FRG7700 or similar comm rx. Tel Luton 0582 25519.

Icom IC225 2m fm, 10W mobile, 25kHz synthesized, £85. MMT432/144R, £115. MM4000KB rtty tx/rx, £180, Marconi TF2361 hf-uhf sweep gen, c/w display and plug-ins, £150. 40ft Versatower, £250. MTV435 tv tx, £120. PET 2001 LGE KB computer and cassette, £150. G8AYN. Tel 04555 57790.

Microwave Modules 432/28 transverter satellite version, used little, £100. MM144/28 transverter, new cond, £70. AR88D spares available. G3AUB, QTHR. Tel Macclesfield 0625 25910.

Daiwa infra-red mic system T4P, for use in car, complete with charger and instruction sheet, used little but works well, £25. Tel Fleet 025-14 28526.

Trio 120S hf tx/rx, and PS30 psu, exc cond, £375. Tel Blackpool (0253) 404566.

Shihizu 105S ssb/fm/cw/hf rig, £270. MMT/V144/28, £60. MMT/V432/28, £85. Bremi linear 26-30MHz, 200W pep, £55. Liner 144MHz ssb/cw/preamp, £75. Excalibur base stn, 28·1-29·7, £110. 2m preamp rf switched, £12.50. Multimode 2, £45. Icom AT500, £260. MM linear 432MHz 100W, £160. Sota 124 linear, 10W i/p 100W o/p, £75. MMT/V432/144R, £110. Miniscan cctv camera, £30. All in gwo. G1BGZ, QTHR. Tel 0900 831243.

Silent key: Property of the late G4REJ: FT101B, £300. External spkr, £15. AT200 tuning unit, £100. TR7800 2m fm mobile, £200. TR700S 2m multimode base, £450. Belcom 2m LA106 linear, £100. Sota 2m linear, £100. Hi-Mound key, as new, £25. Two old style keys, £10. Welz CH20A coaxial switch, as new, £16. Boom mic MM204M, £35. Tie mic, £5. Daiwa cross needle swr/power, £35. VHF LAR Omnimatch, £18. Joymatch atu, £25. Adonis base mic, £35. Stereo amp and spkrs, £25. Alert cb, £25. Cybernet cb, £25. Midland cb, £10. Sony ICF2001 rx, £75. Three PF1 (70cm), two-way desk charger, built-in spkr, £55. KW (E-Zee) match, £50. Various cb accessories, transistor radios, mics, valves, leads, connectors etc. Cleartone CH900 (70cm), £100. 4m Cambridge, £35. Layfette KT320 rx, needs attention, £20. WKS1001 hf 10m a.m./ssb, £40. Phillips N240S cassette deck, £15. Motorola nicad batteries, as new, £20 ea. G60WL not QTHR. Tel 0373 67668.

Vibraplex type of morse keyer, £10. Post paid. R Smith, 6 Breach Lane, Enmore Green, Shaftesbury Dorset SP7 8LE.

FT101B 160-10m, ssb, a.m., mint cond, no mods, hardly used, complete with instruction manual, mic, mains and mobile power connectors etc, in orig packing, £210. G4CXD, QTHR. Tel Ascot (0990) 27951.

Six 4CX259B, £20 ea ono. Two B8F sockets 3000-3600pF bypass with ceramic chimneys, £10 ea ono. One Microwave Modules 50MHz converter (28MHz IF), £25 ono. One Microwave Modules 70cm transverter (2m IF), c/w attenuator, handbook etc, £125 ono. G4AFJ not QTHR. Tel 04557 3344.

Open University microprocessor and product design course for engineers. Complete microcomputer system, alphanumeric keyboard, prototyping board, five course manuals, experimenters book, switched on twice only, cost £395, sell £275 ono. FR50B rx and RL50B tx, original packing, £70. Tel Orpington 29586.

R206 Mk2, mint cond, complete spare valves tray high quality army comms rx, buyer must collect (heavy), £60. B44 Mk2, mint, unmodified, £15. Pye Bantams high band fm, with nicads, two £20 ea. G3VKT. Tel 01-994 1418.

FRG7 switched mech filter, mint cond, manual £135. Marconi TF144G/7 SSG, £15. Gen cov rx, 60kHz-31MHz, eight bands, double S/HET xtal filter, 12 valves, £40. Solatron SB scope CD1012, 25MHz circuit, £45. G4ULR, QTHR. Tel Norwich (0603) 51656.

Shack clearance. Datong D75, £25. Hy-Gain 402BA, gd cond, £200. Unfinished 3-ele 20m Quad project—2 × 20ft lengths 3in boom, all clamps, fittings, fibreglass, wire, absolute bargain, £75. Buyer collects. Solid state linear amp 3WIN, 100W o/p, 12V cw/ssb/fm,1-30MHz, £50. 5-ele 10m beam, similar KLM design, dual driven element 20ft boom, £50. Many other items too small to mention. G3UKS, QTHR. Tel 073 529 2672 evenings.

WANTED

Manual for Hallicrafters SX42 rx. G8WTY, QTHR. Tel Malvern 06845 4968.

FV102DM scanning vfo for FT102. G4BOH, QTHR. Tel 04775 296.

Two RF thermo couple panel mounting meters, 1A FSD. Two variable capacitors 300pF max. G3SCW, QTHR.

FT290R preferably unmodified and in gd clean cond. G3XHX, QTHR. Tel John, Liskeard (Cornwall) 0579 43749 after 7pm.

73 magazine Jan 1982 onward. Software for HP9820 prog calculator. Would correspond with another user. Exch progs etc. John Brown, G3EUR. 74 Humber Avenue, South Ockendon, Essex RM15 5JN. Tel 0708 852371.

Matching linear for Ten-tec Argonaut would consider other suitable linears G4MLI, QTHR. Tel 0840 770344.

HF linear, prefer TL922, MLA2500 or Alpha Prop pitch motor and desyns FS710H or FS50HP. G3FPQ, QTHR. Tel 0420 23168.

Callsign of Stewart Thorpe, sec Eastbourne ARS in 1920s. Any info about prewar Eastbourne club and its members. G3MHF, QTHR. Tel Eastbourne 0323 762252 or 25887.

Counter HP5245L or TF2401. Powermeter HP431C or HP432A. Generators HP608E, 612A. Manuals for above, and Collins 390A. N series attenuators and terminations. HP187B sampler probe accessories. Valves TD0310E, 6299, 8058, 7895, 6CW4, 7239, 8068. Tektronix 1S2, 1L10. G8OAD. Tel 077 836535.

60ft tower tiltover, Versatower or similar, with Guy-sets and winches, mast head and all parts in good galvanised cond, preferably Lincs area, or not too far away. G4VON. Tel 0780 720543 evenings.

Jaybeam MEM88/70 antenna. Heavy duty rotator, must be gd cond. 4CX250R or 4CX250BM valves, prefer new cond. 70cm power splitter for two 2m power splitter for two ants. 1kW power meter for 2/70cm. G6ZYG. Tel Wellingborough (0933) 225946.

Circuit diagram for New Zealand wireless set ZC1 Mk2. Mobile psu for FT200. Also FT230R. Price and particulars please. David Christie, 8 Ballytober Road, Bushmills, Co Antrim, N Ireland. Tel Bushmills 31086 evenings.

Icom IC402 portable 70cm ssb tx. Chris, G6LRY, QTHR. Tel Wantage 023-57 2205 evenings.

Exch Plessey TDMS80 telegraph distortion set, in wkg order for Sony ICF2001 portble rx. Exch or buy. Karagianis, 20 Lea Road, Sonning Common, Reading RG4 9LG. SDC0734 722085.

Tuning drive mechanism for Trio TS700, por TS700 in gd mechanical cond. GM3XOQ. Tel 09502 354.

Collector requires pre-1940 domestic valve radio's, especially Ecko round set, RS3, C25, SH25, Pye MM, Pye K or any set with interesting fret work. Also, Ultra 47 early radio books, mags, wholesalers catalogues. Valves, SP4, AC/VP1 five pin version, HL13, HL1320, PA20, AC/HLDD, FC13C, most 1920-30s types required. G400W. Tel Hinckley (0455) 612091 after 7pm.

WW2 R109, officers handsets for 88 SET, 88 SET pouches. Antenna sections, for 18/46 sets. PSU/If amp No 3 (12V) for 31 SET AFV. Also interested in any ex-WD equipment. Keith, G4MSF, QTHR. Tel 0632 693955.

HQ1 minibeam and Hygain 18AVT/WB, or 18AVT vertical. Will consider Welz CP5 vertical in perfect cond. Also, Yaesu FT290 with case and nicads, no mods other than Mutek front end. Mary, G4ZFT, QTHR as G6YFT. Tel 0274 492715.

By swl a complete range of colour code resistors program for 48K Spectrum, in values 1-10MΩ, gd programs only. All letters returned to help me. M Lee, BRS35140, 26 Bromford Crescent, Erdington, Birmingham B24 9RL.

Exchange new Kenpro KP/200 memory key, for hf tribander beam (not mini), and rotator, in gd cond. Straight swap. G4YMK not QTHR. Tel 789 7429.

Trio TR9500 435MHz multimode, price range £290. PF1 rx's, any cond, prefered with orig xtals. *For sale* Tektronix 547 oscilloscope, with CA module DC-24MHz, £95 or exch 70cm gear. G1EZJ. Tel 0782 46570.

Icom IC2KL, and psu. Pay cash for unit in gd cond, at realistic price. Tel 0780 52504.

Beg-borrow-buy! Circuit diagram handbook for Telequipment S54A 'scope. G4LU, QTHR. Tel 0691 830277.

R1155 rx L, M, N, but will consider B or C versions, complete with DF circuits intact. Also Mk3 DF Loop for above rx. G8CUN, QTHR. Tel 0268 26837.

Alternator, approx 1KVA, 4-pole, to work at 1500rpm. Prefer Markon self-regulating type if possible. G8ZKZ, QTHR. Tel Romford 0708 69770 evenings/weekends.

FTV901R transverter, gd quality memory keyer, MK1024 or similar. Also HQ-1 minibeam. G4OOE, QTHR. Tel 0723 351159.

Vacuum variable and fixed capacitors. Roller coaster type inductors. Transformers. 813 valves bases. Coaxial relays. Turns counters. 8875 valves. Bird Thruline equipment. W.H.Y? Your price paid. Tel 03306 613 after 7.30pm.

Valves, type BW1124, BR1126, BW1121, as used in RF industrial induction heating closed circuit tv camera and monitor microwave intruder alarm. G3SMK, QTHR. Tel Earlswood (Warks) 3423 after 7pm.

B2 or A Mk3, would be interested in any of the suitcase or resistance sets, spares, manuals, in any cond. G3OFO. Tel 01-949 2317.

Rad Com bound volumes for 1975, 1976, 1977, and 1979. Please write. G6JNS, QTHR.

Yaesu FC902 atu, FT901 spkr. Must be in mint cond. GU4SXM, QTHR. Tel 0481 25450.

TS830S tx/rx with cw filters. Also interested in SP730 and AT230. John Pearce. Tel 07072 62300 ext 860.

Eddystone 770S, S640, command rxs BC454, BC455 etc, any cond. John, GM8MLH. Tel 08382 304.

Any service info for ageing (but sentimentally valuable) TW communicator, top band tx/rx. Please state costs. John Kinghorn, GM4DQK, QTHR.

Samson ETM8C electronic keyer, in mint cond. Tony, G4KHT, QTHR. Tel Hull (0482) 852216.

HW7, wkg or not, gd price paid. Mike, G4XBF. Tel Wormley 3263 after 6pm.

Information or manuals. Clansman RT320 2-30MHz unit, £50 for complete manual/copy. Junction switch, synthesizer, ancillary items. Need to hear from anyone who has worked on these please. Grogan, WA4MRR, 5 Rollingwood Drive, Taylors, SC29687 USA.

Help, owing to illness, unable to carry out normal repairs and minor homebrew jobs. Anyone interested in earning a few pounds in Twyford/Reading area. G1AWQ, QTHR.

Trio 530S or Yaesu FT101ZD, and Trio 120V or Yaesu FT7. Icom R70 rx. G3XFB, QTHR. Tel 0902 850033.

C58E 2m multi, cash paid for one in vgc. G6ZNU not QTHR. Tel 01-242 1234 ext 2891 daytime. 01-340 8811 evenings/weekends.

DC 200/250 dc mobile psu for FT200, gd cond only. Tel 0492 2149.

CRT for Tektronix 531A (T533). Spkr, mic for Pye PF70. Inexpensive thro' rotator. Have Textronix

545A for spares. Mark, GM6TKS not QTHR, 20 Trottick Mains, Dundee.
Ten-Tec 263 vfo 645 keyer. Recent foreign callbook. *For sale* Shure CB43 hand dual impedance mic, unused boxed, instructions, £12. TF144G handbook copy, £1.50. Wavemeter class D No1 Mk2, with manual, offers. Valves, books, components, lists, sae. G2HKU, QTHR. Tel 0795 873100.
KW2000 or comparable rig, must have 160, and be in gwo. G4XSM. Tel Bury St Edmunds (Suffolk) 68084.
Yaesu FT102 tx/rx, with fm/a.m. and SP1OL spkr, filter option, if available. Trio 430S with fm/a.m. board psu. Must be in mint cond. Full details. G3MIN, QTHR.
Yaesu antenna tuner FC901 or FC902. G3NDC not QTHR. Tel 01-954 1309.
Drake MSH spkr. Mr MacGregor. Tel 09904 3612.
4m antenna, 2/3 4-ele, 4m linear amp, anything considered VOX3 unit for TS700G. Martyn, G4TIF, QTHR. Tel 0926 313669.
Information-tx/rx type TR1986, 21 valve 24V, 124·5-156MHz, circuit, manual, any info welcome-loan or purchase. G4VVH, QTHR. Tel 0908 665100.
Wireless sets (Canadian) No 29, any items for this set particularly connecting leads etc. Suitcase sets of WW2 or post-WW2, any literature etc, any communications manuals etc, relating to post-war occupied Germany. M G Taylor, 8 Government House Road, York. Tel 0904 29777.
Short wave/gen cov rx able to resolve cw and ssb for young man getting interested in our hobby. G3LP. Tel Gloucester 34890.
Extension spkr, suit FT1. G4SVX. c/o 15 Fuller Way, Croxley, Watford. Tel 0923 720757.
Power supply/loudspeaker unit, or mains transformer for national NCX5 tx/rx. G3TSV. 132 Underdale Road, Shrewsbury SY2 5EF. Tel Shrewsbury 61518.
Army No 19 set, service manual with circuits and alignment procedure urgently needed, preferably to buy. G6RO, QTHR. Tel Bradford 584581.
Trio TL922 linear amplifier, must be gd mechanical and electrical cond. Pair of high power (blue) original Wight traps. G3PEK, QTHR. Tel 0244 300897.
Back numbers, need not be in mint cond, July 1925-December 1926 inclusive, also July 1933, January and February 1934, November 1972, and August 1982. GM3AYR, QTHR. Tel 0334 54105.
Vacuum variable and fixed capacitors. Roller-coaster type inductors. Transformers, 813 valve bases. Coaxial relays. Turns counters. 8875 valves. Bird Thruline equipment. W.H.Y? Your price paid. Tel 03306 613 after 7.30pm.
R1155 rx, prefer unmodded if possible, need not be wkg if complete. W.H.Y? G4LSA. Tel Woodseaves (Stafford) 388.

GLASGOW AMATEUR RADIO EXHIBITION

Cardonald College, Mosspark, Glasgow

11am-5pm

Saturday, 11 May, 1985

Trade exhibits. Exhibition station

RSGB stand. Bring-and-buy stand

Lectures. Refreshments

Talk-in on S22

Details from Ian McGarvie, GM4JDU, 3 Kelso Avenue, Paisley PA2 9JE. Tel: Brediland 2708

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450-470 MHz UHF Band
470-512 MHz UHF 'T' Band

Size: 9"W × 3"H × 9½"D

Weight: 3 lbs.

Power Requirements: 12V DC

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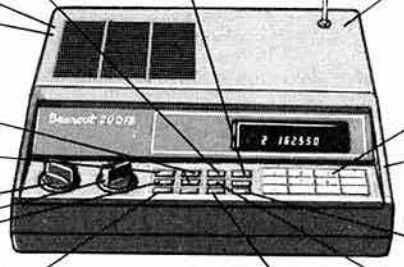

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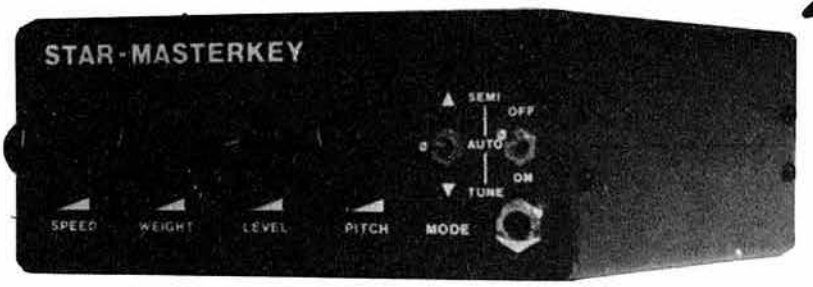

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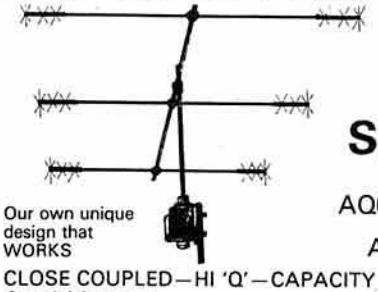

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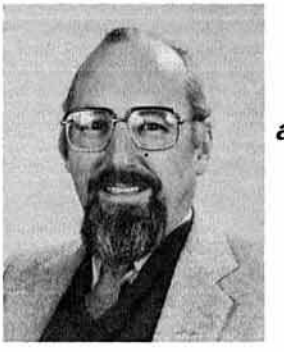

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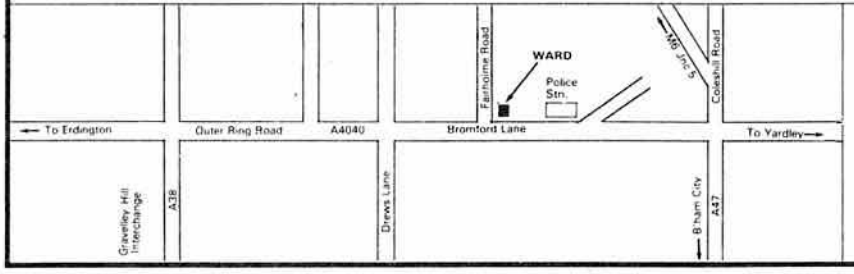

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Latest date for acceptance—7 weeks before 1st of issue month.
All classified and semi-display advertisements MUST be prepaid.

Copy and remittance to: **M. J. HAWKINS G3ZNI, RSGB Advertisements, PO Box 599, Cobham, Surrey KT11 2QE.**
(Cheques should be made payable to RSGB.)

Members' Ads must be sent to the editor at Chelmsford.

VAT ON ADVERTISEMENTS

Advertisements are now liable for VAT at 15%. With immediate effect, the cost of classified advertisements is increased to 35p a word to include the VAT charge. The cost of advertisements paid for prior to the Chancellor's announcement remain unchanged.

FOR SALE

QSL CARDS printed to your own specification on white or coloured gloss card. Send S.A.E. for sample pack to: The Caswell Press, 11 Barons Way, Woodhatch, Reigate, Surrey.

AMIDON TOROIDAL CORES, ferrite rings for TVI filters, ferrite beads. Send SAE for data and prices. SMC (TMP electronics), Unit 27, Pinfold Works, Pinfold Lane, Buckley, Clwyd.

QSL & LISTENER CARDS. Quality printing on coloured and white gloss card at competitive prices. SAE for samples. S. M. Tatham, "Woodside", Orchard Way, Fontwell, Arundel, West Sussex.

G5RV TYPE AERIALS. Half-size £13.50, Full-size £15.50. New Hard Drawn Copper Aerial Wire, 140ft 14swg £7.90; 50 metres 16 swg £6.90. Enamelled soft copper wire 10 metres 12swg £3.50; 50 metres PVC covered Aerial wire £4.20. Ceramic Egg insulators, 40p. Guy rope, 4mm Polypropylene, 50 metres £3.95; 4mm Nylon 50 metres £6.90. 1Kw 1:1 Baluns £13.00. All items post paid. S.M. Tatham G3RSY, 1, Orchard Way, Fontwell, Arundel, West Sussex.

D.I.Y. QSLs/SWLs (state which!!). 100 mixed designs/colours, £2.50 (c.w.o.). Q/Cards, 87 Derwent Street, Blackhil, Consett DH8 8LT.

PERSONALISED QSL CARDS, 1000 £15.00, 5000 £50.00. Sae for samples. Q/Cards, 89 Derwent Street, Blackhill, Consett DH8 8LT.

50m (165ft) AERIAL WIRE. Strong PVC covered copper only, £4.40 inc postage. W. H. Westlake, Clawton, Holsworthy, Devon.

QSL CARDS. Gloss or tinted cards. SAE for samples to Twrog Press, Penybont, Gelildan, Blaenau Ffestiniog, Gwynedd.

CREED TELEPRINTERS 444(TP15) complete with perforator and reader. Tester working. Available to Raynet members only. £42. Details Mike Watson G8CPH, Ipswich (0473) 831448.

PAG, RTTY TERMINAL UNIT KIT. PLL, AFSK, auto start stop. Complete with PCB, power supplies, case components; £58 plus £2.50 p&p. Details Mike Watson G8CPH, Ipswich (0473) 831448.

"RAYNET" YELLOW REFLECTIVE TABBARDS with RAYNET front and rear similar to Police and Ambulance, etc. Also "RAYNET CONTROLLER". 2 sizes. Medium, £7.60; Large, £8.10 inc p&p. Details Mike Watson G8CPH. Ipswich (0473) 831448.

DX QSL CARDS. Display your best cards in our clear plastic hanging wallets. Holds twenty cards. Pack of three, £2.40. Viola Plastics, Dept RC, 36 Croft Road, Hastings, Sussex.

ALL THE FAMOUS MOSLEY ANTENNAE. TA33Jr, Mustang, Atlas, V-3Jr, TD-3Jr Beams, Verticals, etc. Also spares available only direct from us. Send £1 for our Handbook showing all Antennae. Mosley Electronics, 196 Norwich Road, New Costessey, Norwich NR5 0EX.

AMATEUR RADIO EQUIPMENT bought, sold, exchanged. For the best deal, Guaranteed! Phone Dave (040 24) 57722 or send SAE for list. G4TNY Electronics, 132 Albany Road, Hornchurch, Essex RM12 4AQ.

YAESU VALVES FROM G3LLL. Stamped matched pairs P.A. FT101ZD, FT902, etc. 6146B/GE, £24 p.p. (matched 3 FT102, £33 p.p.) FT101Mk1-E 6JS6C/NEC, £22 p.p. NEC 12BY7A OK all, £5.75 p.p. See below AEUK.

BLACK STAR 600MHz COUNTERS. Quality and vlaue. Yes, it's British. Last chance old price, £139.99 p.p. Full range Yaesu on dem. AEUK/Holdings Ltd, 45 Johnston Street, Blackburn BB2 1EF. (0254) 59595. Access/Barclaycard. Closed Thursdays.

MONOLOCK SAFETY MICROPHONE SYSTEM £32.95. Timer + pre-amp Ni-Cads + electret lapel microphone. Suits most rigs including Icoms. Microphone plug fitted. R & A Sudron Ltd, Colliers Lane, Leeds LS17 8LP. (0532) 737120.

G4TJB QSL CARDS Personal and standard designs, DIY cards, Log Books, SAE for samples and price list. G.C. Patterson, 16 Peartree Road, Great Barr, Birmingham B43 6HY.

SPECIAL OFFER Personalised QSL Cards £14.25 per 1000. Logbooks £2.30. SAE samples. G6DQS, 10, Springfield Avenue, Honley, Huddersfield.

G5RV. CONVERT YOURS to low loss open wire feeder. It's easy with our quick fit clip on spreaders. Set of 25, £4.50; or run feeder direct to shack. Extra spreaders, 18p each. 16 SWG hard drawn copper wire, 12p per metre. All post 50p. Complete G5RV kits. Full size, £12.00; half size, £10.50. Post paid. Viola Plastics, 36 Croft Road, Hastings, Sussex.

FOR SALE (cont.)

HIGH CLASS QSL CARDS. Keen prices. SAE for samples and prices to J. S. Coates, Dept RC, 57 Worrall Street, Morley, Leeds LS27 0PJ.

QSL CARDS. Try me for qualiy and price. SAE for samples. A. W. Bailey (G3YNI), Brean Down Press, Wick Lane, Lympsham, Somerset.

DIPOLES—LIGHTWEIGHT—UNOBTRUSIVE. 20M, £6.00. 15M, £5.50. 10M, £5,00. £1.00 p&p. Centre fed, 33ft feeder. Co-ax relay, 3 × PL259. 12v. £7.50 + £1.00 p&p. Manuals and Xtals. SAE. S.S.B. Products. G3EKX. (0872) 862575.

G2VF D.I.Y. LOOP ANTENNAS. Long, medium, short wave. Details SAE to Rylands, 39 Parkside Avenue, Southampton.

WORLD WIDE COUNTRIES CHECK LIST. Keep an easy record of countries worked. Includes full countries, prefix and continent index. £2.50 + 0.50 p&p. A Goodier, 35 Rose Lane, Marple, Stockport, Ches. SK6 6DS. Or from good Amateur Radio Shops.

QUALITY QSL CARDS. Fast turnround. Low prices. Phone Richard (037 22) 75946. CreAtA—Media, 40 Oakhill Road, Ashtead, Surrey.

PCBs MANUFACTURED. Prototypes, small/large production runs. P.T.H., screen printing. Component identification, solder masking. U.V. and screen printing equipment supplied. Sundries and laminate supplied. Orbit (G4GQL), 38 Torquay Gardens, Redbridge, Essex. 01-550 3610.

QSL CARDS. Distinctive QSL's, many designs on high gloss card, reasonably priced. Free samples. State if SWL. Deroga Printing, Whitwell Road, Sparham, Norwich NR9 5PN.

MANUALS. 1155, CR100, AR88, RA117, etc. Oscilloscopes. Old/new equipment. SAE please. "Moorings", Playing Place, Truro TR3 6HD. Tel. (0872) 862575. G3EKX.

UPDATE YOUR QSL's. Locator rubber stamp £3.99. "Please QSL" stamp £3.99. Pad £1.59. Add 45p p&p. M. Brown, 4, Roebuck Green, Slough, SL1 5QY.

HOLIDAY ACCOMMODATION

GET FAT AT FAIRMOUNT! Enjoy our wonderful meals, beautiful en suite bedrooms, warmth and comfort, in a tranquil setting near historic Cockington village. Family holidays with FREE accommodation for children; dogs most welcome too. Special Spring Breaks, and pensioners reductions. From £15.50 B.B.E.D. Also meet G6GR, licensed 63 years, use the rigs if you are licensed also, and try the new TONO communications-terminal computer. Telephone (0803) 605446, Fairmount House Hotel, Herbert Road, Chelston, Torquay.

SELF-CATERING CHALETS. Explore by day, DX by night. My aerials, your rig. £15-£120 per chalet per week. Green, G0ATS, 'Chylean' Tintagel, Cornwall PL34 0HH. Tel. (0840) 212262.

SRI LANKA, MOUNT LAVINIA. Easy reach of beach, restaurants, shopping, city zoo. Transport. Two weeks bed and breakfast (single) US$210, (couple) US$375. Free laundering, no service charges. Write to Mrs Antoinette Perera, Spangles, 84 Templer Road, Mount Lavinia plus £1 or 5 IRCs.

SOUTH DEVON HOLIDAY—FARMBOROUGH HOUSE. Set in own 10 acres near Dartmoor. Opportunities painting, Yoga etc. Well equipped radio shack (G4YXC). Metal/woodworking facilities. Vegetarian wholefood, nonsmoking. Further information SAE please Mrs Sophie Edwards, Farmborough House, Chudleigh, Newton Abbot, Devon TQ13 0DR Tel (0626) 853258.

BOURNEMOUTH "DOLBADARN" PRIVATE HOTEL, 8 Grand Avenue, Southbourne BH6 3SU. Between sea and shops. Residential licence, room radio, call and teamaking facilities. Excellent food. Dinner, Bed and Breakfast from £11.00 daily. Bed and Breakfast from £7.50 daily. (0202) 424826. E. W. & J. W. Batten (G3BKN).

TEIGNMOUTH. ANDREA COURT HOTEL, Second Drive, Landscore Road, Teignmouth TQ14 9JS. Dinner, bed and breakfast from £55.00. Use shack. HF and VHF gear and antennas. Write or telephone for brochure and special discounts. (062 67) 2007. K & S Phillips G8IAW.

SHANKLIN, ISLE OF WIGHT. Small private hotel close all amenities. Superb food and accomodation. Most rooms en suite. Details with pleasure. Gill & Tony Perez (G4SVY), Kenbury Hotel, Clarence Road, Shanklin. (0983) 862085.

SEAFRONT WHITSTABLE KENT. Safe swiming, private seawall patio. High Street walking distance. Share G4LQI HF/VHF aerials. Pet, child OK. One unit suits couple, another sleeps 3. (0227) 266480. If no reply 01-852 3594.

TORQUAY (0803) 607333. Holiday flats. Enjoy low cost self-catering early holiday. Example—flat for two until 22nd June, only £55.00 p.w. inclusive TV, linen. G4NDA, Linden House, Ruckamore Road, Torquay.

CORNISH HOLIDAY COTTAGE. Sleeps four. Fully equipped. Colour TV. Near coast. From £80.00 per week. Phone A. Jeffery G4YRL. (032 65) 3617.

MISCELLANEOUS

COURSE FOR CITY & GUILDS, Radio Amateurs Examination. Pass this important examination and obtain your licence, with an RRC Home Study Course. For details of this and other courses (GCE, Career and professional examinations, etc) write or phone—THE RAPID RESULTS COLLEGE, Dept JT5, Tuition House, London SW19 4DS. Tel: 01-947 7272 (9am–5pm) or use our 24hr Recordacall service 01-946 1102 quoting JT5.

GB NEWS 1985—packed with information for your Continental Holiday, 2 × 13p stamps. GB Car Club, FREEPOST **1**, Romsey, Hants SO5 8ZT.

HEATHKIT. UK SPARES & SERVICE centre. Cedar Electronics, Unit 12, Station Drive, Bredon, Tewkesbury, Gloucestershire. Telephone (0684) 73127.

DL7JK's DAUGHTER WITH FRIEND. Two girls aged 18/15 are each looking for a three week job in households in the London area in August 1985. Exchange of family members possible. Klaus Schitthelm DL7JK, Am Goldbergfeld 5, 8018 Grafing, W Germany (Munich area).

AMATEUR RADIO INSURANCE SCHEME

"ALL RISKS" INSURANCE for portable/mobile/base station amateur radio and ancillary equipment. A service for RSGB members only. Also public liability and equipment insurance for affiliated clubs and societies. Details and leaflets from Nick Gibson, Amateur Radio Insurance Services Ltd, 19 Quarry Street, Guildford, Surrey. Tel: 0483 33771.

COMPUTER SOFTWARE/HARDWARE

G3WHO BBC SOFTWARE. Full feature AMTOR program now available on Eprom. Works with ordinary T.U. and timer unit (supplied). Split screen, memories, clock, mailbox etc. Phone or SAE for details. RTTY program also available on tape (£7.50), Disk (£9.50) and Eprom (£20). P.J. Harris, 10 Appleby Close, Great Alne, Alcester, Warwickshire B49 6HJ. Tel. 078981 377.

ATMOS RTTY £9.50, Morse Tutor £6, QTH Locator £5, all three for £17. Electron/BBC Ham package: Morse, QTH Locator, ATV test card £11, for Sinclair QL £17. AX.25 Packet Radio boards assembled/tested £249, in cabinet £289. SAE details: Vomek Software, 50 Mayridge, Fareham, Hants PO14 4QP.

BBC32k: SUPERB SOPHISTICATED PROGRAMS featuring: random letters, numbers, words, mixtures; 100 plain-language tests; abbreviations/punctuation; output/speed choice; morse keyboard; write, save, replay own.

MORSE READER PROGRAMMES. Off air onto screen. Programmes for BBC B, Spectrum, ZX 81-16K, Dragon, Amstrad 464, Commodore 64 and any VIC 20. Sinclair computers need no interface, others use simple one transistor (BC107) interface. Programmes self tracking 8/30 WPM. All connections to existing sockets. Cassette with full instructions and circuit £6.00. J.E. Price, 4 Housman Walk, Offmore, Kidderminster.

CQ, CQ. COMMODORE 64 OWNERS. "CONTACT-64" lets you record your radio contacts as they happen, gives you screen or printer listings for QSL purposes, and automatically sorts your entries into a master file which can be displayed, searched or altered, and saved or loaded from tape or disk. Can you be without it? £6·50 inc. p&p. From: Galaxy Software. 22 Mountfield Gardens, Kenton, Newcastle upon Tyne NE3 3DB.

RTTY and CW transceive with No TU. Very sophisticated program yet easy to use. Split screen, type ahead, 26 saveable memories, CW ident, QSO review and much more. Needs only a very simple interface (kit, PCB, user port connector supplied). For CBM64, BBC-B, VIC20 (needs expansion). Tape, instructions, interface kit £20 inc p&p. Ready-made interfaces available. CW-only version for Spectrum £10. Technical Software (GW3RRI), Fron, Cesarea, Caernarfon LL54 7RF. (0286) 881886.

MORSE TUTOR CBM64, VIC20, BBC-B, Spectrum, ZX81-16k. Superb program. Learn in stages, absolute beginner to over 40 wpm, random letters, figures, words, plain language. Any amount, any speed. Tape, instructions, comprehensive learning guide £6 inc p&p. GW3RRI, see ad above.

RAE MATHS CBM64, VIC20 (needs expansion), BBC-B, Spectrum, ZX81-16k. Gives unlimited practice and testing in all RAE formulae to make you perfect in this vital part of the exam. Don't let maths make you fail. Pass with this program. Tape, instructions, complete reference sheet £8 inc p&p. GW3RRI, see ad above.

LOCATOR GBM64, VIC20, BBC-B, Spectrum. QTH or Maidenhead locators or lat/long. Distance, beam and return headings, VHF contest points and totals, long path details, converts between locator and lat/long. Tape, instructions £6 inc p&p. GW3RRI, see ad above.

LOGBOOK CBM64, VIC20 (Needs expansion), BBC-B, Spectrum. Records date, band, mode, callsign and remarks of all your contacts. Superfast callsign search. Easy, fast updating of files. Output to screen or printer. Tape, instructions £6 inc p&p. GW3RRI, see ad above.

CONTEST LOG CBM64, BBC-B, VIC20 (needs expansion). All details for RSGB HF/VHF contests. Instant duplicate check. Calculates distance and points for VHF. Outputs in required page format. Tape, instructions £6 inc p&p. GW3RRI, see ad above.

BBC MICRO SOFTWARE. RTTY transceive program in ROM which is entered simply by typing "*RTTY". Sophisticated Morse teacher, slow Morse broadcast software, Morse beacon. Written by professional software designers. Send large SAE for detailed technical specifications. GOC Software Limited, "CQ Cottage", Longhill Lane, Audlem, Cheshire CW3 0HU.

DRAGON/TRS80C SUMMER SALE. Return your G4BMK RTTY or RTTY/CW cartridge with £25.00 for addition of AMTOR. Add £17.25 for clock/PTT module. Other software prices reduced. Phone/SAE for details. Grosvenor Software (G4BMK), QTHR. (0323) 893378.

CBM64 CW TRANSCEIVE. Bristling with features and G4BMK quality. Superb performance with speed tracking 5-60wpm and full type-ahead. Speed lock, QSO review/print, sends to 200wpm. Tape, £10.00. Disk, £12.00. Interface available. State callsign. Split-screen RTTY for CBM64, VIC 20, Atom. G4BMK. See ad above.

AMSTRAD CPC464 SOFTWARE: Morse Tutor, cassette, £7 inc. QSO Indexing System, replaces the card index, cassette, £7 inc. Details as March Radcom. Yeovil Electronic Developments, 44 St Marys Crescent, Yeovil, Somerset BA21 5RR.

AMSTRAD CPC464 morse tutor program. Features Random letters, words, figures or plain language. A full featured tutor program. £6.90 inc VAT & p&p. Available soon, a RTTY transceive program—please enquire. Full range of RTTY & morse terminals available. Please enclose SAE with all enquiries. PNP Communications, 62 Lawes Avenue, Newaven, East Sussex BN9 9SB Tel (0273) 514465.

VAT ON ADVERTISEMENTS

Advertisements are now liable for VAT at 15%. With immediate effect, the cost of classified advertisements is increased to 35p a word to include the VAT charge. The cost of advertisements paid for prior to the Chancellor's announcement remain unchanged.

INDEX TO ADVERTISERS

RSGB MAIL-ORDER PRICE LIST

RSGB books

	Non-members' price	Members' price
A Guide to Amateur Radio (19th edn)	£3.91	£3.52
Amateur Radio Awards (2nd edn)	£3.68	£3.31
Amateur Radio Operating Manual	£6.15	£5.53
HF Antennas for All Locations	£7.35	£6.62
How to Pass the Radio Amateurs' Examination	£3.42	£3.08
Microwave Newsletter Technical Collection	£6.83	£6.15
Morse Code for Radio Amateurs	£1.64	£1.48
RSGB Amateur Radio Call Book (1985 edn)	£6.92	£6.23
Radio Amateurs' Examination Manual (10th edn)	£3.84	£3.46
Radio Communication Handbook (5th edn) Vol 2	£8.46	£7.61
Radio Communication Handbook (Vols 1 and 2 combined, paperback)	£11.79	£10.61
Raynet Manual (1984 edn)	£2.78	£2.50
Teleprinter Handbook (2nd edn)	£12.72	£11.45
Television Interference Manual (2nd edn)	£2.31	£2.08
Test Equipment for the Radio Amateur	£6.41	£5.77
VHF/UHF Manual (4th edn)	£10.58	£9.52
World at Their Fingertips (paperback)	£7.75	£6.98

RSGB logbooks

Amateur Radio Logbook	£2.77	£2.49
Mobile Logbook	£1.23	£1.11
Receiving Station Logbook	£2.87	£2.58

RSGB maps, charts and lists

HF Awards List and Countries List	48p	43p
Great Circle DX Map (wall)	£2.43	£2.19
IARU Region 1 Beacon List	40p	36p
Locator Map of Europe (wall)	£1.95	£1.76
Locator Map of Europe (card for desk)	70p	63p
UK Beacon List	40p	36p
UK Repeater List and maps	50p	45p
World Prefix Map in full colour (wall)	£2.53	£2.28
Meteor Scatter Data	£3.51	£3.16

RSGB members' sundries (members only)

Radio Communication Easibinder	—	£6.71
RSGB badge car sticker	—	49p
RSGB belt (real leather)	—	£7.57
RSGB coffee mugs (sold in pairs) price for two	—	£3.67
RSGB hf contest log sheets (100)	—	£3.13
RSGB vhf contest log sheets (100)	—	£3.13
RSGB tie (coffee, maroon, green or blue)	—	£3.18
RSGB callsign cap	—	£4.98
RSGB logo rubber stamp	—	£3.16
RSGB station callsign plaque*	—	£9.50
RSGB teeshirts (med, large, exl)	—	£4.90
Standard callsign lapel badge*	—	£1.96
De-luxe callsign lapel badge*	—	£2.80
Lapel badge (RSGB emblem, pin fitting)	—	59p
Mini lapel badge (RSGB emblem, pin fitting)	—	68p
Members' headed notepaper (50 sheets) quarto	—	£1.20
Members' headed notepaper (50 sheets) octavo	—	75p

**Delivery approximately five weeks*

Miscellaneous

"Amateur radio" (two colours) car sticker	73p	66p
DX Edge (HF propagation prediction aid)	£14.09	£12.68
"I'm on the air with amateur radio" (four colours) car sticker	84p	76p
"I'm monitoring ·5 are you?" (two colours) car sticker	73p	66p
QSL card holders	£1.23	£1.11
Radio Communication back issues *(As available)*	£1.32	£1.19
Radio Communication bound volume, 1982	£15.93	£14.34
Radio Communication bound volume, 1983	£16.90	£15.21
Radio Communication bound volume, 1984	£16.90	£15.21
Smith charts, pad of 25 (Chartwell D7510)	£2.23	£2.01

Other publications

	Non-members' price	Members' price
Active-filter Cookbook (Sams)	£12.71	£11.44
All About Cubical Quad Antennas (RPI)	£5.83	£5.25
Amateur Single Sideband (Ham Radio)	£5.46	£4.91
Amateur Television Handbook (revised) (BATC)	£2.94	£2.65
Amateur Television Handbook Vol 2 (BATC)	£2.77	£2.49
Antenna Anthology (ARRL)	£6.00	£5.40
ARRL Electronics Data Book (ARRL)	£4.47	£4.02
Beam Antenna Handbook (RPI)	£6.83	£6.15
Better Short Wave Reception (RPI)	£6.83	£6.15
Care and Feeding of Power Grid Tubes (Varian)	£6.99	£6.29
CMOS Cookbook (Sams)	£13.07	£11.76
Complete DX'er (W9KNI)	£7.77	£6.99
Complete Shortwave Listener's Handbook (Tab)	£12.21	£10.99
Design of VMOS Circuits with experiments (Sams)	£8.50	£7.65
FET Principles, Experiments and Projects (Sams)	£8.04	£7.24
FM and Repeaters for the Radio Amateur (ARRL)	£4.30	£3.87
G-QRP Club Circuit Book	£4.52	£4.07
Guide to Oscar Operation (AMSAT)	£1.78	£1.60
Hints and Kinks for the Radio Amateur (ARRL)	£4.47	£4.02
How to Troubleshoot and Repair AR Equipment	£10.47	£9.42
IC Op-amp Cookbook (Sams)	£11.76	£10.58
International VHF FM Guide	£2.45	£2.21
Newcomer's Guide to Simplex and Repeaters on 2m (UK FM Group)	£1.24	£1.12
**Power Supply Handbook* (Tab)	£10.99	£9.89
Radio Amateurs Antenna Handbook (RPI)	£7.88	£7.08
Radio Amateurs Callbook (1985) (DX listings) (ARC1)	£18.35	£16.52
Radio Amateur Callbook (1985 USA listings) (ARCI)	£18.87	£16.98
Radio Amateurs Handbook (1984) (ARRL)	£6.66	£5.99
Radio Amateurs Handbook (1985) (Softback) (ARRL)	£15.80	£14.22
Radio Amateurs Handbook (1985) (Hardback) (ARRL)	£21.90	£19.71
RTTY Today (UEI) (A modern guide to rtty)	£7.19	£6.47
Radio Frequency Interference (ARRL)	£4.18	£3.76
Satellite Experimenters Handbook (ARRL)	£10.11	£9.10
Satellite Tracking Software for the Radio Amateur (AMSAT-UK)	£4.47	£4.02
**Secrets of Ham Radio DXing* (Tab)	£7.92	£7.13
Semiconductor Data Book (Newnes)	£7.97	£7.17
**Shortwave Listeners' Antenna Handbook*	£10.10	£9.09
Shortwave Propagation Handbook (Cowan)	£7.79	£7.01
Simple Low-cost Wire Antennas (RPI)	£6.83	£6.15
Solid State Design for the Radio Amateur (ARRL)	£7.87	£7.08
Television for Amateurs (BATC)	£2.23	£2.01
Towers International Transistor Selector	£13.95	£12.56
Towers International MOS Power & FET Selector	£10.95	£9.86
Towers Op-Amp Selector	£9.50	£8.55
**UHF-Compendium Parts 1 and 2*	£14.93	£13.44
Understanding Amateur Radio (ARRL)	£4.73	£4.26
Understanding the Oscilloscope	£10.10	£9.09
VHF Propagation Handbook (Nampa)	£3.75	£3.38
Weekend Projects for the Radio Amateur (ARRL)	£4.95	£4.46
World Atlas (RACI)	£3.35	£3.02
World Radio TV Handbook 1985	£19.81	£17.83
**99 Test Equipment Projects You Can Build*	£8.00	£7.20

***Items marked with an asterisk may not be available immediately. Please telephone before ordering to confirm availability.**

RSGB kits

Morseman (*Rad Com* December 1984)		
Kit 1	£12.78	£11.50
Kit 2	£19.52	£17.57
Kit 3	£36.11	£32.50
CMOS Z80 ic	£8.17	£7.35

MORSE INSTRUCTION AID

RSGB morse course Stage 1 (to 5wpm)	£4.54	£4.09

MAGAZINE SUBSCRIPTIONS

QST (including ARRL membership). One year	£31.53	£28.38
Two years	£60.00	£54.00
Three years	£89.74	£80.77
By air via KLM (to W Europe only) one year	£44.81	£40.33
Ham Radio Magazine (per annum) (incl air delivery)	£25.35	£22.81

NEWSLETTER SUBSCRIPTIONS

Microwave Newsletter, VHF Newsletter, DX Newsletter. For details contact the membership services department at RSGB headquarters.

ORDERING INFORMATION

NON-MEMBERS. Use left-hand price columns. Note that members' sundries are only available to members of RSGB.

MEMBERS. Use right-hand price columns. It is essential that you quote your call sign or BRS number so that you can be recognised as a member.

PRICES. These include postage, packing and VAT where applicable. For airmail despatch, please ask for price before ordering. Goods are obtainable, less p & p, at RSGB headquarters between 10am and 4pm, Monday to Friday.

POSTAL TERMS. Cash with order. **Stamps and book tokens cannot be accepted.** Cheques and postal orders should be crossed and made payable to "Radio Society of Great Britain". Our Giro account number is 5335256. Please write your name and address clearly on the order, and allow up to 28 days for delivery.

ORDER FROM: RSGB Publications (Sales), Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JW

(Raynet supplies should be obtained from Mrs J. Balestrini, Merrivale, Willow Walk, Culverstone, Gravesend, Kent)

TVHF230c 9 band hf transverter

£334.90
+£5 p&p inc VAT

Transverters once had a deserved reputation for being a second best approach to getting on to any band. With careful system design and a *truly* high performance transverter this need not be so. People have favourably compared the receive performance of our TVHF 230c when coupled to a modern vhf 'base station' transceiver to that of prestige hf transceivers costing well into four figures! Indeed, those of you with knowledge of German may well be interested to read the review of the TVHF 230c in the March 1985 issue of 'Beam' magazine, where the author compares its performance *very* favourably with a 'top-of-the-line' U.S.A. manufactured transceiver costing several times more!! Even with a budget 2m rig, the performance will be better in most respects than the sort of hf transceiver available second-hand at the same price!

On transmit, the signal generated is very clean, and the 10W pep output is enough to work the world with a decent antenna. Of course, if you want to be a really big signal, then this power is just right for driving a variety of power amplifiers! (If you have a valve vhf amplifier, then an hf linear becomes a very simple thing to build—a pair of 4CX350's will burn as big a hole in 20m as 144MHz, and there is enough drive available from the '230c to comfortably saturate a 4CX1500!!)

GDIF 107ub 10GHz WBFM back-end processing board

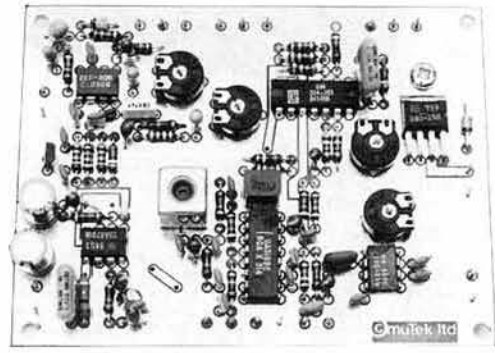
The GDIF 107ub has become a very successful and popular way of getting on to the 10GHz band! With a surplus intruder alarm unit (available from the Microwave Society —send G8MWR QTHR a SAE for membership details!), and an antenna you can experience the unique thrills of full-duplex WBFM 10GHz operation.

The GDIF 107ub is a sophisticated 'back-end' processing system for Gunn diode based transceivers. It contains a complete high performance I.F. strip, which will give enough audio (provide your own speaker!) to be heard on a windy hilltop. The power supply is rather more sophisticated than the usual 7805, and allows for smooth electrical tuning (over the whole of the new band segment with typical Gunn diodes) and highly effective afc, together with good quality modulation. The modulator employs a dedicated 'VOGAD' chip, so it's very difficult indeed to overmodulate, whilst the tone modulator uses a phase shift oscillator generating a much nicer sounding tone than the usual run of relaxation oscillators.

The board comes completely built and aligned, together with a very comprehensive set of instructions, hints and tips.

From a personal angle, both Chris G4DGU and myself have had enormous fun (and some exercise!!) hilltopping with our systems (which you may have seen at various rallies and exhibitions). *Come and join the growing band!*

Stephen G4SJP



£49.65 +£1.50 p&p inc VAT

The range

		£
TVHF 230c	Very high performance 2m to 9 hf bands transverter	334.90
TVVF 50a	Very high performance 10m to 6m transverter	239.90
TVVF 50c	Very high performance (again!) 2m to 6m transverter	199.90
SLNA 144s	2m low-noise rf-switched preamplifier 0·9dB typical noise figure	39.95
SLNA 144u	Unswitched version of the SLNA 144s	22.40
SLNA 144ub	Unboxed version of the SLNA 144u	13.70
SLNA 145sb	Transceiver optimised preamplifier for the FT 290	29.90
SBLA 144e	Masthead-mounting 2m low-noise high dynamic range preamplifier. 250W through-power	89.90
GFBA 144e	Ultra-high performance masthead-mounting GaAsFet 2m preamplifier using advanced noiseless negative feedback for low noise figure and superb dynamic performance. 1000W pep (ssb) through-power. Supplied with ATCS 500 sequencer-controller	149.90
GLNA 432e	Masthead-mounting 430-440MHz high performance GaAsFet preamplifier. 0·9dB typical noise figure, 250W through-power. Supplied with ATCS 500 sequencer-controller	149.90
GLNA 433e	Masthead-mounting 430-440MHz high performance GaAsFet preamplifier. 1dB typical noise figure. Rf switching, 50W through-power	79.90
TLNA 432u	Unswitched bipolar 430-440MHz preamplifier. 1·5dB typical noise figure	29.90
TLNA 432ub	Unboxed version of the TLNA 432u	22.40
BLNA 432ub	Sub-miniature 430-440MHz preamplifier. 1·3dB typical noise figure. Requires external filtering.	13.70
BBBA 500u	20-500MHz high dynamic range broadband preamplifier. Ideal for scanners	34.90
RPCB 144ub	Complete replacement front-end for the FT221 and FT225	79.90
RPCB 251ub	Complete replacement front-end for the IC211 and IC251	84.90
RPCB 271ub	Complete replacement front-end for the IC271 (e and h)	89.90
GDIF 107ub	Gunn diode WBFM back-end processing board	49.65
LBPF 144u	Low-loss 144-148MHz two-pole bandpass filter. 0·3dB typical insertion loss, 120W power handling	22.40
LBPF 432u	Low-loss 430-440MHz two-pole bandpass filter. 0·3dB typical insertion loss, 100W power handling	22.40
XBPF 700ub	Microstripline bandpass tvi filter	2.95
ATCS 500	Sequencer-controller	33.90
VFAT 206	25W 6dB attenuator suitable for use with the TVHF 230c	19.65

Carriage/postage rates

GFBA 144e, SBLA 144e, GLNA 432e, GLNA 433e	2.50
TVHF 230c, TVVF 50a, TVVF 50c	5.00
All other products above	1.50

ALL PRICES INCLUDE 15% VAT E. & O.E.

muTek limited —the rf technology company

Dept. RC, Bradworthy, Holsworthy, Devon EX22 7TU (0409 24) 543)

Access BARCLAYCARD VISA

YAESU

GENERAL COVERAGE RECEIVER

AUTHORISED YAESU

FRG-8800

General Coverage
Continuous coverage from 150KHz to 30MHz. Two speed spin tuned VFO plus keyboard plus computer interface control.

All Mode
The FRG-8800 demodulates SSB (USB & LSB) CW, AM (Wide and Narrow) and FM narrow as standard. This, complemented by an all mode squelch, produces the most practical receiver available. The FM narrow is useful for 10M, CB and for VHF with the optional VHF convertor.

Memory
The FRG-8800 comes fully equipped with twelve memories programmed and scanned at the touch of a single button. Any of the memory channels will accept a frequency within the whole range of the receiver including the VHF range (with the optional VHF unit). The mode is also stored in the memory eliminating the need for inconvenient manual mode change, when hopping from one memory to the next.

Selectivity & Sensitivity
Four filters are fitted as standard (SSB/CW, AM, AM-NAR and FM-NAR) with bandwidths chosen for optimum performance, these combined with switchable AGC and variable tone control provides maximum enjoyment despite todays crowded bands.

High input sensitivities are obtained by the latest in RF stages, making the most of inefficient aerials and difficult locations, and a continuously variable RF attenuator control overcomes problems encountered with very powerful stations.

LCD Display
The back-lit green LCD display incorporates easy to read "any angle" 10mm digits.

A twelve function display indicates the transceiver's status at a glance. It includes memory channel number, mode, and frequency to a resolution of 100Hz. Also included is a two dimensional LCD, graphical SIMPO and 'S' meter, which is conventionally calibrated at 1-5 and 0-9, +20dB, +40dB, +60dB respectively.

Keyboard
A 12 button keyboard is fitted as standard allowing quick accurate changes of frequency and band, (MHz and KHz programmed individually). The keyboard also has nine control buttons to allow rapid changes from memory to VFO, memory to memory and VFO to memory. Memory channels can also be recalled at the turn of a knob, ideal for storing calling/working channels or broadcast reception.

The keyboard is complemented by a opto-coupled two speed, VFO drive fast for rapid tuning of a band or slow for accurately tuning in a signal. In addition a fine tune control compensates for drift in the received signal.

Clock/time
Dual accurate 12 hour clocks, with AM/PM indicators are ideal for log keeping (GMT/Local). The clock uses the main digital display and features full back-up facilities in the event of a mains failure or disconnection. The timer can activate the receiver or tape recorder via the relay contacts provided. A snooze facility allows up to 59 minutes of listening.

VHF Convertor (optional)
The FRV-8800, extends coverage to include 118-174MHz all within the main frame, thereby allowing monitoring of, PMR, marine and air bands, as well as 2M.

The FRG-8800 is operated as before via the keyboard or VFO, and the memory still holds any frequency and mode. The *actual* VHF frequency is displayed on the main LCD to a resolution of 100Hz.

Worldwide
At 6·1Kg (excluding convertor) the FRG-8800 is ideal for taking on any trip. The power supply is easily adjustable from 240-220VAC to 110-120V, 50/60Hz mains and 12VDC operation is optional.

SPECIFICATION

Frequency coverage:
150KHz-29·999MHz
118MHz-173·999MHz*

Frequency resolution:
100Hz (Digital Readout)

Frequency stability:
< ±300Hz in 30 mins after 1 min on
<50Hz in 30 mins after warm up

Modes of reception:
AM, CW, NBFM SSB (LSB/USB) A3E, A1A, G3E, J3E

Selectivity
SSB/CW (J3E/A1A):
2·7KHz @ −6dB, 8·0KHz @ −50dB
FM(G3E) narrow:
12·5KHz @ −6dB, 30KHz @ −40dB
AM (A3EH3E) (standard/narrow):
6·0KHz @ −6dB, 15KHz @ −50dB
2·7KHz @ −6dB, 8KHz @ −50dB

Sensitivity:
SSB/CW (J3E/A1A) @ 10dB S+N/N:
<0·4μV into 50 ohms, 1·50-30MHz
<3·0μV into 500 ohms, 0·15-1·6MHz
<1·0μV into 50 ohms, 118-174MHz*
FM (G3E) @ 20dB S+N/N:
<1·0μV into 50 ohms, 1·60-30MHz
<2·0μV into 50 ohms, 118-174MHz*
AM (A3E) @ 10dB S+N/N:
<4·0μV into 50 ohms 1·60-30MHz
<3·0μV into 500 ohms, 0·15-1·6MHz
<10μV into 50 ohms 118-174MHz*

Squelch sensitivity:
SSB/CW (J3E/A1A):
<2μV, 1·60-30·0MHz
<4μV, 118-174MHz*
FM(G3E):
<0·5μV, 1·6-30·0MHz
<1·0μV, 118-174MHz*
AM (A3E):
<2μV, 1·60-30·0MHz
<4μV, 118-174MHz*

Audio output:
1·4W in 8 ohms internal @ 10% T.H.D.
4-16 ohms external speaker/phones
Constant level line output (recorder)

Power requirements:
100/120 220/240V @ 50/60Hz
35VA Rx, 5VA standby
12VDC (nominal)*
1A Rx, 0·020A standby

Dimensions (Ex/Inc projections)
335/350 W, 120/130 H, 235/270 D, mm
Weight 6.1/6.3 Kg (w/o, c/w VHF unit)

*OPTIONAL UNIT

SMC

South Midlands Comms Ltd
Rumbridge Street
Totton
Hants SO4 4DP

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Alum
Birmingham

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