February 1983

RADio COMmunication

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A digital slow to fast sstv converter for monochrome or colour . . . . by B. A. SMITH, G3WCY

Journal of the Radio Society of Great Britain

RSGB

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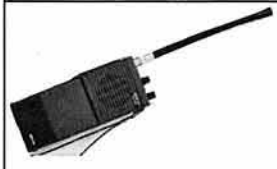

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FEBRUARY 1983

VOLUME 59 No 2

RADio COMmunication

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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.

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

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

ABC MEMBER OF THE AUDIT BUREAU OF CIRCULATIONS

29,080 copies per issue average circulation in 1981

Closing date for contributions unless otherwise notified: five weeks before publication date

I have used the TS430S, John has used it, Alan has used it, in fact we have all put the new HF rig from Trio on the air and our unanimous opinion is that with this new rig Trio have pushed the concept of transceiver as we all knew it well into the next generation of equipment. Not only is the rig compact, only slightly larger than the TS130S but along with being a full amateur band transceiver the new TS430S also provides todays discerning operator with a general coverage receiver. Key features of the new rig are two digital VFO's, eight memory channels each of which can be used as a separate VFO, programmable band scan, IF shift, notch filter and the provision for internally fitting an optional FM mode.

The TS430S modes of operation are USB, LSB, CW, and AM. FM is available by the addition of the optional FM430 frequency modulation unit. Mode selection is easily accomplished by front panel switches with adjacent LED indicators.

In addition to the amateur bands from 160 to 10 metres (including the new frequency allocations) the TS430S features a 150kHz to 30MHz general coverage receiver. Front panel UP/DOWN switches allow easy selection of the desired amateur band. A MHz step switch provides 1MHz band steps across the entire range of the transceiver and each of the two digital VFO's is completely tunable from 150kHz to 30MHz.

The two digital VFO's operate independently of each other tuning in 10Hz steps, a STEP switch is provided, use of which increases the tuning step to 100Hz. An A = B switch is provided to enable the operator to quickly put both VFO's on the same frequency, ideal for checking on the source of QRM without losing the original operating frequency. A lock switch guards against accidental frequency shift. RIT is provided which operates on both VFO's and memory channels alike.

Each memory stores frequency, mode and band information, the eighth memory holds receive and transmit frequencies independently so giving simple split frequency operation. A front panel VFO-MEMO switch allows each of the memory channels to be used either as a VFO or as a fixed channel. An internal lithium battery gives complete memory and VFO back-up independent of the external supply to the transceiver. The TS430S also has Memory scan, the transceiver scanning only the channels in which a frequency has been stored. Not only does the memory hold frequency but the mode also, most useful if a mix of broadcast frequencies has the odd SSB net frequency within it. The hold time for each occupied channel is approximately 2 seconds, a hold switch is provided to interrupt the scanning process.

A programmable band scan is available, the limits of scan being set by memory channels 6 and 7. Again the hold switch will cancel the scan function.

IF shift enhances listening on today's busy bands.

A tunable notch filter is included to give best interference rejection.

A front panel NAR/WIDE switch allows narrow-wide IF filter selection when the optional filters are installed. In the SSB mode, with the optional YK-88SN (1·8kHz) filter installed, either 2·4kHz wide, or 1·8kHz narrow may be selected. In the CW mode, with the optional YK88C (500Hz) or the YK88CN (270Hz) filter installed 2·4kHz wide or 500Hz or 270Hz narrow may be selected. In the AM mode, with the optional YK88A (6kHz) filter installed, 6kHz wide or 2·4kHz narrow may be selected. In the FM mode, with the optional FM430 unit installed, a single 15kHz bandwidth is provided.

A front panel switch activates the speech processor circuit, with its audio compression circuit, and change in ALC time constant, resulting in a marked improvement in intelligibility, accompanied by a substantial increase in "talk power."

The TS430S runs 200 watts input on SSB/CW on 160-15 metres; 180 watts on 12-10 metres. In the AM mode, it runs 80 watts on all bands and in the FM mode with the optional FM-430 unit fitted the rig runs 100 watts input, again on all bands. The TS430S operates from 12 volts DC, or from 240 volts AC by means of an optional AC power supply.

All mode squelch circuit.

Includes a 20dB FR attenuator.

A transverter socket is included on the rear panel.

TS430S £698 inc VAT carr. £5.00.

the **new** hf amateur band transceiver **and** general coverage receiver .... the Trio TS430S

Now from Trio, the R2000 general coverage receiver. By taking all the superb features of the R1000 and combining them with the latest in microprocessor control Trio have, in one step, completely revised the standard by which short wave receivers are judged. Among the many features provided for the discerning listener are programmable scan, memory scan, memory retention of the mode set for a particular frequency and last, but not least, Trio have included an FM mode—why FM after all this time and our repeated comment that for a shortwave broadcast receiver FM is not really necessary. Take a look at the rear panel of the R2000: a socket marked VHF converter. Wouldn't it be superb if Trio produced a VHF converter covering from 118 to 174MHz—then you would require FM, you would also require AM. Study the features and I am sure you will agree the Trio R2000 is the receiver for you.

Continuous Coverage from 150kHz to 30MHz
Front panel up/down band switches allow easy selection within the full coverage of the receiver. The VFO is continually tunable throughout the full 150kHz-30MHz range.

All Modes SSB, CW AM and FM

Ten Memories Store Frequency, Band and Mode Data
Each of the ten memories can be tuned by the VFO, thus operating as ten built in digital VFOs. The original memory frequency can be recalled by simply pressing the appropriate memory channel key. All information on frequency, band, and *mode* is stored in the selected memory.
The "auto M" switch allows two types of memory storage: when the "auto M" switch is off, data is memorized by pressing the "M in" switch; when the "auto M" switch is on the frequency being used at that time is automatically memorized.

Memory Scan
Scans all memory channels or may be user programmed to scan specific channels. Frequency, band and mode are automatically selected in accordance with the memory channel being scanned.

Programmable Band Scan
Scans automatically within the programmed bandwidth. Memory channels 9 and 0 establish the scan limit frequencies. The hold switch interrupts the scanning process. However, the frequency may be adjusted using the tuning knob whilst in the scan hold position.

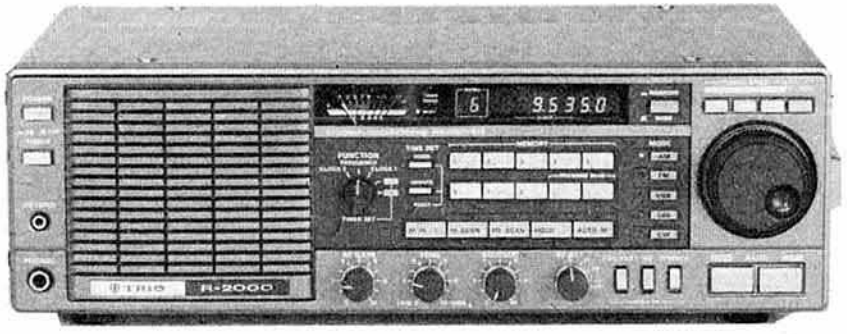
Clock Display with Integral Timer

Three Built In Filters with Narrow/Wide Selector
In the AM mode 6kHz wide or 2·7kHz narrow may be selected. In the SSB mode 2·7kHz is automatically selected. In the CW mode 2·7kHz is again chosen and if the optional YG455C filter is installed then 500Hz in the narrow position. In the FM mode 15kHz bandwidth is automatically selected.

Other important features are: squelch on all modes, noise blanker, a large 4 inch front mounted speaker, tone control, RF attenuator, AGC switch, high and low impedance antenna terminals, 13·8 V DC operation, record jack and, of course, provision for a VHF converter. All in all, a truly remarkable receiver.

£391.00 inc VAT carriage £5.00

"memorable"
the new receiver from Trio.



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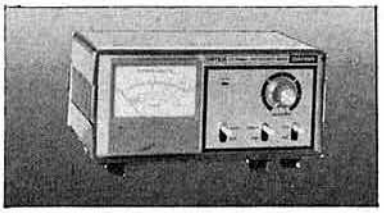
TRIO

As the appointed distributors for Trio, we recommend that you purchase your Trio equipment from an approved stockist (list above). Any stockist *not* on the list has no connection with the Trio UK sales and service organisation and cannot, despite claims to the contrary, offer any meaningful guarantee of backup service on Trio equipment.

we recommend the DAIWA range.

		Price inc. VAT	Carr.
VHF AMATEUR RECEIVERS			
SR9	2m FM tunable/xtal receiver 144-146MHz	46.00	1.50
SR1000	2m synthesised VHF monitor receiver. Requires no crystals for full amateur band coverage 144-146MHz	72.50	2.25
POWER & SWR METERS			
CN520	1-8-60MHz mini cross needle power/SWR meter	32.50	1.50
CN540	50-150MHz mini cross needle power/SWR meter	35.00	1.50
CN620A	1-8-150MHz cross pointer power and SWR meter. Up to 1kW	52.81	1.50
CN630	140-450MHz cross pointer power and SWR meter. Up to 200W	75.00	1.50
CN650	1-2-2-5GHz cross pointer power and SWR meter. Up to 20W	95.00	1.50
CNW518	3-30MHz 8 band hi power tuner and cross needle power meter	175.00	2.00
CNA1001A	Fully automatic all band ATU. Includes cross pointer power meter	156.00	5.00
CNA2002	As for CNA1001A but 2kW rating for tuner and power meter	228.00	5.00
ANTENNA ACCESSORIES			
CS201/TW2	Two way 50 ohm coax switch. 0-500MHz	11.98	1.00
CS401	Four way 50ohm coaxial switch 0-500MHz	36.99	2.00
ROTATORS			
DR7500X	For HF 3 element beams. Preset controller. 6 core cable	98.04	5.00
DR7500R	As for DR7500X but using the DAIWA round controller	107.98	5.00
DR7600X	Heavy duty. Will take up to 2 element 40m beam. Preset control	141.00	5.00



DR7600R	As for DR7600X but using the DAIWA round controller	152.00	5.00
KS065	Deluxe bearing for fixing stays to rotating mast	18.50	2.00
PS200D 20	Heavy duty power supply 9-15v 20 amps. Fully metered	98.00	5.00
POWER SUPPLIES			
PS300	Daiwa heavy duty PSU 30A max 22A continuous	117.99	5.00

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RM940	New mobile mic with no connections between mic and rig	45.00	1.50
S9	Spare sensor for RM940 mic system	6.50	0.50
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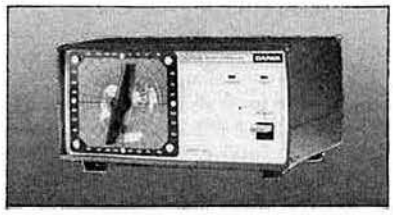


the NRD, NSD line

If I am absolutely honest, I am not certain whether I own an 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 NRD 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 others. This is 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 I refer to, only a small part of the vast range, are marine radio equipment, Marisat mobile terminals, 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 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, the assumption is incorrect. The NRD is easy to use with the minimum of controls to ensure the operator really enjoys his listening time. Digital readout, MHz, mode and filter bandwidth switches together with a VFO knob that will tune the band continuously without using any other control, from 10 KHz to 30 MHz or vice versa. To assist with difficult band conditions the NRD515 has pass band tuning and the medium wave broadcast section from 600 KHz to 1·6 MHz has a preselector control to cope with the crowded conditions. Add the optional 600 Hz CW filter and the 96 channel memory unit and, as other NRD515 owners would say, "a joy to own".

Now available for the radio amateur who is also a short wave man is the NSD515 transmitter. Again, part of my station, the NSD515 is, without a doubt, the only companion for the NRD515. A connecting harness which links the two units together provides full transceive operation or on release of a push button the units assume their own identities and become separates. A "remote" position on the transmitter MHz switch enables the receiver MHz switch to control the transmitter,so, as you tune across the band and into an amateur section then the transmitter automatically "comes up" on the same band. With the remote VFO push button selected on the transmitter and the MHz switch at remote, the transmitter becomes the slave of the receiver and operating simplicity is yours. Of course, in only seconds the two pieces of equipment can be set to work cross band or duplex.

Add to the above an RF speech compressor, an overmodulation indicator and the ability to monitor your transmitted audio and you will see how easy it is to produce the perfect signal.

Add 100 watts of transmitted signal and an optional internal aerial tuning unit which is matched individually to each band and is switched from one band to the other remotely by either transmitter, receiver or memory unit and you will see how much care and attention to detail JRC apply to their range of amateur equipment.

POWER SUPPLY UNIT
NBD 515.
£148.35 inc. VAT

TRANSMITTER
NSD 515.
£1223.60 inc. VAT

RECEIVER
WITH 96 CHANNEL MEMORY UNIT
NRD 515 **NDH 515**
£985.00 **£198 inc VAT**

SPEAKER
NVA 515
£34.50 inc. VAT

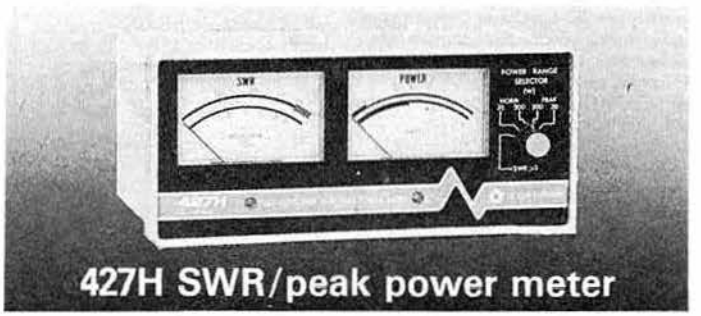
We are pleased to note that the RSGB has shouldered the task of mounting a national exhibition once again, to take place in March at N.E.C. Birmingham. We feel that this can be of great benefit to visitors and exhibitors alike and we are happy to give wholehearted support to the RSGB in this venture
Well done RSGB. Now let's all support them

OBITER DICTA

Good morning

The **new rigs** from Trio: the new **general coverage receiver** from Trio, **the R2000**, the new HF rig, **the TR430S**, the new 70 cm handheld **the TR3500**, and last but not least **the TR7930 FM mobile.** Of course Trio have dealt with the problematic red led display – most attractive and easy to read under shack conditions but when enclosed in a car with one of those **rare shafts** of sunlight playing on the front panel then not so good. I remember travelling all the way to Glasgow under such conditions and I am pleased to see **Trio, being the company they are,** have put on their thinking caps and designed "A **green** floodlit panel upon which **is superimposed the liquid crystal display**".

I have had the TR7930 in my "possession" for several weeks now and when I rise early—you all know me **as a bright early riser**—I have noticed that the **morning beams** of sunlight that filter through the



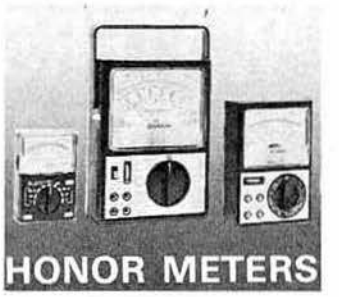
427H SWR/peak power meter

orange blossom outside my window do not affect in the slightest the new readout of the TR7930.

For those of you who travel quickly the motorways of the kingdom, we announce **a new magnetic mount** called the YS505M—£15.75 inc. VAT. This new mag mount has an unbelievably powerful magnet. We offer no guarantees regarding performance at speed. However, we tried one on the side of a filing cabinet and it is still there. **Strong lads** from the workshop have tried to remove Excalibur from the cabinet without success. It is rumoured that the person to pull the mag mount from its resting place will win the hand of Irene, our gorgeous secretary, who has been locked up in the tower of overwork. **Shades of King Arthur and the Knights of the Round Table,** or have I got my myths mixed up? You see girls, and I am sure you won't take offence at the chivalry which abounds at Lowe Electronics. Regarding winning her hand, I think if I were the chap to remove the mag mount then I would hope for more than her hand!

This brings me to the subject of **Vibroplex keys.** As you all know, the name **Vibroplex** is well known among all radio amateurs. It is a name that brings to mind the Presentation Day for **Long Service Awards** at your company. Out onto the well-lit platform you step and the Chairman of the Company, after a few kind words, hands you a solid gold Vibroplex keyer. Well, not solid gold but certainly the presentation keyer is included in our range. We thought it about time that **this superb range of equipment,** skill and technology at its finest, should be available to all here in the United Kingdom.

We stock the following models: the prices quoted include VAT but do not include the carriage charge which is £5.00. **The presentation,** top of the range at £99.80, the de luxe, aptly named **the original,** at £66.50 and £53.20 for the standard, **the Vibro-keyer** with Vibroplex parts used as keying mechanism for an electronic keyer, deluxe £62.18 and standard £49.20. For the iambic man, the **"Vibroplex iambic"** in three specifications: presentation £92.50, deluxe £62.18 and standard £49.20. New to the range and in two distinct versions is **the brass racer,** a basic model on a wooden plinth for £66.80 and an absolutely superb version **having an electronic keyer built into the base.** Using the Curtis 8044 chip, this self-contained keyer and paddle is fully iambic with dot/dash insertion and adjustable speed control. Designed for use on either valve or solid state equipment, the keyer is available at £99.00. Not only an ideal present for either the man or woman in your life but the opportunity **to own a piece of nostalgia,** a Vibroplex keyer.



HONOR METERS

I mentioned several months ago the new AOR handheld transceiver, the AR280. I am pleased to say that many amateurs are now finding out just how convenient and reliable are rigs produced by this company. The AR240 and AR740, which I have used for several years, still perform to the same high standard they had when new. **The new AR280** with its **5 watts** output and simple easy to use design seems to me a bargain at £188.00 inc. VAT.

To change the subject, how many of you boys or girls on a visit to one of our existing shops have thought how nice it would be **to work in Amateur Radio** full time? Well someone's chance of a lifetime has come. I am at present looking for **a Shop Manager** for our new premises to open shortly in **the North East** of the Kingdom. If my carefully laid plans go well then our new shop will be located in Darlington and the Manager will obviously live within this area. The post is open to either sex, the obvious criteria being that the person must be an **above normally enthusiastic radio amateur,** preferably a Class A licence holder, **have an unblemished record of honesty** and like people, not all people but most of them. If you are interested then ring us, explain that it is about the job vacancy in the North East. We can have a chat and if you are what we are looking for we can proceed further.

Back to the plot; why have Trio omitted **the VB2530** from the TR2500 information leaflet? Why has Alan omitted **the VB2530** from the price list? The answer is simple: they had forgotten about his new 2 metre amplifier. Giving 30 watts from the 2.5 watt TR2500 drive and costing only £66.24, the VB2530 comes complete with all connections and mobile bracket. A nice accessory and together with the speaker/mike they make what is a versatile hand portable and mobile rig as well. Those wanting the JAPAN RADIO COMPANY JST100 had better put their names on the waiting list as it's going to be a very popular transceiver.

I popped into **the Glasgow shop** recently. Sim and I enjoyed a plate of chips from the nearest restaurant. To celebrate my visit Sim bought four cream cakes which were absolutely superb. So not only have you ladies got the Botanical Gardens to enjoy whilst your husband browses (sorry, XYLS, YL, etc. are all more than welcome whilst their OM's study with interest the botanical specimens) but you have the chance of a first class meal. Not in the shop I hasten to add as we do not have sufficeint cutlery! **The London shop,** however, does not enjoy these catering facilities but I do believe British Rail do have a buffet at nearby stations.

Before I close, **just a word about the R2000.** The VHF converter available later in the year as an option. From what I have been told by Trio, if the converter is fitted then when you tune up to 29.999.9, if you continue to tune upwards the rig automatically moves to the VHF frequency and progression up the band continues.

POWER SUPPLY

Anyway, that's about if for now as I have just heard a rumour that **some gallant knight** from downstairs has removed the mag mount from the cabinet and claimed Irene so I have to find a white charger so that they can ride off together into the sunset!

So, Gud Dxes 73es FBYLS, XYLS, esFBOM, etc. David

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- Large LED display and illuminated meter
- Complete with mic, mounting brackets, DC leads etc.

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- High quality USB, LSB, CW, FM for base or mobile
- Power output 10 watts switchable 1 watt on all modes
- Receiver sensitivity better than 0·3μv/20dB and 0·15μv/10dB
- Dual programmable VFO's, 600kHz shift, automatic tone burst
- Automatic scanning and up/down frequency microphone control
- Complete with mic, mounting brackets and DC leads, etc

£269!
Carriage free

FULL FACTORY WARRANTY

NEW MIZUHO SB2X 2M SSB PORTABLE

- 144·25-144·35MHz VXO frequency control
- 2m SSB/CW internal battery powered portable. 0·2w output
- Receiver sensitivity better than 15dB for 0·5μv
- Built-in microphone with optional external mic socket
- Noise blanker circuit and built in CW key
- BNC aerial socket/headphone socket/external psu socket.
- Base station performance from a pocket portable

£89!

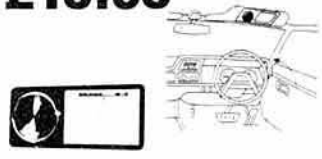
NEW FDK ATC720 AIRCRAFT MONITOR

- 118-136MHz AM portable aircraft monitor
- 25kHz steps controlled by thumbwheel switch
- Sensitivity better than 1 microvolt
- Internal long lasting rechargeable ni-cad battery pack
- Plug in helical whip and external earpiece socket
- Auto tracking front-end tuning for good image rejection
- Supplied complete with AC charger and aerial

£129
plus free list of UK airband frequencies.

NEW ADONIS MOBILE SPEAKER

£15.95



- Ideal remote speaker for mobile operation
- 8 ohm impedance. Ultra slim construction
- Includes "magic" memo pad
- Fits onto sun visor with special velcro straps
- Makes mobile copy much easier and more enjoyable

Carriage £1.00

NEW AIRBAND BASE/MOBILE MONITOR CD-6000

£89.95
Carriage £1.50

- 110MHz-139·995MHz in 5kHz steps
- Covers all AM channels including beacons
- Clear LED digital readout display
- Sensitivity better than 0·5μv for 10dB
- 12v DC power requirement. 400mA
- Automatic scanning facility. Built in speaker
- Complete with mobile mounting bracket and DC cable

WATERS & STANTON ELECTRONICS

18/20 MAIN ROAD, HOCKLEY, ESSEX. Tel: (0702) 206835

WELZ®

"DIAMOND" RANGE OF ANTENNAS

GH22
BASE ANT
144 MHz
2 × 5/8th wave
6·5dB gain
£24.95
Power 100 watts
Height 2·7m
Wind 25m/sec
Weight.0·9Kg
Mast clamp 25·50mm
SO239 connector

Carriage charge on all aerials—£3.75

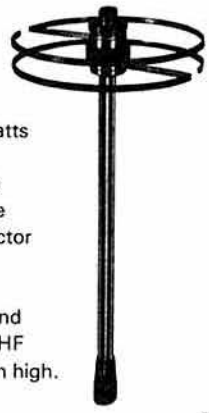
Carriage on accessories ordered separately—£1.50

B285
BASE ANT
144 MHz
1 × 5/8th wave
3·4dB gain
£14.50
Power 100 watts
Height 1·3m
Wind 35m/sec
Weight 0·75Kg
Mast clamp 25·50mm
SO239 connector

M285
MOBILE ANT
144 MHz
5/8th wave
3·4dB gain
£7.95
Power 100 watts
Height 1·3m
Tapered whip
Fold over base
PL259 connector

M287
MOBILE ANT
144 MHz
7/8th wave
4·5dB gain
£13.95
Power 100 watts
Height 1·8m
Tapered whip
Fold over base
PL259 connector

DP-LOR



DP-LOR
Elevated ground plane for all VHF models 0·35m high.
£17.95

"HF" MOBILE RANGE

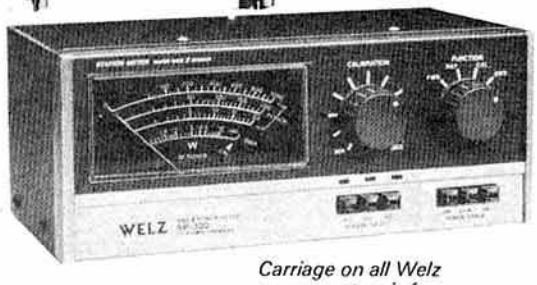
DP-100S

EL40 EL80 LBR BDS

GLS

MB

Model No	Description	Price
DP100S	5 band HF mobile with telescopic base	£79.95
LBR	Heavy duty base spring to DP100S	£10.50
BDS	Bumper mounting strap for DP100S	£9.50
EL40	40m base loaded whip 2·45m PL259 con	£28.95
EL80	80m base loaded whip 2·48m PL259 con	£29.95
GLS	Gutter mount (SO239) with 5m cable	£8.50
MB	Deluxe magnetic base (SO239) with 5m cable	£11.50
TRB	Heavy duty trunk lip mount (SO239)	£13.95
KB105	80-10m vert 1kW 7m high	£79.00
KB101	40-10m vert 1kW 5m high	£54.00
CP5	80-10m compact vertical with radials 200 watts	£99.95



Carriage on all Welz power meters is free

JOIN THE HUNDREDS OF WELZ USERS AND EXPERIENCE "PERFORMANCE"

KB105

WELZ DELUXE POWER METERS

SP600	1·8-500 MHz 2kW (HF) 200 watts VHF/UHF 3 power levels 0-20, 200 or 2000 watts 3 ant inputs	£95.00
SP300	1·8-500 MHz 1kW (HF) 200 watts VHF/UHF 3 power levels 0-20, 200 or 2000 watts 3 ant inputs	£85.00
SP200	1·8-160 MHz 0-20, 200, 1000 watts 2 ant inputs	£61.95
SP400	130-500 MHz 0-5, 20, 150 watts N connectors	£61.95

WELZ SP10X

1·8-150 MHz
20/200 watts
VSWR and power
50 ohm/SO239
Sens = 3 Watts
Pocket size
Ideal for mobile
£21.95

WELZ CH20 COAX SWITCH

Performance coaxial switch
1 input and 2 outputs
DC-900MHz 0·1dB
Isolation 50-70dB
VSWR 1:1 Power 1kW
Coaxial cavity
Gold plated contacts
£15.95

WELZ SP15M POWER METER

1·8-150 MHz Flat
2·5/20/20 Watts
VSWR and power measurements
50 ohm/SO239/0·2dB
VSWR sensitivity - 1·5 Watts
Large, easy to read meter
Accuracy better than 10%
£29

WELZ AC38 HF ATU

Ideal hf atu
8 bands 3·5-29·7 MHz
Power rating 200W CW 400W PEP
Input 50 ohm SO239
Output 20-300 ohm unbalanced
Insertion loss 0·5dB
Matches all modern transceivers
£59

SP10X

CH20A

WATERS & STANTON ELECTRONICS

18-20, MAIN ROAD, HOCKLEY, ESSEX TEL: (0702) 206835/204965

		Price Inc. VAT	Carr. & Ins.
FDK RANGE			
M.700AX	2m FM 25 watt.	179.00	n/c
M.750X	2m FM/SSB/CW 10w.	269.00	n/c
Expander	70cm transverter	199.00	n/c
PS750	230v AC power supply	66.00	n/c
Palm II	2m FM 6 channel	109.00	n/c
Palm IV	70cm FM 6 channel	109.00	n/c
TB1	1750Hz tone burst	10.00	0.50
TM56B	2m FM 230v/12v DC scanner	59.00	n/c
TM56B	Marine version	59.00	n/c
FDK	12v DC leads	2.75	0.65
CC2	Case for Palm II/IV	6.75	0.75
BC2	230v AC charger	4.50	0.75
BB2	"AA" size battery case	5.00	0.75
BT2	Ni-cad battery pack	12.00	0.75
Xtals	for Palm II and Palm IV	3.00	0.25
Xtals	for TM56B	3.00	0.25
T1200	2m synthesised handheld	159.00	n/c
SNAP-1	Joining plates. M750/Expander	7.95	1.00
AZDEN RANGE			
PCS3000	25w 2m FM trans.	179.00	n/c
PCS300	2m synthesised handheld	179.00	n/c
ECK	5m cable kit	25.00	n/c
AS006	Mobile extension speaker	8.95	1.00
PCS4000	25w 2m FM trans.	t.b.a.	
WELZ PROFESSIONAL POWER/ SWR METERS & ACCESSORIES			
SP200	1-8-160MHz 20w-200w-1kw	61.95	n/c
SP300	1-8-500MHz 20w-200w-1kw	85.00	n/c
SP400	130-500MHz 5w-20w-150w	61.95	n/c
SP15M	1-8-160MHz 5w-20w-200w	32.00	n/c
SP380	1-8-500MHz 200w	49.95	n/c
SP10X	1-8-160MHz 200w	21.95	n/c
AC38	3-5-30MHz Coax ATU	59.00	n/c
CT15A	50w dummy load	6.95	0.75
CT15N	15/50w dum load. N Plug	11.95	0.75
CT150	150/400w dummy load	32.00	n/c
CT300	300/kw dummy load	45.00	n/c
CH20A	2 way coax switch	15.95	n/c
CH20N	2 way coax switch "N"	27.95	n/c
ADONIS MICROPHONES			
MM202S	Safety mic. Lapel type	21.95	1.00
MM202HD	Safety mic. head band	29.00	1.00
MM202HM	Headphone & Mic.	39.00	1.00
NEW AM303	Base station mic.	27.95	1.00
NEW AM503	Base station mic.	37.00	1.00
AM802	Base station mic.	49.00	1.00
TRIO			
NEW TS930S	Solid state transceiver	1154.00	n/c
TS830S	160-10m transceiver	678.00	n/c
VFO230	Digital VFO	231.00	2.00
AT230	All band ATU	129.00	2.00
SP230	External speaker unit	39.00	1.75
DS2	Optional dc pack	47.50	1.75
DFC230	Digital remote controller	179.00	1.75
YK88C	500Hz CW filter	30.30	0.75
YK88CN	270Hz CW filter	35.40	0.75
SM220	Station monitor scope	198.00	5.00
BS8	Panoramic display module	49.60	1.50
TS430S	160-10m transceiver	t.b.a.	n/c
VFO240	External VFO	92.50	5.00
TS430S	8 band 200w pep mobile	531.00	n/c
TS130V	8 band 20w pep mobile	433.00	n/c
TL120	200w pep linear for TS120V	159.00	2.00
MB100	Mobile mount for TS130	17.00	1.50
VFO120	External VFO	93.00	2.00
SP120	Base station speaker	25.00	2.00
SP40	New mobile speaker unit	13.50	1.00
AT130	100w antenna tuner	88.50	1.50
PS20	AC power supply 4 amps	54.90	3.00
PS30	AC power supply 20 amps	96.00	5.00
MA5	Trio 5 band mobile aerial	99.80	3.25
MC50	Deluxe desk mic.	29.44	1.50
MC35S	Fist microphone 50k	14.00	0.75
MC30S	Fist microphone 500ohm	14.00	0.75
MC40S	Up/down microphone	14.00	0.75
LF30A	HF low pass filter	20.00	1.00
RD300	1kw dummy load	52.20	2.00
NEW TS780	2m/70cm transceiver	799.00	n/c
TR9000	2m multimode transceiver	359.00	n/c
TR9130	2m multimode 25w	411.00	n/c
BO9	Base plinth for TR9000	37.25	1.50
TR7730	Compact 25w 2m FM tcvr	268.00	2.00
TR7800	2m FM 25w transceiver	257.00	2.00
TR2300	2m FM portable tcvr	144.00	2.00
VB2300	10w amplifier for TR2300	62.00	1.50
MB2	Mobile mount	20.00	1.00
RA1	Rubber flexible antenna	6.90	0.75
PS1200	AC power supply unit & charger	29.50	1.50
NEW TR2500	Compact 2m FM h'held	220.00	2.50
ST2	Base stand charger	49.50	1.75
SC4	Soft case	13.00	0.75
MS1	Mobile stand/trickle chgr	30.30	1.25
SMC25	Speaker microphone	15.40	0.75
PB25	Spare battery pack	23.50	0.75
LH2	Deluxe leather case	22.75	0.75
TR8400	70cm FM mobile tcvr	299.00	2.00
PS10	Base station power supply	64.00	2.50
TR9500	70cm multimode tcvr	428.50	n/c
PL1	Charger lead for TR2300	1.30	0.75
R1000	Synthesised 200kHz-30MHz receiver	297.00	n/c
SP100	External speaker unit	26.90	2.00
HC10	Digital station clock	64.00	1.50
HS5	Deluxe headphones	21.85	1.25
HS4	Economy headphones	10.35	1.25
NEW R600	Synthesised 150kHz-30MHz receiver	244.00	n/c
DM81	Dip resonance meter	67.50	1.50
DL705	Digital multimeter	80.00	1.50
MC76	Case for DL705	4.95	1.00

SERVICE

"YES IT DOES GO WRONG SOMETIMES"

Even the best equipment goes wrong and you want to be in a position whereby you are assured that any faults can be rectified quickly and efficiently. At Hockley we have a well equipped, full-time service department to give you just that re-assurance. It's only when things go wrong that you begin to tell the "men from the boys" in the retailing world. Our policy is quite simple. We will service any equipment that we sell both in and out of warranty and do our utmost to get the work completed as fast as is humanly possible. Minor faults we will try and do whilst you wait but do please telephone before making a journey to us so that we can make sure it can be fitted into our day's schedule.

YAESU			
NEW FT102	All band transceiver	785.00	n/c
KEYT901	Curtis keyer	23.00	0.75
DCT1	DC lead	6.50	0.75
RAMT1	Memory board	10.00	0.75
FMUT1	F.M. Unit	t.b.a.	0.75
XF8.9KCN	300Hz CW filter	15.35	0.75
XF8.9KC	600Hz CW filter	15.35	0.75
XF8.9KA	6kHz AM filter	15.35	0.75
XF10.7KC	CW filter	13.80	0.75
FT902DM	9 band AM/FM transceiver	885.00	n/c
FT902DE	9 band transceiver	790.00	n/c
FC902	9 band atu SWR/PWR etc	135.00	5.00
FTV901R(2)	Transverter fitted 2m mod	285.00	5.00
FTV901R	T'verter main frame only	195.00	5.00
430TV	70cms module for tvtr	185.00	2.00
144TV	2m module for transverter	100.00	2.00
70TV	4m module for transverter	80.00	2.00
YO91P	Monitor scope with pan. adaptor	330.00	5.00
FV901DM	Remote vfo for 901	260.00	5.00
SP901	External speaker	31.00	2.00
FL2100Z	160-10m 1200w linear	449.00	n/c
FT101ZFM	160-10m 9 band transc.	590.00	n/c
FT101ZDFM	As above with digital readout	665.00	n/c
DCT101Z	12v DC adaptor	42.50	1.50
FV101Z	Remote VFO for FT101Z/ZD	112.00	5.00
FV101DM	External Digital VFO	249.00	5.00
FANT101	Fan for 101 series	13.80	1.00
FT707	80-10m 8 band transceiver	509.00	n/c
FP707	230v AC for FT707	112.00	5.00
MR7	Metal rack for FT707	15.70	2.00
MMB2	Mobile mounting bracket	16.00	1.50
FV707DM	Digital VFO	203.00	5.00
FL110	100w linear amplifier	155.00	5.00
FRG7	General Coverage rcvr	199.00	n/c
FRG7700	Gen. co. receiver	335.00	n/c
MEMGR7700	Memory module	64.00	1.00
DCRG7700	DC modification kit	1.15	0.50
FRT7700	Antenna tuner	37.00	1.50
FF5	Low pass filter	9.95	0.75
VHF Converters for FRG7700:			
	FRV7700 'A' 118-130; 130-140; 140-150MHz	69.75	1.50
	FRV7700 'B' 118-130; 140-150; 50-59MHz	75.50	1.50
	FRV7700 'C' 140-150; 150-160; 160-170MHz	69.95	1.50
	FRV7700 'D' 118-130; 140-150; 70-80MHz	72.45	1.50
	FRV7700 'E' 118-130; 140-150; 150-160MHz	71.30	1.50
	FRV7700 'F' 118-130; 150-160; 170-180MHz	71.30	1.50
FT208R	2½watt 2m h'held tcvr	199.00	1.50
FT708R	1 watt 70cms h'held tcvr	229.00	1.50
FNB2	Nicad battery pack	17.25	0.75
NC9C	Slow charger unit	8.00	0.75
PA3	12v charger unit	13.40	0.75
MMB10	Mobile bracket	6.50	0.75
FT290R	2m all-mode portable	265.00	n/c
FT790R	70cms all-mode portable	325.00	1.00
NC11C	Charger for FT290R	8.00	1.00
CSC-1	Carrying case	3.45	0.75
MMB-11	Mobile mounting bracket	22.25	1.50
FL2010	10 watt linear	59.00	2.00
NC/WSE	2amp hour ni-cad pack	20.00	1.75
FT480R	2m 10 watt SSB/CW/FM transceiver	369.00	n/c
FP80A	230v AC power supply	63.25	2.00
FL2050	50 watt linear	115.00	2.00
FT780R	70cms all-mode tcvr	399.00	2.00
YAESU ACCESSORIES			
YM21	Hand mic. 600ohm 4 pin	13.80	0.75
YM24A	Hand mic. 2K ohm 6 pin	16.85	0.75
YM34	Desk mic. 500/50K ohm 8 pin	21.45	1.50
YM35	Hand mic. 8 pin scanning. 600ohm	13.80	0.75
YM36	Hand mic. 8 pin n/c. 600ohm	13.05	0.75
YM37	Hand mic. 600ohm 8 pin	6.90	0.75
YM38	Desk mic. 600/50K ohm 8 pin	24.90	1.50
YM39	600ohm 7 pin hand speaker/mic.	14.95	0.75
YE7A	Hand mic. 600ohm 4 pin	6.90	0.75
YD148A	Desk mic. 600/50k ohm 4 pin	21.10	1.50
YD844A	Desk mic. 600/50k ohm	25.30	1.50
FP4	230v/4 amp 12v psu	42.95	2.00
FP12	230v/12 amp 12v psu	86.25	5.00
YH55	8ohm communication headphones	10.00	1.00
YH77	Lightweight headphones	10.00	1.00
QTR24D	24 hour World clock	28.00	1.50
FF501DX	Low pass filter 2kw	23.00	1.50
YP150Z	Dummy load/wattmeter	92.00	1.50
ICOM			
IC740	HF transceiver 100W	699.00	n/c
FL30	SSB Pass band tune filter	24.70	0.75
FL44	Hi Q 455kHz xtal filter	t.b.a.	0.75
FL45	CW Narrow xtal filter	34.20	0.75
EX202	LDA unit for above	t.b.a.	0.75
EX203	CW Audio filter	11.60	0.75
EX205	Transverter controller	10.50	1.00
IC720A	HF transceiver + Gen. Cov. Rcvr.	883.00	n/c
PS20	PSU for above with speaker	130.00	5.00
PS15	PSU no speaker	99.00	5.00
FL32	CW narrow filter	29.30	0.75
FL34	AM filter	23.40	0.75
BC10A/E	Mains memory backup	5.30	0.75
IC2KL	Matching HF linear 500W	839.00	n/c
IC2KLPS	PSU for above	211.00	5.00
ICAT500	1-8-30MHz auto tuner	299.00	5.00
ICAT100	3-5-30MHz auto tuner	249.00	5.00
IC45IE	70cm FM + SSB base stn	630.00	n/c
IC25IE	2m FM + SSB base stn	499.00	n/c
IC290E	2m Multimode mobile 10W	366.00	n/c
IC490E	70cm multimode mobile	445.00	n/c
IC25E	2m FM mobile 25W	259.00	n/c
IC2E	2m FM handy talky	159.00	n/c
IC4E	70cm hand portable	199.00	n/c
ICML1	10 watt mobile booster	49.00	1.00
BP5	11 volt battery pack	30.50	0.75
BP4	Battery box for 6 × AA	5.80	0.75
BP3	Standard battery pack	17.70	0.75
BP2	6 volt pack	22.00	0.75
BC30	Base charger for above	39.00	0.75
BC25	Mains charger as supplied	4.25	0.75
DC1	12 volt adaptor pack	8.40	0.75
HM9	Speaker/Microphone	12.00	0.75
CP1	Mobile charging lead	3.25	0.75
LC1/2/3	Cases each	3.50	0.75
IC202S	2m SSB portable tcvr.	169.00	n/c
IC402	70cm SSB portable tcvr.	245.00	n/c
ICSP2/3	External speaker	29.00	1.50
IC3PE	3 amp psu + speaker	64.90	1.50
ICSM2	Desk mic. 4 pin plug	29.00	1.50
ICSM5	Desk mic. 8 pin plug	29.00	1.50
ICHM3	Hand mic.	12.00	0.75
ICHM5	N/C mic. as above	20.00	0.75
ICHM7	Hand mic.	12.00	0.75
ICHM10	Scan mic.	20.00	0.75
LOWE RECEIVERS			
SRX-30	General Coverage HF receiver	158.00	n/c
SRX-30D	SRX30 with dig readout	195.00	n/c

MICROWAVE MODULES RANGE

MML28/100-3	10m 100w linear/preamp	129.95	2.00
MML70/50S	4m 50 watt linear/preamp	85.00	1.25
MML70/100-S	4m 100 w linear/preamp	139.00	2.00
MML144/30L-S	1·3 w I/P 30 w O/P	69.95	1.75
MML144/50S	2m 50 w linear/preamp	85.00	1.25
MML144/100-S	2m 100 w linear/preamp	139.95	2.00
MML144/100LS	2m 100 w (1 or 3w i/p)	159.00	2.00
MML432/20	70cm 20 w linear/preamp	85.00	1.25
MML432/50	70cm 50 w linear/preamp	109.00	2.00
MML432/100	70cm 100 watt linear	228.65	2.00
MML1296/10	23cm 10 watt linear	199.00	1.25
MMC435/51	70cm ATV converter	37.90	0.75
MMC435/600	70cm ATV converter	27.90	0.75
MTV435	70cm ATV 20 watt tx	149.00	1.25
MM1000	ASCII to morse converter	69.95	1.25
MM1000KB	Morse converter with keyboard	99.95	2.00
MM2001	RTTY to TV converter	189.00	1.25
MM4000	RTTY transceiver	269.00	1.25
MM4000KB	with keyboard	299.00	2.00
MMS1	The MORSETALKER	115.00	1.25
MMS2	Advanced morse trainer	169.00	1.25
MMT28/144	10m transverter	109.00	1.25
MMT70/28	4m transverter	119.95	1.25
MMT70/144	4m transverter	119.95	1.25
MMT144/28	2m transverter	109.95	1.25
MMT432/28-S	70cm transverter	159.95	1.25
MMT432/144-R	70cm transverter	184.00	1.25
MMT1296/144	23cm transverter	184.00	2.00
MMC28/144	10m to 2m converter	29.90	0.75
MMC50/28	6m to 10m converter	29.90	0.75
MMC70/28	4m to 10m converter	29.90	0.75
MMC70/28LO	4m to 10m converter	32.90	0.75
MMC144/28	2m to 10m converter	29.90	0.75
MMC144/28LO	2m to 10m converter	32.90	0.75
MMC432/28-S	70cm to 10m converter	37.90	0.75
MMC432/144-S	70cm to 2m converter	37.90	0.75
MMC1296/28	23cm to 10m converter	34.90	0.75
MMK1296/144	23cm to 2m converter	69.95	0.75
MMK1691/137.5	1691MHz Meteosat converter	129.95	1.25
MMA28	10m low noise preamp	16.95	0.75
MMA144V	2m RF switched preamp	34.90	0.75
MMA1296	23cm low noise preamp	34.90	0.75
MMDO50/500	500MHz digital meter	75.00	0.75
MMD600P	600MHz prescaler	29.90	0.75
MMDP1	Counter amplifier/probe	14.90	0.75
MMF144	2m bandpass filter	11.90	0.75
MMF432	70cm bandpass filter	11.90	0.75
MMR15/10	15dB, 10 watt attenuator	11.90	0.75

DATONG

PC1	General Cov. Converter	137.42	n/c
VLF	VLF converter 28-29MHz coverage	29.90	n/c
FL1	Agile audio filter	79.35	n/c
FL2	Multi-Mode audio filter	89.70	n/c
ASP/B	Automatic r.f. clipper (Trio)	82.80	n/c
ASP/A	Automatic r.f. clipper (Yaesu)	82.80	n/c
D75	Manual r.f. speech clipper	56.35	n/c
D70	Morse Tutor	56.35	n/c
MK	Keyboard morse sender	137.42	n/c
RFA	Broad band pre-amplifier	33.92	n/c
AD270	Active dipole (indoor mounting) 12v DC	47.15	n/c
AD370	Active dipole (outdoor mounting) 12v DC	64.40	n/c
MPU	Mains power unit	6.90	n/c
DC144/28	2 metre converter	39.67	n/c
Codecall 'A'	4000 link programmable codes	32.20	n/c
Codecall 'B'	4000 switch programmable codes	33.92	n/c

JAYBEAM ANTENNAS

10, 15 & 20 metre antennas			
TB3	HF 3 el tribander 1kw	189.00	5.00
VR3	HF Vertical triband 1kw	46.00	4.00
4 metre antennas			
4Y/4M	4 element beam	29.90	4.00
PMH2/4M	2 way phasing harness	16.00	1.50
2 metre antennas			
DC1/WB	Wide band discone (100-470MHz)	41.40	3.00
LR1/2M	Colinear 4·3db	29.90	3.00
LR2/2M	Colinear 2·8db	23.00	3.00
C5/2M	5db glass fibre colinear	54.00	4.00
5Y/2M	5 element yagi	14.40	3.00
8Y/2M	8 element yagi	17.80	3.50
10Y/2M	10 element yagi	33.35	4.00
PBM10/2M	10 element parabeam	44.85	4.00
PBM14/2M	14 element parabeam	55.80	4.00
5XY/2M	Crossed 5 element yagi	28.00	3.50
8XY/2M	Crossed 8 element yagi	35.60	4.00
10XY/2M	Crossed 10 element yagi	46.00	4.00
X6/2M/X12/70cm	dual band crossed yagi	42.50	4.00
PMH/2C	Harness for circular pol.	8.00	1.50
Q4/2M	4 element quad yagi	29.00	3.00
Q6/2M	6 element quad yagi	39.00	4.00
Q8/2M	8 element quad yagi	44.85	4.00
D5/2M	Double 5 slot-fed yagi	25.00	3.00
D8/2M	Double 8 slot-fed yagi	34.50	4.00
SVMK/2M	Kit for vertical pol.	9.00	3.00
UGP/2M	Ground plane	12.60	2.00
HO/2M	Mobile 'halo' head only	6.00	2.00
HM/2M	Mobile 'halo' with 24" mast	6.60	2.00
PMH2/2M	2 way phasing harness	12.65	1.50
PMH4/2M	4 way phasing harness	28.75	1.50
70cm Antennas			
C8/70cm	8db glass fibre colinear	62.00	4.00
D8/70cm	Double 8 slot-fed yagi	25.90	3.00
PBM18/70cm	18 element parabeam yagi	32.20	3.00
PBM24/70cm	24 element parabeam yagi	42.55	4.00
MBM28/70cm	28 el multibeam yagi	21.30	3.00
MBM48/70cm	48 el multibeam yagi	35.65	3.00
MBM88/70cm	88 el multibeam yagi	48.90	4.00
8XY/70cm	Crossed 8 element yagi	42.50	3.00
12XY/70cm	Crossed 12 element yagi	52.90	4.00
PMH2/70cm	2 way phasing harness	10.30	1.50
PMH4/70cm	4 way phasing harness	22.45	1.50
23cm Antennas			
CR23cm	Corner reflector array	40.25	3.00
D15/1296	Double 15 slot-fed yagi	36.80	3.00
PMH2/23cm	2 way phasing harness	31.00	1.50

AN INVITATION

We're only 10 mins from Southend-on-Sea. Why not come and visit our large showroom where everything is on display and can be demonstrated. There's a couple of nice country pubs nearby that serve good ale and food And a brisk walk along the sea front (or down the pier and back if you can manage 2½ miles) will blow the old cobwebs away! You can reach us by rail on the Southend to Liverpool Street line or by road via the A127 or A130. We look forward to seeing you soon.

MAIL ORDER

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Once you've made the decision to buy you'll want to get your equipment as quickly as possible. That's why we set up a completely separate mail order department to give you exactly that kind of service. Martin Pyke is our mail order manager and his number one job is to get all goods shipped out the same day as the order is received. We can take orders right up to around 5.00 p.m. for same day despatch (with the exception of the larger items where 2.30 p.m. is the limit). Either send us your order by post using our clip out order form contained in this advert or telephone us your credit card details.

SPECIAL VHF ANTENNAS

Scan-X	65-520MHz discone rx only	16.00	3.00
LAB	Airband ground plane	11.50	2.50
LMD	Marine dipole aerial	4.80	2.00
GDX-2	Discone aerial 50-480mHz tx & rx	39.50	3.00

G-WHIP MOBILE ANTENNA RANGE

Tribander helical for 10/15/20 metres	25.80	3.00
Base mount single hole fixing + 3m cable	6.30	1.25
LF40m coil for above aerial	6.55	1.25
LF80m coil for above aerial	6.55	1.25
LF160m coil for above aerial	6.55	1.25
LF telescopic resonator whip	4.25	1.25

AERIAL ROTATORS (complete with control boxes)

CDE AR40 (5 core cable) up to 2 el. tribander	79.00	3.50
Channelmaster 9502B (3 core) up to 8 el. VHF	54.00	3.50
9523 Channelmaster alignment bearing	14.50	1.25
Jaybeam (KR400 RC) (6 core) up to 3 el. HF beams	99.00	3.50
250 Hirschmann (3 core) suits VHF aerials up to 8 el.	43.00	2.50
SL100 Alignment bearing for 250	13.50	1.50

HF ANTENNAS (Various manufacturers)

Mini-Products HQ-1 20/15/10m 2 el. 1kw "Mini-Beam	139.00	4.00
Mini-Products C4 20/15/10m vertical dipole 1kw	59.00	3.00
Mosley TD3JR 20/15/10m wire dipole 600w	40.00	2.00
Mosley "Mini-Beam" 20/15/10m 2 el. beam 600 watts	99.00	4.00
Mosley TA33JR 3 band 3 el. beam 600 w	161.00	4.00
Hy-Gain 12AVQ 20/15/10m vertical 2kw	50.60	3.00
Hy-Gain 14AVQ 40-10m vertical 2kw	64.00	3.00
Hy-Gain 18AVT/WB 80-10m vertical 2kw	109.25	3.50
HF5 80-10m vertical 200 watts	48.50	3.50
Radial kit for HF5	30.50	3.00
Jaybeam TB3 HF 3 el tribander beam 2kw	189.00	5.00
Jaybeam VR3 HF vertical 2kw	46.00	4.00
Western DX-5V 5 band 2kw vertical	89.00	3.00
5-band commercial grade 1kw 80-10m dipole	39.00	2.00

VHF/UHF MONITOR RECEIVERS

SX200N	Scanning receiver	260.00	5.00
BEARCAT 220	Scanning receiver	199.00	5.00
TM56B	FM Scanner 12v DC/230v AC	89.00	2.00
Sound Air 008	8 channel FM monitor	39.00	2.00
Sound Air M161	16 channel FM monitor	39.00	2.00
SR9(A)	2m Amateur receiver 12v DC	46.00	2.00
SR9(M)	Marine band rcvr 12v DC	46.00	2.00

ANTIFERENCE (ANTENNA SPECIALISTS) MOBILE ANTENNAS

ASP201	2m ¼ wave aerial	3.95	3.00
ASP3462	70cm colinear 3db gain	8.95	3.00
K220A	Magnetic mount for above	8.95	2.00
ASP3009	2m 3db gain 5/8th wave	9.95	3.00
ASP3677	Deluxe 2m 3db gain 5/8th wave	15.95	3.00
ASP3667	Deluxe 70cms 5db gain	16.95	3.00
K220	Magnetic mount	8.95	2.00
ASPM161	'No-hole' boot mount	3.75	1.00
ASPM124	28MHz ¼ wave whip	18.95	3.00

HOKUSHIN RANGE (MOBILE ANTENNAS)

2E	2m 5/8 wave 3·4db gain	8.50	3.00
2NE	2m 7/8 wave 4·5db gain	14.50	3.00
10SE	28MHz whip	12.65	3.00
15SE	21MHz whip	£13.80	3.00
20SE	14MHz whip	£15.35	3.00
RG4M	Base for all above aerials	4.50	1.50
GSS	Gutter/boot mount	4.50	1.50
MB5	Magnetic mount with 5m coax (not 2NE)	7.95	2.00
CBA311	2m ¼ wave gutter clip aerial	5.00	3.00

SWL AERIALS & ATU's

SW69	SWL 50ft dipole 3-30MHz	24.95	1.50
004	3-30MHz 60ft dipole with		
Mosley RD5	50ft coax All band dipole	29.92	2.00
Global AT1000	SWL antenna tuning unit 0·2MHz-30MHz	40.00	2.00
		31.95	2.00

AIR BAND PORTABLE MONITORS

R517	Air band portable receiver	49.50	1.50
AIR1	Soft case for R517	3.00	1.00
Crystals for R517		3.00	0.25
ATC720SP	Synth Air Rec 118-136Mz	189.00	n/c
ATC720	Hobby version of above	129.00	n/c

MISCELLANEOUS ITEMS

PS134	13·8v 4 amp power supply	24.95	2.00
PS125	5 amp AC power supply	29.95	2.50
PP1310	PSU 240v/13·8v DC output at 10amp protected	49.50	3.00
Global PS15	6 amp psu with meter	32.95	2.00
EK121	Katsumi Electronic keyer	32.50	1.50
EKM12	Matching side tone monitor	10.95	1.25
COK2	Morse code oscillator	6.95	0.75
HK708	Telegraph CW key (manual)	11.75	1.00
YW3	Twin SWR/Power/Field strength meter	12.50	0.75
MF210	Self powered 2m FM monitor	12.00	0.75
FX1	Deluxe station wavemeter	33.00	1.50
DM81	Solid state dip meter	67.50	1.50
Altai	Dip oscillator	47.00	1.50

MAIL ORDER SLIP to: Waters & Stanton Electronics, Main Road, Hockley, Essex.

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The Missing Link

Have you ever wondered how to combine personal computing and amateur radio? Certainly you can run QRA and contest log programs on your computer, but that's not very exciting. Why not use your computer to communicate?
You can go out and buy a cheap phase lock loop demodulator and feed software to your computer to do Baudot code conversion, but what kind of system is that? It gives you a third rate, error prone RTTY system and ties up your computer in running the conversion program. It takes away all the flexibility of writing your own programs. You paid a lot for your transceiver and you paid a lot for your computer. You deserve better!
Now, ICS offer a superb, commercial quality Terminal Unit, with a four section audio filter/discriminator demodulator and crystal controlled tones. Code conversion to and from ASCII is built in — so you can use your computer as a terminal and write your own application programs in BASIC.
The 16 LED frequency analyser style tuning indicator is probably the best on the market. All mode control is carried out direct from your computer by ESC and CONTROL codes and front panel mode displays can be interrogated over the interface. It couldn't be easier!
The AMT-1 also includes full AMTOR error correcting data transmission facilities. Due to its incredibly low error rate, through QRM and fading, this mode is now taking over from normal amateur RTTY, as it has in commercial ship-to-shore radio. Hundreds of Amateurs are currently active on AMTOR world-wide. The FCC is about to give American Amateurs permission to use AMTOR.
Used only on ordinary RTTY, the AMT-1 is still one of the best terminal units available.

SPECIFICATION:
Tone Specification—IARU (low) tones.
Transceiver connection—PTT, MIC, SPKR.
Computer Connection—RS232, ASCII (110 or 75 Bauds)
Modes: RTTY, AMTOR, ASCII Transceiver plus CW transmit.
Power Supply Requirement: 12-14 V at 800mA.

CHOICE OF COMPUTER/TERMINAL
Since launching the AMT-1, we have had many enquiries about which computers and terminals are useable with it. The answer is that most surplus ASCII terminals, provided they have a 75 or 110 Baud RS232 interface, will work very well. Many personal computers, such as the BBC model B, TRS80, Pet and Apple will also work. At the lower end, the choice is more limited, as many low cost personal computers have either no serial interface available or a very poor one. A major exception is the VIC20 (last seen at £120. inc VAT and going down). This has a very fine keyboard and serial interface, and is probably the most cost effective computer available.

We have an easy to use, menu driven applications program for the VIC, recorded on VIC format tape, together with overlays for the function keys available at £9.99 (plus 75p P&P). The 20 column limitation of the VIC is worked around in the program by incorporating a 'word wrap around' facility—which means that you don't get split words at the end of every line. It is written in BASIC, so you can easily extend it if you wish.

For those who would like to go to a full 80 column display for the VIC, we can offer a high quality 80 column conversion module plus an RS232 serial interface for a package price of £120 (plus £1.00 P&P). This is available as a package only, and requires the use of a high resolution video monitor.

CHOICE OF TRANSCEIVER
Virtually every modern transceiver has adequate transmit/receive switching times for Amtor use.

Made in England

£275.00
(plus £3.50 P&P and Insurance)

AMT-1 AMTOR/RTTY/ASCII/CW TERMINAL UNIT

OTHER AMATEUR RADIO PRODUCTS FROM ICS			
BT-1	Basic Morse Trainer	**£62.50**	plus £2.00 P&P & Ins.
WB1-C	Woodpecker Blanker	**£122.00**	plus £2.50 P&P & Ins.
MM-2	Morsematic Keyer	**£129.00**	plus £2.50 P&P & Ins.
CK-2	'Contester' Memory Keyer	**£107.00**	plus £2.50 P&P & Ins.
KT-2	Keyer/trainer	**£89.00**	plus £2.00 P&P & Ins.
MBA-RO	Morse/RTTY/ASCII Reader	**£189.00**	plus £2.50 P&P & Ins.
MBA-RC	Code Converter (Send/Receive version of MBA-RO)	**£399.00**	plus £3.50 P&P & Ins.
Isopole 144	Antenna for 2 metres	**£32.50**	plus £2.50 P&P & Ins.
Isopole 440	Antenna for 70 cms	**£49.00**	plus £2.50 P&P & Ins.

ICS Products are also available from the following regional dealers:
Amateur Radio Exchange, London 01-992 5765
South Midlands Communications Limited, Southampton (0703) 867333
Elliott Electronics, Leicester 553293
Dewsbury Electronics, Stourbridge 390063

All prices include VAT @ 15%

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NEW! FT-980 HF Transceiver

The **ALL NEW** FT980 CAT transceiver with continuous RX coverage of 150Hz-30MHz and computer interface option.

FT-290R/FT-790R 2m & 70cm portables

10 memories, 2 VFO's, LCD display, C size battery, easy car mounting tray.

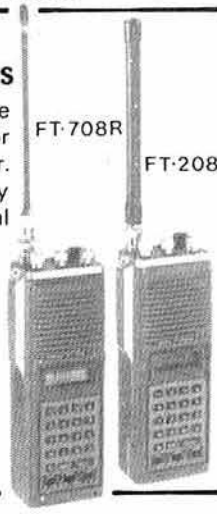
FT-290R 0.5 low/2.5 high watts out

FT-790R 0.2 low/1.0 high watts out (incorporates speech compressor).

FT-708R and FT-208R Synthesized UHF/VHF transceivers

The FT-708R and FT-208R provide new dimensions in operating flexibility for the discerning 70cm and 2m operator. LCD display, 10 memories, memory and bandscan, priority function, internal battery back-up. RF output FT-708R, 200mW low, 1 watt high, FT-208R, 300mW low, 2·5 watts high.

NC8 Charger DC PSU



FT-708R FT-208R

FT-230R/730R 2m & 70cm FM mobiles

- Two independent VFO's
- 10 memories
- Priority function
- Memory and band scan
- 12.5/25KHz steps (25/100KHz FT-730R)
- Large LCD readout.

FRG-7700 High performance communications receiver

YAESU's top of the range receiver. All-mode capability, USB, LSB, CW, AM *and* FM 12 memory channels with back-up. Digital quartz clock feature with timer. Pictured here with matching FRT-7700 Antenna tuner and FRV-7700 VHF converter.

FT-480R/780R 2m & 70cm mobiles

The most advanced 2 metre and 70 cm mobiles available today — USB, LSB, FM, CW full scanning with priority channel, 4 memory channel, dual synthesized VFO system.

AGENTS

North West - Thanet Electronics Ltd. Gordon, G3LEQ, Knutsford (0565) 4040
Wales & West - Ross Clare, GW3NWS, Gwent (0633) 880 146
East Anglia - Amateur Electronics UK, East Anglia, Dr. T. Thirst (TIM) G4CTT, Norwich 0603 667189
North East - North East Amateur Radio, Darlington 0325 55969
Shropshire - Syd Poole G3IMP, Newport, Salop 0952 814275

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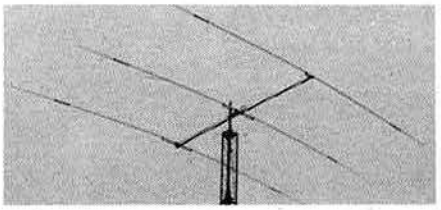
TET ANTENNA SYSTEMS



AX210N	10 ele. yagi for 2m crossed	74.95	(n/c)
HB10F2T	2 ele. 10m mono band beam	51.50	(n/c)
HB10F3T	3 ele. 10m mono band beam	74.95	(n/c)
HB15F2T	2 ele. 15m mono band beam	60.66	(n/c)
HB15F3T	3 ele. 15m mono band beam	93.46	(n/c)
HB15M2SP	VP mini size 15m 2 ele.	69.50	(n/c)
HB15M3SP	VP mini size 15m 3 ele.	102.30	(n/c)
HB34D	4 ele. tri band beam 10/15/20m	222.90	(n/c)
HB33SP	3 ele. tri band beam 10/15/20m	192.50	(n/c)
HB35C	Tri band array 10/15/20m	283.95	(n/c)
HB35T	5 ele. 10/15/20m	278.50	(n/c)
MV3BH	Vertical for 10/15/20m	37.99	(n/c)
MV4BH	Vertical for 10/15/20/40m	48.90	(n/c)
MV5BH	Vertical for 10/15/20/40/80m	63.95	(n/c)
MLA4	Loop antenna 10/15/40/80	105.60	(n/c)
SQ22	Phased 2 ele. swiss quad 2m	58.95	(n/c)
SQY06	6 ele. quagi 2m	45.75	(n/c)
SQY08	8 ele. quagi 2m	52.75	(n/c)
HB210S	10 ele. dual driven yagi 2m	47.99	(n/c)
TE214	14 ele. long yagi 2m	74.40	(n/c)
SSL720	9 x 2 ele. (18) slot fed 70cm	77.20	(n/c)
HB23SP	2 ele. tri band beam 10/15/20m	135.60	(n/c)
SSL218	9 x 2 ele. (18) slot fed 2m	144.79	(n/c)
TPH2	Phasing harness 2m	17.25	(n/c)
QYU10	10 ele. quagi 70cm	67.90	(n/c)
SQ007	70cm 2 ele. phased swiss quad	66.99	(n/c)
SQ10	Swiss quad 10m	97.50	(n/c)
SQ15	Swiss quad 15m	106.90	(n/c)

YAESU ANTENNAS

Base			
RSL145GP	½ wave base ant. 2m	21.20	(1.50)
RSL435GP	½ wave co-linear 70cm	31.60	(1.50)
HF Mobile			
RSL3.5	3.5MHz resonator & whip	12.21	(0.50)
RSL7.0	7.0MHz resonator & whip	11.80	(0.50)
RSL14.0	14.0MHz resonator & whip	11.45	(0.50)
RSL21.0	21.0MHz resonator & whip	11.20	(0.50)
RSL28.0	28.0MHz resonator & whip	11.00	(0.50)
RSL2A	Mast to suit above	5.00	(0.50)
RSM2	Gutter mount/Feeder/PL259 suit above	10.94	(0.75)
VHF Mobile			
RSL145	2m ¼ wave fibreglass whip	12.10	(0.50)
RSL145S	2m ¼ wave steel whip foldover	9.25	(0.50)
RSL150SS	2m ¼ wave PL259 shock spring	3.90	(0.50)
RSM2	Gutter mount/Feeder/PL259 (RSL145)	10.94	(0.75)
RSM4M	Heavy duty mag/Feeder/PL259	13.25	(1.00)
UHF Mobile			
RSL435S	¼ wave antenna	15.50	(0.50)

ANTIFERENCE ANTENNAS

VHF Mobile			
TAP3009	¼ wave 3db snap-in hinged whip	11.42	(3.00)
TAP3677	¼ wave 3db snap-in shock coil	15.64	(3.00)
TAP3002	¼ wave unity gain snap-in hinged whip	8.81	(3.00)
UHF Mobile			
TAP3462	½ over ¼ wave 3db	9.89	(3.00)
TAP3697	½ over ¼ wave 5db	18.40	(3.00)
K220	Mag mount/Feeder to suit above	10.73	(2.00)

Antennas Various/Accessories

HQ1	Mini beam 10/15/20m 2 ele. 1kW	TBA	(4.00)
C4	Vertical 10/15/20m	48.50	(3.00)
G4MH	Mini beam 10/15/20	85.00	(4.00)
KTLM-4	Gutter mount/Cable assy. SO239	6.90	(0.50)

DATONG PRODUCTS

PC1	50KHz to 30MHz receive converter	137.42	(0.50)
VLF	Very low freq. converter	29.90	(0.50)
FL1	Frequency agile audio filter	79.35	(0.50)
FL2	Multimode audio filter	89.70	(0.50)
ASP/A	Auto RF speech clipper (YAESU)	82.80	(0.50)
ASP/B	Auto RF speech clipper (TRIO)	89.70	(0.50)
D75	Manual RF speech clipper	56.35	(0.50)
RFC/M	RF speech clipper module	29.90	(0.50)
D70	Morse tutor	56.35	(0.50)
AD270	Active dipole RX ant. (indoor)	47.15	(0.50)
AD370	Active dipole RX ant. (outdoor)	64.40	(0.50)
MK	Morse keyboard	137.42	(0.50)
DC144/28	2m converter	39.67	(0.50)
RFA	Broadband preamplifier	33.92	(0.50)
MPU	Mains power unit	6.90	(0.50)

MICROWAVE MODULES

Transverters			
MMT28/144	10m transverter	109.95	(2.50)
MMT70/144	4m transverter	119.95	(2.50)
MMT432/144R	70cm transverter	184.00	(2.50)
MMT1296/144	23cm transverter	184.00	(3.00)
MMT70/28	4m transverter	119.95	(2.50)
MMT144/28	2m transverter	109.95	(2.50)
MMT432/28S	70cm transverter	159.95	(2.50)
Linear Amplifiers			
MML28/100S	10m 100W linear amp.	129.95	(3.00)
MML70/50S	4m 50W linear amp.	85.00	(2.50)
MML70/100S	4m 100W linear amp.	139.95	(3.00)
MML144/30LS	2m 30W linear amp. 1-3W in	69.95	(2.50)
MML144/50S	2m 50W linear amp.	85.00	(2.50)
MML144/100LS	2m 100W linear 1-3W in	159.95	(3.00)
MML144/100S	2m 100W linear 10W in	139.95	(3.00)
MML432/50	70cm 50W linear amp.	109.95	(3.00)
MML432/100	70cm 100W linear amp.	228.65	(4.00)
MML1296/10	23cm 10W linear amp.	199.00	(2.50)
MML432/30	70cm 30W linear amp. 1-3W in	99.00	(3.00)
Converters			
MM1000KB	ASC11 morse converter with keyboard	99.95	(3.00)
MM4001	RTTY to TV converter	189.00	(2.50)
MM4001KB	RTTY transceiver	269.00	(2.50)
MM4000KB	RTTY transceiver with keyboard	299.00	(4.00)
MMC28/144	10m to 2m converter	29.90	(1.00)
MMC50/28	6m to 10m converter	29.90	(1.00)
MMC70/28	4m to 10m converter	29.90	(1.00)
MMC70/28LO	4m to 10m with LO	32.90	(1.00)
MMC432/28S	70cm to 10m converter	37.90	(1.00)
MMC432/144S	70cm to 2m converter	37.90	(1.00)
MMC435/600	UHF ATV converter	27.90	(1.00)
MMC1296/28	23cm to 10m converter	34.90	(1.00)
MMC1296/144	1296MHz low noise converter	69.95	(1.00)
MMK1691/137.5	1691MHz meteosat converter	129.95	(2.50)
Morse Talkers			
MMS1	Morse tutor 2-20WPM Side tone	115.00	(2.50)
MMS2	Morse tutor (advanced) 6-32WPM + speak back	169.00	(2.50)
Amateur TV			
MTV435	70cm 20W (PSP) transmitter	149.00	(2.50)
MMC435/600	Converter ATV UHF output	27.90	(1.00)
Preamplifiers			
MMA144V	2m preamp RF switched	34.90	(1.00)
MMA28	10m preamp	16.95	(1.00)
MMA1296	23cm preamp	34.90	(1.00)
Frequency Counters			
MMD650/500	500MHz digital meter	75.00	(1.00)
MMD600P	600MHz pre scaler	29.90	(1.00)
MMDP-1	Probe	14.90	(0.50)
Filters			
MMF144	2m band pass 40W max.	11.90	(1.00)
MMF452	70cm band pass 40W max.	11.90	(1.00)
Various			
MMS384	384MHz signal source	29.90	(1.00)
MMR15/10	15db 10W attenuator	11.90	(1.00)

HI-MOUND MORSE KEYS

HK702	Up down keyer marble base	24.50	(0.50)
HK704	Up down keyer	16.68	(0.50)
HK705	Up down keyer	12.50	(0.50)
HK706	Up down keyer	13.75	(0.50)
HK708	Up down keyer	11.96	(0.50)
HK808	Up down keyer marble base	39.57	(0.50)
MK704	Twin paddle keyer	10.95	(0.50)
MK705	Twin paddle keyer marble base	22.00	(0.50)
MOULDINGS			
IK	Iambic keyer	19.95	(0.50)

TOKYO HY POWER

HC150	HF ATU SWR/Power meter 200W PEP	62.50	(n/c)
HC2000	HF 2kW ATU SWR/Power meter 6 POS ant. switch. 6 to 1 vernier high Q coils 2kW peak 1kW continuous	276.55	(n/c)

Antenna Rotators & Accessories

SU2000	Light duty rotator	34.95	(3.50)
9502	Channel master med duty up to 8 ele.	57.00	(3.50)
9523	Alignment bearing for 9502	14.38	(1.25)
KR400	Med/Heavy duty 180° meter (inc. lower casting)	90.85	(3.50)
KR400RC	Med/Heavy duty 360° meter Load 200Kg 1½"-2" masts	102.35	(3.50)
CASTING	Lower casting set (400RC)	15.00	(1.25)
KR600RC	Heavy duty 360° meter Load 200Kg Rot600Kg/cm Brake 4000Kg/cm 1¼"-2"masts	136.85	(3.50)

Antenna Switches

SA450	SO239 connectors 1 in 2 out	9.75	(0.50)
SA450N	"N" type connectors 1 in 2 out	12.75	(0.50)

Baluns

BL50A	RAK 50 ohm ferrite BALUN 1:1 1.8-38MHz 1kW	12.88	(1.50)
W2AU	1:1 50 ohm 3-40MHz 1kW	14.99	(1.50)

Dummy Loads

T30	30W DC 500MHz PL259	6.61	(0.50)
T100	100W DC 500MHz SO239	20.12	(1.00)
T200	200W DC 500MHz SO239	31.36	(1.50)
T210	Wide band 10W 1.2G-2.4G	24.50	(0.75)
AW05	Pocket RF wattmeter 5W up to 500MHz BNC	19.75	(1.00)

Filters

AKD	Hi-pass blocks 0-200MHz RF interference to UHF above 400MHz	5.50	(0.50)

Linear Amplifiers

YAESU

FL110	HF 160/80/40/20/15/10m 100W (10W drive)	155.25	(n/c)
FL2100Z	HF warc 1200w PEP. SSB 1kW CW. 400W AM/FM/FSK	449.00	(n/c)
FL2010	2m VHF 10W linear	54.00	(n/c)
FL2050	2m VHF 50W linear 10W drive	115.00	(n/c)
FL7010	70cm UHF 10W linear	91.00	(n/c)

TOKYO HY POWER

HL32V	VHF 30W linear 1-5W drive HI-LOW output	53.50	(n/c)
HL82V	VHF linear preamp output meter 2-12W in 35-85+ out	144.50	(n/c)
HL160V	VHF linear preamp output meter 1-10W in 160W+ out	242.40	(n/c)
HL45U	UHF linear preamp 2-15W in 10-45W out		(n/c)

ADONIS MICROPHONES Mobile/Base

MM202S	Mobile safety mic. (non scanning)	23.00	(1.00)
MM202HD	Mobile safety mic. (scanning)	30.00	(1.00)
AM502	Desk mic. (compressor selectable)	45.94	(1.00)

Miscellaneous

Mutec

SNL144S	2m preamp RF switched	33.90	(1.00)
RPC8	144UB FT221/225 front end board	64.50	(1.25)

Ni-cads

AA	AA size Ni-cad	1.00	(0.20)
C	C size Ni-cad	2.40	(0.30)
NC1850	Ni-cad charger (4 x C or 4 x AA)	9.50	(1.00)

DRAE PRODUCTS

DRAE4	4 amp PSU	30.75	(2.00)
DRAE6	6 amp PSU	48.00	(2.50)
DRAE12	12 amp PSU	74.00	(3.00)
DRAE24	24 amp PSU	105.00	(4.00)
DRAE WM	135-450MHz wavemeter	27.50	(1.00)

"N" Connectors (Silver Plated)

N58	"N" Male connector RG58	2.25	(0.25)
N8	"N" Male connector RG8	2.40	(0.25)
N308	"N" T adaptor (three female)	2.40	(0.25)
N307	"N" L adaptor (1 male 1 female)	2.40	(0.25)
N306	"N" Double female adaptor	1.90	(0.25)
N310	"N" Double male adaptor	2.50	(0.25)
N8304	"N" Female to BNC male adaptor	2.10	(0.25)
N402	"N" Plug to SO239	2.05	(0.25)
N403	"N" Socket to PL259	2.00	(0.25)
N404	"N" Socket to SO239	1.80	(0.25)

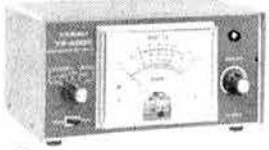
Speakers/Headphones

Various

RT650	4 ohm, 8 ohm 3W nom 6W max	6.50	(0.50)
MS60	3W nom 5W max	7.50	(0.50)
S2	Headphones (cobalt magnets)	5.75	(0.50)

YAESU

YH55	Headphones Low Z	10.00	(0.50)
YH77	Lightweight headphones Low Z	10.00	(0.50)



SWR/Power Meters

YAESU

YS200		52.90	(n/c)
YS2000		69.79	(n/c)

Other Makes

RF2000	Twin meter 3.5-150MHz F/Scale 200/2000W	18.25	(1.00)
YM1X	Twin meter 3.5-150MHz F/Scale 12 or 120W	14.99	(1.00)

Please send your order direct to Dept. MH at our main address below, including carriage charges where applicable and your full delivery address.

Amateur Electronics UK
504-516 Alum Rock Road · Birmingham 8
Telephone: 021-327 1497 or 021-327 6313
Telex: 334312 PERLEC G
Opening hours: 9.30 to 5.30 Tues. to Sat. continuous – CLOSED all day Monday.

Carriage charges shown apply to UK mainland only.

All prices include VAT

All prices subject to alteration without notice.

SPECIAL OFFER

TRS-80 Colour Computer Ideal for RTTY & SSTV Send for details

COLLINS KWM-380 Amateur Bands

Transceiver 1.8-30MHz
Receiver 1.8-30MHz
£2195.00

BEARCAT SCANNERS

BC-100FB **£345.00**
Hand held 16 channel programmable

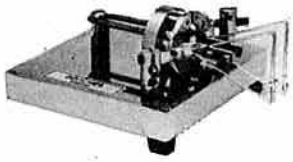
NEW!
BC-20/20FB

40 Channels
AM/FM
£258.75

BC-150FB 10 channel **£144.90**
BC-250FB 50 channel **£258.75**

BENCHER PADDLES

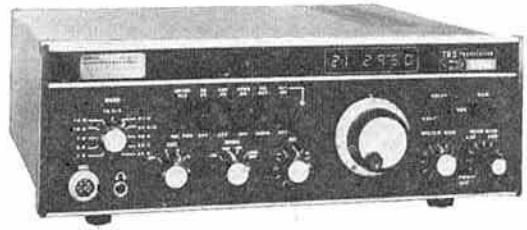
BY-1 Black Base	**£35.84**
BY-2 Chrome Base	**£43.72**
BY-3 Gold plated	**£92.00**
ZA-1A Balun	**£15.00**
ZA-2A Balun	**£17.25**
ZY-2 CW Audio Filter	**£57.50**



DRAKE TR7A

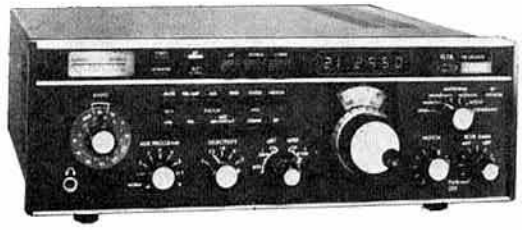
The Transceiver others try to copy
£1199.00

DRAKE TR5



DRAKE's low cost Transceiver
£657.00

DRAKE R7A



General Coverage Receiver
£1173.00

TRIO - YAESU - ICOM
FDK - KDK - DATONG - HUSTLER
SHURE - ASTATIC - Hy-GAIN
TELEX - MICROWAVE MODULES
HAL - DAVTREND - AVANTI and
EVERYTHING ELSE IN AMATEUR RADIO

Access

RADIO SHACK LTD

188 BROADHURST GARDENS,
LONDON NW6 3AY

(Just around the corner from West Hampstead Station on the Jubilee Line)

Giro Account No. 588 7151 Telephone 01-624 7174 Telex: 23718

BARCLAYCARD VISA

THANET'S GUIDE

IC-25E £269.
45E £289 inc.

Amazingly small, yet very sensitive. Two VFO's, five memories, priority channel, full duplex and reverse. LED S-meter, 25KHz or 5KHz step tuning. Same multi-scanning functions as the 290 from mic or front panel. All in all the best 2M FM mobile ICOM have ever made.

IC-290E £379.
490E £429. 290H £399 inc.

This very popular 2m multimode the IC-290E now has a big brother, the 25 WATT IC-290H as well as a 70cm cousin the IC-490E. Both of these newer models have a GREEN display. All three have 5 Channel memories, scan facilities on either memories or the whole band, tone-call button on the microphone and instant listen input for repeaters. Why not call us now for further details – or even better visit us, or one of our dealers or agents for a demonstration?

CUE DEE antennas

The BEST in recent tests and really well made too. Send for a catalogue of these DX antennas. Here's part of the range:-

4el 2m yagi VHF	4144A	8 dBd	£24.93
10el 2m yagi VHF	10144	11.4 dBd	£45.16
15el 2m yagi VHF	15144	14 dBd	£63.00
17el 70cm yagi UHF	17432	14.5 dBd	£48.00
4/5el HF Beam	DUO 2	(14/21 MHz) 9/8 dBd	£356.71

All matching cables, clamps and booms available for stacking 10 and 15 element yagis.

IC-505 £299 inc.

As you know, the Home Office have given permission for the 50MHz band to be used to holders of special licences – the issue of which is to be controlled. This must be one of the most exciting things that has happened to the Radio Amateur since the invention of sliced bread (or should I say the micro-processor?). As you know, there are many countries in the world who already have 50MHz – so there is already some exciting equipment available. One of these is the ICOM IC-505 which is a multi-mode portable offering a choice of outputs of 3W (portable) or 10W (fixed). We have imported a few of these excellent little transceivers and they are available at **£299. inc. VAT** so why not think about trying out this excellent band? Call us or send for technical details.

Securicor or post despatch free.

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

TO THE GALAXY

Can YOU read the many RTTY and CW stations to be heard on the air?

Short wave listeners and amateurs are able to take more interest in other modes of transmission than speech with the new ranges of decoders and senders available. As well as amateur transmissions there is loads of interesting news and other broadcasts which can be read using these space-age devices. As UK importers of the world renowned TONO and TASCO products we can offer you a wide range of devices from a simple morse and RTTY reader which can be plugged into your TV to complete send and receive systems with memories and built-in displays or outputs for a high definition VDU. MR-250 £325, 9000E £699, CWR-670 £289, CWR-685E £789 and CWR-610 £189. Please call us for further details or visit us or your dealer for a demonstration.

And remember we also sell **Yaesu, Jaybeam, Datong, Welz, G-Whip, Weslern, TAL, Bearcat, Versatower** and **RSGB** publications from our shop and showroom at the address shown below.

Come in for a demonstration or just a chat, our qualified sales staff and technicians will be glad to assist you.

Listed below are other sets available from Thanet Electronics, a more detailed specification of these will appear in future advertisements, prices are inclusive of VAT. IC-730 £629, IC-720 £949, IC-2KL with PSU £1149, IC-100E £349, IC-SP3 £39, IC-410 £379, IC-AT500 £339, IC-251 £559, IC-2E £169, IC-4E £199, IC-AT100 £249, IC-551 £369, IC-PS20 £139, IC-PS15 £119, IC-ML1 £59, IC-451 £689,

Agents

Agents (phone first – all evenings and weekends only, except Scotland).
Scotland – Jack GM8 GEC (031 665 2420)
Midlands – Tony G8AVH (021 329-2305)
North West – Gordon G3LEQ Knutsford (0565)4040
Ansafone available

Dealers

Wisbech Amateur Radio Exchange (0945) 581 099
Tyrone Amateur Electronics N. Ireland (0662) 2043
Bredhurst Electronics Sussex (0444) 400786
Photo-Acoustics Ltd. Bucks (0908) 610625
S & S Amateur Radio Lancs (07) 744 22239
Alyntronics Tyne & Wear (0632) 761002
Fanthorpes Humberside (0482) 223096
LAM Electronics Glos (0242) 43891
Booth Holdings Avon (02217) 2402
Telecom S Yorks (0226) 5031
Gemini Lancs (0204) 652233
Logic Poole (0202) 683093

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Thanet Electronics
143 Reculver Road, Herne Bay, Kent. Tel: (02273) 63859.

BARCLAYCARD VISA

Same day despatch if possible

FT ONE £1,349 inc. VAT @ 15% & SECURICOR

*Option

FREE FINANCE

★ Rx: 150KHz-30MHz. Continuous general coverage.
★ Tx: 160-10m (9 bands) or 1.5-30MHz commercial.
★ All Modes: AM, CW, FM*, FSK, LSB, USB.
★ 10 VFO's!!! Any Tx-Rx split within coverage.
★ Two frequency selection ways, *no* bandswitch.
★ Main dial, velvet smooth, 10Hz resolution.
★ Inbuilt keyboard with up/down scanning.
★ Dedicated digital display for RIT offset.
★ Receiver dynamic range up to 100dB!!!
★ SSB: Variable bandwidth *and* IF shift.
★ 300* or 600Hz*, 2,400 → 300Hz, 6kHz*, 12kHz*.
★ Audio peak and notch filter. FM squelch.
★ Advanced variable threshold noise blanker.
★ 100W RF, key down capability, solid state.
★ Mains and 12VDC. Switch mode PSU built in.
★ RF processor. Auto mic gain control. VOX.
★ Last but not least *full* break in on CW.

FT902DM £885 inc. VAT @ 15% & SECURICOR

★ 160-10 metres including new allocations.
★ Variable IF bandwidth 2.4kHz down to 300Hz.
★ Audio Peak and independent notch controls.
★ AM, FSK, USB, LSB, CW, FM, (Tx and Rx).*
★ Semi-break in, inbuilt Curtis IC Keyer included.
★ Digital plus analogue frequency displays.
★ VOX built-in and adjustable.
★ Instant write in memory channel.**
★ Tune up button (10 sec, of full power).
★ Switchable AGC and RF attenuator.
★ Optional 350 or 600Hz CW, 6kHz AM filters included.
★ Clarifier (RIT) switchable on Tx, Rx or both.
★ Plug in modular, computer style constructor.
★ Fully adjustable RF Speech processor.
★ Ergonomically designed with necessary LEDS.
★ Incredible range of matching accessories.
★ Universal power supply 110-234V AC and 12V DC.**

'PLASTIC' BY PHONE

*Option ** D & DE Models

FT102 £785 inc. VAT @ 15% & SECURICOR

FREE CREDIT COVER

★ 1.8-3.5-7-10-14-18-21-24.5-28MHz
★ All modes: LSB, USB, CW, AM†, FM†, (†Option board)
★ Front end: extra high level, operates on 24V DC
★ RF stage bypassable, boosts dynamic range over 100 dB!
★ Variable bandwidth 2.7KHz→500Hz *and* IF Shift
★ Fixed bandwidth filters, parallel or cascade
★ IF notch (455kHz) *and* independent audio peak
★ Noise blanker adjustable for pulse *width*
★ External Rx and separate Rx antenna provisions
★ *Three* 6146B in special configuration—40dB IMD!
★ Extra product detector for checking Tx IF signal
★ Dual meter, peak hold ALC system
★ Mic amp with tunable audio network

SP102:—Speaker, Hi and Lo AF filters, 12 responses!
FV012:—VFO, 10Hz steps and readout, scanning, QSY
FC102:—ATU, 1·2KW, 20/200/1200 W FSD PEP, wire
FAS-1-4R:—4 way waterproof antenna selector

FT101Z £559 inc. VAT @ 15% & SECURICOR

★ 160-10 metres including new allocations.
★ Variable IF bandwidth 2.4kHz down to 300Hz.
★ Selectable CW fixed bandwidth CW-W and CW-N*.
★ Semi-break in with sidetone for excellent CW.
★ Digital plus analogue frequency displays (ZD models).
★ 180W PIP and—31dB 3rd order intermod.
★ RF speech processor fitted—adjustable level.
★ VOX built-in and is adjustable from the front panel.
★ Wide dynamic range for big signal handling.
★ High usable sensitivity, for those weak ones.
★ Superb noise blanker—adjustable threshold.
★ Attenuator; 0-10-20dB, AGC; slow-fast-off.
★ Clarifier (RIT) switchable on Tx, Rx or both.
★ Low level transvertor drive output facility.
★ Universal power supply 100-234V AC and 12V DC*
★ Incredible range of matching accessories.
★ 6 models: Digital/Analogue—AM/FM options.

FREE SECURICOR

*Option

FT707 £509 inc. VAT @ 15% & SECURICOR

2 YEAR GUARANTEE

★ 80-10 metres (including 10, 18 and 24MHz bands).
★ USB-LSB-CWN-AM (Tx and Rx operation).
★ 100W PEP. 50% power output at 3:1 VSWR.
★ Full "broad band" no tune output stage.
★ Excellent Rx dynamic range, power transistor buffers.
★ Rx Schottky diode ring mixer module.
★ Local oscillator with ultra-low noise floor.
★ Variable IF bandwidth—16 crystal poles.
★ Bandwidths 6kHz*, 2.4kHz-300Hz, (600-350) Hz*.
★ AGC; slow-fast switchable VOX built-in.
★ Semi-break in with side tone for excellent CW.
★ Digital (100Hz) plus analogue frequency display.
★ LED Level meter reads: S, PO and ALC.
★ Indicators for: calibrator, fix, int/ext VFO.
★ Receiver offset tuning (RIT-clarifier) control.
★ Advanced noise blanker with local loop AGC.

*Option

SMC FM MODIFIED VERSION AVAILABLE; £40 EXTRA

FT230R £239 inc VAT @ 15% & CARRIAGE

- 150(W) × 50(H) × 176(D)mm.
- Up/down, memory/band scanning.
- Easy "write-in" memory channels.
- Memory backup "5 year" lithium cell.
- Ten memories with priority functions.
- Supplied with scanning microphone.
- Illuminated "any angle" LCD display functions.
- Display to 100's of Hz.
- Two completely independent VFO's.
- Operation between memory and VFO.
- Full reverse repeater function.
- Manual and automatic tone burst.
- Large "full sound" internal speaker.
- Concentric volume and squelch.

2 or 70!

- 144-146MHz (extensions possible).
- 25W RF output, 3W on low.
- 25 and 12½kHz steps provided.
- ±600kHz repeater split, 1750Hz burst.
- Tx; 5A. Rx 300mA (standby).

- 430-434MHz (440-445MHz possible).
- 10W RF output, 1W on low.
- 25 and 100kHz steps provided.
- ±1.6 MHz repeater split, 1750Hz burst
- Tx 3A, Rx 300mA (standby).

FT730R £285 inc VAT @ 15% & SECURICOR

- Multimode USB, LSB, FM, CW
- Optically coupled main tuning
- 100Hz backlit LCD Frequency display
- 10 memory channels "5 year" backup
- Any Tx/Rx split with dual VFOs
- Up/down tuning from microphone
- AF output 1W @ 10% THD
- Bandwidth 2·4kHz and 14kHz @ −6dB
- LED's, "on air", "busy" m/c meter; S.PO
- 58 (H) × 150 (W) × 195 (D). 1.3kg

'790 EX-STOCK

SMC8C	Slow Charger (220mA)	£8.80
MMB 11	Mobile Mount	£22.25
CSC1A	Soft carrying case	£3.45
FL2010	Linear Amplifier 2m 10W	£59.00
FL7010	Linear Amplifier 70cms	£91.00

6, 2 or 70!

FT290R £265 inc

VAT @ 15% & POSTAGE

- 144-146MHz (144-148 possible)
- 2.5W PEP, 2.5W 300mW out or FM
- FM: 25kHz and 12.5kHz steps
- SSB: 1kHz and 100Hz steps
- ±600kHz repeater split, 1750kHz burst
- Integral telescopic antenna
- Rx, 70mA, Tx; 800mA (FM maximum)

FT790R £325 inc

VAT @ 15% & POSTAGE

- 430-330MHz (440-450 alternative)
- 1W PEP, 1W/250mW FM/CW out
- FM: 100kHz and 25kHz steps
- SSB: 1kHz and 100Hz steps
- 1·6MHz shift with input monitor, 1,750Hz burst
- Rx: 100mA/200mA. Tx; 750mA maximum
- BNC Mounted ¼λ flexi antenna included

2 or 70!

- USB-LSB-CW-FM (A3j, A1, F3)
- 30W PIP A3j, 10/1 W out A1 F3
- Any TX Rx split with dual VFO's
- Four easy write-in memory channels
- Memory scanning with slot display
- Up/down tuning/scanning from mic.
- Priority channel on any memory slot
- Digital RIT. Advanced noise blanker
- Satellite mode allows tuning on Tx
- Semi break in with side tone
- Very bright blue 100Hz digital display
- Display shows Tx & Rx freq (inc RIT)
- String LED display for "S" and PO
- LED's; "On Air", Clar, Hi/Low, FM mod.
- Size (Case): 8.3" D, 2.3" H, 6.9" W

illustrated with SC1 station consol & YD418 mic

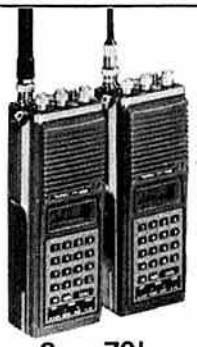
FT480R (2m) £369 inc VAT @ 15% & SECURICOR

- 144-146MHz (143.5-148.5 possible)
- ±600kHz standard repeater split
- Excellent dynamic range and sensitivity
- FM; 25, 12½, 1kHz steps
- SSB; 1,000, 100, 10Hz steps

- FT780R1·6 fitted 1·6MHz Shift **£459** inc.
- 430-434MHz (440-445) possible
- GaAs Fet RF for incredible sensitivity
- FM; 100kHz, 25kHz, 1kHz, steps
- SSB; 1,000, 100, 10Hz steps

FT780R (70cm) £399 inc VAT @ 15% & SECURICOR

- Keyboard entry of frequencies/splits
- LCD digital display with backlight
- Any split + or − programmable
- Ten memory channels "5 year" back up
- Up/down manual tuning. Memory scan
- Manual or auto scan for busy/clear
- Priority channel with search back
- Scan between any two frequencies
- Auto scan restart. 1,750Hz tone burst
- Built in condenser microphone
- 500mW to int/ext speaker
- External speaker/mic available
- 168(H) × 61(W) × 39(D)mm
- C/w Quick change NiCad pack, helical



2 or 70!

FT208R £209 inc

VAT @ 15% & POSTAGE

- 144-146MHz (144-148 possible)
- 12.5/25kHz synthesizer steps
- ± 600kHz repeater split
- 2.5 or 0.3W RF output
- Rx: 20mA squelch 150mA max AF
- Tx: 800mA at 2.5W RF
- 0.25μV for 12dB SINAD

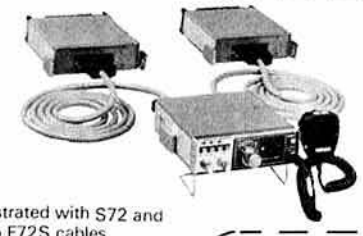
FT708R £229 inc

VAT @ 15% & POSTAGE

- 430-440MHz (440-450 alternative)
- 25kHz synthesizer steps
- ±7.6MHz EU split standard
- 1W or 100mW RF output
- Rx 20mA squelch, 150mA (max AF)
- Tx:500mA it 1W RF
- 0.4μV for 12dB SINAD

2 and/or 70!!

- Four easy write-in memory channels
- Rx priority channel (auto check)
- Scanning band/memory empty/busy
- Up/down tuning/scanning from mic.
- Optically coupled tuning control
- Manual and automatic tone burst
- String LED's for 'S' and PO. 7 status LEDs
- 1½W of audio to internal/external speaker
- **FT720** Control Head
- 3.3 (4.3)" D × 6" W × 2 (2.2)" H
- **S72** Switching box
- Pushbutton band change Auto steps/splits
- **E72S** Extension cable, 2m long
- **E72L** Extension cable, 4m long
- **MMB3** Mobile Mounting bracket for deck



illustrated with S72 and two E72S cables

FT720RV £199 inc VAT @ 15% & SECURICOR

- 144-146MHz (144-148MHz possible)
- 12½kHz synthesizer, 600kHz shift
- 0.3μV for 20dB quieting
- Rx 0.5A. Tx RV 3.5A, RVH 6.5A
- 5.8 (6.5)" D × 6" W × 2(2.2)" D

- 430-434MHz
- 25kHz synthesizer steps, 1.6MHz shift
- 0.5μV for 20dB quieting
- Rx; 0.5A, Tx; 4.5A
- 5.8 (6.5)" D × 6" W × 2(2.2) " D

FT720RU £229 inc VAT @ 15% & SECURICOR

★ NEW—FT726R, 3 BAND, MULTIMODE, VHF/UHF ★

The FT726R is a revolutionary combination of a full feature VHF/UHF transceiver with the deluxe facilities (which you have always wondered why were only available on HF transceivers) such as IF shift and variable bandwidth for SSB and CW operations incorporating a full duplex option for the ultimate cross band and satellite transceiver!
The transceiver main frame accepts 3 modules, 2 meters (standard), 430-440MHz and six meters (options). Modes catered for are SSB-CW-FM with optimum provisions made for each: 20Hz steps for SSB/CW, selectable steps for FM (also preset and programmable repeater splits), plus a A & B VFO system with no less than 10 memory channels. Surely the development of the decade in VHF/UHF transceiver technology.

FT726R(2)	Transceiver incorporating 145MHz	**£649**
SAT726	Full duplex cross band unit	**£82.80**
430T726	430-440MHz Module	**£208.90**
50T726	Six meter module	**£157.15**

FT980 £1,115 inc VAT @ 15% & SECURICOR

INSTANT HP

- ★ Notch filter in IF (AGC immune to hetrodynes).
- ★ Full break in keying. 500/600/700Hz beat.
- ★ Unique analogue scale of digital type.
- ★ Comprehensive twin meter metering.
- ★ Memory retains mode information.
- ★ Rx 150kHz-30MHz.
- ★ Tx 160-10m 9 bands + 3 × 500kHz Aux bands.
- ★ All modes AM, CW, LSB, USB, AFSK, FM standard.
- ★ IF shift + variable bandwidth 2·6kHz-300Hz.
- ★ Inbuilt keyboard operation + Scanning.
- ★ Switchable attenuator 10, 20, 30dB.
- ★ Audio peak + notch filter – 40dB.
- ★ RF process or Auto mic gain control.
- ★ 3rd order IMD – 40dB at 100W PEP.
- ★ AFSK shift 170, 425, 850Hz selectable.
- ★ Multi channel memory + programmable scan limits.

DIGITAL MULTI-METER

£29.95

3½ Digit with full autoranging and full auto-polarity operation. Large LCD display. Overload protection.
DCV; 200mV-1kV. ACV; 2-600V
DCA; 200mA. ACA; 200mA.
Ohms; 200-2M.
KD200 Remarkable price inc p & p **£29.95.**

FT107 STATION

£350 OFF

£825 buys a FT107 c/w a FP107 internal power supply. Do that and we will give you; The DMS unit, The Antenna Tuner, The transverter frame and an external speaker (together listed at **£354.55**) FREE!!!!

NEW

AMTOR TERMINAL UNIT £275

AMT1. AMTOR RTTY ASCII and CW Transmit. Remarkable error correcting facilities. Ideal with the full break-in FT ONE and FT980.

£50 OFF

144MHz, 250W(+) PEP. £449

NAG 144XL LINEAR. 4CX350F tube, 10W nom. drive, switchable pre-amp. RF and hard switching. Thermal delay.

SOUTH MIDLANDS COMMUNICATIONS LTD

S. M. HOUSE, RUMBRIDGE STREET, TOTTON, SOUTHAMPTON SO4 4DP, ENGLAND
Tel: Totton (0703) 867333, Telex: 477351 SMCOMM G, Telegram: "Aerial" Southampton.

GRIMSBY
S.M.C (Humberside)
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S.M.C. (Stoke)
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Kidsgrove (07816) 72644
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SMC AGENTS

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Stourbridge	Brian	G3ZUL	(03843) 5917	Tandragee	Mervyn	GI3WWY	(0762) 840656	Jersey	Geoff	GJ4ICD	(0534) 26788

hy-gain

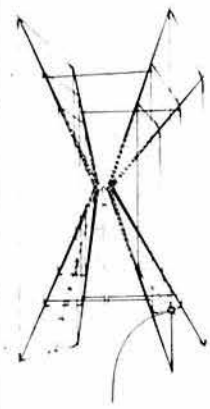
The TH7DXX is a new 7 element (10-15-20M) broadband VSWR less than 2:1 at band edges! Compact 20' (6·1M) turning radius—31' (9·4M) longest element dual driven element Yagi which by combining monoband *and* high Q, ultra high power, trapped parasitics provides an average front to back of 22dB on 20 and 15 and 17dB on 10 meters. The antenna weighs 75lbs (34kg) and its projected 9·4 sq feet (0·9 sq m) of wind area produces a load of 240lbs at 80 mph (129 kph).

Construction features include: 6063-T832 taper swaged thick wall aluminium, 18-8 stainless hardware, diecast ali boom/mast clamps, heavy gauge ele/boom clamp and rugged phasing lines. It uses a ß match for DC ground and comes complete with preformed feeder straps and the famous BN86 ferrite balun.

		inc VAT	p/p
12AVQ	Vertical 10·20m inc.	**£50.60**	£2.20
14AVQ/WB	Vertical 10·40m inc.	**£64.40**	£2.20
18AVT/WB	Vertical 10·80m inc.	**£109.25**	£2.20
14RMQ	Roof mounting Kit	**£36.22**	£2.20
18V	Vertical 10·80m inc.	**£29.78**	£2.20
103BA	3 Ele Yagi 10m	**£67.85**	£2.20
105BA	5 Ele Yagi 10m	**£143.75**	£3.95
153BA	3 Ele Yagi 15m	**£90.85**	£2.20
155BA	5 Ele Yagi 15m	**£217.35**	£5.90
203BA	3 Ele Yagi 20m	**£166.75**	£4.90
204BA	4 Ele Yagi 20m	**£286.35**	£7.30
205BA	5 Ele Yagi 20m	**£362.25**	£9.40
402BA	2 Ele Yagi 40m	**£247.25**	£6.50
DB10/15A	3 Ele Yagi 10·15m	**£146.05**	£4.80
TH3JNR	3 Ele Yagi 10·15·20m	**£194.35**	£3.10
TH2MK3	2 Ele Yagi 10·15·20m	**£169.05**	£3.20
TH3MK3	3 Ele Yagi 10·15·20m	**£274.85**	£5.30
TH5DXX	"Thunderbird" 5 el.	**£378.35**	£6.70
TH7DXX	"Thunderbird" 7 el.	**£458.85**	£8.75
HYQUAD	2'Ele Quad 10·15·20m	**£332.35**	£6.00
18TD	Dipole Tape 10·80m	**£113.85**	£2.80
BN86	Balun 1:1·3·30MHz	**£15.53**	£1.40
LA1	Lightning Arrestor	**£48.19**	£0.92

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

Gem Quad



A light strong, boomless, quad antenna covering 10·15·20m. The centre spider is aluminium and the spreader arms (13·6ft and 2·2lb) are of a glass fibre tridectic construction. (Thin rods forming a triangle with tape criss-crossing for light, rigid, low wind resistance structure.)

The double cone shape offers optimum spacing between loops and maintains these critical measurements even under severe weather conditions. This optimum spacing provides "monobander" performance; high gain, maximum capture area, low angle radiation, low SWR and good F/B and F/S ratios. The toroidal balun supplied provides single 50 ohm coaxial feed on all bands, with no lossey coils, traps or switches.

2 element 18' × 18' × 9½'; TR 9½'; 8dB Gain; 25dB F/B
3 element As 2 ele plus 6·5 boom; 8·9dB Gain; 30dB F/B.
4 element As 2 ele plus 13' boom; TR 22'.

GQ2E	2 Ele Antenna	**£189.75**	£5.40
GQ3E	3 Ele Antenna	**£313.95**	£9.20
GQ4E	4 Ele Antenna	**£446.20**	£10.00
GQCK1	Conversion Kit 1 Ele	**£126.50**	£4.10
GQCK2	Conversion Kit 2 Ele	**£256.45**	£6.70
GQSPIDER	Centre piece (spare)	**£32.78**	£1.80
GQSPREADER	Spreader Arm (spare)	**£16.10**	£2.40

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

J-BEAM

4 METRES			
4Y/4M	Yagi 4 element	7dBd	**£29.90** £2.20
PMH2/4M	Phasing harness 2 way		**£16.10** £1.50
2 METRES			
40/2M	Halo head only	0dBd	**£5.98** £0.70
HM/2M	Halo with 24" mast	0dBd	**£6.55** £0.95
C5/2M	Colinear omni vert	4·8dBd	**£54.62** £2.20
LW5/2M	Yagi 5 element	7·8dBd	**£14.37** £2.20
LW8/2M	Yagi 8 element	9·5dBd	**£17.82** £2.20
LW10/2M	Yagi 10 element	10·5dBd	**£24.15** £2.20
LW16/2M	Yagi 16 element	13·4dBd	**£35.07** £2.20
14Y/2M	Yagi 14 element	12·8dBd	**£36.23** £2.20
PBM10/2M	10 ele Parabeam	11·7dBd	**£44.85** £2.20
PBM14/2M	14 ele Parabeam	13·7dBd	**£55.77** £2.20
Q4/2M	Quad 4 element	9·4dBd	**£29.32** £2.20
Q6/2M	Quad 6 element	10·9dBd	**£39.10** £2.20
Q8/2M	Quad 8 element	11·9dBd	**£44.85** £2.20
D5/2M	Yagi 5 over 5 slot	10dBd	**£25.30** £2.20
D8/2M	Yagi 8 over 8 slot	11·1dBd	**£34.50** £2.20
5XY/2M	Yagi 5 ele crossed	7·8dBd	**£28.17** £2.20
8XY/2M	Yagi 8 ele crossed	9·5dBd	**£35.65** £2.20
10XY/2M	Yagi 10 ele crossed	10·8dBd	**£46.00** £2.20
PMH2/C	Harness cir polarisation		**£9.77** £1.20
PMH2/2M	Harness 2 way 144MHz		**£12.65** £1.20
PMH4/2M	Harness 4 way 144MHz		**£28.75** £1.20
SEVENTY CM			
C8/70	Colinear Omni Vertical	6·1dBd	**£62.10** £2.20
D8/70	Yagi 8 over 8 slot	12·3dBd	**£25.87** £2.20
PBM18/70	18 ele Parabeam	13·5dBd	**£32.20** £2.20
PBM24/70	24 ele Parabeam	15·1dBd	**£42.55** £2.20
LW24/70	Yagi 24 element	14·8dBd	**£27.02** £2.20
MBM28/70	28 ele Multibeam	11·5dBd	**£21.27** £2.20
MBM48/70	48 ele Multibeam	14·0dBd	**£35.65** £2.20
MBM88/70	88 ele Multibeam	16·3dBd	**£48.87** £2.20
8XY/70	Yagi 8 ele crossed	10dBd	**£42.55** £2.20
12XY/70	Yagi 12 ele crossed	12dBd	**£52.90** £2.20
PMH2/70	Harness 2 way		**£10.35** £1.00
PMH4/70	Harness 4 way		**£22.42** £1.50
1296 MHz			
CR2/23CM	Corner reflector	13·5dBd	**£40.25** £2.20
PMH2/23CM	Harness 2 way		**£31.05** £1.50

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

Kenpro

KR600RC
£136.85

360° round type meter Max. load 200kg. Rot, 600kg/cm, brake 4,000kg/m. 1¼in-2½in masts Lower casting optional.

KR400RC
£102.35

360° round type meter Max. load 200kg. Rot, 400kg/cm, brake 1,500kg/cm. 1¼in-2½in masts Lower casting optional.

KR500
£90.85

Elevation Rotator (180°) Up to 50kg of Load. 1¼in-2½in mast. 1¼in-1⅝in boom

KR250
£51.75

Twist and switch controller. Rotator 200kg/cm. Brake 600kg. 1in-1½in masts.

NB: PRICES INCLUDE VAT AT 15%
Carriage free (post or road) mainland only

Channel Master

9508
£79.92

Auto control, secondary pointer gives position during travel. Stainless steel hardware. Heaviest duty "offset type". To 5sq

Takes 1-2" masts and 1-2" stub.

9502
£56.92

Automatic control box. Dial direction secondary pointer gives position during travel.

Takes 1-2" mast and 1-1⅞" stub.

Upper mast support bearing.

2" mast and 1¾" stub.

Post and packing **£1.20**
9523 **£14.38**

Rotary bearing 3-way guying.

Takes 1$\frac{29}{32}$" mast.

Post and packing. **85p**
9525 **£14.38**

NB: PRICES INCLUDE VAT AT 15%
Carriage free (or as shown) mainland only

CDE

AR40
£79.35

Accurate, silent self-calibrating control box. Dial up desired beam heading, push knob; motor rotates to that position and then switches off.

CD45
£125.35

Large illuminated meter gives read out of antenna heading at all times. Armature brake. Low voltage meter. Handles antennas to 8½sq ft.

HAM IV
£228.85

Large illuminated meter gives read out of antenna heading at, all times. wedge solenoid brake mechanism. Handles antennas to 15sq ft.

T2X
£287.50

Large illuminated meter gives read out of antenna heading at all times. Wedge solenoid brake mechanism. Handles antennas to 30sq ft.

NB: PRICES INCLUDE VAT AT 15%
Carriage free (post or road) mainland only

SMC

SOUTH MIDLANDS COMMUNICATIONS LIMITED

BRANCHES: CHESTERFIELD · GRIMSBY · STOKE · LEEDS · BUCKLEY

COAX SMC PLUGS

BNC PLUG 50 ohms

UG88	Standard type 5.5mm	£0.78
UG599	Large type 11.2mm	£3.22

BNC SOCKET 50 ohms

UG290	Standard 4 hole type	£0.78
UG1094	Nut fixing type	£0.76
UG69	Free, cable-end, 5.5mm	£0.94

BNC COUPLER 50 ohms

UG914	Back to back female	£1.07
UG491	Back to back male	£1.66
UG274	'T' 2 female 1 male	£2.23
SMC3FBNC	'T' 3 female	£2.02
UG306	Elbow, Male-Female	£1.86

BNC INTERSERIES ADAPTOR 50 ohms

UG255	BNC plug – UHF socket	£1.76
UG273	BNC socket – UHF plug	£1.76
UG201	BNC socket – N plug	£3.28
UG349	BNC plug – N socket	£3.16
UG606	BNC socket – N socket	£2.59

UHF PLUG

PL259	Standard type 11.2mm	£0.55
PL259P	Push on type 11.2mm	£0.79
UG175	Reducer 5.0mm	£0.14
UG176	Reducer 5.6mm	£0.14
PL259R	Reduced type 5.0mm	£0.67
PL259A	Deluxe type 11.2mm	£1.50
PL259B	Deluxe type 5.0mm	£1.13
PL259SL	'Solderless' 11.2mm	£0.63
PL259SS	'Solderless' 5.0mm	£0.63
PL259E	Angle type 5.0mm	£0.95
PL259M	Metric type standard 11.2mm	£0.75
L42P	For LDF2/50 Heliax	£10.58
L44P	For LDF4/50 Heliax	£10.35
PL259PM	Panel mount 4 hole	£1.07

UHF SOCKET

S0239F	Standard 4 hole fix	£0.48
S0239F31000	4 hole PTFE Au plate	£0.97
S0239T	2 hole fixing type	£0.48
S0239NI	Nut fixing inside type	£0.59
S0239NO	Nut fixing outside type	£0.59
S0239E	Free angle type 5.0mm	£1.01
	Free cable end 5.0mm	£2.22
MX913/C	Dust Cap c/w chain	£0.46
MX913/M	Dust Cap metric type	£0.46

UHF COUPLER

PL258	Back to back female	£0.91
PL274	Back to back chassis	£1.07
SMCPL/PL	Back to back male	£1.38
M359	Elbow male-female	£1.07
M358	'T' 2 female 1 male	£1.38
M358AF	'T' 3 female	£1.70
M458	'X' 3 female 1 male	£2.13

UHF INTERSERIES ADAPTORS

UG255	UHF socket – BNC plug	£1.76
UG273	UHF plug – BNC socket	£1.76
S0/25	UHF socket – 2.5mm jack	TOS
S0/35	UHF socket – 3.5mm jack	£0.79
S0/NF	UHF socket – N socket	£1.96
UG146	UHF socket – N plug	£2.25
UG83	UHF plug – N socket	£1.96

UHF CABLES

PL36PL	3.0' RG58 PL259 ends	£1.85

N PLUG 50 ohms

UG536	Small type 5.5mm	£2.82
UG21	Standard type 11.2mm	£1.55
L42W	For LDF2/50 Heliax	£8.51
L44W	For LDF4/50 Heliax	£12.42

N SOCKET 50 ohms

UG58	Standard 4 hole fix	£0.94
UG1052	Free cable end 5.5mm	£2.85
UG23	Free cable end 11mm	£1.70
L42N	Free jack for LDF2/50	£8.51
L44N	Free jack for LDF4/50	£12.42
MX913C	Dust cap c/w chain	£0.46

N COUPLER 50 ohms

UG107	'T' 2 female 1 male	£3.74
UG28	'T' 3 female	£3.16
UG57	Double male adaptor	£2.70
UG29	Double female adaptor	£2.13
UG27	Elbow male-female	£2.24

N INTERSERIES ADAPTORS 50 ohms

UG201	N plug – BNC socket	£3.28
UG349	N socket – BNC plug	£3.16
UG606	N socket – BNC socket	£2.59
UG146	N plug – UHF socket	£2.25
UG83	N socket – UHF plug	£1.96
S0/NF	N socket – UHF socket	£1.96

NB: PRICES INCLUDE VAT AT 15%
Postage: £0.50 any quantity (UK)

HANSEN

IN LINE POWER/SWR BRIDGES P.E.P., R.M.S. 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.

FS710: PEP AUTO-SWR RMS LEVEL
FS710 £78.20

FS710H: 1·8-60MHz. 20, 200, 2kW
FS710V: 50-150MHz. 20, 200W
V.S.W.R: 4:1 and to 20:1
Accuracy: ±7% of FSD
Impedance: 50 52 Ohms
Connectors: SO239
Power: 240 Volts AC 50Hz
Weight: 3·lbs (1·5Kgs)
Size overall: 8 × 4 × 5½"
Size Meter: 2 × 3¼"
Time Const: PEP follow 4 second

FS500 £60.95

PEAK READING LEVEL RESPONSE
FS500H 1·8 60MHz 20, 200 & 2kW
FS500V 50 150MHz 20 & 200W
Power ±7% FSD. SWR 1:1 5:1
Size: 8 × 4 × 5½"

FS600 £44.85

PEAK READING LEVEL RESPONSE
FS601M 1·8 30MHz 20 & 200W
FS601MH 1·8 30MHz 200 & 2kW
FS602M 50 150MHz 20 & 200W
FS603M 430 440MHz 5 & 20W
Power ±10% FSD. SWR 1:1 3:1
Size: 6¼ × 2¾ × 4¼"

FS300 £40.25

LEVEL RESPONSE, LARGE METER
FS300H 1·8MHz 20, 200 1kW,
FS300V 50 150MHz 20, 200W FSD
Power ±10% SWR 1:1 3:1 ±10%
Size: 8 × 4 × 5½"

FS7 £35.65

VHF/UHF WATTMETER & BRIDGE
FS7 145MHz & 432MHz 5, 20, 200W
Power average ± 10%. SWR 1:1-3:1
Power Max: 144MHz, 200W
432MHz 20W
Size: 6¼ × 2¾ × 4¼". 'N' type sockets

FS711 £32.20

REMOTE INDICATOR TYPE
FS711H 1·8-30MHz 20 & 200W
FS711V 50-150MHz 20 & 200W
FS711U 430-440MHz 5 & 20W
Power ± 10% SWR 1:1-3:1 ±3%
Indicator 5 × 2½ × 1½"
coupler 3½ × 2½ × 1¼"

FS5E £32.20

INDEPENDENT TWIN METER
FS5E 3·5 150MHz 20, 200 & 1kW
Power average ± 10%. SWR 1:1-5:1
Power Max: 1kW 3·5 30MHz
50W 50 150MHz
Size: 7 × 3 × 3½". 'On the Air' LED

FS300M £31.05

LEVEL RESPONSE, POWER & SWR
FS301M 1·8 30MHz 20, 200W
FS301MH 1·8 30MHz 200, 2kW
FS302M 50 150MHz 20, 200W
Power ±10%. SWR 1:1 3:1 ±3%
Size: 6¼ × 2¾ × 4¼"

SWR3S £23.00

WIDE RANGE POWER & SWR
SWR3S 3·5 150MHz 20 & 200W
Power average ± 10%. SWR 1:1-3:1
Power Max: 200W 3·5 30MHz
50W 50 150MHz
Size: 6 × 2¾ × 2½". Antenna switch

SWR50B £23

TWIN METER, RELATIVE POWER
SWR50B 3·5 150MHz Scaled 1kW
Power average ± 20%. SWR 1:1-3:1
Power Max: HF 1kW 1:1. 300W 3:1,
VHF 50W
Size: 6 × 2¾ × 2½". 'On the Air' LED

8 new models in stock. Sae for details

NB: PRICES INCLUDE VAT AT 15%
Carriage free (surface post) worldwide

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, and 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.

Model	Band	Gain	Type	Power	Length	Price
20SE	20m		(¼λ)	100W	1·72m	£15.35
17SE	17m		(¼λ)	200W	1·92m	£14.20
15SE	15m		(¼λ)	130W	1·72m	£13.80
12SE	12m		(¼λ)	200W	1·92m	£13,40
10SE	10m		(¼λ)	100W	1·72m	£12.65
4E	4m	0dB	½λ	150W	1·03m	£7.65
2H/PL	2m		(½λ)	50W	0·17m	£3.45
2QW	2m	0dB	½λ	200W	0·49m	£2.30
2VF	2m	3dB	½λ	50W	1.06m	£10.35
2NE	2m	3dB	½λ	150W	1·30m	£6.90
78SF	2m		(½λ)	100W	1·42m	£12.25
78F	2m	4·5dB	½λ	100W	1·75m	£12.25
78B	2m	4·5dB	½λ	150W	1·72m	£12.65
88F	2m	5·2m	⅝λ	100W	2.03m	£16.50
70N2M	2/70	2·7dB 5·1dB	(½λ) 2 × ½λ	100w	0·89m	£14.20
258	70cm	5·5dB	2 × ½λ	100W	0.91m	£11.50
358	70cm	6·3dB	3 × ½λ	100W	1·36m	£14.95

Model	Description	Price
SOWM	Wing Mount. SO239M upper SO239 under adjustable angle	£3.45
TMCAS	Boot Mount c/w 6 mtrs RG58 and PL259 plug	£7.65
GCCA	Gutter Mount deluxe cast type c/w 4 mtrs cable assemble and PL259	£8.80
SOMM	Mag Mount c/w 4 mtrs RG58 PL259 *For use with smaller antennas only*	£8.45

An alternative mounting for any of the two metre antennas listed above is the BSD stainless steel bumper strap at **£7.75** plus the HS88BK extension tube at **£16.50** which raises by 80 cms and acts as a counterpoise to the radiator.

Also fitting the bumper mount is the 10 foot, 3 section (quick disconnect and fold over jointed) mobile colinear element which provides about 7dB of gain for **£28.35.**

Stop press: ⅝λ ultra low radiation angle, typ. 30° below ⅝λ. Substantial improvement on DX (in clear).

For operation on 2 metres and 70 cms the dual band 70N2M is an elegant solution particularly when combined with the HS770 diplexer which provides 50W power handling, 30dB isolation between transceivers with an insertion loss of only 0·5dB for **£13.80.**

NB: PRICES INCLUDE VAT AT 15%
Mainland delivery: accs. £0.80, antennas £1.80

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Mr E. G. Allen, G3DRN, QSL Bureau manager, 30 Bodnant Gardens, London SW20 0UD
A list of QSL Bureau sub-managers was published in the January 1983 issue, and amendments appear under "QTC" in this issue.

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The national society representing all UK radio amateurs

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.

GENERAL MANAGER AND SECRETARY
D. A. Evans, G3OUF

EDITOR
A. W. Hutchinson

RSGB HEADLINE NEWS—Tel 0707 59312

By telephoning the above number, members can receive up-to-date amateur radio news of immediate interest from a three-minute recording. This is generally updated twice or more weekly.

RSGB SUNDAY NEWS BROADCASTS

These broadcasts are made every Sunday morning, giving almost complete coverage of the British Isles. Stations broadcasting them (particulars below) use the callsign GB2RS.

The purpose of these news broadcasts is to provide an outlet for amateur radio news items which cannot wait for the next issue of *Rad Com.* Items for inclusion should reach RSGB HQ by letter (marked "GB2RS news") or telephone 0707 59260 before 10am on Wednesdays, although no guarantee of inclusion can be given. Once broadcast, items are not usually repeated.

INTENDED RECEPTION AREA	NORMAL READER	RESERVE READER	LOCAL START TIME
Frequency: 3·640MHz. Mode: ssb			
NE Scotland	GM3HGA	GM3VEY	1130
Frequency: 3·650MHz. Mode: ssb			
SE England	G2MI	G4ARZ	0900
Midlands	G2CVV	G8QZ	0930
SW England/Wales	G8ML	G3JFH/G4IEY	1000
Northern Ireland	GI3GAL	GI3SXG	1030
NE England	G5VO	G3MCF	1100
E Scotland	GM4CUZ	GM4FLP	1430
Midlands	G8QZ	G2CVV/G3SZJ	1800
Frequency: 3·660MHz. Mode: ssb			
Central Scotland	GM3TCW	GM3ULP	1130
Frequency: 7·0475MHz. Mode: a.m.			
UK (from Northern Ireland)	GI3GGY	GI2DHB	0900
UK (from N Midlands)	G3LEQ	G2CVV	1100
Frequency: 144·250MHz. Mode: ssb (horizontal polarization)			
N from Carlisle	G4LAA	(Vacancy)	0930
SW from the Midlands	G3BA	G3KQF	0930
NE from S Devon	G3CHN	G3PBV	1000
NW from Manchester	G3SMT	G3SMM	1000
NNW from Cleveland	G4JJB	G8FTZ	1000
W from Carlisle	G4LAA	(Vacancy)	1030
SE from Lincoln	G3NRO	G8ZVF	1030
SW from London	G3FZL/G3VAG	G3IIR	1030
S from Aberdeen	GM8GHV	GM8MBP	1030
W from Bristol	G4CJZ	G3ZWY	1100
NE from Cambridge	G8HVV	G8BBK	1100
W from Bangor, Co Down	GI3TLT	GI3SXG	1130
Frequency: 145·525MHz (S21). Mode: fm (vertical polarization)			
Caithness	GM4KNQ	GM4LNN	0930
Cornwall	G2ABC	G3NPB	0930
North Hampshire	G8CKN	G3PZN	0930
Suffolk	G3ZNU	G4FZZ/G4HMF	0930
Leeds	G3SPX	G8XGN	0930
Co Down	GI3WEM	GI4DOR	0930
Edinburgh	GM4EHO	(Vacancy)	0930
E Cornwall/S Devon	G3ZYY	G8XTE	1000
Londonderry	GI2DHB	GI4AHD	1000
London	G3FZL/G3VAG	G3IIR	1000
Birmingham	G3BA	G4LCM	1000
Lincolnshire	G3NRO	G8ZVF	1000
Tyneside	G4LDT	G8TKU	1000
Glasgow	GM4HCO	GM4CXM	1000
Elgin	GM4ILS	(Vacancy)	1000
Southampton	G8LVC	G4COM/G4IDV	1030
E Sussex coast	G8SC	G3ZFE	1030
Bristol	G4CJZ	G3ZWY/G8NNU	1030
Cambridge	G8HVV	G8BBK	1030
Manchester	G3LEQ	G3JWK	1030
Dumfries	GM3MSG	(Vacancy)	1100
Brighton coast	G3ZYE	G8GEZ	1100
Preston	G8WAT	(Vacancy)	1100
Huntingdon, Cambs	(Vacancy)	G8TQI	1100
Jersey	GJ4JWA	GJ8YVL	1100
Barmouth, Gwynedd	GW6CGR	GW6ARL/GW3KJW	1100
Clwyd/Merseyside	GW4IEQ	G8NNS	1100
Aberystwyth	GW4JXB	GW8MAW	1130
Exeter	G3PBV	G4PCB	1130
Leicester	G4JYS	G4EYL	1130
Scarborough	G4OSD	G4EEV	1130
Enniskillen	GI4PCY	GI4CZW	1230

QTC
Amateur radio news

Emergency communications changes

The Home Office has sanctioned the following changes to Raynet and other emergency operation which came into effect on 1 January 1983. The package is the result of considerable effort by the RSGB Licensing Advisory Committee over the past year, and represents a major breakthrough in the field of emergency communications.

(1) Any Raynet group which is registered with the RSGB may take part in any exercise event which is requested by a user service as specified in the licence. There are two provisos: (a) civil defence-type exercises have not yet been cleared, and are to be the subject of further discussions with the Ministry of Defence and the Home Office; (b) each Raynet group may only take part in one exercise per calendar month.

This means that marathons, charity walks and so on are now allowed to be supported by Raynet under the category of exercises. This gives plenty of opportunity for groups to exercise, and to determine the nature of the type of exercises in which they wish to be involved.

A simple procedure will be set up whereby Raynet controllers inform RSGB headquarters of the exercises which have taken place, or which are scheduled to take place, so that there will be a central record of all exercises which will be available to the Home Office if required.

(2) In the past there has been no provision in the amateur licence for the use of amateur radio at the scene of an emergency, such as a road traffic accident. In future an amateur may pass third-party messages directly connnected with such an emergency case, **provided that no other conventional means of communication is available.** To give an example, if the amateur comes across a pile-up on the M1, he should use the motorway telephones if possible, but he may use amateur radio if they are out of action for some reason.

(3) There have been occasions in the past during emergencies when it would have been convenient for the amateur to be able to hand the microphone to a doctor or some other responsible person in order to pass urgent traffic. In future this will be permitted provided that the amateur supervises the operation of the station.

(4) The Home Office sees no reason why other user services should not be included in the amateur licence. They quote coastguards, mountain rescue and the fire brigade as examples. It is very much up to Raynet to sell itself to these organizations, who in turn need to approach the Home Office so that they can be added to the list of users in the amateur licence.

Radio Amateurs' Examination

The new method of examining candidates for the Radio Amateurs' Examination by multiple-choice questions has now been in operation for three years. During this time numerous misleading comments have appeared in technical journals and elsewhere, and the Education Committee of the RSGB considers that a definitive statement on the examination might be of assistance to prospective RAE candidates.

The examination is administered by the City & Guilds of London Institute on behalf of the Home Office, which is the UK licensing authority. This arrangement was first made in 1946 at the request of the RSGB.

Oversight of the examination is in the hands of an advisory committee which includes three members of the RSGB nominated by the Society's Education Committee, together with representatives of the Home Office, the City & Guilds, the Association of Principals in Colleges of Higher and Further Education, and of other bodies interested in the training of candidates for amateur transmitting licences. Through this committee the Society is able to keep a watching brief on the conduct of the examination and to ensure that the syllabus reflects changes taking place in amateur radio techniques.

The introduction of the multiple-choice system has not been without difficulties, but these are gradually being overcome and the advantages of the new system are becoming apparent. In particular, candidates who are ill-equipped to deal with questions involving the essay-type of answer are finding the multiple-choice type of question more to their liking, as recent results have shown.

Recently the number of candidates entering for the examination has increased dramatically. In particular it would seem that many cb enthusiasts have become disenchanted with that form of communication, and are seeking the greater scope for experiment and communication which is to be realized through the securing of the amateur transmitting licence.

As was expected, several complaints concerning the suitability of questions, errors in the question paper, delay in the publication of results etc reach the RSGB from time to time. These should properly be addressed to the City & Guilds of London Institute in the first instance, but the majority reach the advisory committee eventually. The committee makes every effort to ensure that mistakes are rectified and that the efficiency of the administrative machinery is improved. Great care is taken in the preparation of the examination questions, and the Society's representatives assist and advise on this at every stage.

Lecture list

RSGB headquarters is in the process of compiling a list of lectures, speakers and demonstrators dealing with all aspects of amateur radio, designed to help affiliated societies and clubs with the planning of programmes. The scheme will be voluntary and, as such, lecturers will not be under any obligation. Clubs should expect to cover out-of-pocket expenses of those lecturers who do attend, and this should be agreed beforehand.

Anyone who is willing to give a talk is asked to send their name, address and telephone numbers (for both daytime and evening) together with brief details of the lecture etc to: David Gough, G6EFQ, Membership Services Section, RSGB, Alma House, Cranborne Road, Potters Bar, Herts EN6 3JW.

RAE: medal awards

With effect from the summer examination of 1982, the City & Guilds of London Institute is making annual Bronze Medal awards to the most outstanding candidate or candidates in the examinations. Three awards have been made for May 1982. The winners and centres through which they entered are: Christopher Dracup—The High School, Evening Institute, Knightsbridge, Newcastle-upon-Tyne. Richard Keith Freeston—RSGB Centre, Derby. William George Winteridge—Highbury College of Technology, Portsmouth.

In future, awards will be made on an annual basis and the number made will normally be based on the size of entry for the examinations.

QSL Bureau

G3SAA-G4SZZ series. The sub-manager for this series is Mr A. Bell, G4MHQ, 22 Ryde Place, Lee-on-the-Solent, Hampshire.

G4TAA-G4TZZ series. The sub-manager for this series is Mr J. P. Porter, G3YZR, The Post Office, 53 The Village, Strensall, York YO3 8XA.

The list of sub-managers published in the "*Rad Com* Operating Guide", January 1983, should be amended accordingly.

International Reply Coupons

IRCs tend to be used by some radio amateurs as a form of international currency, but this can be a source of embarrassment to recipients who wish to exchange them for postage stamps. They can only be used to purchase postage stamps if they are correctly franked by the issuing office and are presented within six months of the date of issue. One such case reported recently by a UK amateur was the receipt of an irc issued in Tokyo five years ago and sent to him from Brazil!

1983 SKE

Following the success of its first Straight Key Evening held on 29 April last year, the Edgware & D RS is holding a similar event on 31 March this year. This will be a cw event on 3·5MHz for everyone to enjoy in relaxed and friendly company—from the veteran G2+2 to the newest G4+3. Push aside the electronic generators of dots and dashes, and join in the art of brass-pounding: continuously adjustable speed, even while sending; infinitely variable dot-dash ratio; no mains and no batteries required.

The evening will start at about 1900 and last for as long as arms and fists hold out. Suggested frequencies: 3,520-3,580kHz; QRP around 3,550kHz. Call "CQ SKE". Comments on the event will be welcomed by John Bluff, G3SJE (G3ASR), 52 Winchester Road, Kenton, Harrow, Middx HA3 9PE.

City of Belfast YMCA RC

To celebrate its sixtieth anniversary, this club hopes to have a monthly activity weekend throughout 1983 using the special event callsign GB2YM. The club would like to hear from other YMCA radio clubs, and possibly

make radio contact with them. It is believed that the City of Belfast YMCA RC may be the oldest YMCA radio club in existence. Write to the club chairman Dr D. Hutchinson, GI4FUM, 12 Wellington Place, Belfast 1.

Inverness ARC

This club was recently formed and meets on Mondays (RAE course) and Thursdays at the Cameron Boys Club, Planefield Road, Inverness. New members will be welcome, and enquiries should be addressed to the club secretary, Bob Brown, GM8VIZ, The Flat, 21 High Street, Dingwall, Rossshire IV15 9RU.

Stolen equipment

From the home of a member in Maidstone on 4 December: Trio TSH30S serial number 1042114, dc power supply and MC50 microphone. Any information to Maidstone police.

RAF CWR nets

The Civilian Wireless Reserve was formed in 1938 as part of the RAFVR, and its members were called up to serve in the second world war; it was disbanded after the war. The names of over 80 former members are listed in the present *RSGB Amateur Radio Call Book,* of which over 30 have called into the CWR nets which commenced in February last year. Net details are:

First Monday in each month, 3,760kHz ssb, 10pm, controller G3BR, deputy G2WI.

Second Monday in each month, 7,050kHz ssb, 10pm, controller G8DR, deputy G3BR.

Sid Hall, G3BR, 57 New Street Hill, Bromley, Kent BR1 5AX, tel 01-857 8502, knows there are several other former CWR amateurs of whom he has no record, and he would like to make contact with them.

Can you help

Arnold Feldman, WB3DAO, 4385 Crest Heights Road, Baltimore, Maryland 21215, USA, would be pleased to receive from UK licensed amateurs under 15 years old, photographs of themselves and their rigs for display in the club rooms of WB3DZO. The club has a number of active junior licensed operators and future operators which it is training.

F/Sgt B. W. Hepburn, G8BGI/ON8WW, NICS COA, SHAPE, BFPO 26, would like to obtain programs in either 6502 machine code or Microsoft Basic language which would enable him to display rtty or facsimile transmissions on his Microtan computer.

Provided sufficient information is supplied he is willing to attempt to convert any programs to suit his system, and to pay any resonable cost for suitable programs.

RSGB publications in North America

Members living in North America are reminded that the American Radio Relay League now stocks a selection of RSGB titles, including *Amateur Radio Operating Manual, Amateur Radio Techniques, Radio Communication Handbook, VHF/UHF Manual* and the new *HF Antennas for All locations.* The address for further information is American Radio Relay League, 225 Main Street, Newington, Conn 06111.

Bill Mead, G5YY, who will celebrate 51 years as a licensed amateur on 19 May 1983. He became a member of RSGB in 1930; a founder-member of the Midland ARS in 1931, and of Burton-on-Trent ARS in 1933; a member of Derby Wireless Club in 1937, and a founder-member of Derby & D ARS (in 1947) of which he became an honorary member and vice-president in 1973; a founder-member of RAOTA in 1957; and chairman of the Leicester RS in 1954. He is also a member of the Royal Signals ARS, and during the second world war he served as a Voluntary Interceptor.

He is shown holding a Mullard T61d valve which he purchased in 1934 after his power limit was increased from 10 to 50W. It cost £6.50 (two weeks wages at that time) and is still in good working order.
Photo: *Leicester Mercury*

RSGB NATIONAL AMATEUR RADIO CONVENTION

Halls 6 and 6a
National Exhibition Centre, Birmingham

Saturday and Sunday 5 and 6 March 1983

Opening hours: 10am-6pm, 5 March; 10am-5pm, 6 March

LARGE TRADE EXHIBITION

RSGB STAND—publications and information

RSGB NATIONAL HF CONVENTION

Lectures and/or forums on
*LOW-POWER EQUIPMENT
*RADIO TELEPRINTERS
*RECEIVER DESIGN
*DX OPERATING

RSGB COMMITTEE PRESENTATIONS

VHF and microwave lectures
Interference forum
Propagation
Education—"Introduction to amateur radio"

ENTRANCE FEE: £2 for adults. Free for under-14s if accompanied by an adult

CHANGE OF VENUE

After several years at Alexandra Palace, London, the RSGB National Amateur Radio Exhibition is this year taking place at the National Exhibition Centre, Birmingham. In addition to the change of venue, it has been expanded from being simply an exhibition into a convention.

Following the disastrous fire at Alexandra Palace in 1980 the Society took a long look at the alternatives available, and it held its 1982 exhibition in the brand-new Alexandra Pavilion. In many ways this was a success, but the exhibition could make no real provision for the small trader.

Amateur radio exhibitions need to make provision for all types of exhibitor if they are to do justice to the hobby's wide spectrum of interest. It is necessary to give the high-volume high-turnover main dealer a prestigious and extensive stand so that he can show his products to the best advantage. At the other end of the scale, provision has to be made for the smaller trader dealing in components, kits etc. Both are vital to the interest of amateur radio, and an exhibition which does not include both—by making provision for everything from the professionally-designed display stand to one man behind a table—cannot be said to be truly representative of the full extent and potential of the hobby.

With all these things in mind, it was decided that nothing less than the resources of the National Exhibition Centre would suffice.

The benefits

The NEC, which is close to Birmingham's airport and a few minutes' walk from the new railway station, Birmingham International, was purpose-built a few years ago and deliberately aimed at providing the best facilities for any type of exhibition. Hall 6 is slightly smaller than the Alexandra Pavilion, but larger than the old Great Hall of Alexandra Palace. Hall 6a is approximately a quarter of the size of Hall 6.

Any exhibition which is not purely regional in character and which caters for a nationwide interest such as amateur radio needs to be situated in a location which is easy to reach from all parts of the country. Birmingham, being close to the centre of England, fulfils these requirements.

How to get there

By rail

Birmingham International railway station was built specifically to serve the NEC, and is linked by covered walkway and escalator to the exhibition buildings. Frequent trains from London (Euston) provide an 80min connection, and there are 10min journeys to Coventry and Birmingham (New Street). The latter is an important hub in the UK rail network.

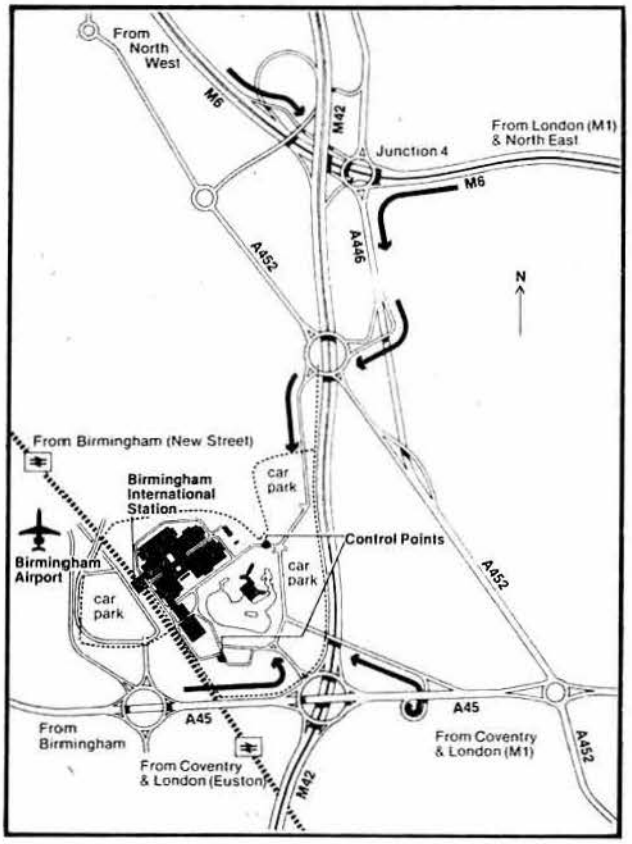
Details of special package-deal arrangements were published on page 27 of the January issue of *Radio Communication*.

By road

Birmingham is located at the centre of the national motorway system, and can be reached quickly from all parts of the UK. A pattern of specially-built roads gives direct access from the M1, M5, M6, M42 and M45, and parking for 15,000 cars and 200 coaches is available; a free shuttle bus brings visitors from the car park to the main entrance. The NEC is also on local bus routes.

By air

Birmingham Airport is adjacent to the NEC; a 5min journey by taxi or bus. Scheduled flights operate between Birmingham and all major European cities, with five flights a day connecting with London Heathrow.



A digital slow to fast sstv converter for monochrome or colour

(PART 1)

by B. A. SMITH, G3WCY*

Introduction

One of the first considerations in any new venture is cost, and when the author became interested in the sstv mode he found that the only available ready-built scan converter was in excess of £600. Alternative ideas were pursued, and the outcome is this article, which describes an easy-to-build low-cost sstv converter for receiving pictures only. All components used are standard easy-to-find types, readily available from any good electronic component supplier.

A study of the available sstv literature revealed that the original analogue method of sstv reception, using the long-persistence type of crt, was a little old-fashioned and that these special crts were difficult to obtain. Concluding that the digital conversion method was better, a search was made for a suitable design. The author claims no originality for the design used in this article; it is in fact a modified version of a design by Takao Yabana, JA0BZC, which first appeared in *A5 Magazine*. The original was intended for the American/Japanese 525-lines 60Hz tv system, and was therefore not suitable for the UK 625-line 50Hz system. However, it only required a few modifications to make it compatible for the UK tv systems, as will be described.

SSTV principles

The concept of digital conversion for reception of sstv pictures is to change the incoming slow-scan signal, which is in analogue form, into a digital signal. This is then synchronized, recognized and stored in a dynamic random access memory, to be released and refreshed at the required fast-scan rate to enable a simulated picture to be displayed on a normal 625-line tv receiver.

The actual picture displayed is only 128 picture-elements (pixels) wide, with four bits or digits to a pixel, by 128 lines high. As the scanning rate is so slow all movement is lost, but considering that 128 lines are now spread into the space of 625 lines, the clarity and resolution is quite amazing. Various landmarks in London are quite easily recognizable, as shown in the photographs.

Each picture frame is written or completed in approximately 8s, and if you listen carefully to the audio tones of sstv, sometimes described as a kind of musical rtty, the horizontal reset pulse will be heard as a short bleep once every 8s. The big advantage of sstv is its very narrow bandwidth of only 1,100Hz within the audio spectrum of 1,200–2,300Hz, enabling transmission and reception over long distances. Also, as it is within the audio spectrum, pictures are easily stored on conventional audio tape recorders.

Operation of analogue to digital board

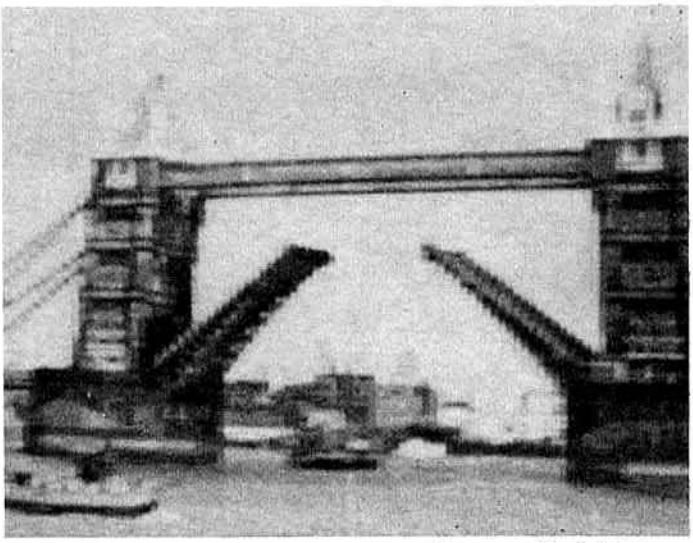
The circuit shown in Fig 1 comprises an audio op-amp IC1, protected by limiting diodes D101 and D102. SSTV demodulators and filters are catered for by IC2, IC3 plus bridge networks D103–D110 and IC4. The output from IC4 is connected to analogue to digital conversion circuitry IC5, IC6, IC7, IC8 and IC18. IC5 and IC6 are l.e.d. bar drivers type LM3914 each containing 10 comparators, 16 of which are used to give 16 levels of video fed to the input of IC7 and IC8, which are eight-line priority encoders. These outputs are interfaced to IC18, giving an overall 16-to-4-bit conversion, presenting a four-level gray code in data form to memory chips IC37–IC40 in Fig 3.

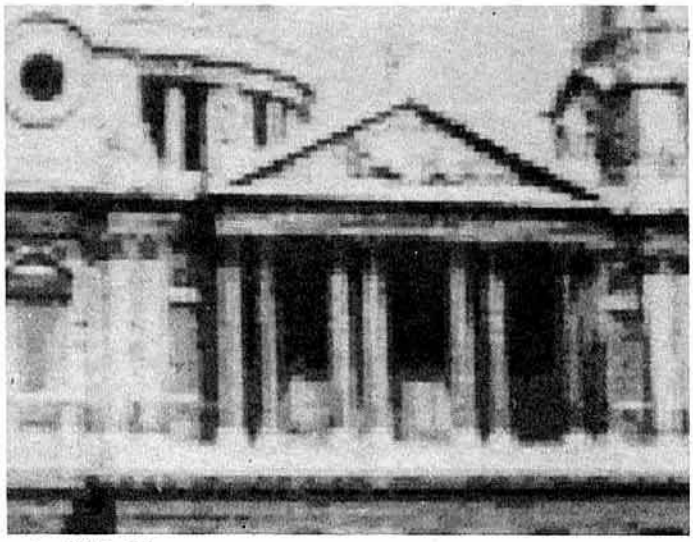
IC9 and IC10 form a 1,200Hz bandpass filter which extracts sync pulses from the sstv signal via IC3. These pulses are amplified and split by transistors TR101–TR103, giving the required horizontal and vertical slow synchronization pulses at the outputs of IC11 points TP3 and TP4.

The circuit shown in Fig 2 provides fast-scan sync pulses, which are derived from an adjustable oscillator, utilizing the famous 555 timer, which is adjusted to run at 31·250kHz. This output at pin 3 of IC12 drives a series of 7490 decade counters. IC13 (b) is used in the divide-by-two mode, producing an output of 15·625kHz fast-scan 625-line horizontal sync pulse, the remaining 7490s are wired in the divide-by-five mode, providing division down to 50Hz fast-scan vertical sync output.

Operation of digital memory board

The circuit of this board is shown in Fig 3. The memory section, IC37–IC40, uses 16k r.a.m. type 4116; select types that have an access time of 250ns or better, otherwise errors may occur during the WRITE mode. The seven address lines A0 to A6 are driven by IC23 and IC31 which are ROW and COLUMN address counters respectively.





Typical pictures as received "off-air"

*27 Dartmouth Road, Ruislip, Middx HA4 0DD.

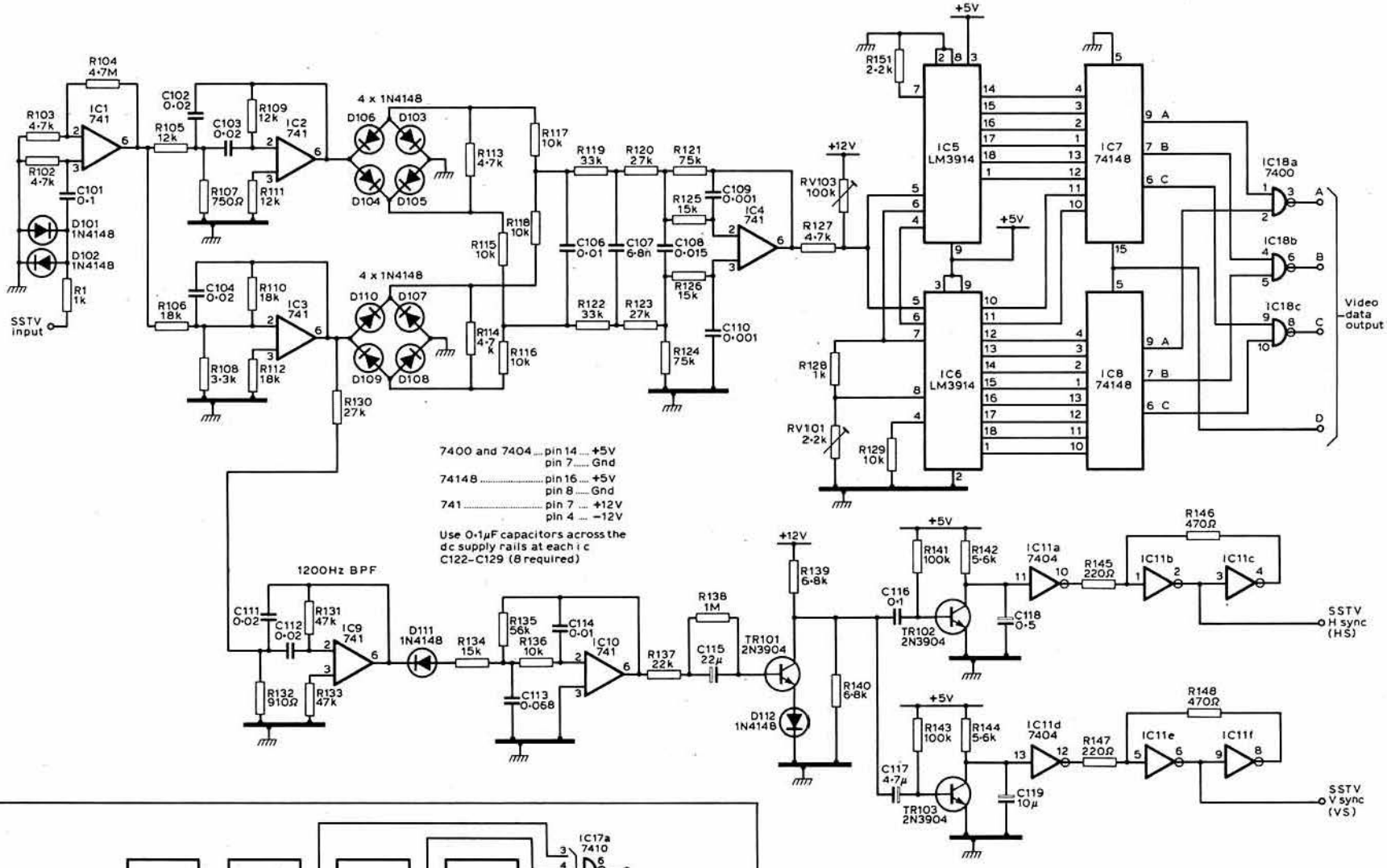


Fig 1. Circuit diagram of the analogue board

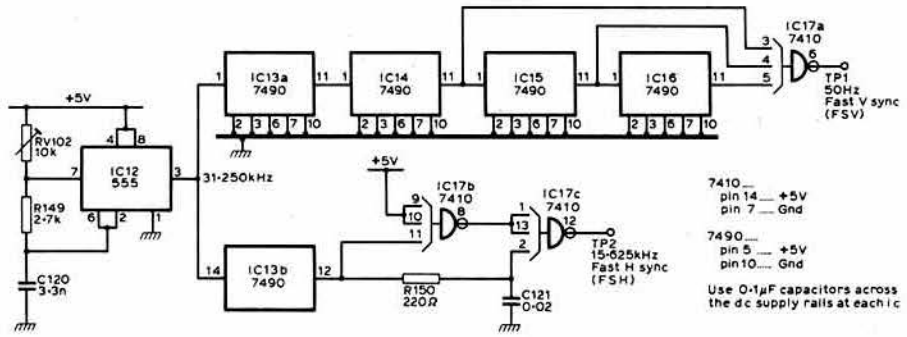


Fig 2. Circuit of the fast-scan sync (part of the analogue board)

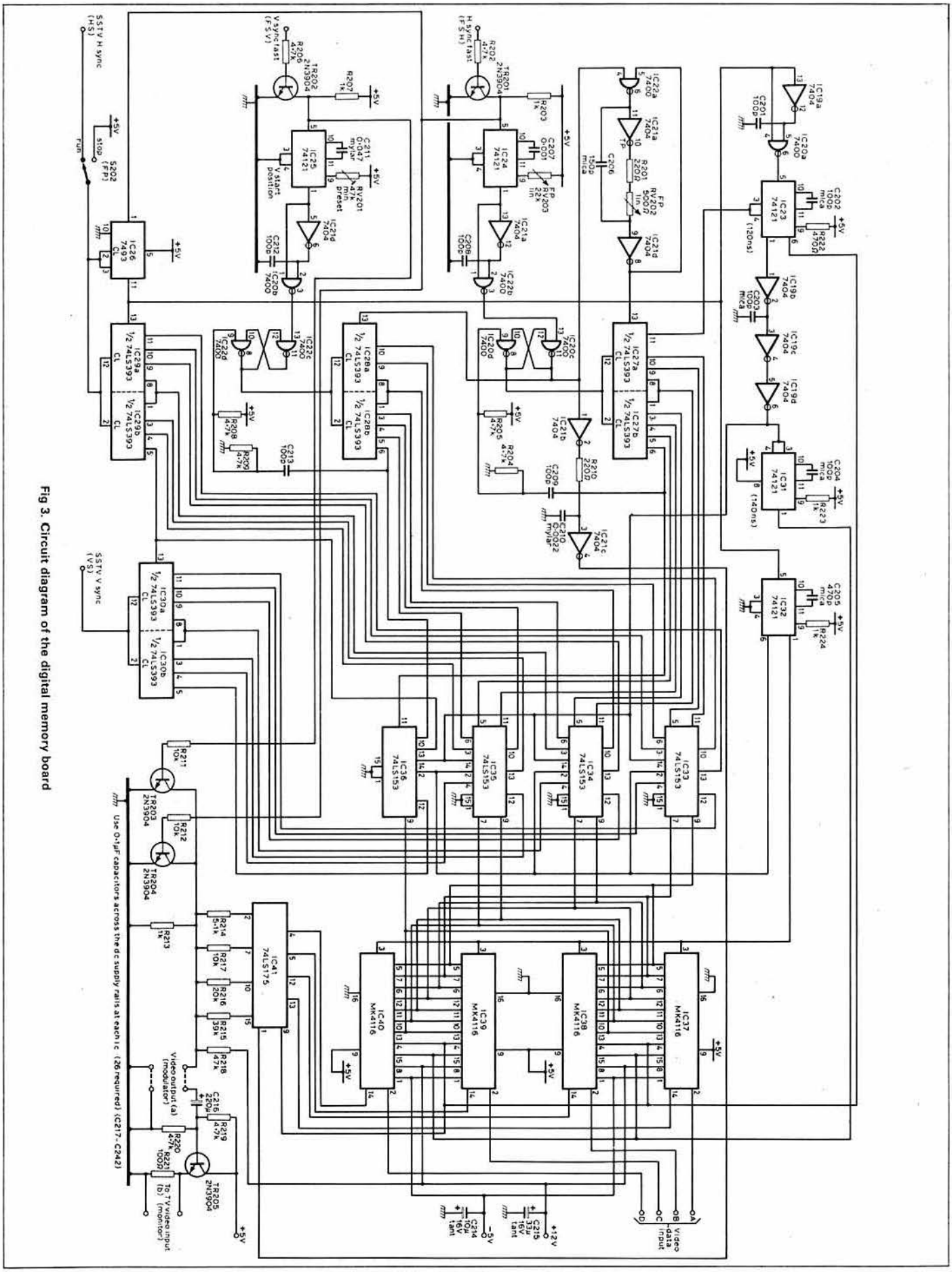


Fig 3. Circuit diagram of the digital memory board

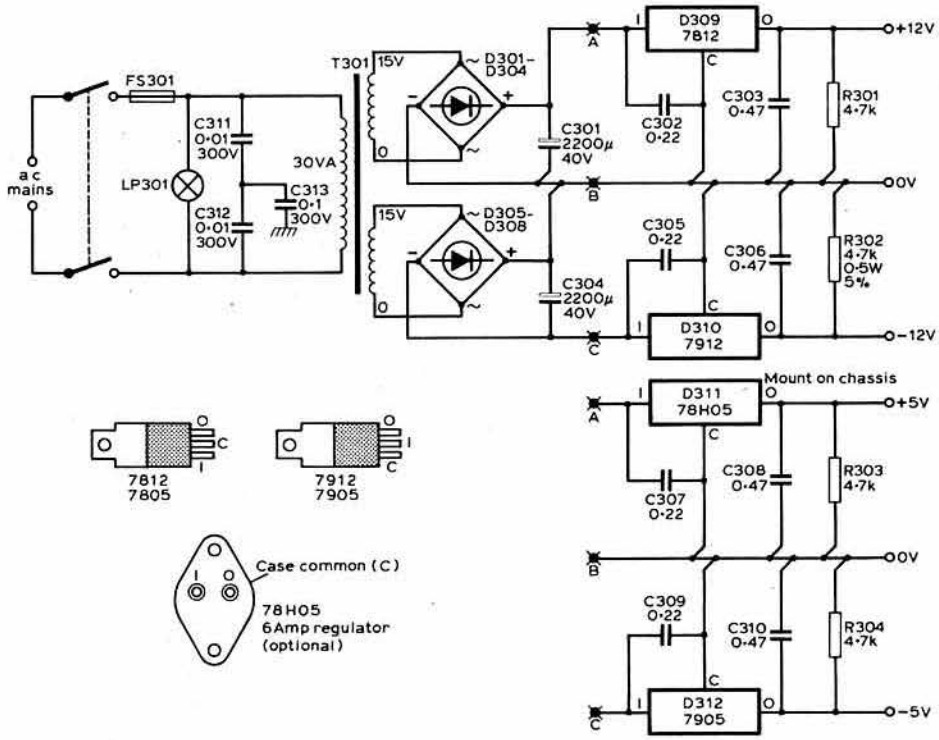


Fig 4. Power supply circuit

The WRITE and READ counters used are ordinary binary counters type 74LS393. IC27 is the READ ROW counter, and IC28 the READ COLUMN counter. IC29 and IC30 are the WRITE ROW and COLUMN counters, while WRITE ENABLE for the memories is fed from pin 1 of IC32. The alternate ROW and COLUMN counters are multiplexed from four 74LS153 dual 4-to-1-line multiplexers IC33–IC36.

The position of the horizontal picture is determined from IC24, which sets IC20. When this occurs, oscillator IC19 begins, and IC27 then starts to count to 256, upon which IC20 resets and IC27 stops counting and waits for the next horizontal sync pulse. IC21 parts b and c produce a blanking pulse, the length of which is determined by R210 and C210. Vertical timing is achieved in a similar manner, the clock for the vertical counter is fed from the fast vertical sync at the base of TR202.

To stop the WRITE function, the horizontal slow sync is halted by connecting pins 2 and 12 of IC29 to the + 5V rail, with the effect of producing a freeze frame function. This is very useful for picture study and storage, hence a small toggle switch S202 is brought to the front panel for convenience.

The digital video signal from data output of the 4116 memories (pin 14) is converted by IC41, 74LS175, into simple binary with the aid of the common R, 2R, 4R, 8R method using resistors R214–R217; use good quality two per cent types here. Horizontal and vertical fast sync is re-introduced at this point by means of TR203 and TR204.

At this stage video is ready for display at either of the output terminals (a) or (b). The two points give alternative outputs: (a) is for connecting to a normal domestic tv receiver via a suitable modulator, as used in computers, or tv games; (b) goes via TR205, an emitter follower, to provide the correct 75Ω output impedance for a monitor.

Feeding the video via a modulator to a tv receiver is not recommended, as rather poor picture quality and resolution is obtained. If a proper monitor cannot be obtained, a normal domestic portable black and white tv receiver may very easily be modified to suit the purpose and act as a monitor, with no harm or change to the receiver's normal operation—not forgetting to observe the necessary safety precautions when opening a tv set.

The first essential is to obtain the circuit diagram or manual of the tv set in question. With this, locate the cathode of the crt and trace back from the cathode to the video driver stages, which in modern sets comprise two transistor drivers in a series configuration. Cut the track at the base input of the second transistor (from the cathode) and bring a pair of miniature 75Ω coaxial leads from either side of the cut track, to a convenient external position of the set. These leads (as short as possible) should be connected to a switch and coaxial socket arrangement, where the switch is wired to open

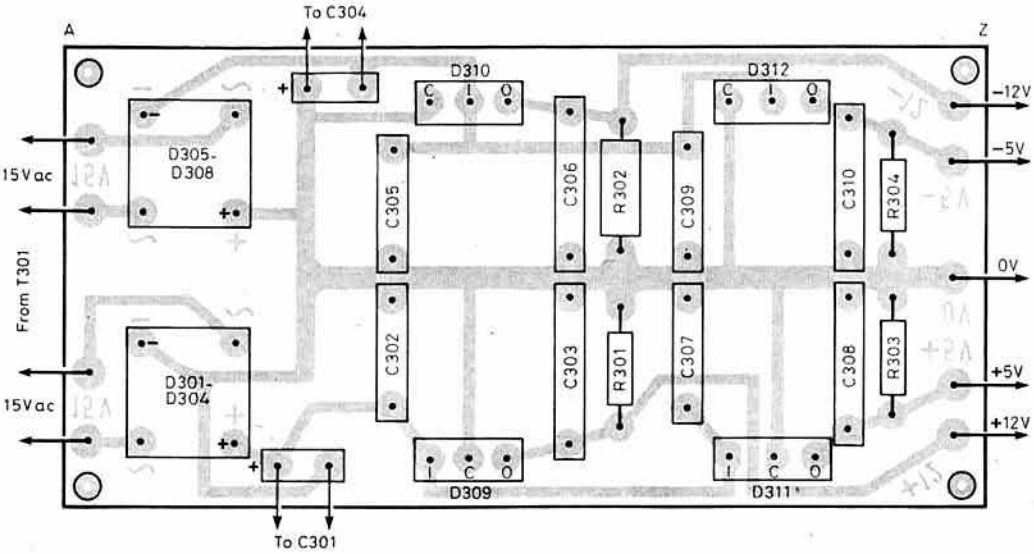


Fig 5. PSU pcb layout

COMPONENTS LIST

ANALOGUE BOARD

R101, 128	1kΩ
R102, 103, 113, 114, 127	4·7kΩ
R104	4·7MΩ
R105, 109, 111	12kΩ
R106, 110, 112	18kΩ
R107	750Ω
R108	3·3kΩ
R115, 116, 117, 118, 129, 136	10kΩ
R119, 122	33kΩ
R120, 123, 130	27kΩ
R121, 124	75kΩ
R125, 126, 134	15kΩ
R131, 133	47kΩ
R132	910Ω
R135	56kΩ
R137	22kΩ
R138	1MΩ
R139, 140	6·8kΩ
R141, 143	100kΩ
R142, R144	5·6kΩ
R145, 147, 150	220Ω
R146, 148	470Ω
R149	2·7kΩ
R51	2·2kΩ
All resistors 0·25W 5%.	
RV101	2·2kΩ
RV102	10kΩ
RV103	100kΩ

C101, 116	0·1μF
C102, 103, 104, 105 111, 112, 121	0·02μF
C106, 114	0·01μF
C107	6·8nF
C108	0·015μF
C109, 110	0·001μF
C113	0·068μF
C115	22μF tant 16V
C117	4·7μF tant 16V
C118	0·5μF
C119	10μF tant 16V
C120	3·3nF
C122-129	0·1μF (bypass)
All capacitors except C115, 117 and 119 are mylar, metallized polyester or monolithic ceramic types, 10% or better.	
IC1, 2, 3, 4, 9, 10	741
IC5, 6	3914*
IC7, 8	74148
IC11	7404
IC12	555
IC13-16	7490
IC17	7410
IC18	7400
*RS Type 308-174 or LM3914	
D101-112	IN4148
TR1, 2, 3	2N3904

DIGITAL MEMORY BOARD

R201, 210	220Ω
R202, 204, 205, 206 208, 209	4·7kΩ
R203, 207, 213, 223, 224	1kΩ
R211, 212, 217	10kΩ
R214	5·1kΩ
R215	39kΩ
R216	20kΩ
R218	47kΩ
R219, 220	4·7kΩ
R221	100Ω
R222	470Ω
All resistors 0·25W 5% except R214, 215, 216 and 217 which are 2%.	
RV201	47kΩ min preset
RV202	500Ω pot lin
RV203	22kΩ pot lin
IC19, 21	7404
IC20, 22	7400
IC23, 24, 25, 31, 32	74121
IC27, 28, 29, 30	74LS393

C201, 202, 203, 204 208, 209, 212, 213	100pF
C205	470pF
C206	150pF
C207	0·001μF
C210	0·0022μF
C211	0·047μF
C214	10μF tant 16V
C215	33μF tant 16V
C216	220μF
C217-242	0·1μF decoupling capacitors marked dc on layout
Use good quality, mylar or metallized polyester capacitors except for C214 and C215, 10% or better.	
TR201-205	2N3904
IC33, 34, 35, 36	74LS153
IC37, 38, 39, 40	4116
IC41	74LS175

PSU

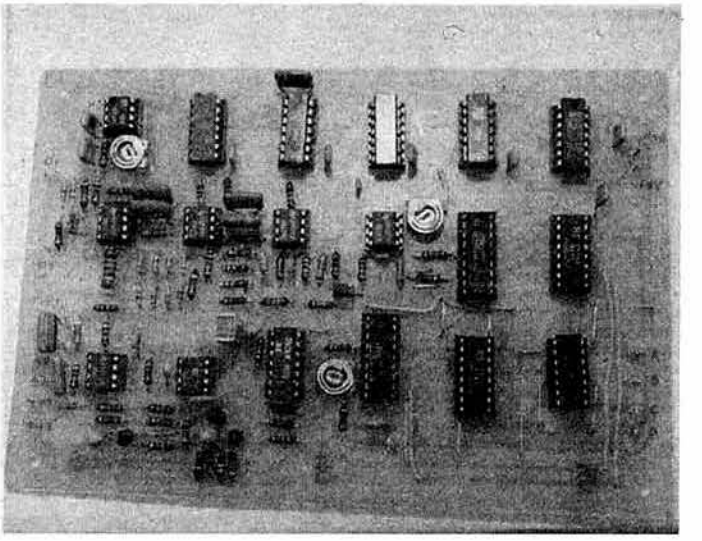
R301, 303, 304	4·7kΩ
R302	4·7kΩ 0·5W 5%
C301, 304	2,200μF 40V electrolytic can type
C302, 305, 307, 309	0·22μF
C303, 306, 308, 310	0·47μF
C311, 312	0·01μF 300V ac wkg
C313	0·21μF 300V ac wkg

D301-308	2A bridge rectifier
D309	7812 1A +12V regulator
D310	7912 1A −12V regulator
D311*	78H05 6A +5V regulator
D312	7905 1A-5V regulator
*Can be a 7805 1A radiator, but a good heatsink must be provided	
T301	240V primary, 2×15V secondaries @ 2A(301A)

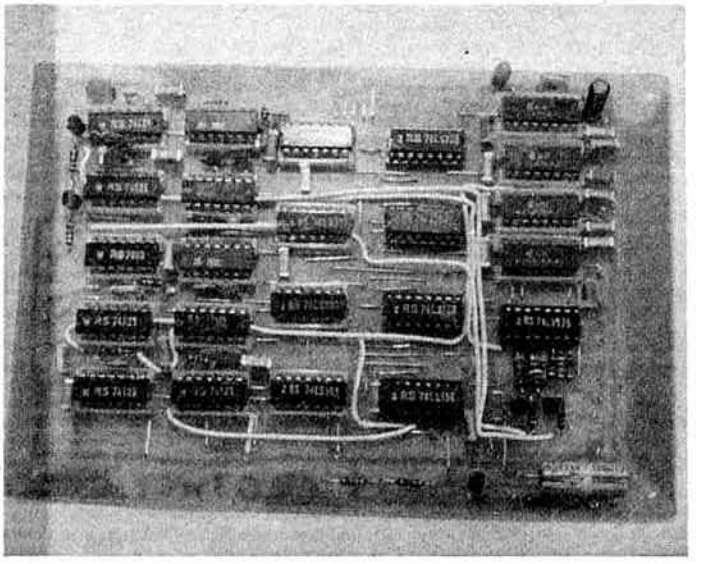
COLOUR AMPLIFIER CIRCUIT

R401, 402	10kΩ
R403	2·2kΩ
R404, 405	1kΩ
R406, 407, 408, 416 417, 418	180Ω
R409	4·3kΩ
R410, 411, 412	3·6kΩ
R413, 414, 415	510Ω
R419, 420, 421	16kΩ
RV401, 402, 403	1kΩ pots
RV404	5kΩ pot

C401, 405	0·1μF
C402, 403, 404	2·2μF
C406,407, 408	2·7μF
C409	33μF tant
TR401, 402	2N3904
TR403, 404, 405	BF338
SK401-403	BNC
SK404	Phono
S401	Four-pole two-way rotary



Analogue board



Digital memory board

and close the cut pcb track, thus restoring normal tv operation if required. When the switch is in the open position the coaxial socket will be connected to the piece of track that goes to the base of the driver transistor, therefore the sstv video output from the converter is plugged into this socket with resulting good quality and resolution. The ideal screen size for the sstv format is 9in by up to a maximum of 14in. If it is larger than this, the little pixels will appear as large squares and the viewer would need to sit at least 5ft or more from the screen before any picture would become recognizable.

Power supply requirements

The psu used may be of any design or as that shown in Fig 4. In this a single 100VA transformer with double 15V secondaries is used for convenience, with the usual regulator configuration to provide plus and minus 12 and 5V. Current requirements are +5V at 500mA, −5V at 1mA, +12V at 80mA, and −12V at 15mA; thus in most cases a common zener output could be used to cut costs. If a 7805 is used for the +5V rail, use a good heatsink —this is even more important if the higher current 6A regulator 78H05 is used—this gives a cooler running +5V regulator, plus plenty of scope for memory expansion in the future. It may be found that these dc supply lines are noisy, so check them with a scope and, if necessary, fit a 100μF capacitor across the offending rails to suppress the noise. It is a wise precaution to kill the noise at source, even though bypass capacitors are fitted at almost every ic.

(TO BE CONTINUED)

An introduction to elliptic filters for the radio amateur

by JOHN WILKINSON, BSc, G4HGT*

Introduction

Elliptic function filters possess the best attenuation vs frequency characteristics of all passive filters, and can give superb performance when a sharp cut-off is required. Unfortunately, little information on their design exists in amateur literature, and it is often difficult for the non-engineering amateur to sort out the mass of information presented in filter handbooks.

This article is split into two parts:

(a) A brief description of the filters and practical designs with scaling methods for low- and high-pass configurations.

(b) A more thorough treatment of filter tables and methods for bandpass filters.

In this way it is hoped that these useful filters can be tried with some degree of confidence.

Basic principles

An elliptic filter differs from other types, such as Butterworth and Chebyshev, in that it has resonant circuits in it. These provide points in the amplitude vs frequency response where the signal attenuation is very high. Due to these transmission zeros, the steepest rate of attenuation vs frequency can be achieved.

Fig 1 compares the three common filter configurations. The elliptic filter is approximately 15dB better than the Chebyshev filter at 1·5 times the turnover frequency ω_0, but above this frequency the attenuation does not continue to fall away. This is the price that has to be paid for having a sharp turnover, although normally the filter designer can take this into account when a specification is to be met. Careful design can place these zeros to give high attenuation at desired points; in the examples, one design is given having zeros at $2\omega_0$ and $3{\cdot}14\omega_0$, an ideal response for most harmonic-producing transmitters.

Like Chebyshev filters, elliptic filters do not have a flat response in the passband. Instead, they are equi-ripple, with the amount of ripple being chosen by the designer. Values of ripple less than 1dB are typical, with increased passband ripple being traded against increased stopband attenuation.

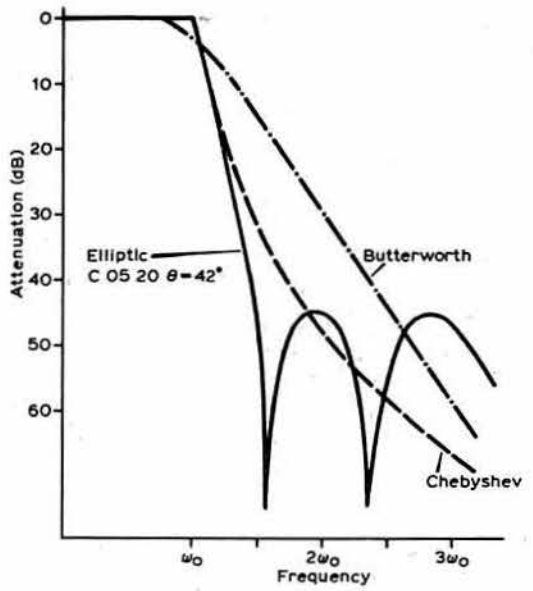
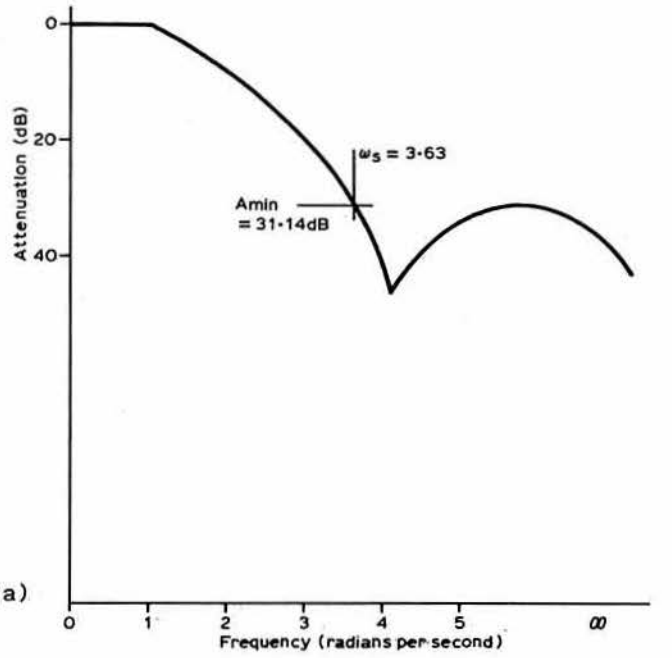


Fig 1. Comparison of filter types



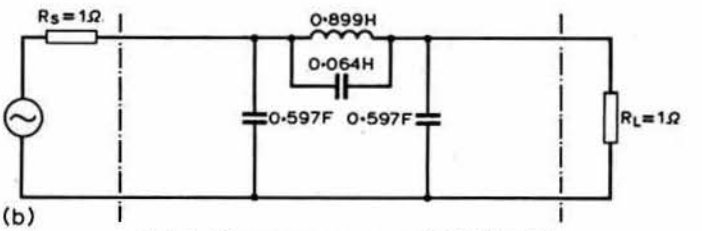
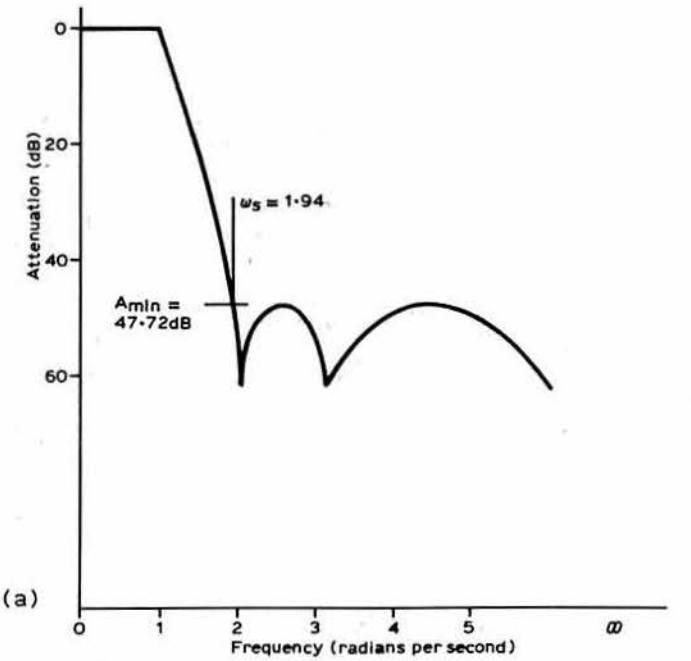


Fig 2. (a) Frequency response of C 03 05 $\theta = 16°$
(b) Component values for C 03 05 $\theta = 16°$ (Capacitor value is 0·064F, not 0·064H)



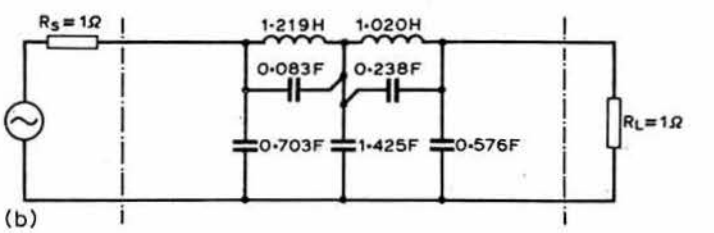


Fig 3. (a) Frequency response of C 05 05 $\theta = 31°$
(b) Component values for C 05 05 $\theta = 31°$

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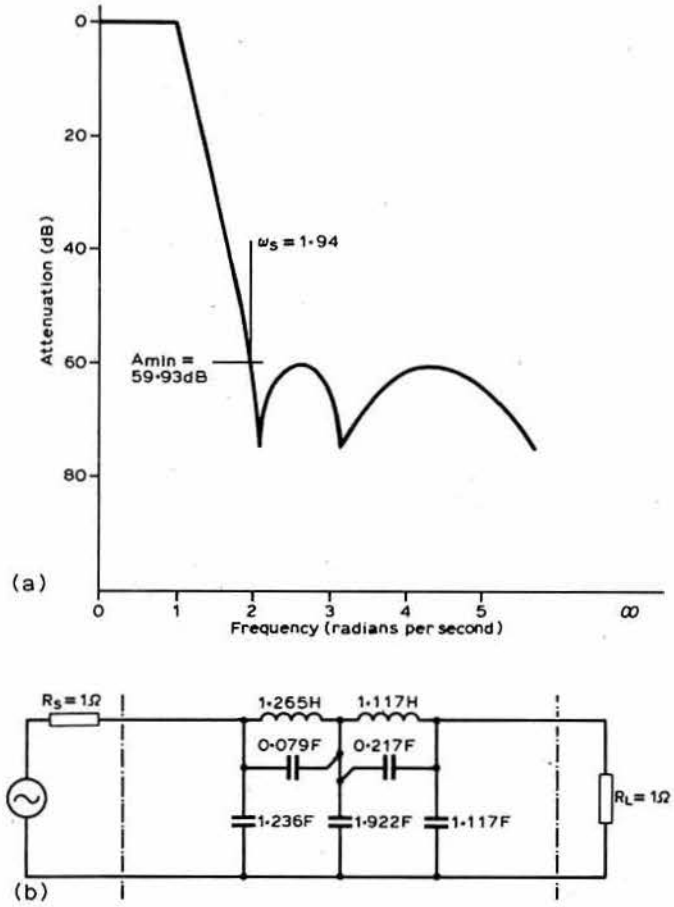

Fig 4. (a) Frequency response of C 05 20 $\theta = 31°$
(b) Component values for C 05 20 $\theta = 31°$

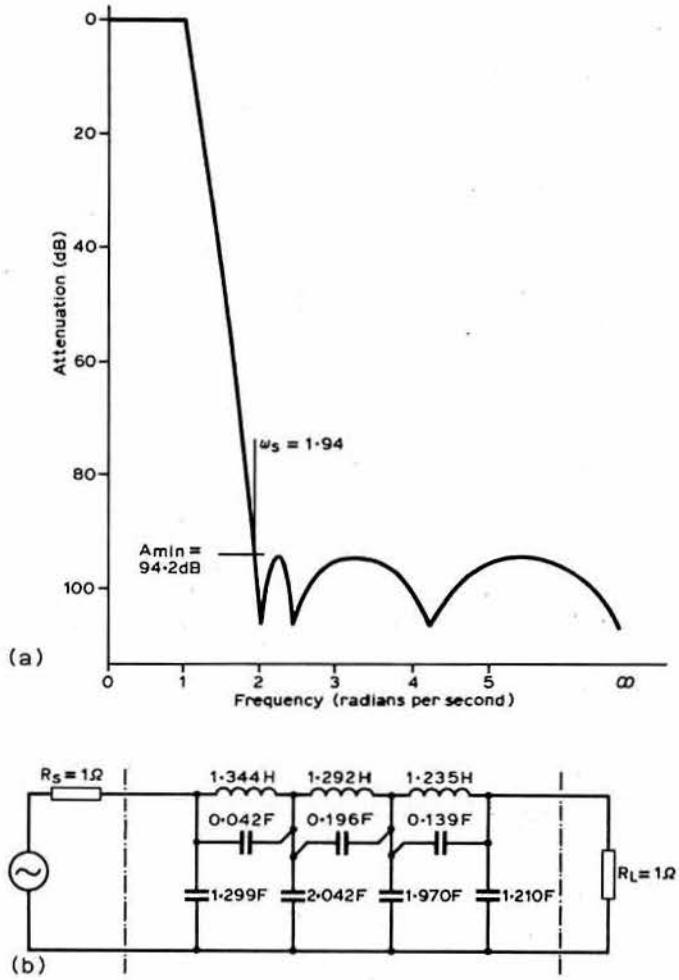

Fig 5. (a) Frequency response of C 07 20 $\theta = 31°$
(b) Component values for C 07 20 $\theta = 31°$

Normalization

Filter tables are printed in handbooks on filters (see "Bibliography") and detail the component values and frequency responses of a selection of filters. They are arranged so that all the filters have a turnover frequency of 1 rad/s, usually denoted ω_0. (Angular frequency is a scaled version of frequency more usually expressed in hertz: 1rad/s = 2π cycles/s = 6·28Hz.) The frequency response is then expressed in terms of ω_0, ie 40dB of attenuation at $3{\cdot}75\omega_0$ etc. This technique, known as normalization, reduces the number of filters that have to be tabulated.

The values of inductors and capacitors obtained from tables are measured in Henries and Farads respectively, and the normalized system impedance is 1Ω.

Frequency and impedance scaling

Once a normalized frequency response has been obtained, either from tables or the examples, the values of inductors and capacitors have to be adjusted to give the desired response at the frequency and impedance level required.

For frequency scaling, the following rules are applied:

$$C(\text{scaled}) = \frac{C(\text{table})}{2\pi \times \text{desired frequency}}$$

and

$$L(\text{scaled}) = \frac{L(\text{table})}{2\pi \times \text{desired frequency}}$$

(If a 2·4732F capacitor is required in the normalized table, then for a 28MHz 1Ω filter its value will be $\frac{2{\cdot}4732}{2\pi \times 28 \times 10^6} = 14{\cdot}05\text{nF}$.)

The filter can then be impedance scaled as follows:

$$C(\text{used}) = \frac{C(\text{scaled})}{\text{impedance}}$$

and

$$L(\text{used}) = L(\text{scaled}) \times \text{impedance}.$$

(So in a 50Ω system, the above capacitor would have the value:

$$C = \frac{14{\cdot}05\text{nF}}{50} = 281\text{pF}.)$$

Note that the resonant frequencies of the tuned circuits so formed should still be in the same ratios to the turnover frequency as they were in the normalized circuit. Due to the transformations used, the following equation should be used:

$$\omega = \frac{1}{\sqrt{L(\text{table}) \times C(\text{table})}}$$

Definition of terms

In the examples, each filter is denoted by a code of the form:

$$C\ n\ p\theta = m$$

and these completely describe the filter.

n is the order of the filter and gives an indication of the quality and hence complexity of the filter.

p is the reflection coefficient of the filter and is related to the passband ripple and the vswr.

θ determines the steepness of the filter—the higher θ, the steeper the filter.

As well as the values of inductors and capacitors required, a filter table will also give values for tuned circuit resonant frequencies, and an indication of the stopband attenuation.

Unlike Butterworth and Chebyshev filters, the turnover frequency ω_0 is measured at the *attenuation = passband ripple* point, as opposed to the 3dB attenuation point. The frequency at which the attenuation first equals the stopband attenuation is denoted ω_s, and A_{min} is the minimum attenuation in the stopband.

How to use the examples

The purpose of this section is to simplify the work needed to produce an elliptic filter. Figs 2-5 are standard filter designs taken from filter tables, and they should satisfy filter requirements for most amateurs. The filters are presented in normalized form, ie turnover frequency = 1rad/s, and a graph of expected attenuation vs frequency is also given. Methods for

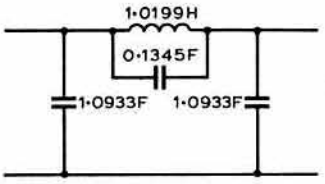

Fig 6. Normalized component values for C 03 20 $\theta = 25°$

converting these designs to practical filters have been explained in earlier sections, but to give the reader more confidence a full worked example of a third-order design will be given.

In the examples, it will be noted that even-order filters are omitted. This is because they have the same number of inductors as the filter with the next higher order, but due to their lower order their performance is not as good. All the scaling methods outlined will work with even-order filters, and the interested amateur will find them useful when the filter is to be used between non-equal terminations.

Worked example

A filter is required for the output of a 10MHz transmitter. A turnover frequency of 11MHz is desirable and more than 30dB of attenuation is required at the third harmonic. The system impedance is 50Ω.

This specification is met by the filter denoted C 03 20 $\theta = 25°$; its circuit is shown in Fig 6.

For an 11MHz filter:

$$C_1 = C_3 = \frac{1{\cdot}0933}{2 \times \pi \times 11 \times 10^6} = 15{\cdot}82\text{nF}$$

$$C_2 = \frac{0{\cdot}1345}{2 \times \pi \times 11 \times 10^6} = 1{\cdot}946\text{nF}$$

$$L = \frac{1{\cdot}0199}{2 \times \pi \times 11 \times 10^6} = 14{\cdot}75\text{nH}.$$

In a 50Ω system:

$$C_1 = C_3 = \frac{15{\cdot}82\text{nF}}{50} = 316{\cdot}4\text{pF}$$

$$C_2 = \frac{1{\cdot}946\text{nF}}{50} = 38{\cdot}92\text{pF}$$

$$L = 14{\cdot}75\text{nH} \times 50 = 737\text{nH}.$$

The resonant frequency of the tuned circuit is:

$$f_s = \frac{1}{2\pi\sqrt{LC_2}} = 29{\cdot}706\text{MHz}.$$

Above this frequency the attenuation is greater than 31·4dB.

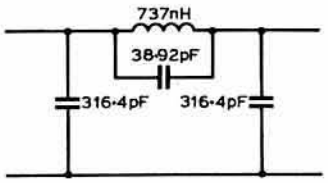

Fig 7. Final values for the worked example

Duality

In the above examples, the circuit used has the minimum number of inductors. The dual circuit has the maximum number of inductors and is produced by the following rules:

(a) shunt circuit becomes series circuit;
(b) parallel tuned circuit becomes series tuned circuit;
(c) capacitors become inductors and vice versa;
(d) all values remain the same.

Fig 8 shows the method for a fifth-order filter.

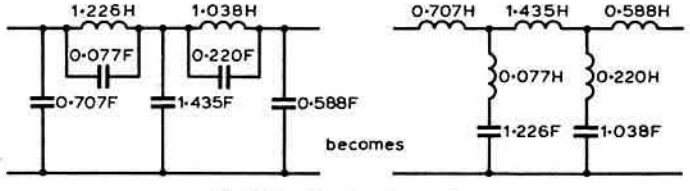

Fig 8. Duality transformation

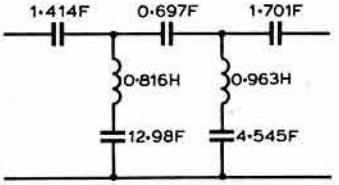

Fig 9. Highpass transformation of Fig 8

Highpass transformation

This is best achieved by using the dual circuit as shown above. The transformation rules are:

L becomes C and C becomes L

and the values are inverted, ie $L = \frac{1}{C}$

The highpass filter produced has the minimum number of inductors and the resulting filter is shown in Fig 9.

How to find your own filter design

There are quite a few handbooks (see bibliography for details) containing tables of values for elliptic filters, and if the reader is interested in designing his own particular filter then this section may clarify the methods to be used. As mentioned earlier, three parameters are used by mathematicians to denote a particular filter, these are; n, ρ and θ, being order, reflection coefficient and modular angle respectively. Each table is headed C n ρ, and the filters are tabulated in terms of θ. (C denotes Cauer who was a famous network theorist).

The order n of a filter indicates the number of transmission zeros as follows:

$$\text{number of zeros} = \frac{n+1}{2} \text{ for n odd}$$

$$= \frac{n}{2} \text{ for n even.}$$

The number of tuned circuits is always one less than the number of transmission zeros, due to the fact that there is always a transmission zero at infinite frequency (assuming low-pass basis):

$$\text{number of tuned circuits} = \frac{n-1}{2} \text{ for n odd,}$$

$$= \frac{n-2}{2} \text{ for n even.}$$

A disadvantage of even-order filters is their need for an extra inductor; it is therefore sensible to use the next higher odd-order filter and benefit from its improved performance. For filters requiring non-equal terminations, and if a small passband loss can be tolerated, even-order filters come into their own.

Reflection coefficient ρ will probably be understood more easily as a form of vswr:

$$\rho(\%) = \frac{\text{VSWR} - 1}{\text{VSWR} + 1} \times 100\%;$$

and ρ is directly related to the passband ripple R_{dB} by:

$$R_{dB} = -10 \log(1 - \rho^2).$$

Filter tables usually take values of ρ in steps of five per cent for most usable values.

Table 1. Values of VSWR and R_{dB} in terms of ρ

ρ(%)	VSWR	R_{dB}
1	1·020	0·0004
5	1·105	0·011
10	1·222	0·044
15	1·353	0·099
20	1·500	0·177
50	3·000	1·250

As was mentioned before, ρ also affects the stopband attenuation, with increased attenuation being gained at the expense of matching.

The modular angle θ of the filter determines the steepness of the filter and is defined as:

$$\theta = \text{arc sin} \frac{1}{\omega_s}$$

and tabulation is in steps of 1°; see Table 2.

Table 2. Values of ω_s in terms of θ

θ	ω_s
10	5·76
30	2·00
50	1·31
70	1·06
90	1·00

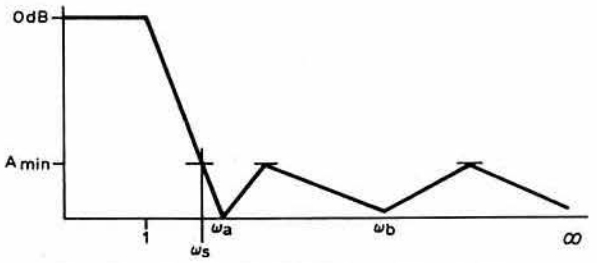

Fig 10. Showing relevant frequency response features

Again, there is a compromise to be made between stopband attenuation and steepness, since for high values of θ the stopband performance is degraded. Thus if a very sharp filter is required, then increasing the order is the only way to obtain a high stopband attenuation.

A typical normalized filter design table will have the form shown in Table 3.

Bandpass filters

Elliptic function lowpass filters can be transformed into bandpass filters which are superior to other types such as Butterworth or Chebyshev. Each lowpass transmission zero is transformed into a pair of transmission zeros positioned either side of the centre frequency. Bandpass filters are geometrically symmetrical about their centre frequency; that is, two frequencies having the same level of attenuation on either side of the passband are related by the equation:

$$f_{upper} \times f_{lower} = f_0^2.$$

If only one stopband frequency is known then the other can be found.

The lowpass filter is transformed by resonating each inductor with a series capacitor, and each capacitor with a parallel inductor at the centre frequency f_0; the transformations are shown in Fig 11.

The last network in the figure occurs frequently in practice, and the configuration is not very easy to implement. There are two parallel resonances which are not independent. It is possible to use this network, but an alternative configuration exists which uses two parallel tuned circuits in series. These correspond to the two stopband zeros, one above and one below the passband.

The transformation is achieved as follows:
First calculate,

$$\beta = \left[1 + \frac{1}{2LC}\right] + \sqrt{\left[1 + \frac{1}{2LC}\right]^2 - 1}$$

Then,

$$L_a = \frac{1}{C(\beta + 1)} \qquad L_b = \beta L_a$$

$$C_a = 1/L_b \qquad C_b = 1/L_a$$

the resonant frequencies are;

$$\Omega_a = \sqrt{\beta} \text{ and } \Omega_b = 1/\Omega_a$$

Example of low to bandpass transformation

A filter is required for the input of a 3·5MHz receiver. The desired frequency response is shown in Fig 13, and 30dB of attenuation is required at 3·8725MHz.

First calculate

$$f_0 = \sqrt{3{\cdot}500 \times 3{\cdot}800} = 3{\cdot}6469\text{MHz}.$$

The lower stopband frequency then follows at 3·4345MHz.
The filter steepness is calculated from;

$$\text{Steepness} = \frac{\text{stopband bandwidth}}{\text{passband bandwidth}} = \frac{3{\cdot}8725 - 3{\cdot}4345}{0{\cdot}3000} = 1{\cdot}4601$$

A lowpass filter is chosen having a steepness of 1·4601 and possessing the desired attenuation. From Table 3, fifth order filter C 05 05 $\theta = 43°$ has been selected.

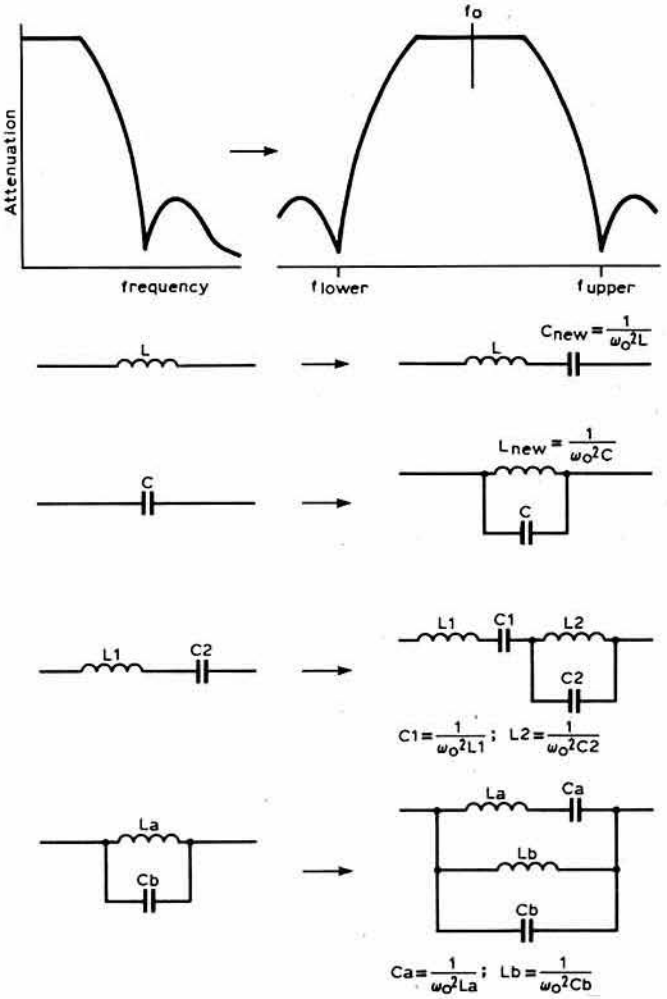

Fig 11. Low to bandpass transformations

The network values are now multiplied by Q_{bp}. This is calculated from:

$$Q_{bp} = \frac{f_0}{\text{bandwidth}} = \frac{3{\cdot}6469}{0{\cdot}3} = 12{\cdot}1564$$

Now form a normalized bandpass filter using the transformations shown in Fig 11, assuming $\omega_0 = 1$ throughout.

The upper branches are now transformed as follows:
For the left-hand branch,

$$L = 13{\cdot}7270\text{H}$$
$$C = 2{\cdot}0933\text{F}$$

$$\beta = \left[1 + \frac{1}{2LC}\right] + \sqrt{\left[1 + \frac{1}{2LC}\right]^2 - 1}$$

$$\beta = 1{\cdot}20476$$

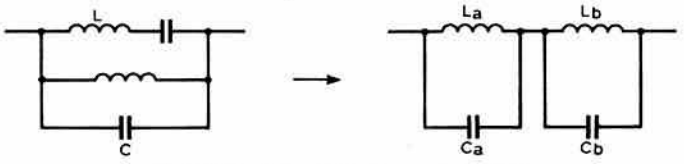

Fig 12. Transformation of upper branches

Table 3. Typical normalized filter design parameters

C 05 05

θ	ω_s	A_{min}	ω_a	ω_b	C1	C2	C3	C4	C5	L2	L4
40·0	1·5557	35·85	1·6170	2·4377	0·6580	0·1456	1·3282	0·4590	0·4426	1·1556	0·8331
41·0	1·5243	34·67	1·5833	2·3781	0·6521	0·1541	1·3168	0·4924	0·4252	1·1472	0·8099
42·0	1·4945	33·52	1·5515	2·3213	0·6460	0·1630	1·3053	0·5283	0·4072	1·1384	0·7862
43·0	1·4663	32·38	1·5213	2·2672	0·6397	0·1722	1·2937	0·5669	0·3885	1·1292	0·7620
44·0	1·4396	31·27	1·4926	2·2154	0·6332	0·1819	1·2822	0·6085	0·3693	1·1198	0·7375
45·0	1·4142	30·17	1·4654	2·1660	0·6265	0·1920	1·2706	0·6535	0·3494	1·1099	0·7125

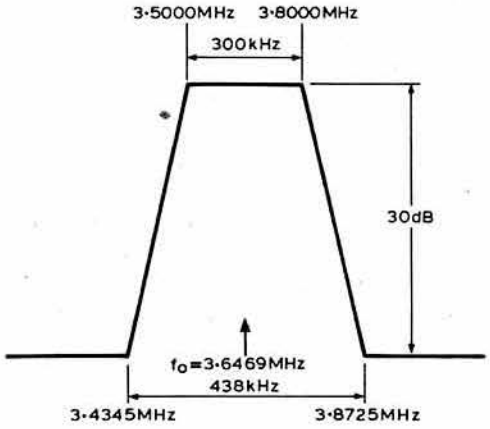

Fig 13. Filter frequency response

$$L_a = \frac{1}{C(\beta+1)} = 0{\cdot}21667H$$

$$L_b = \beta L_a \quad = 0{\cdot}26104H$$

$$C_a = \frac{1}{L_b} \quad = 3{\cdot}83088F$$

$$C_b = \frac{1}{L_a} \quad = 4{\cdot}61529F$$

$\Omega_a = 1{\cdot}09762$, $\Omega_b = 0{\cdot}91107$

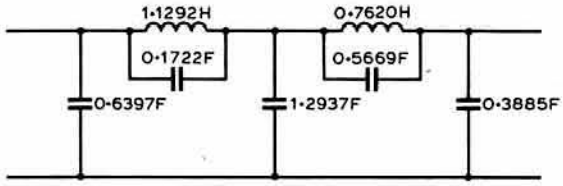

Fig 14. Component values for C 05 05 $\theta = 43°$

For the right-hand branch,

$L = 9{\cdot}2632H$
$C = 6{\cdot}8915F$
$\beta = 1{\cdot}13324$
$L_a = 0{\cdot}06802H$
$L_b = 0{\cdot}07709H$
$C_a = 12{\cdot}9727F$
$C_b = 14{\cdot}7012F$

$\Omega_a = 1{\cdot}06454$ $\Omega_b = 0{\cdot}93938$

These transformations are shown in Fig 17.

At this point it is worthwhile checking the calculations. First,

$$Q_{bp}(\Omega_a - \Omega_b) = \omega_a \text{ or } \omega_b.$$

For the RHS, $Q_{bp} = 12{\cdot}1564$ $\Omega_a = 1{\cdot}06454$ $\Omega_b = 0{\cdot}93938$

$12{\cdot}1564\ (1{\cdot}06454 - 0{\cdot}93938) = 1{\cdot}5215$

$\simeq \omega_a\ (1{\cdot}5213)$

For the LHS, $12{\cdot}1564\ (1{\cdot}09762 - 0{\cdot}91107) = 2{\cdot}26778$

$\simeq \omega_b\ (2{\cdot}2672)$

Now the filter is scaled to the centre frequency of 3·6469MHz and, assuming a system impedance of 50Ω, the final filter design is shown in Fig 18.

Choice of components

Passive filters are suitable for frequencies from 100kHz upwards; below this frequency inductor values become large, entailing bulky and often lossy coils. Active lf filters remove the need for inductors completely by using operational amplifiers.

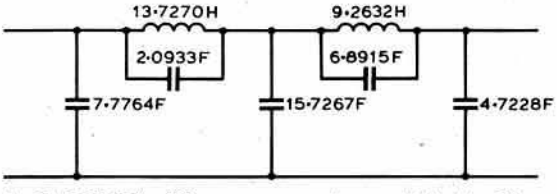

Fig 15. C 05 05 $\theta = 43°$ component values multiplied by Qbp

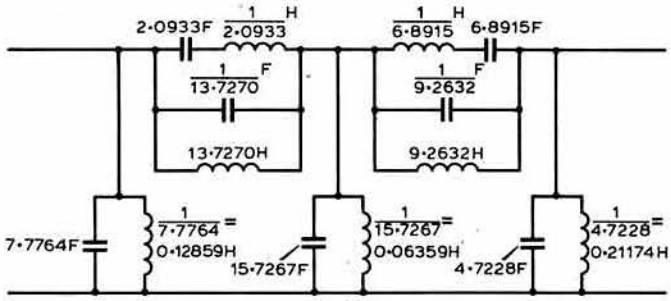

Fig 16. Normalized bandpass filter

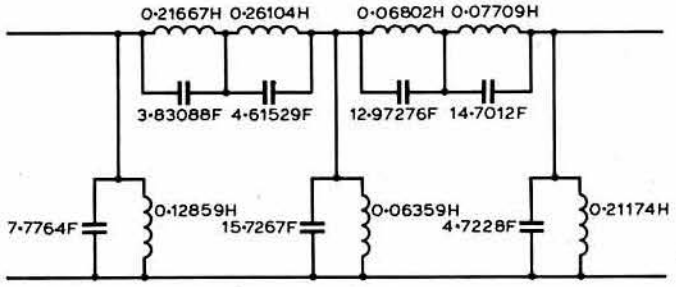

Fig 17. Normalized bandpass filter with transformed upper branches

Silver mica, polystyrene or low-K ceramic capacitors are most suitable with their one to two per cent accuracy ensuring good repeatability of the design. The author has found toroidal inductors to be most useful, providing high-Q and self-screening properties. For single layer and pile-wound coils, the correct ferrite core will enable a high-Q to be obtained and assist adjustments.

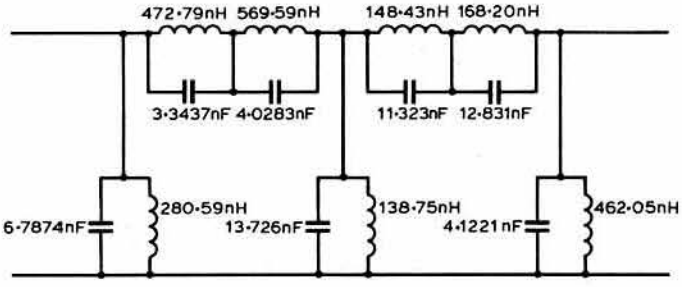

Fig 18. Final scaled circuit

Optimum results will be obtained with highly accurate values of components. It is wise to check the values of inductors before they are placed in the circuit, since turn spacing and lead lengths can cause errors. This can be done using a gdo and a frequency counter. Accurate capacitor values can be made by series and parallel combinations, remembering that the accuracy cannot be better than the least accurate component.

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TECHNICAL TOPICS

Pat Hawker, G3VA

THERE ARE many radio amateurs, not only in the UK, who find it difficult to be enthusiastic about the changes that they see creeping (some would say galloping) into the hobby. Perhaps it may be of some reassurance to note that this is by no means a new phenomenon.

In October 1938, I was making my first tentative contacts with a brand-new callsign. I tend to look back nostalgically on that era as "vintage amateur radio". Yet, that same month, in a letter to the editor of *The T & R Bulletin* (as *Radio Communication* was then called), G. C. Oxley, G8MW, was writing:

"What are the needs of British amateurs? So far as I can find they are very simple: ability to scrape through the telegraphy test and a fat bank balance. The cash is necessary to pay for the latest 'Bultitoob Z Super-super', the 250-watt-plus transmitter, the extra charge for a high-power licence, with quite a sum reserved for fancy QSL cards". G8MW continued:

"In 1921 G2JK wrote: 'The aim of the true wireless experimenter should not be merely to purchase a complete installation or to build one up from a complete set of working drawings, but rather to *design* his set' . . ."

Change "bultitoob" to solidstate; 250-watt-plus to about 1kW; and reserve an even larger sum for fancy QSLs and dxpeditions; and for 1938 read 1982!

However, there was (and is) a brighter side. In 1938 the editor headlined G8MW's letter "Scathing but fortunately not quite true". Admittedly, I was one of those who learned morse solely with the object "to scrape through the telegraphy test": I took mine at the height of the Munich crisis of 1938 feeling that it was highly unlikely that any more licences would be issued. I even used "phone only" for the first few weeks when the licence finally did come through. But I certainly did not (as a schoolboy) have a bank balance, let alone a fat one. I used either an 0-v-1 or an ordinary "all-wave" broadcast receiver and left the "bultitoob" models to others. And the rig, with 350V on a T20, ran only marginally above the 10W of my licence.

Today, it is perhaps easier than in 1938, or even 1921, to believe that amateur radio is going off the rails and heading towards little besides a factory-built squawk box, a linear and a rotary beam. Yet whenever I meet other amateurs I find them still interested in the technical side of the hobby; many even share my belief that cw is still a good mode. Some *like* using low power. The hobby seems constantly to renew its dynamic, its proven survivability. There is still hope that amateur radio will outlive the factory rigs, the plethora of operating awards, contests and dxpeditions, even the anti-morse lobby.

Plus ça change, plus c'est la même chose.

Electrically short antennas

One of the significant differences between operation on hf and vhf is that on some of the lower hf bands it is usually necessary to use antennas physically shorter than the λ/2 needed to achieve resonance and with the element relatively close to the ground. Even on the higher hf bands this will also usually be true of mobile or "balcony" antennas. Such antenna systems are made resonant by inductive or capacitive loading and/or by working in monopole rather than dipole fashion against earth.

Theoretically, it must be emphasized, a correctly-designed short vertical antenna can provide a very efficient system; unfortunately it is only in exceptional circumstances (for example, a ship-board installation with its salt-water "earth") that anything like the theoretical efficiency can be achieved, even when the ohmic losses are reduced by using large-diameter highly-conductive elements and capacitive rather than inductive loading. This is because the radiation resistance will normally be considerably lower than the total loss resistance, so that most of the rf energy fed to the antenna is dissipated as heat in the earth: Fig 1. The true radiation efficiency may be only a few per cent; for example, if this is five per cent (by no means untypical) then from every 100W of expensively-generated rf safely delivered to the element only 5W will radiate, most of it in every direction and at every vertical radiation angle other than those needed to take the signal towards the dx station.

Stan Gibilisco, W1GV/4, in "Efficiency of short antennas" (*Ham Radio*

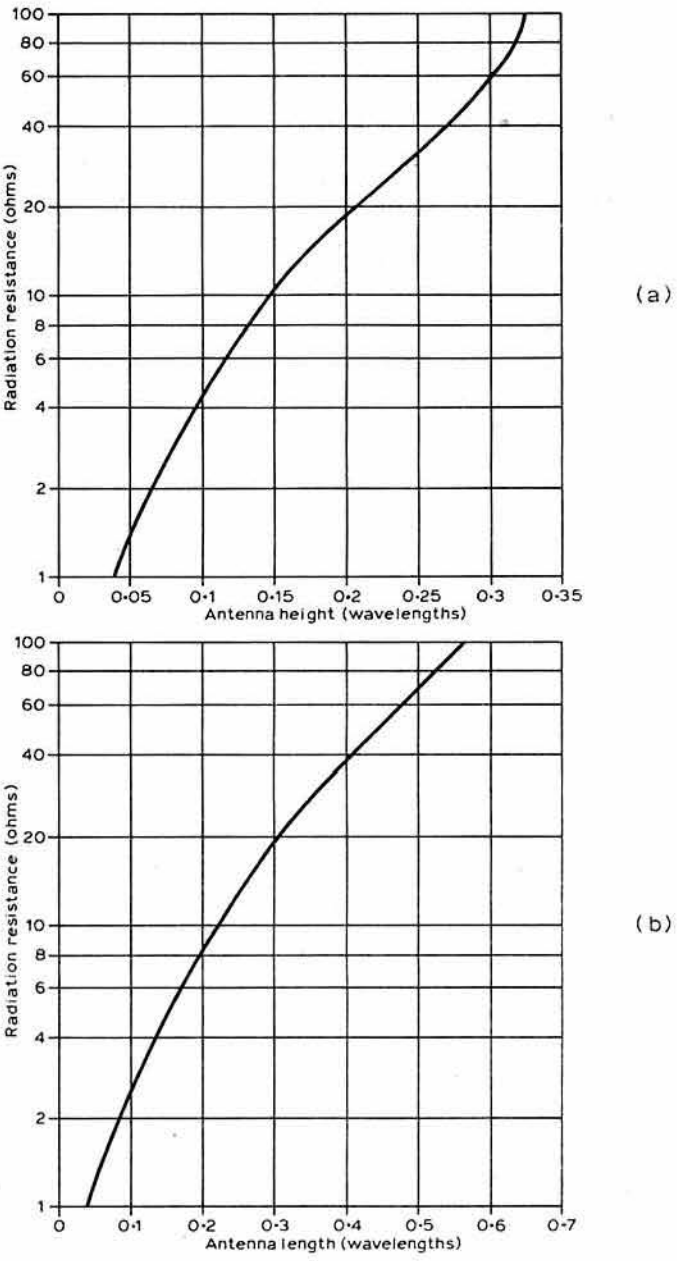

Fig 1. (a) Radio resistance of a short vertical antenna in terms of its height. Note this graph applies only to single-element radiators without parasitic or phased elements. (b) Similar curve for short centre-fed dipole elements. (Stan Gibilisco, W1GV/4)

September 1982, pp18–21) shows that the radiation resistance of a λ/10 vertical rod is roughly 4Ω, whereas the total loss resistance of such a system may easily be 50Ω or more, representing an efficiency of less than eight per cent. In these circumstances, incidentally, a low swr is often a sure sign of *inefficiency*!

The effect of the earth

It has to be admitted that in our approach to antenna planning we tend to over-simplify and think in terms of text-book, two-dimensional radiation-pattern diagrams. It is not easy to think three-dimensionally except in terms of "free-space", even though we may be well aware of the basic fact that in practice the spherical shape of "free space" has to be cut in two by the ground beneath us with all the further complications of "image" elements. Nor do we usually worry unduly about the lobes and nulls in the vertical radiation pattern when we think in terms of directivity.

Table 1, derived from the Rockwell International (Collins) *HF Communication Data Book*, shows simple hf antennas in unfamiliar guise, suddenly endowed with "gains" that might appear to put a three-element beam to shame (although we should remember that an antenna array is equally not located in free space). The table assumes that the antenna is above a perfect

TABLE 1—Gain of simple antennas above perfect ground

Antenna type	How located	Max gain (dBi)	Direction of maximum gain
Short dipole	Free space	1·76	Plane perpendicular to axis
λ/2 dipole	Free space	2·15	Plane perpendicular to axis
Short vertical monopole	Over perfect ground	4·76	Towards horizon
λ/4 vertical monopole	Over perfect ground	5·15	Towards horizon
λ/2 horizontal dipole	Close to perfect ground	9·1	Straight upwards
	λ/4 above perfect ground	7·4	Straight upwards
	λ/2 above perfect ground	8·2	Plane perpendicular to axis, 30° above horizon
	5λ/8 above perfect ground	9·2	Plane perpendicular to axis, 24·6° above horizon
λ/2 vertical dipole	λ/2* above perfect ground	8·2	Towards horizon

*Height from ground to centre of antenna

(***Source** HF Communication Data Book* by Collins/Rockwell International)

earth. But if the figures show anything it is that they should bring home to us the extent of the losses brought about by less than a perfect earth.

Ever since the classic work by Dr George Brown and his RCA colleagues in the 'thirties, the preferred form of earth system for mf broadcasting monopole antennas has comprised 120 long buried radials. Indeed this can be shown to provide an extremely efficient earth, but it has meant that for over 40 years very little attention has been given to the use of elevated "counterpoise" systems that were widely used and popular in the 'twenties and 'thirties.

Thus for many years the very term "counterpoise" has been slipping out of use, at least until its recent revival as a result of the work of Les Moxon, G6XN, *(TT* and *HF Antennas for all locations).* Yet parallel work by Phil Horwood, G3FRB *(Rad Com* November 1981) and Dr Martin Sweeting, G3YJO, as reported in *TT* August 1982, shows that an elevated groundplane, groundscreen or counterpoise are systems *more* not *less* efficient than an equivalent number of buried radials.

The counterpoise investigated

During the past few years three former professional engineers, led by Archibald Doty, K8CFU, have been enlivening their retirement by investigating this question of the relative efficiency of buried radials, groundscreens both on the surface and elevated, and elevated counterpoises. After making many *thousands* of measurements they have just presented to an IEEE meeting a paper "Characteristics of the counterpoise and the elevated groundscreen" (A. C. Doty with J. A. Frey and H. J. Mills) and a short version of this paper is due to appear in *QST* this month.

A privately-funded research project of such a magnitude, undertaken by three elderly engineers with an aggregate age of 203 years, setting out and succeeding in showing that a good deal of what has appeared in the professional antenna literature during the past 60 years on this subject is in error, or at least seriously flawed, is remarkable. That the project succeeds in pinpointing how the errors occurred and in resurrecting the importance of the counterpoise is even more remarkable!

This ambitious project has unearthed (if I dare use that word) several important new facts; in particular it shows that the currents flowing in buried radials of the conventional type are *not,* as usually postulated, uniform, but depend upon ground conductivity in the immediate vicinity of the individual wires. It indicates that there can be unexpectedly large variations in surface ground conductivity within the area covered by the ground system of a typical vertical antenna. But the tests further show that the distribution of return currents collected by wires elevated by 6 to 8ft is distinctly different from that found in buried radials. Lossy ground between the antenna and the radials reduces their efficiency in providing return currents. All the initial indications are that elevated ground systems (whether counterpoise or elevated but earthed groundscreens) as in Fig 2,

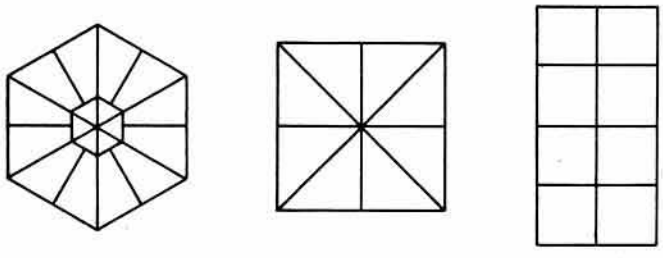

Fig 2. Typical multi-wire counterpoise or groundscreen system mounted below a vertical antenna. Recent intensive investigations by Arch Doty, K8CFU, and friends show that such systems are more efficient than *buried* systems of comparable size. (Doty, Frey and Mills)

used with electrically-short vertical antennas *require substantially fewer radials than needed by a buried wire system of equal efficiency.* A conclusion calculated to upset conventional thinking of the past 40 years!

This does not mean that buried radials do not make good earth systems, but it does suggest that elevated systems are more efficient.

Directivity of optimum-shaped antennas

Landstorfer's optimum-shaped 3λ/2 antenna element, described in the December 1982 *TT,* has attracted comment from readers who are puzzled by the single-headed arrow shown in Fig 1 that month and by my use of the term "unidirectional". It has been pointed out that the element can be *approximated* to a short unterminated long-wire V-beam or to a set of three dipoles in a W8JK-type of driven array. In both cases these approximations result in *bi-directional* radiation patterns. Jim Watt, G6ZC, has provided a careful vector analysis to support this view.

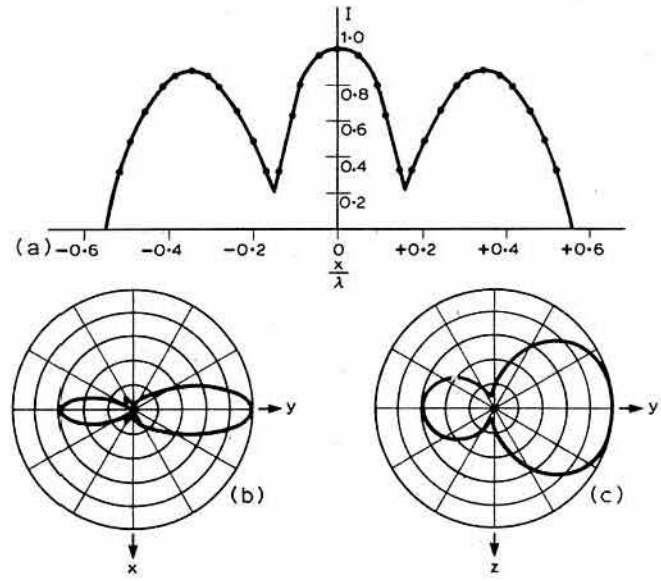

Fig 3. (a) Normalized current distribution on an optimum-shaped 3λ/2 element. (b) E-plane power pattern. (c) H-plane power pattern. (Cheng and Liang)

In fact, these readers are *approximately* right. Fig 3 shows the current distribution and radiation patterns of a *single* 3λ/2 shaped element as calculated by D. K. Cheng and C. H. Liang of Syracuse University (*Electronics Letters* 16 September 1982). These show an *approximately* bi-directional pattern, but with pronounced major and minor lobes that represent forward gain, though with a relatively poor front-to-back ratio. The forward lobe, however, is sufficiently pronounced to justify Landstorfer's single-headed arrow and (perhaps less excusably) my use of the term "unidirectional", even though from an operating viewpoint it would work well in both directions. To quote from Landstorfer's 1979 explanation: "If properly shaped a 3λ/2 dipole can be a very efficient radiator, which is superior in gain to conventional straight-lined dipoles. The basic idea is to compensate the phase differences within the current distribution by time delays. Due to a special shaping, waves originating from various sections of the antenna arrive at different times at a far-off

point in the direction of main radiation (parallel to the plane of symmetry). The time delays correspond to phase shifts. For optimum shape of the antenna structure the resulting phase shifts will approximately compensate the phase reversals within the current distribution, and the field strength phasors in the far-field will add almost *in* phase. *This is only true, however, in the deliberate direction of main radiation*—but will in general not hold for other directions. As a consequence, relatively high values of directivity can be expected with such an antenna." (my italics). Of course when combined with other elements, as indicated in December, true unidirectional patterns with good front-to-back ratios can be expected.

Solar generators—amorphous silicon

Another way in which solar generators (see *TT* January 1983) may become more attractive is the developing use of amorphous silicon, even though at present the conversion efficiency of amorphous silicon photovoltaic cells is less than that of conventional silicon cells. The attraction of amorphous silicon, both for solar cells and liquid crystal displays, is that large-area cells can be fabricated. The professional journals are beginning to contain many references to this semiconductor material, so it is as well to come to terms with this development.

What is amorphous silicon and how does it differ from silicon semiconductors? The following paragraphs are based on some notes issued recently by Racal Research Ltd.

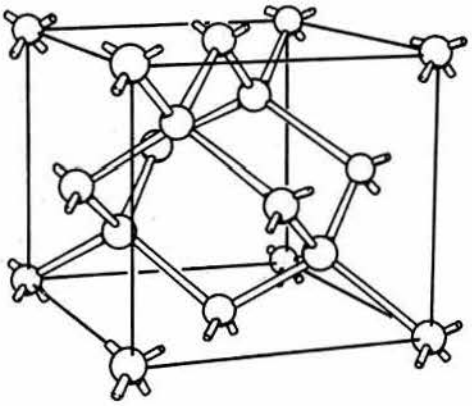

Fig 4. Crystal structure of silicon

"In a perfect crystal of silicon the atoms are arranged in a regular pattern (Fig 4). Each atom has four equidistant neighbours symmetrically arranged at the vertices of a regular tetrahedron; all the interatomic bonds are the same length and all the bond angles are 109°; the characteristic 'six-membered ring' can also be seen in Fig 4. This structure is repeated indefinitely and symmetrically throughout the crystal—there is 'long-range order' and perfect 'periodicity'.

"In amorphous silicon each atom is again surrounded by four neighbours, but otherwise the correspondence with the crystalline material breaks down. The neighbours are not equidistant, the bond lengths and angles vary, and rings of atoms may have five or seven members (Fig 5 shows this schematically). Furthermore, amorphous silicon may contain as much as 10 atomic per cent of hydrogen, whereas silicon crystals are ultra-pure. The result is that, in contrast to silicon crystals, there is no long-range order in the amorphous material.

"A consequence of this lack of long-range order is that the standard quantum theory of crystalline solids—which has successfully explained why some materials are conductors while others are insulators or semiconductors—needs to be modified for amorphous solids. It appears

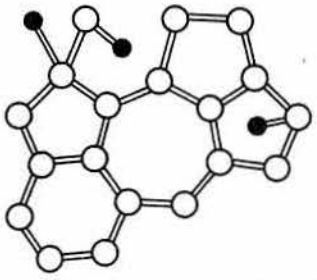

Fig 5. Schematic representation of amorphous silicon that may open the way to large area photovoltaic solar cells. The filled circles represent hydrogen, the open circles silicon

that the sharp 'energy-band edges' of crystalline materials are replaced by 'mobility edges'—a sharp increase in electron mobility—which explains how conductivity can occur (though it must be said that the theory is not yet fully worked out).

"A major experimental advance occurred when research workers demonstrated that amorphous silicon could be doped, making possible diodes and transistors. An important feature of this work was the incorporation of hydrogen into the silicon to nullify the 'dangling bonds' which might inhibit conductivity (Fig 5). However, amorphous silicon technology is still in its infancy—rather as crystalline silicon technology was in the days of germanium.

"The starting-point for the manufacture of silicon chips is a sausage-shaped 'boule' of ultra-pure single-crystal silicon which is cut into slices ('wafers'), processed, cut into dies a couple of millimetres square, which are then mounted in a package of some sort, usually rectangular with legs. It is obvious that the largest 'chip' that can be made is limited by the diameter of the slice (or of the 'boule') which is, with present technology, 5in at most —larger crystals are difficult to grow. Another problem would be the 'yield'—if the device occupies the whole slice, a single defect could make it useless.

"Amorphous silicon devices, however, being prepared in a different way, can be made much larger."

There is still some way to go before we are likely to see widespread use of amorphous silicon devices in amateur radio equipment. But it is not so many years ago that germanium was the latest thing in semiconductors, and silicon and gallium arsenide technology seemed in the distant future!

Microwave oven rfi

During the past few years I have referred several times to the interference problems experienced by radio astronomers and those using 12GHz satellite television receivers arising from the crude but powerful and harmonic-prone magnetron "transmitters" used in microwave ovens. Bill Orr, W6SAI, in "Ham Radio Techniques" *(Ham Radio* September 1982, pp40–1), describes from personal experience a rather different type of rfi affecting mf, hf and vhf reception, arising from microwave ovens. He first encountered it when the output of his kitchen broadcast radio was obliterated each time his new oven was turned on and replaced with "a raspy sound like that of a chain-saw cutting through a hard oak knot". Broad wiggly bands appeared across his low-band vhf tv channels, and the raspy sounds were found to show up on 1·8 and 3·5MHz.

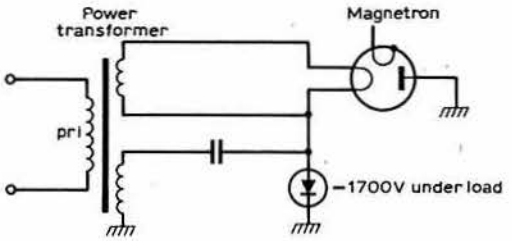

Fig 6. A typical crude high-voltage power supply for the magnetron in a microwave oven. This provides "rac" (rectified ac) output with the voltage changing from −2,800V on standby to −1,700V on full load. Unless an rfi filter is connected in the primary circuit of the mains transformer, such a system is likely to inject harmonic-prone pulses into the mains wiring in much the same way as some switched-mode power supplies for colour television receivers or thyristor-type light dimmers

Refraining from shouting "timber", W6SAI traced the problem to the "rectified ac" high-voltage power supply for the magnetron; that is to say, half-wave rectification with no filter capacitors: Fig 6. Attempts to interest the oven manufacturers in his problem finally resulted in their refusal to provide a free rfi filter but their willingness to sell him a German-made filter for $25 including delivery charges. This cured the problem. Bill Orr, however, is naturally indignant that while some countries insist that rfi filters are fitted to microwave ovens, others do not. In general, any psu fitted with semiconductor rectifiers is liable to inject "hash" into the power line unless some form of rf filtering is used. Often this can be very simple.

200–300V regulated psu

Although most interest these days tends to be centred on low-voltage, high-current power supplies, there is still a demand for bench-type units capable of supplying an adjustable well-regulated and current-limited output at about 250V.

Such a unit, based on the use of a power-fet 'pass' device and an ic floating regulator, has recently been described by H. F. Nissink of the Australian Maritime College in *Electronics* 3 November, 1982: Fig 7. It is designed to

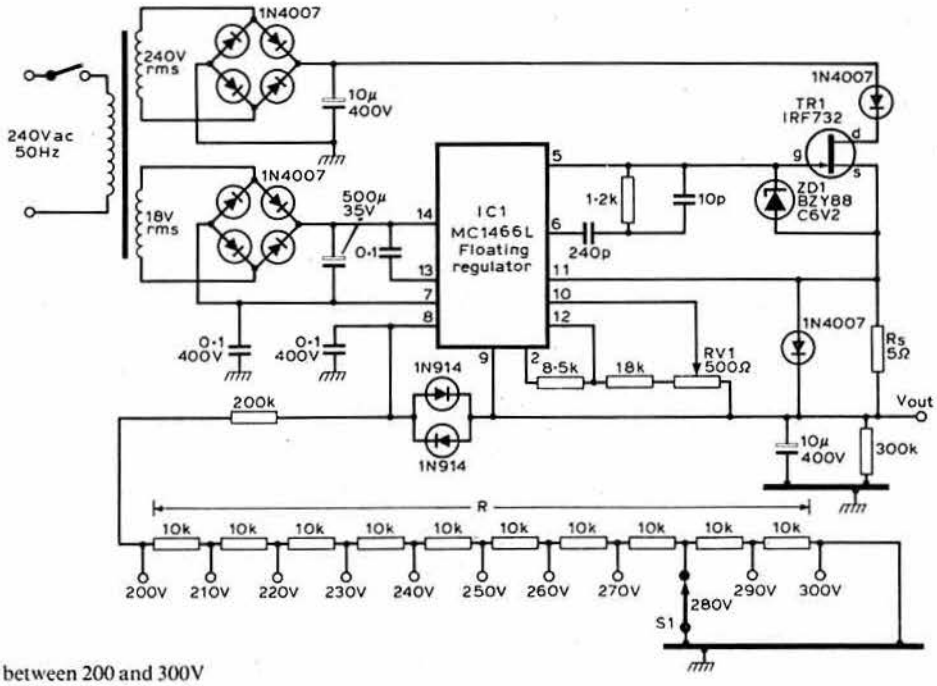

Fig 7. Power supply delivering a regulated output of from 200 to 300V in 10V steps with adjustable current limiting to a maximum of 50mA. The low drive required for the power fet regulator enables the regulator to boost the output voltage and eliminates the need for the conventional Darlington-type amplifier

provide a regulated output adjustable in steps of 10V between 200 and 300V with a maximum constant-current output of 50mA, although this can be adjusted downwards. The use of a power-fet, with its low-drive requirement, eliminates the need for the usual Darlington-type stage to drive the pass transistor. The MC1466L ic floating regulator provides a 300V reference voltage across the resistor chain; for continuously variable output this chain can be replaced by a 100kΩ linear potentiometer. The output voltage is compared with this, and the error voltage applied to the gate of the pass fet. The zener diode ZD1 provides extra gate protection for the fet. The current sensing resistor, Rs, determines the maximum constant-current output, while the actual value can be adjusted from zero to 50mA by means of RV1.

Wide-range absorption wavemeter

In the 'thirties the most essential "test equipment" for any radio amateur was: (a) multi-range dc volt-ohm-milliamp testmeter; (b) neon bulb as an rf voltage detector; (c) torch bulb and loop as rf current detector; and (d) an absorption wavemeter, preferably calibrated against quartz crystal frequencies. Despite all the changes, one could still do a lot of useful work with just those tools of the trade.

David Long, G3PTU, considers that although many designs for absorption wavemeters continue to be published, they mostly are intended to cover only a limited range, particularly on vhf or uhf. He has recently built a wavemeter that remains reasonably sensitive throughout the range 70MHz to 1·3GHz based on a now obsolete but once popular type of tv tuner. He writes:

"After many attempts to produce wide-range wavemeters using switched inductors without much success, an alternative approach was adopted successfully. In this design (Fig 8) one has virtually a collection of separate wavemeters sharing a common meter movement.

"A suitable tuner was obtained from a local tv 'graveyard'. This type of unit was made by HDF Ltd and widely used by Pye and other associated companies; unlike the standard tuners, these covered Bands 1, 3, 4 and 5 in one compact unit; as a result they have more ganged sections to the tuning capacitor, and are of larger capacitance swing than can be found in separate uhf and vhf tuners.

"All components were removed from the unit with the exception of the ganged capacitors, the trimmers and the leadthrough capacitors that originally carried the ht, heater leads etc. As can be seen from Fig 8, a bnc socket is mounted in each compartment of the chassis, and the dividing partitions were made rf-proof with copper sheet and solder. At the rear of each compartment a leadthrough 1,000pF capacitor is mounted; in some cases a hole had to be drilled to accommodate this. Each compartment is then formed into an individual wavemeter, the detector diode being wired to the leadthrough capacitor. It is important that all diodes should be connected in the same sense and should be of superior type (eg HP2800 diodes available from Messrs J. Birkett of Lincoln).

"A sensitive meter and resistors complete the device. The low input impedance to each wavemeter can be fed via coaxial cable from a coupler off a transmission line or alternatively from a search loop. One selects the appropriate range by connecting the cable plug to the correct bnc socket, leaving the others open-circuit.

"Good calibration is needed, and this will be easier for some people than others. It should not present any difficulty if you have access to a suitable signal generator; a transmitter with detectable harmonics can also be used.

"My unit covers 70MHz to 1·3GHz in four ranges. Although sensitivity is a little low at the high end, the third harmonic of a 432MHz source can be identified. The principle of having separate tuning circuits works well, and the device has proved very useful during constructional activities. Other similar arrangements would probably prove equally successful. A basically similar unit has already been built covering 1·7 to 180MHz."

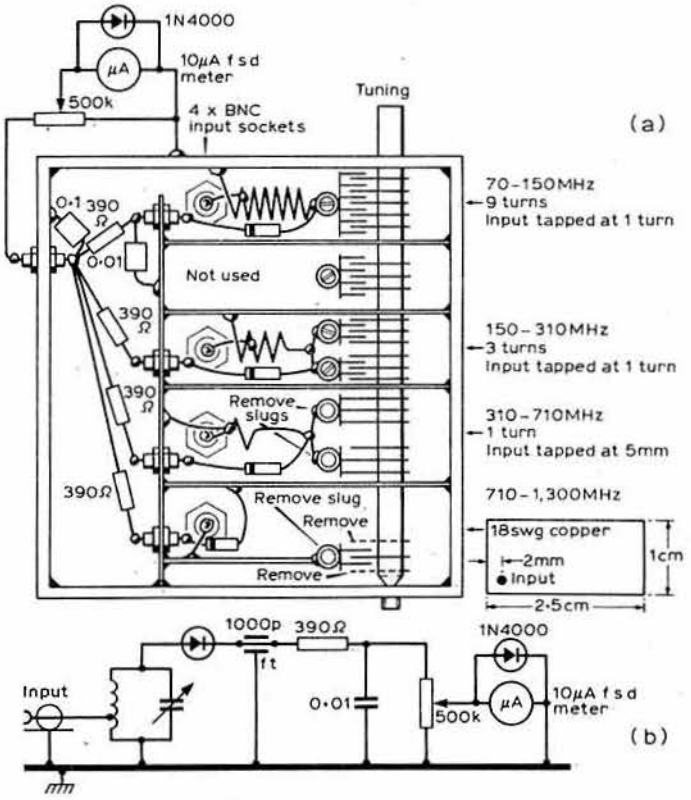

Fig 8. Wide-range absorption wavemeter covering 70-1,300MHz made by David Long, G3PTU, using old dual vhf/uhf tv tuner assembly. In effect four separate resonant circuits share a single sensitive meter

Hands-free binocular magnifiers

The decreasing size of components and the trend towards microminiaturization have tended to make electronic construction rather like old-style watch repairing: a task calling for what the Americans call 20/20 vision, and even then a magnifying glass is often an invaluable aid. For those of us who, with the passage of years, have needed the aid of the optician, the task becomes increasingly difficult. Bifocal glasses are useful, but even with so-called "executive-type bifocals" one finds the angle of vision rather restricted. A large magnifying glass can be a great help for those with three hands.

Recently I happened to mention this problem to a visiting American amateur. He said immediately that the answer was a good head-mounted binocular magnifier, and that these aids were increasingly being used for electronic constructional work in the USA. I had to admit that I had never come across such a device.

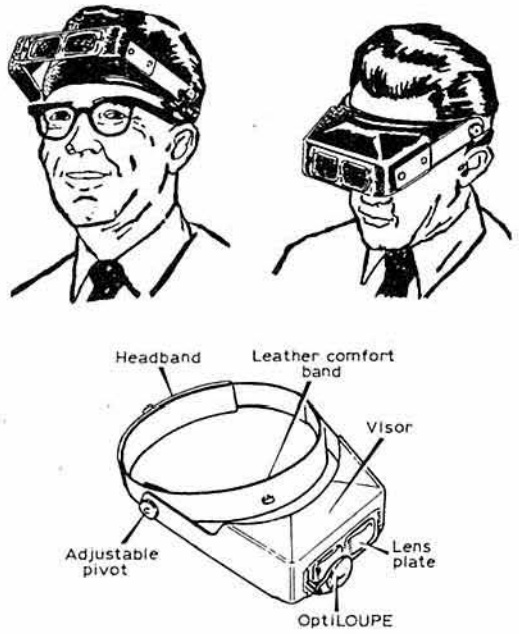

Fig 9. The "OptiVisor" device that provides hands free when working on miniature circuits, etc. When not required the "visor" is raised. Provision is made for an attachment for either eye

Now, thanks to his generosity, I have been trying out an "OptiVisor Model DA5"—an optical glass binocular magnifier made by the Donegal Optical Company Inc, 15549 West 108th Street, Lenexa, Kansas 66219, USA. Model makers tell me these devices are advertised in magazines for British model enthusiasts. This ingenious device (Fig 9) is fitted with good quality glass lenses ground and polished to full ophthalmic standards. Six different lens plates are available, with magnification/focal lengths ranging from No 2, 1½-times/20in to No 10 3½-times/4in. The model I have been using has Plate No 4 2-times/10in. The lens plate is fitted into a visor that is roomy enough to fit over normal glasses. The headband is adjustable and it is all quite comfortable to wear over long periods.

I do not know if similar devices at similar prices (around $25) are available in the UK. But it does seem a useful idea both for constructional work and for proof-reading the smallest sizes of type.

Automatic switch-off circuit

The problem with battery-operated test and ancillary equipment for absent-minded people like me is that we forget to switch it off after use and then, next time, find the battery exhausted. One solution is to add automatic switch-off circuitry to any equipment that is not linked in with the main station on-off switch. Fig 10 shows a battery-saving circuit that has been described by Dr T. F. North, of Grange Electronics, in the applied ideas section of *Electronic Engineering* June 1982, p22.

This circuit automatically switches equipment off after about half-an-hour and is designed so that it is easy to incorporate into almost any equipment, even when this has its on-off switch mounted on a printed circuit board.

Installation and switching action is described as follows: "The equipment's negative battery lead is cut and the two ends connected as shown in Fig 10. The only other connection required is to the equipment's switched positive supply.

"On switching on, the cmos CD4060 ic counter is reset by C1. The Q14

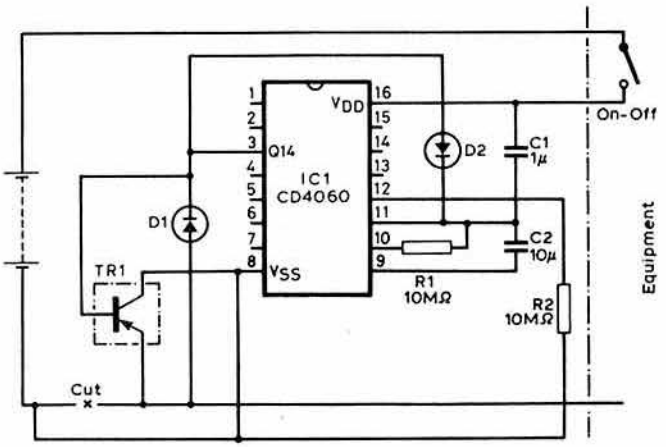

Fig 10. Automatic switch-off attachment that saves batteries

output goes low and provides power to the equipment through diode D1. If this is more than a few milliamps then a suitable pass transistor (TR1, shown dotted) should be substituted for D1. The oscillator (C2 and R1 and internal inverters in IC1) will clock on the counter until Q14 goes high. D2 will then inhibit the oscillator so that the equipment remains switched off until its own on-off switch is first switched off and then on again."

TVI and the vcr

In the January *TT* it was shown, on the basis of the Home Office work carried out by Dr J. Durkin, how vulnerable consumer-electronics equipment is to direct breakthrough of strong local signals, almost regardless of transmission frequency. But one growing problem was not mentioned. This is the much greater susceptibility of television receivers to tvi when these are being used in conjunction with the growing number of video cassette recorders (vcr machines) already in use in almost three million homes in the UK.

Shaun Scannell, G3ZSU, has looked into several cases of vcr-induced tvi, and rightly feels that other readers will be interested in some observations on this subject. He writes:

"There does not appear to be any vcr currently on sale designed expressly for use in the UK. All available models appear to be fitted with tuners that cover vhf Bands 1 and 3, and uhf Bands 4 and 5. Consequently the input diplexing amplifier which splits the incoming tv signals between recorder and associated tv set is a wideband amplifier providing at least some gain over the entire range of about 20 to 900MHz. One model checked recently had 12dB gain even at 14MHz.

"This wideband amplifier remains in operation all the time that the video machine is connected to the mains supply, even when the user is watching broadcast programmes; to the viewer the vcr is only operating when the tape is in motion. A recent case of tvi resulting from 28MHz operation was cured by fitting a good high-pass filter between the antenna and the vcr plus a toroidal braidbreaker between the vcr and the tv set.

"There is another problem. The output from the video tape head drum feeds into an extremely high-gain wideband amplifier which covers a frequency range of from near dc to about 4 or 5MHz; thus operation on 1·8 or 3·5MHz could lead to direct pick-up in this head-amplifier. Indeed one local tv technician tells me that it can require a separation of several feet between vcr machine and tv set just to prevent interference to the head-amplifier from the tv timebase or switching-mode power supply.

"Any form of tvi/rfi, even if curable with filters, causes social problems between neighbours. It would surely be easy for Parliament to pass a short consumer-protection Act that "any video tape machine shall have no significant response to signals other than those within the tv broadcast Bands 4 and 5. Makers would then have to fit suitable high-pass filters to the input amplifiers.

"I sometimes wonder whether, were it not for the motor vehicle construction and use regulations, some manufacturers would bother to fit brakes to their cars. After all, doing so must put the cost up and the friction of the pads with the discs must increase fuel consumption and increase maintenance costs. Clearly car manufacturers would like to have the choice of fitting or not fitting brakes! This is analogous to the arguments presented by consumer electronics firms which appear to feel that each 'unnecessary' capacitor that adds 0·1p to the price of their products loses them custom."

It would be nice to feel that our MPs might be willing to pass such legislation as G3ZSU suggests. Nice—but I suspect it would take many sunspot cycles for it to happen! □

Sporadic-E observations in 1982

by R. A. HAM, BRS15744*

ALTHOUGH THE AUTHOR logged a sporadic-E disturbance around 50MHz during the early morning of 23 April, and two events (reaching higher in frequency) on 4 and 8 September, the typical and more widespread disturbances of the 1982 sporadic-E season began on 9 May and ended 113 days later on 29 August—some seven days less than the 1981 season.

During the 1982 season, sporadic-E manifestations, often disrupting radio and television signals between 40 and 80MHz, occurred on 38 days, compared with 39 days in 1981 and 52 days in 1980. The majority of daily observations were made around 0830, 1230 and 1800bst, and the sporadic-E events recorded at those times are indicated by the dark squares in Fig 1 under times A, B and C respectively.

Equipment

Throughout the period, the author used a JVC CX610GB colour receiver and a Sanyo 9300PN video recorder to locate both mono and colour, 625-line, pictures in the 48 to 68MHz region, and an ex-army R216 vhf communications receiver to check for broadcast dx between 40 and 100MHz. The signals were located by a combined Band 1/3 Yagi and fed to each receiver via an Antiference XS3 distribution amplifier.

Early warning

As in prevous years the television synchronizing pulses transmitted on Ch E2, 48·25MHz, and Ch R1, 49·75MHz, were used by the author for early warning of sporadic-E, because experience has shown that these pulses are among the first signals to appear and the last to fade away when sporadic-E is present. At the beginning of many of the events listed in Fig 1, the signals from the 28MHz beacons in Germany, DF0AAB, DK0TE and DL0IGI; Hungary, HG2BHA; and Norway, LA5TEN; often increased in strength from barely audible to exceptionally strong and, like the tv pulses, they proved to be another useful indicator, especially when trying to judge the extent of a growing disturbance.

Continental broadcasting stations

On most days indicated in Fig 1, the peak of the sporadic-E disturbance reached 80MHz, causing very strong signals to be received in many parts of the UK from a multitude of eastern European fm broadcasting stations

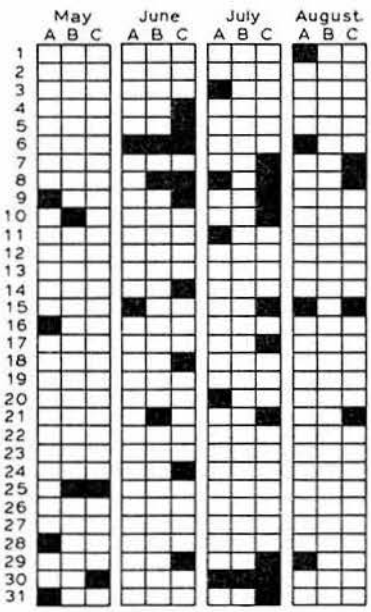

Fig 1. Monthly distribution of sporadic-E during the 1982 season

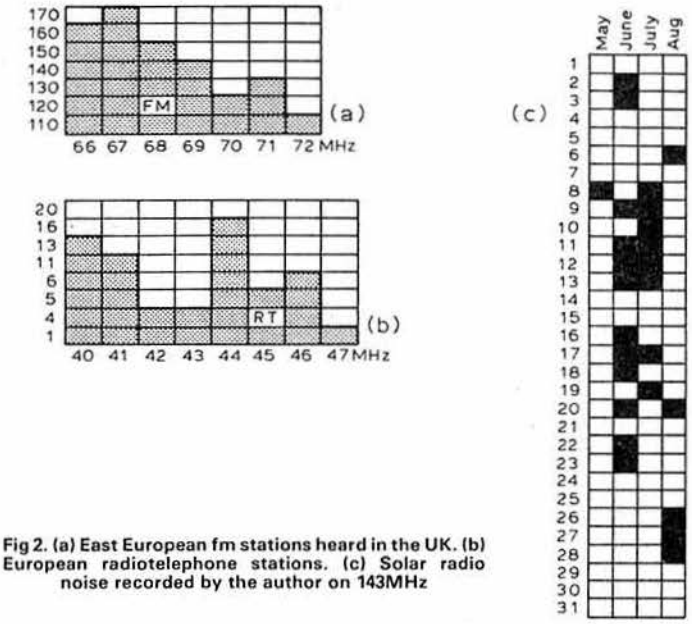

Fig 2. (a) East European fm stations heard in the UK. (b) European radiotelephone stations. (c) Solar radio noise recorded by the author on 143MHz

operating between 66 and 73MHz. The frequency distribution and the number of times that these signals were logged, between each megahertz, is illustrated in Fig 2(a). Although these signals were very strong during the peak of the disturbance, they were usually subject to deep and sharp fading at the beginning and shortly before the end of each event.

European radiotelephone stations

Another area of the spectrum worth investigating during the sporadic-E season is the lower end of Band 1, where European radiotelephone signals often appear. Generally these signals are strong and vary in numbers according to the intensity of the prevailing sporadic-E. During the 1982 season the number of such signals heard by the author, and indicated in Fig 2(b), was 60 compared with 93 in 1981 and 74 in 1980.

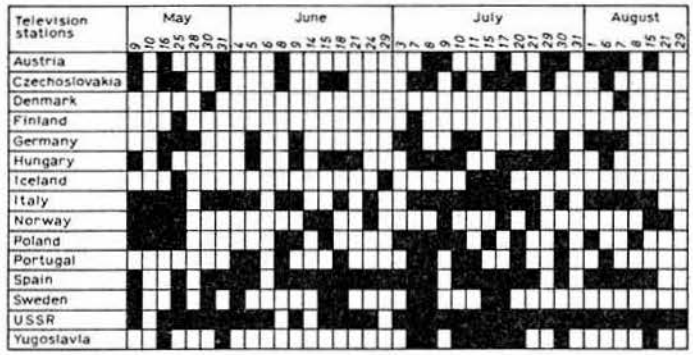

Fig 3. Distribution of tv pictures received by UK tv dxers during the sporadic-E season

Solar activity

Twenty-six days of solar activity were recorded by the author at 143MHz, Fig 2(c), between May and August, compared with 48 days and 38 days respectively for the same periods in 1980 and 1981. With the conclusion of another season's observations, there is still no evidence to suggest that there is any direct connection between sporadic-E disturbances and the "active" sun.

DX tv

Throughout the 1982 season, including several days not listed in Figs 1 and 3 (when activity was limited around 50MHz), a wide variety of television pictures were received in the UK from those countries listed in Fig 3. Most of the stations were identified by their clocks, inter-programme captions and test cards, and it was interesting to see pictures from Italy, Spain, Scandinavia and the USSR mixing together under the fluctuating influence of the sporadic-E. □

*"Faraday", Grayfriars, Storrington, Sussex.

The Snowdon effect—an interesting case of vhf propagation

by J. DAVID LAST, PhD, MIEE, GW3MZY*

THE ARFON 144MHz repeater, GB3AR, is installed at an IBA television station at Nebo, about 1,000ft up on the foothills of Snowdonia looking out over the Irish Sea. From here it serves amateurs in an arc stretching from the island of Anglesey in the north, through most of the Lleyn peninsula to the west, down to the Cardigan Bay coastal belt as far south as the Pembroke peninsula. It is also used by many stations in the coastal region of Ireland around Dublin.

To the east, though, things are very different (Fig 1). The mountains of Snowdonia rise to over 3,000ft without a break from northeast to southeast, with the Clwydian and Berwyn hills behind them and Cader Idris to the south. Looking out from the repeater in the direction of the northwest of England, one can see the massif of Snowdon itself lying across the path. Clearly, the repeater's signals are not going to be heard far in that direction and, since many of the contacts it carries are in Welsh, there are two serious barriers to communication!

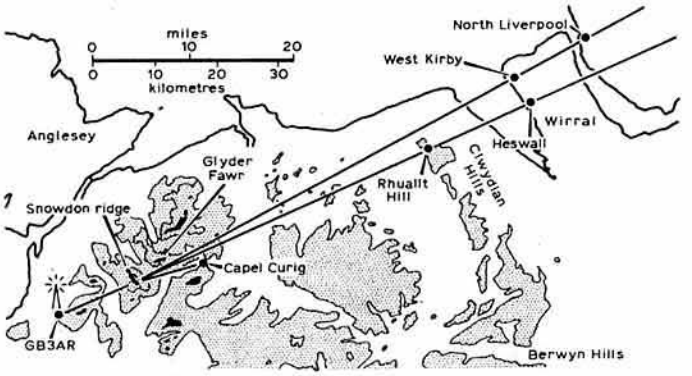

Fig 1. Locations to the east of GB3AR from which contacts have been made

However, shortly after AR came into service in 1979, reports began to circulate of amateurs accessing it from the most unexpected locations. GW4KAZ was heard from a deep valley bottom in the heart of the mountains at Capel Curig, a spot separated from the repeater by the entire mass of Snowdon! Then GW8UZL/M, returning home to enjoy a welcome in the hillside, heard a strong signal from AR for a very short distance while descending Rhuallt Hill on the A55 North Wales coastal route some 70km east of the repeater. A number of contacts were also made from further away by stations on the Wirral peninsula and the Lancashire coastal plain.

A remarkable feature of these reports was that, while the stations concerned could access AR consistently and under any conditions—G8LEM at West Kirby on the Wirral could do so using a 600mW hand-held transmitter—others a mile or so away could not even detect the carrier. Mobiles would hear the repeater's signal come out of the noise, peak to a moderately-strong level and fade again as they drove a distance of a mile or less. These observations led to heated discussions. Unworthy suspicions were voiced, and friends were won and lost! Clearly, the situation needed investigating.

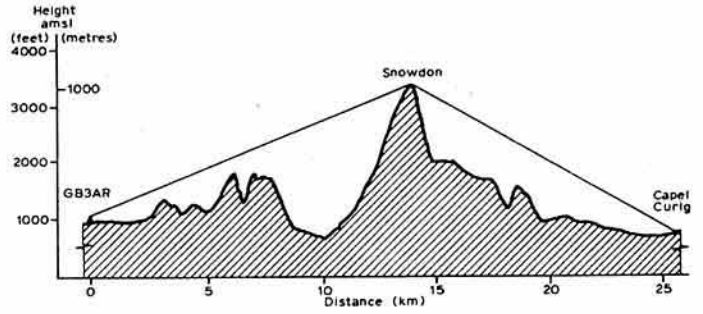

Fig 2. Vertical profile of the path from GB3AR to Capel Curig—Earth's curvature correction omitted

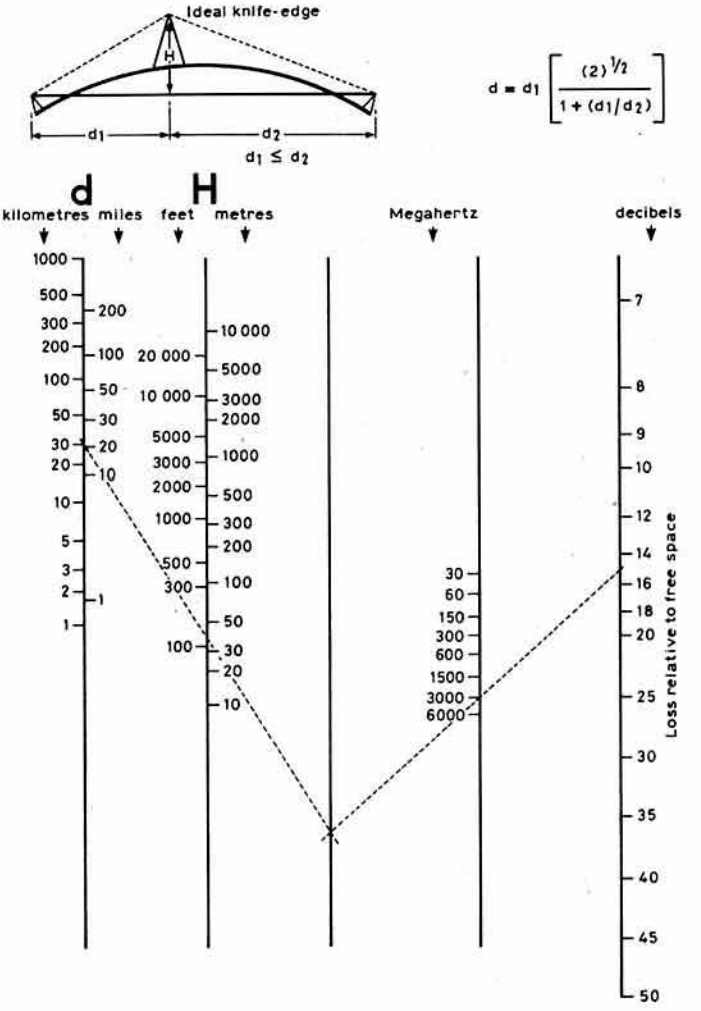

Fig 3. Nomogram for calculating knife-edge diffraction loss relative to free space (after Bullington [1,2])

Plotting on a map the locations from which AR could be accessed, showed that they all lay within a sector some 10° wide. It appeared, therefore, that there was something very unusual about propagation in this direction.

The Capel Curig case was studied first by drawing the profile of the path from the repeater. The result, shown in Fig 2, is quite dramatic. The repeater stands at 1,035ft above sea level, and Capel Curig at 650ft, but the shortest path joining them passes close to the summit of Snowdon and has a maximum altitude of 3,400ft. No other hill intervenes: Figs 1 and 2 show that there is line of sight from the repeater to the summit, while the path from the summit to Capel Curig lies along the narrow valley of Dyffryn Mymbyr.

At first sight it might appear that this valley is setting the width of the sector in which signals are received, but close inspection of the map shows that it is not nearly narrow enough to do so. Some other factor must be involved. And it has still to be explained how the signals are getting past Snowdon in the first place.

Returning to the path profile, it is striking how sharp the mountain top appears to be, and if one studies the summit area in detail this is confirmed. Snowdon does not have a rounded peak like most of the mountains of the

*The Orchard House, Gorddinog, Llanfairfechan, Gwynedd.

The Snowdon ridge—Snowdon summit is on the right, Crib-y-Ddysgyl on the left. *Photo:* Mary Aris

region, but a sharply-edged ridge with a vertical angle of approximately 90° between the faces. The famous "Snowdon horseshoe" is topped by three sections of this ridge, the outer two running roughly parallel with the propagation path from the repeater to Capel Curig. The central section, however, (shown in the photograph) lies almost at right angles to the path, and is nearly 1km broad.

Radio engineers have long known that signals can propagate over sharp ridges. The mechanism is that of diffraction, which is a fundamental property of wave motion—the diffraction of light is one of the bugbears of school physics! Because of diffraction all shadows, whether of light or radio, have fuzzy edges, the scale of the effect being related to the wavelength. Textbooks on radio propagation usually contain a nomogram like that of Fig 3 which allows the effects of diffracting edges to be estimated [1,2]. These calculations are generally based on the ideal case of "knife-edge" diffraction, and they show the diffraction loss which must be added to the free-space loss to give the total path loss.

Real hills, however, are usually rounded rather than knife-edged, and their diffraction losses are considerably greater than the knife-edge model predicts. In recent years theoretical and practical studies have led to techniques for estimating the losses of rounded-hill paths with reasonable accuracy, and some computer-based systems for predicting the service areas of transmitters use these methods [3,4].

Returning to Snowdon, this seems to be a rare case of a mountain ridge which is almost knife-edged. If so, it may turn out to attenuate the signals which pass over it by a quite acceptable amount—despite its great height. Applying the knife-edge model to the repeater-to-Capel Curig path at the repeater's output frequency of 145·7MHz, a diffraction attenuation of 32dB can be predicted. When added to the free-space loss of 101dB this gives a total path loss of 133dB. The transmitter effective radiated power is known, so the received signal from a dipole antenna can be estimated—approximately 10μV. This should be sufficient to give excellent copy!

To check out the prediction, a mobile receiver was modified to allow the signal strength to be recorded on a chart recorder. The equipment was carefully calibrated, using laboratory test-gear, and installed in a vehicle fitted with a $\lambda/4$, magnetic-based antenna in the centre of the roof. Then, working on a large flat airfield, the polar diagram of the receiving set-up was plotted (Fig 4). This shows the usual funny mobile-radio sort of shape, but it confirms that, if the direction of travel of the vehicle is planned carefully, it should be possible to sample the variation of field strength with distance along fairly straight roads, without changes of heading playing too large a role. Now to Capel Curig to check the estimates—and the tall stories!

Fig 5 shows the plot taken while travelling along the A5 trunk road through the part of Capel Curig from which contacts had been reported. There is no doubt that the signal comes up out of the noise and peaks at about 5μV—averaging out the flutter. Allowing for the uncertainty of the prediction process and the use of a vehicle-mounted groundplane antenna, this is quite a good agreement with the value predicted. It begins to look as if this is a case of knife-edge diffraction.

What about the reports from further away? Checking the path from the repeater to the next nearest reported contact, Rhuallt Hill, shows that this too passes over the Snowdon ridge and through the narrow valley of Dyffryn Mymbyr. There are other hills between Snowdon and Rhuallt but, if the profile is carefully plotted, it can be seen that mobiles climbing the hill come into line-of-sight with Snowdon summit at about 600ft asl—and that corresponds pretty well with the reports. And at Rhuallt Hill the vertical angle by which the signals must diffract over the Snowdon ridge has fallen to about 3°, compared with 6° at Capel Curig, so the diffraction loss should be less.

It seems as if Snowdon must be regarded in quite a new light—not as the main obstacle to the propagation of signals to the east, but rather as the means for doing so! If this is true, then, in checking the paths to other locations with which contacts have been made, it will be necessary to treat the ridge as a signal source and look for gaps between the rounded hills downstream from Snowdon which could allow the signals to travel long distances.

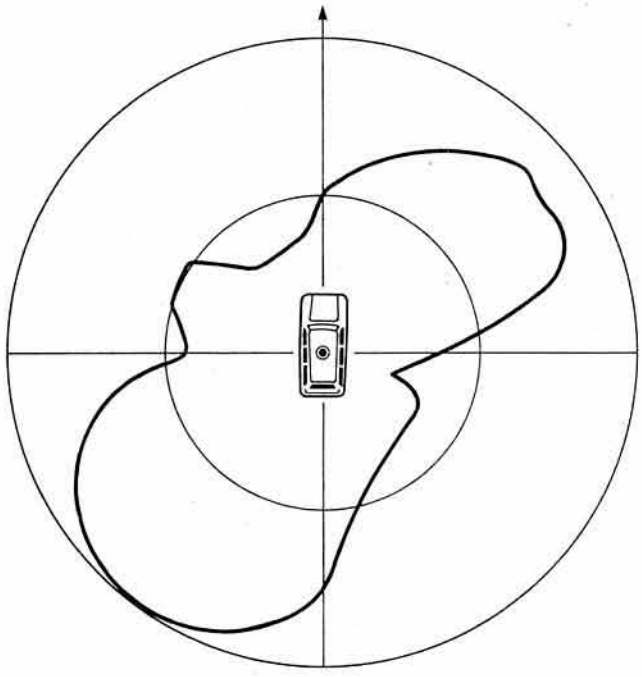

Fig 4. Horizontal polar diagram of mobile receiving antenna used in tests—linear scale

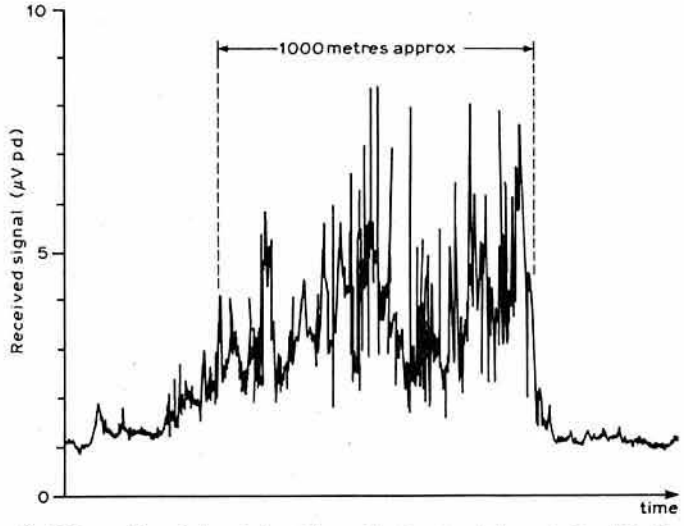

Fig 5. Recording of signal strength received on track through Capel Curig

Returning to the map (Fig 1) it can be seen that the combination of the Snowdon ridge and the narrow valley of Dyffryn Mymbyr allows the signal which was detected at Capel Curig to fan out to the east. There it should illuminate not only Rhuallt Hill, but a stretch of the Clwydian Hills some 15km wide. These hills are classically rounded-topped—most of their names start with "Moel" which means a bare, rounded hill in Welsh—so they are very poor diffractors. Between the hills receiving the Snowdon signals, however, are a number of deep valleys, so it may be that the signals are squeezing through these passes to form narrow "beams" which radiate out over the northwest of England. If this hypothesis is true, it should be possible to detect something of the kind by driving across these beams with the recording equipment. So a safari to England was planned, to take in the Wirral peninsula and the Lancashire coastal plain.

The first signal strength record was taken while driving from the base to the tip of the Wirral peninsula along the western coastal road which runs almost at sea-level, some 80 to 90km from the repeater. Tropospheric propagation conditions were flat. For most of the route there was no sign of AR, which was being kept in operation throughout the test by co-operating stations of guaranteed vocal endurance. Occasionally GB3HH, which shares the channel with AR, would be heard weakly, but it could easily be distinguished from AR by its different pip-tone frequency.

However, two clear sectors of AR reception were recorded, one at Heswall and the other at West Kirby, about 6km apart. They were both very narrow, coming and going in less than 1km. That means that they subtended angles of much less than 1° at the repeater. But the received signals were moderately strong: at Heswall they peaked to 3μV, and at West Kirby they reached 10μV.

Having found these two narrow beams, it was intriguing to try to detect them further away from the repeater. A recording, made while travelling back along the centre of the Wirral on the M53 motorway, shows evidence of both of them. Also, the stronger "West Kirby beam" clearly crosses the Mersey and can be detected in North Liverpool. It was possible to use this path to work back via the repeater during the tests, transmitting on the $\lambda/4$ mobile antenna from a heavily built-up area in Bootle. The distance from the repeater was almost 100km.

As one travels further east it becomes more difficult to conduct tests using the mobile equipment because of co-channel interference from GB3HH. However, certain fixed stations on the Lancashire plain regularly work through GB3AR, using directional antennas to avoid accessing both repeaters simultaneously. There seems little doubt, therefore, that the propagation paths are usable from points much further east than Liverpool, and, quite possibly, they could be detected on the western slopes of the Pennines. Certainly the relatively-high signal level of 3μV received on the $\lambda/4$ antenna close to sea level in Liverpool suggests that the maximum range had not been reached. The weaker "Heswall beam" may also continue eastwards, passing north of Manchester.

It was predicted earlier that beams of this kind would be present, and that each of them would correspond to a gap in the Clwydian range of hills. When this theory was checked by drawing lines to the repeater from the points on the Wirral coastal track at which maximum signal strengths were received, a further insight was revealed into what was happening. The Heswall path clearly runs from AR, over the Snowdon ridge, through the valley of Dyffryn Mymbyr, across country, through the narrow valley by which the A55 crosses Rhuallt Hill and across the Dee estuary. This path fits the model suggested earlier.

However, in contrast, a line from the repeater to West Kirby passes through the summit of Glyder Fawr shortly after crossing the Snowdon ridge. This is strange, as signals via this path are stronger on the Wirral than those via the Heswall path. To understand what is happening one must draw a line from the repeater to that part of the Snowdon ridge which looks down the valley of Dyffryn Mymbyr, and another from the ridge to West Kirby. This second line lies through Dyffryn Mymbyr and through a second gap in the Clwydian Hills. The tracks to and from the Snowdon ridge differ in azimuth by about 4°, but both are lines of sight. So the mechanism of propagation still appears to be diffraction over the Snowdon ridge.

This discussion of the West Kirby path illustrates the way in which one is now seeking paths from the ridge to possible sites, and regarding the ridge virtually as a transmitter. The wheel has come full circle; contacts are now thought to be taking place because of, not in spite of, Snowdon!

It should be stressed, however, that this is rather too simple a picture. The mountain ranges of Snowdonia are complex and virtually certain to offer other propagation paths via various routes. Some may involve knife-edge diffraction, some reflection. The ones described here are unusual, however, partly because the diffraction paths are so successful and partly because of the remarkable combinations of factors which allow contacts to take place.

It appears that the stations accessing GB3AR from the east are doing so via signal paths which not only diffract over the Snowdon ridge but also pass through a narrow valley between the hills lying immediately downstream of Snowdon and one of a number of valleys through the Clwydian Hills. It is not surprising, therefore, that amateurs who have had the foresight to purchase properties fulfilling all these conditions tend to regard themselves as somewhat out of the ordinary!

However, they are probably not as special as it might appear. Most radio amateurs have a very clear, detailed and precise picture of their stations' vhf or uhf coverage, and many can quote examples of contacts with repeaters or other stations in directions, and over paths, which they find surprising. Also, they make these contacts routinely and not just by means of transient propagation modes such as sporadic-E or temperature inversions.

It is fascinating to study such paths carefully, to work out the routes the signals are taking, and to try to tie up the received signal strengths with those predicted by diffraction and free-space calculations. As a bonus, it is occasionally even possible to predict and confirm the existence of other, unsuspected propagation paths.

Acknowledgements

The author thanks those amateurs who have reported the contacts they have made via the strange paths over Snowdon to GB3AR, and also to his son, Tom Last, and to John Parry, GW3VVC, who helped with the field trials.

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Ken Willis, G8VR*

THE WET AND WINDY WEATHER prevailing throughout November and well into December meant that conditions on the vhf bands were completely flat for most of that time. Tropospheric propagation was virtually non-existent, though the period was enlivened by a few interesting auroras, and also by the Geminids meteor shower, which peaked sometime between 13 and 14 December. There have also been some "happenings" on 50MHz, though of a rather less spectacular nature than those of the previous two autumns, as the solar cycle is now well advanced on its downward path.

By the time this appears in print spring will be a mere two months away, and with it the promise of sporadic-E and those big auroras which G2FKZ says are possible. To paraphrase a quote in the *Central Scotland & Borders FM News*, if your antenna stayed up during the winter gales, it is either not big enough or not high enough!

Repeater news

G3ZYY (Saltash, Cornwall) has provided some information on the current status of the West Devon Repeater Group's installation, GB3WD. The group has been experiencing site problems, but it is hoped that these have now been resolved, so the repeater should come on the air early in 1983 from North Hessary Tor, near Princetown, on Dartmoor. The site is expected to give excellent 144MHz coverage for both north and south Devon, and to "fill in" gaps in the coverage of the existing repeaters operated by the group, GB3WR, GB3WW, GB3BC, GB3TR and GB3NC. Applications for membership of the group that provides this fine service for the West Country would be greatly appreciated, and should be made to G3ZYY, QTHR, who can also be reached by telephone on Saltash 5913.

The hills and valleys of the Devon countryside are exactly the sort of terrain for which repeaters were originally conceived, making mobile communication reliable in areas which would otherwise be useless for such operation. From personal experience I have found repeaters in the west to be extremely well organized. The regular users seem to go out of their way to make visitors feel welcome, and in an area which many of us visit for holidays, this can be a great asset. A contribution to the upkeep of the systems from those intending to visit such a region would, I am sure, be appreciated by the groups concerned.

The Sudbury (Suffolk) Repeater Group is ready to go with its repeater GB3SU, on 432MHz. There is apparently still some doubt whether the channel RB15 will finally be allocated to the repeater, but apart from that all paperwork is with the licensing authority, and the group simply awaits the appropriate piece of paper to enable them to switch on. Further information and requests for membership should go to G4GGC, QTHR.

Administrative and constructional work proceeds for the proposed repeater, GB3SF, which they plan to locate on the tower of the metallurgy building of the University of Sheffield. This is no ordinary "machine"—it is the first single-channel frequency-locked ssb repeater experiment in the UK. It is proposed to operate it initially for a 12-month period as a planned experiment. The channel selected for it is RS37 (145·185/145·785), ie 10kHz above R7. The paperwork for submission to the licensing authority has been completed following acceptance of the specification of the system by the RWG and VHF Committee. Development work is in the capable hands of Dr A. J. T. Whitaker, G3RKL, and its introduction into service should not be far away.

GB3MB is another 144MHz repeater application which rests with the licensing authority. Its specification proposes operation on channel R0, with a location at Birtle, near Bury, Lancs. Timeout will be 2min with audio muting. A novel feature is an "end of transmission" report in the form of a morse letter, which is selected by internal sensors in the logic system for monitoring parts of the installation. This gives early warning of any malfunction.

GB3CS (central Scotland) has had its first major "facelift" since 1977, and among other things now boasts a new antenna system. The old colinear Yagi combination has been retained for future use if required, but the new antenna comprises two phased dipoles mounted on opposite legs of the mast at a height of almost 600ft. LDF4 low-loss cable is used as the feeder. Reception reports since the change suggest that regions which were accessed in the early days of the repeater, but which had now become difficult to reach as equipment deteriorated, are again being worked through the repeater.

GB3FF was involved in the channel change reported in *4-2-70* for November. Since that time it has performed admirably. From *Central Scotland & Borders FM News* comes a note on the logic arrangements for both GB3CS and GB3FF. Both will allow talkthrough for 80s. If the input drops within this period, GB3CS will send a morse "K", and GB3FF a "T". After 80s the timeout mode will only be apparent when the offending station drops input, at which point GB3CS will reply with five rapid "pips", and GB3FF with three. This will not penalize the other user, but will simply draw attention to the fact that a timeout has occurred.

Aurora

The period 20 November to 20 December saw quite a lot of auroral activity. From Shetland, GM3XOQ reports a very good visual aurora on 21 November around 2230gmt, but with winds gusting to 100mph it was not possible for him to erect his antenna. Perhaps there are one or two compensations for living in suburbia after all! However, on 23 November Pete heard signals at varying strengths from 1550gmt until midnight, but worked "no real dx", the best being SM3JGG in HV square on 144MHz cw. Again this was a good visual display at his QTH, with rays of light overhead emanating from a glow on a bearing of 30°, along which path radio signals were strongest. This report of someone actually seeing an aurora and correlating it with its effect on vhf signals is fascinating. The afternoon of 24 November produced another aurora at GM3XOQ. Between 1430 and 1800gmt he heard an OH in LU square, but could not raise him. This was one of those occasions when the aurora was better in the south than in the very far north. In the Home Counties it proved very intense. It was first detected in the London area around 1345gmt, and continued until 1945gmt. Stations in countries HG, UP2, UQ2, YU, OE and OK were worked by stations as far south as AL square, and it is believed, though not confirmed, that a UO5 was worked by a station in Essex. That prefix was also heard being worked by a Dutch station. During the event beacons GB3CTC and GB3ANG were very strong, with auroral tone, on 70MHz as well as 144MHz, and many contacts were made on the 70MHz band.

In this same event GI6DRK (Co Tyrone) worked 16 stations, his best being OE5OLL (GI), OK1MBS (HK), F stations in BH and AG, and others in G, PA, ON and DL. All this was on 144MHz ssb, and clearly ssb contacts via aurora are no longer to be regarded as unusual, since, with better equipment and many more operators participating in these events, they are now commonplace.

In the same period GI4OMK (Belfast) arrived home from work to catch the final hour of the aurora, and worked OK1MBS, OE5OLL and DF9RJ (GI), all being at S9. He also worked a large batch of ON, D, F and PAs. He said that it was a nice change from the "white hiss" which he had been hearing on his receiver for some time before the event, when conditions were so poor.

GM4CXM (Glasgow) had many contacts in this aurora, and his list included three OKs, four Y22s, and one LA, all on 144MHz cw.

G4BPY uses an auroral indicator tuned to 51·743MHz (Inverness tv channel), and this alerted him to the event on 24 November. He went on to 432MHz and worked PA0EZ (CM), DF1OH (EM), PA0WWM (CM), DF3EE (DL) and G3LQR (AM). He then moved to 70MHz and worked SM6PU crossband (70/28). Gordon makes a plea for more operators to use cw on 432MHz during auroras, and certainly his recent success on this band suggests that this could prove quite profitable. He also commented on the fact that this event produced auroral signals over the whole arc NW to NE (about 90°). Doppler shift required him to use about 2kHz of off-set, employing his clarifier, but he also used the better technique of calling CQ and listening for replies using a separate vfo. This is obviously an excellent way of determining *and* coping with large doppler shifts.

On 27 November a "massive proton event" was reported that kept those in the know on their toes for 48h in case this particle emission from the sun would produce another major aurora. There are no reports that it did so, though a very weak aurora was detected in the south between 1600 and 1700gmt on 29 November.

Early in December the vhf net was buzzing with news that the Russian auroral warning system had forecast possible auroras on 7, 8, 9 and 10 December with probability "3"; and for 24, 25 and 26 December at probability "4". The higher the number, the greater the likelihood of an event occurring.

What subsequently occurred brought only admiration for this particular warning system, because auroras arrived on schedule on 7, 8, and 10 December. As this is being written Christmas is still eight days away, so it

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is possible that there will be many neglected dinners, and children sitting deserted around the tree, if our USSR friends are proved right in the second part of their forecast!

In the south the auroras were quite strong and of good duration, but the stations heard were mainly from GM and GI, plus the usual nearer Continental prefixes. As is so often the case, one or two real dx stations appeared early and late in the event. At G8VR on 7 December OH1AA was heard briefly, but could not be raised beyond several QRZ calls from him, although G3LTF did have a contact with him. In similar fashion, in the aurora of 8 December, G4IJE (Essex) worked RQ2GAG right at the start, after which no super-dx was copied throughout the event.

The most detailed reports have come from Scottish stations. On 7 December GM4CXP (Roxburghshire) was alerted to the event at 1715gmt, and went on to work about a dozen stations, the most distant being SK6NP/6 (GS), LA9CM (FT), LA2SN (ES) and OZ5VHF (FP). His beam headings varied between 20° at the start, and 50° at the end.

On 8 December GM4CXM worked SM6CMU (FR), while GM4CXP enjoyed himself in contacts with RQ2GAG (MQ), SM7DLZ (IQ), SK4BX (HT), OH1DP (LU), OH1AJ (LU), LA9BM (EU) and LA6QBA (FT). Things had gone quiet by 2010gmt, when he had to close down. GM3WCS found new squares hard to come by in this and the other auroras, but worked RQ2GAG for a new one.

The aurora of 10 December was a good one for GM3WCS, who says that he worked almost every European country in it. In the three auroras he worked over 150 stations, and deplores the operating techniques of some European operators, who call him repeatedly when he makes CQ calls directed to specific dx areas—for example a "CQ USSR" can bring back shoals of D stations. One can sympathize with both sides in this situation, of course! In this same event GM4IPK worked OH1DP and many other stations. During December he worked 10 new squares. GM4CXM worked much dx, including SM7DLZ, SM5CHK (HS), SM5FRH (HT), LA6CU (CU), and LA2DH (ET).

As has been mentioned before, auroras present very different pictures to operators in different parts of the country. The main merits in publishing lists of "who worked what" are, it would seem, to provide lists of Europeans who are active, and their locations, and to keep up to date the 27-day charts to forecast future auroras.

Not everyone finds auroral contacts easy to come by. Down in Gillingham, Kent, G8ZYL is in a location which does not offer much in the way of propagation to the north. She was therefore delighted on 10 December to work her first GM in her very first auroral contact, an event she will remember vividly throughout her amateur radio career. One thing remains certain: if you do not call them, you will never work them.

There were minor auroras in the southern part of England on 17 and 18 December. The latter was very strong in Sweden but did not get going over the UK.

Beacon news

Preparations are in hand to find a site for a second 50MHz beacon somewhere in the south of England. It is felt that the beacon should provide coverage for reception by European operators as, with the prospect of some UK 50MHz experimental permits being issued in 1983, the availability of European stations to be worked crossband should clearly be encouraged. A beacon would give these stations a good indication of propagation conditions to the UK, and would show when the band was open.

The 50MHz beacon at Angelsey, GB3SIX, which had been operating outside television hours, was switched to 24h operation on 28 December. It beams west at present since the main interest in the band is currently for transatlantic propagation. Reception reports would be appreciated.

During meteor showers such as the recent Geminids, reflections from some of the more remote European beacons can be received by listening on the frequency for long periods and noting any pings or bursts. The number and strength of reflections received is a good indicator of the meteor activity in that particular direction at the time. Both GB3SIX and GB3ANG can be heard via this mode during the night hours, the latter on both 70MHz and 144MHz.

OE5FO (144·955MHz) is a good one to check, although it has not surfaced at this location for some time. Another is SK4MPI, which can often be heard around the peak of a shower, the distance being quite long in this case.

SM6EAN reports that beacon SK7UHH (IQ23j) is currently operating on 432·940MHz. It beams 30° using 25W erp as an auroral warning, and is omnidirectional, with 2·5W erp for tropo. Keying is a carrier plus call and QTH. In an initial test using 1W erp omnidirectional the beacon was copied by UA1ZAO in Murmansk at QRB 1,550km. During 1983 the power will be increased to 500W erp for auroral warning, and 50W erp for tropo. Reports would be welcomed by SK7CA or SM6EAN.

Miscellany

I have been taken to task by one reader for referring to stations in UP2, UQ2 and UR2 as "Russians". He suggests that this is akin to calling a Glaswegian an Englishman—a heinous offence by any standards! The inhabitants of Estonia, Latvia and Lithuania are no doubt just as keen as the Scots to preserve their national identities, but to me, stations whose callsigns commence with a letter "U", and who have to have their QSL cards sent via Box 88, Moscow, must always have a strong Russian flavour. On the other hand, countries such as Hungary, Romania, Bulgaria and Czechoslovakia have not only retained their country names, but the old national prefix as well, *and* they have their own QSL bureaux. However, in the interests of avoiding a diplomatic incident I will try to remember in future to refer to "U" stations as "USSR stations", which I am told would be quite acceptable.

The American space shuttle mission STS-9, scheduled for October 1983, may provide some vhf activity for amateurs, as one of the crew-members, Dr Owen Garriott, W5LFL, plans to take a handheld or other low-power rig with him into space. More details will be announced later, but tentative plans are to designate certain repeaters around the world to act as "gateways" through which all contacts can be co-ordinated. There are some repeaters known to us all which hopefully will play no part in the programme, but as they say in the army, "no names, no pack-drill"!

John Holmes, G4LRS, has written to say that F6CVN is not the only "dx-minded operator in CI square" (*4-2-70* December 1982). He has a card for a 144MHz contact from Joel, F1CVL, in CI76b to prove it. John was also pleased to work his first SM, taking advantage of the aurora on 8 December to get around or over a 300ft hill which blocks his propagation in that direction. His new MM amplifier helped a lot in making this contact possible.

Those who have not yet tried satellite communications would be advised to read the *Ephemeris* feature by Bob Phillips, G4IQQ, in *Radio Communication*. They should also obtain a copy of the Amsat-UK publication *Guide to Oscar Operating*, price 75p including postage from G3AAJ, QTHR. This interesting booklet gives information on the RS series of satellites as well as Oscar 8 and Oscar 9. Plans for the Phase 3B satellite are also covered. There are stations in the DXCC category from satellite contacts—which indicates how this mode can extend coverage and provide some interesting activity on vhf when conditions deny all other forms of propagation. Remember though that contacts made through a satellite do not qualify for the normal awards, although there are some specific satellite awards available for those who like to have a target. Cards for such contacts should be clearly marked to indicate that a satellite was involved in the contact. The mode is particularly useful for those in poor locations, and the technique is simple and quickly learned.

GM4BVU (Lanarkshire) is active on 43MHz video, using an MTV435 transmitter and a modified Microwave Modules 100W linear. About 60W is fed to an MBM88 antenna. After the first week of operation results are said to be very good, with P1/3 pictures received in Kennoway by GM3RVK over a path of some 56 miles. Regular P5 pictures have been exchanged over a four-mile path to Motherwell, with GM3ULP at the other end. Norrie listens regularly on 144·75MHz, GB3ML and S20, and appreciates reports from any one who can receive him, especially in colour. He has sent an excellent sample caption in brilliant colours, which he transmits as his identification signal.

G6ADC (Coventry) and G8IDP (Norwich) have provided information on SIAD, mentioned in *4-2-70* December 1982. This station is located on one of the forts built in the Thames Estuary as part of the wartime anti-aircraft defences. This particular fort is some 8km north of Whitstable in Kent, and was occupied some three years ago by a group who designated it the "Principality of Sealand". They first operated using cb, but changed to 144MHz when joined by a licensed operator. The location is given as AL08e, and one operator is DG6KB. The occupiers say that they have applied to IARU for formal recognition as a separate country, and to the United Nations also, but it seems unlikely that this status will ever be granted. If it should be, however, there should be quite a pile-up until we have all added it to our score. Meanwhile they have a QSL card with details of how to write to them, descriptions of their postage stamps and coins, and tape recordings of the history of Sealand!

G3VOM (Manchester) comments further on the use of fm on frequencies allocated to satellite operation. He says that fm on 145·825MHz makes one of the RS robot satellites inoperable over the whole of western Europe. He goes on to say that since 145·800–146·00MHz will be the downlink band for the Phase 3 satellite, it is in the interests of us all to do everything possible to keep this part of the spectrum clear. So if you hear non-satellite operation on those frequencies, try to tell the people concerned about this frequency allocation.

DX enthusiasts who have entered the fray relatively recently may not

know about the European publication *Dubus* which is published four times each year. It is very much a specialist magazine devoted to the more exotic forms of vhf and uhf dx, and to get listed in its "Who worked Who" columns is like being accepted for *Debrett's Peerage!* Distribution in this country is handled by Bob McHenry, G3NSM, QTHR, who would be pleased to hear from those wishing to obtain back numbers, or to sign up for future issues.

50MHz

Last month *4-2-70* reported on 50MHz events up to about 13 November. Some further information on activity around that date has since come to hand. On 11 November, G4BPY worked five USA stations crossband (50/28) in the shape of W1RJA, W3JO, N0KV/4, W3IWU and K8MMM. He heard but did not work WB1DNS, W1GCI, W2IDZ and KA1PE.

Solar conditions improved quite unexpectedly in the period 7 to 11 December, and some notable crossband contacts were made between the UK and North American stations.

In a 2h opening on 7 December VE1YX (Bridgewater, NS) worked G4GLT, G4BPY, G4JCC, G5KW and G3WBQ. The VE station reported that the muf actually reached 51MHz, a very high frequency for this part of the solar cycle. G4JCC went on to work W1IMM, and G4BPY had a string of crossband contacts with W1IMM, WB1FVS, WB2MAI, KA1DZV, K1IL, VE1BPY and K1NDF. There was an aurora around at the time, during which Gordon copied EI4RF on 70·130MHz with his beam due north, and a 51·743 tv carrier, also with this heading.

Another opening occurred on 11 December between about 1130 and 1530gmt. Both G4GLT and G4BPY copied the French Guiana beacon FY7THF, peaking S9 at G4GLT, but being only S2-3 with Gordon. They also heard, but could not raise, PJ9EE in Curacao. Again there was auroral tone on the 51·743 tv carrier. G5KW was not able to hear PJ9EE from his portable location near GB3VHF in Kent. Later in this event G4GLT worked W1IMM, K1WHS, WA1TBV, K2MUB, K1ZFE, W2IDZ, N0KV/4 and K8MMM. He also had a partial contact with K1IKN. Signals did not rise much above S4-5, and much deep QSB was in evidence. Calls heard but not worked were WA1OUB, W1QXX and W3XO (who writes the American equivalent of *4-2-70* for *QST* magazine). G4BPY managed contacts with W1RJA, W3JO, N0KV/4, W3IWU and K8MMM. The signals from K8MMM were S9, and in a 28MHz contact with this station later, G4GLT learned why this was so. K8MMM runs the legal limit of 1kW to four five-element Yagis stacked vertically 20ft apart, the top antenna being more than 90ft above ground. Since the terrain in Ohio is very flat over much of the state, his take-off is also probably very good. Hardly the sort of antenna system for a suburban backyard in the UK!

On 14 December G4BPY worked WA1UQC, WB1FVS and VE1YX in a short opening between 1500 and 1525gmt. On 15 December there was a change in propagation, and when G4BPY worked VE1YX the antenna was directed towards the Caribbean, so some "side-scatter" was much in evidence.

Dave Newman, G4GLT (Leicester), has sent a very interesting tape of 50MHz "happenings" during last September and October. One was a recording of GB3SIX during an aurora on 22 September between 0656 and 0716gmt. This was particularly interesting, as most of us knew about the big aurora on the afternoon of that day but nobody else had reported its occurence so early in the day.

Another recording was of ZS6PW, heard via tep on 2 October, as reported here in December and on 18 October signals were taped from ZS1STB (Capetown) on 50·01MHz. On this day, G5KW at Lands End received good signals from PY2AA.

When the history of 50MHz is written the dedication of these enthusiasts should not be forgotten. To catch the brief openings which have occurred requires diligent monitoring of the band for hours on end, ignoring exciting things which might be happening on other frequencies. Even to leave the shack for a meal may mean that the opening is missed.

Progress has been made with the proposed experimental 50MHz permits to be issued to a limited number of UK amateurs for operation outside tv hours. Following the submission of completed questionnaires by a large number of interested amateurs, the Society met representatives of the Home Office on 21 December when each application was considered on its merits. A list was finally drawn up comprising 18 G, 5 GW, 10 GM, three from the Channel Islands, and three GI amateurs, plus one on the Isle of Wight. Emphasis was placed on geographical location to provide the best possible range of contacts for those participating in the experiment. Attention was also paid to the various modes, including meteor scatter.

After approval of the list by the BBC, it was the intention of the Home Office to issue letters of intent rather than separate licences to each of the stations selected, and it was planned that these would go out during the first week of January 1983.

The selection process was an unenviable one, since many well-equipped and capable stations were included in the list under consideration. Hopefully the experiment will prove so successful that it will encourage the licensing authority to extend similar facilities to others at a later date.

70MHz

In the past GW3MHW operated from two locations on 70MHz, and provided many operators with squares XM and YM. He now proposes to discontinue operation from XM60d and says that those who need the square should look for him on 70·215MHz at 8pm when he has regular skeds with G2AOK. Unfortunately his letter arrived too late for inclusion last month, so by the time this appears he may already have closed down in XM.

GW3MHW remarked on several new callsigns heard on 70MHz. Among them were G4DMF, G4JGM, G4MKF, G4LMZ and G4ISQ; and G3VPS, who was very active on the band in the old amplitude modulation days, but is now back with some excellent sideband. GW3MHW has also heard EI6DT, GB2BT, G3SOA, G3IOI, G3CUN and G2FLY, and commented on the good reception of both GB3CTC and EI4RF beacons.

During the Geminids shower GM3WCS had an excellent crossband contact (70/144) with YU3ES in GF square. Ken received a 46 report, and YU3ES copied a 10s burst from him using only a dipole. YU3ES was also using a converter supplied by G4IJE.

GM3WCS would very much like to work some UK stations via sporadic meteors (or during showers). Anyone wishing to arrange skeds can write to him, QTHR, or telephone him on 0383 726456. If the distance between stations is too short, backscatter can be tried. G4IJE regularly makes such tests on 70MHz with considerable success.

When the new 50MHz permits are issued it will be very interesting to compare results between ms tests on 50 and 70MHz, possibly using simultaneous transmission on both bands.

Meteor scatter

The main meteor scatter news is related to the Geminids shower which was active between 12 and 14 December. This shower does not generally exhibit a sharp peak, but instead gives rise to good meteor reflections over a period of 48h or more. This is in contrast to the Quadrantids which is a very short-lived shower with a marked peak, and the Perseids, which is perhaps the most popular and rewarding of the year.

It was very good to hear so many newcomers trying their hand in this mode, both on cw and ssb. It is to be hoped that they will not be discouraged because the reflections were not outstanding, as many excellent contacts were made. With this continued growth of interest in meteor scatter, G3WZT's comments in earlier *4-2-70* columns about the need to adopt new procedures on the random calling frequencies were well illustrated. There were hordes of stations co-channel on both 144·100 and 144·200MHz at times, though as they all call together they are at least free from QRM during the listening periods. Discipline was very good, and those participating had clearly done their homework. There is no doubt that this form of communication will become commonplace in the future, and eventually not be regarded as an "exotic" mode.

On the random ssb channel YU3ZV was much in demand, as he always puts in a strong signal during major showers. On the cw random frequency, YU3ULM was at times S8-9, but throughout every listening period during the evenings of 13 and 14 December six or seven different stations could be heard beaming towards England from E and SE Europe.

The best results were obtained, as might be expected, from those who had arranged skeds and therefore had the undivided attention of the remote station for one or two hours at a time. Among the newcomers at the cw end G4KPX and G4NQC were very noticeable for their fine operating and strict adherence to procedures. This paid off in the form of contacts with LA1TV (ET), LA6QBA (FT), YU3ES (GF) and OK1KRA (HK) for G4KPX who also heard a chirpy signal on random which he thinks was UB5GDL (though it might also have been UB5BDC, who has this sort of signal on the vhf net). G4NQC worked HG8KWG (KG), HG1YA (IH), YU3TAK (HG), and a probable with OK3YCM (JI). He found ssb more difficult.

Down in the West Country G4NDG (Tiverton) was using the shower as a means of getting his act together by listening both on the random frequencies and to other stations' calls. He copied lots of bits and pieces on the cw channel, and then a 1s burst revealed "CQ OH1ZAA". Experienced operators of the ms mode will know only too well the excitement of copying one's first real dx call. This particular station was some 1,950km distant from G4NDG (in KV), so it is no surprise that Paul cannot wait to get things set up so that he can have some two-way communication over such paths.

G4IJE could hardly be expected to miss this event, and two of his contacts were out of the ordinary. He embarked on an ssb sked with

(Continued on page 143)

RSGB NATIONAL VHF CONVENTION

Sandown Park Racecourse, Esher, Surrey

Saturday 26 March 1983

- **One day exhibition and lecture programme**
- **Saturday social evening and buffet supper**
- **Comprehensive trade exhibition**
- **Exhibition by specialist groups**
- **Equipment test facility**
- **Full lecture programme on vhf, uhf and microwave subjects**

PROGRAMME

1030 **Convention opens.** Entrance through racecourse turnstiles. (Open to exhibitors from 0800 through special exhibitors' entrance) **Refreshments.** Snack bar in the hall will be open from 1100 to 1600, and the licensed bar will be open throughout the convention.

Equipment test facility—operated by Don Hamilton, G8DON

1400 **Convention address** by RSGB President

LECTURE PROGRAMME

	Stream A	Stream B	Stream C
1415	"GB3SF—An experimental pilot ssb talk-through station", Tony Whitaker, G3RKL	"144MHz field aligned scatter propagation", Serge Canivenc, F8SH (IARU Region 1, sporadic-E co-ordinator)	"An introduction to microwaves and microwave operating", Petra Suckling, G4KGC
1515	"RF radiation hazards", Roger Blackmore, G4PMK, and Ian White, G3SEK	"AMSAT Phase 3b—hopes and expectations", AMSAT UK members	"The new microwave bands", Heath Rees, G3HWR
1615	VHF Committee forum, Chairman and members of committee	"Computing for the vhf amateur", John Morris, G4ANB	"Microwave eme from the backyard", Charles Suckling G3WDG

1715 Lecture session ends

1800 Trade exhibition closes

The lectures will be held in the Wolsey Bar or Warren Terrace, and the Wolsey and Claremont restaurants. Detailed arrangements will be notified on arrival

SOCIAL EVENING

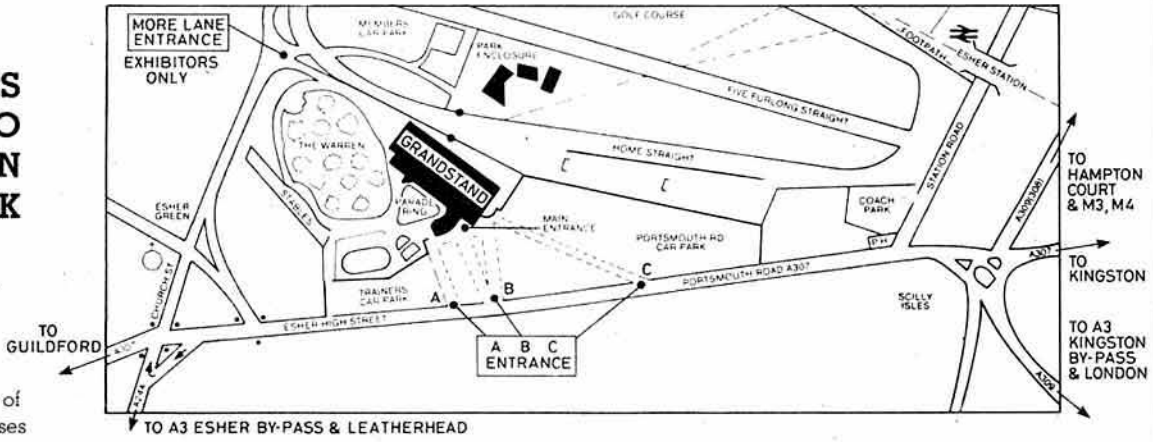
1900 Social evening begins in the Cavalry Room.

2000 A substantial "knife and fork" buffet supper consisting of three courses plus coffee will be served.

2100 Presentation of awards.

2300 Convention ends

ACCESS MAP TO SANDOWN PARK



Map by courtesy of United Racecourses

APPLICATION FOR TICKETS

RSGB NATIONAL VHF CONVENTION
26 March 1983

Please supply tickets as under:	Cost	Number	Total cost
Convention and exhibition only	£1.00	.....	.....
Convention and exhibition (under 18)	£0.75	.....	.....
Convention, exhibition and evening	£8.50	.....	.....
Evening only – if purchased in advance	£8.00	.....	.....

I enclose cheque/postal order for £.....

(Evening only – if purchased on day ..... £8.50)

Name.....

Address.....

This application for tickets must be sent to: Mr B. Rider, G4FLQ, Membership Services Section, RSGB, Alma House, Cranborne Road, Potters Bar, Herts EN6 3JN. Cheques to be made payable to RSGB.

Early application will be greatly appreciated

4-2-70

(Continued from page 141)

EA7AG (YW) without much hope of success, since the Spanish station was using relatively simple equipment, and the distance is almost at the limit of normal ms operation. He completed well within the hour, receiving some fine bursts from EA7AG, and clocked up square No 289. He also was lucky to get a sked with 4U1ITU, the United Nations station in Geneva. This counts as a separate country for the purpose of European awards, and on this occasion HB9QQ made a special trip to activate the station on ms. G4IJE worked him quite easily for country No 50 on 144MHz, half-way to DXCC! During and just before the shower, Paul also worked OE1APS and OE1RKU, both in II square, and on random ssb YU3ES, OK3TJK (II), OK1OA (HK) and YU7AU (KE).

GM3WCS did not find the shower all that good, but nevertheless managed to complete about half his arranged 13 schedules. He was successful with HG8CE (KG), OE5XDL (HI), I1DMP (DF), DK2LM (EJ) and DL3MBG (GI). His most memorable sked was the crossband with YU3ES reported elsewhere in this feature. Ken heard nothing from either UC2ACA or UC2AAB, with whom he had arranged skeds.

Also up in Scotland, GM4CXM had a lot of 144MHz ssb skeds arranged, and the results were little short of fantastic. Readers will recall that in *4-2-70* for December Ray was reported as having had a remarkable series of random contacts during the Perseids. This time he worked SM3BZS (HY), OK1MAC (HJ), OE1APS (II), IW2BNA (EF), UR2RQT (MS), OE1RKU (II), I1KTC (EF), I4YNO (FE), DF7RG (GI), DL7YS (GM), I1DMP (DF), F1GTR (ZG), F1EIT (BG), I1JTQ (DF), F6DKQ (DH), OE3OKS (IH) and DL3MBG (GI). He did not use random at all. The contact with UR2RQT on ssb is most interesting, and it would be useful to learn if others have worked that station in this mode.

By the time this is being read the Quadrantids shower will have come and gone, then things on ms will become somewhat quiet until late spring. However, G4IJE goes on working DJ5MS every week using sporadic meteors, showing that it is quite possible to work all the year round if skeds are arranged through the 14MHz vhf net.

Awards

Ken Osborne, G4IGO (Bristol), recently qualified for a 175 squares/20 countries certificate on 144MHz by submitting cards to upgrade his previous 150/20 claim. He was the first to claim in this particular category, and his cards included several for auroral contacts, and seven for meteor scatter.

By an amazing coincidence, two further claims for the 175/20 award were received by G5UM, the vhf awards manager, by the same post. One came from G3BW (Whitehaven), who submitted 25 cards to upgrade his earlier award. All but three were for cw contacts, 10 of them in the ms mode. The second claimant was G8VR (Hartley, Kent) who also sent in 25 cards, mostly for cw contacts, nine being in the ms mode. G5UM said that among this batch was one from Iceland, the first he had ever received for a 144MHz contact. G3BW received No 2 sticker, and G8VR No 3 in the 175/50 category. All three awards point to the value of cw for working into the rare and remote places.

G6ADH (Surrey) recently became the second Class B licensee to reach 100 squares confirmed. He also received the 144MHz Senior, a very fine achievement for a station not able to use cw.

G4MEJ, in making his first claim for an award, opted to go straight for the 60/15 squares category, and received No 34.

G6FIO (Solihull) made sure of both the 144MHz Standard and the 40/10 Squares awards by sending a single batch of cards. He had actually worked 107 squares on the band, but like so many others awaits confirmation.

Proof that high power is not necessary to work long distances was provided by some interesting awards. G4MDU (mid-Northants) claimed the 144MHz Senior and received certificate No 189. He used no more than 10W to achieve this distinction, yet some of his cards were for contacts with UP2 and UQ2 at distances of more than 1,500km. This was also his third award in eight months, having previously gained the 144MHz Standard and a squares award.

G4KGV (Cleveland) also submitted a double claim, one for the 144MHz Standard, and one for a basic squares certificate. He again used only 10W into a high-gain antenna, a nice way of overcoming tvi in many cases.

G8TRW (Hockley) needed even less power to earn his 40/10 squares award. He used 3W from an IC202 into a 14-element parabeam.

Stop press

There was a very good opening on 50MHz to the Caribbean on 20 December, during which G3UUT heard many stations from that region. On 28 December a very high level of sun noise was audible on 144MHz but no significant aurora seems to have developed.

The change to 24h operation of the 50MHz beacon GB3SIX produced quick results, when its signals were copied by KM1V of Hartford, Connecticut, on 31 December around 1pm local time.

Deadlines. Please send all news intended for the April issue to arrive not later than 23 February (last-minute items by 4 March).

RAYNET

G. Cluer, G4AVV*

THIS PART of the year tends to be the time when many Raynet groups are called to assist in searches for snowbound motorists, or to provide communication to villages cut off by bad weather conditions. Already reports have been received of Raynet involvement in missing person searches, and a number of realistic exercises have been reported. I notice a rise in the number of night-time and even early-morning exercises; quite a departure from the summer Sunday afternoon picnics that we have tended to call exercises in the past.

North London Raynet and other groups report on surprise exercises called either by themselves or by the user service. North London held one recently and had 14 members active within 15min. Unfortunately they report that "everyone thought everyone else was bringing the antennas"—a common problem when you are in a rush to respond as quickly as possible. This group, incidentally, ran the talk-in station recently at the Electronic Hobbies Fair, and the Solihull & Chelmsley Wood Group has offered to do the talk-in for this year's RSGB exhibition at the NEC in Birmingham. Raynet groups would seem a natural choice for a talk-in station, as who better (we hope) know the local road and radio conditions.

Reading through December's incident reports I notice one from the Highlands (Scotland) Raynet Group indicating that they were asked by the local Coastguard for help as they had lost contact with a lifeboat on Loch Nevis. As it happened Raynet was not needed, which was lucky as operation for the Coastguard is not allowed under the terms of the amateur licence. It seems strange that it was amateurs working for the Coastguard in 1952 which led to Raynet being formed, but now, 30 years later, the Coastguard is still not one of our user services. The Home Office has indicated that any organization which might wish to be counted as a user service (Coastguard, mountain rescue, fire services etc) should approach the Home Office direct. The time would now seem to be right for the Coastguard to do this.

The South Anglia Group reports operation for the Salvation Army (via the county emergency planning officer) at the scene of a fire in a large chemical warehouse back in October. Use was made of local repeaters on vhf and uhf, and other amateurs are thanked for keeping these clear. The officer in charge of the Salvation Army group was adamant that due to the location, the many changes in requirements, and the duration of the callout, the Salvation Army could not have given the level of service they did without radio communications.

The South Sussex Group was involved in a missing-person search at the request of the police in August, and the Solihull & Chelmsley Wood Group reported two incidents where amateur radio and Raynet were used to contact (a) a passenger in a car whose wife had suffered an epileptic fit and (b) to call for ambulance assistance after a road traffic accident.

Besides these groups, the following groups have reported large-scale exercises:

South East Dorset—a night-time exercise held in Weymouth car racing stadium in appalling weather conditions working with the St John Ambulance;

Gloucestershire Raynet—an exercise which began at 2335 on a Saturday night and must have tested to the limit the understanding of the members' xyls;

SE London—a winter's evening exercise which had members trying to follow road maps in the dark and trying to locate telegraph poles in the middle of waterlogged fields;

Mid Cornwall—at the request of RAF St Mawgan and the cepo;

North Bowland—at the request of the police on the Ingleborough Mountain;

South Yorkshire (Sheffield)—on behalf of the Red Cross, a 7h exercise in both heat and rain;

South Bedfordshire—an exercise with the cepo in which React also took part;

Highland—another 7h exercise with the Red Cross in continuous rain and an 11·5h exercise with the local police;

Havering—who particularly thank other amateurs in London for keeping their frequency clear from 1600 to 2100 on 4 September.

I am also grateful to Lothian Raynet and the Zone 7 representative for details of events in their area. □

Raynet Zone 7 controllers at a meeting in Exeter during September 1982. L to r: (back row) G8AQJ, Devon; G8XQQ, Devon; G8YOF, Avon; G3JAU, Dorset; G8SGW; G8JOJ, Wiltshire; G8JXS, Gloucester; G8TJF, Somerset; G8LXQ; G6BAL, Devon; (middle row) G4GTH, Dorset; G3ZKI, Avon; G6FGS, Devon; G6EQM, Devon; G3XFL, Cornwall; G8TZE, Gloucester: (front row) G4JYF, Cornwall; G4FRG, Avon; G3XC, Cornwall; G4DOQ, Devon; G8RQK, Devon.
Photo: **G8AOJ xyl**

*12 Bingham Road, Addiscombe, Croydon CR0 7EB.

BOOK REVIEW

Practical Handbook of Valve Radio Repair by Chas. E. Miller. First published 1982 by Newnes Technical Books. 230 + X double-column pages (200 by 260mm). Price £13·50 (hard covers).

Recently a member wrote that he had recovered from a dustbin an old communications receiver which he now wished to restore to working order. Could somebody please identify it? The answer was easy—and also interesting. He had found a 1939 Eddystone ECR receiver which was almost certainly the first high-performance communications receiver complete with phasing-type crystal filter to be designed in the UK expressly for radio amateurs. It was sold for £45, a sum which then represented many weeks' wages for a skilled technician.

By comparison with the ECR, the vast majority of domestic "wireless sets" of that era were of far more humdrum design, although often housed in large, impressive and sometimes innovative cabinets. Nevertheless some medium- and long-wave sets were at the peak of their design with rf stages, bandpass and even motorized tuning, good-quality push-pull output stages and the like. Among the run-of-the-mill there were indeed a few receivers, in valve circuitry and styling, that have seldom since been bettered—"vintage wireless".

During recent years the recovery and restoration of old radios and gramophones has become for some a hobby, for others a business—catered for by such magazines as the bi-monthly *Sounds Vintage* and encouraged by reports of high prices reached at auction for rare models in good condition.

In this new book Chas Miller brings together a mass of information and receiver circuit diagrams from the early crystal sets of the 'twenties to the first hybrid valve/semiconductor models of the 'fifties, including car radios and some a.m./fm models. He also provides many hints that help to date or restore valve radios, including some 60 pages of valve data. The book also contains some fascinating reproductions of early advertisements. The extensive list of intermediate frequencies shows the wide use in the 'thirties of an i.f. between 115 and 130kHz.

Much of the data and diagrams appear to be taken from trade service sheets and manuals; unfortunately many do not include component values. No attempt has been made to cover communications receivers or specialized hf models. A few of the author's comments on broadcasting in the UK, although often witty, are not in accordance with my own recollections—but generally, for those interested in this side of the hobby, an excellent book.

G3VA

MICROWAVES

Charles Suckling, G3WDG*

A receive converter for 3·4GHz

The popular W2GGV interdigital mixer configuration, used successfully by many stations on 1·3 and 2·3GHz, is also capable of use on 3·4GHz, and can form the basis of a simple, yet very effective, receive converter for this band. The writer recently developed such a converter, using metalwork built by G4FRE from a *VHF Communications* design, in conjunction with the Microwave Committee local oscillator board *(Rad Com* October 1981, p906). The latter was crystalled for 92·000MHz, producing drive at 368MHz.

The circuit diagram is shown in Fig 1. The lo input is matched to the BXY28 multiplier diode using a simple LC network. The diode generates harmonics of 368MHz, and the adjacent resonator in the interdigital filter selects the wanted ninth harmonic, at 3,312MHz. The 3,456MHz input signal passes via the other resonator, and the two signals are mixed to 144MHz by the mixer diode, which is connected to the centre element of the filter. The i.f. output is then amplified by a low-noise preamplifier using a BFR34A transistor.

Constructional details of the converter are shown in Fig 2. The unit is built on a piece of double-sided copper-clad pcb material which forms the main chassis. The brass bars which carry the interdigital elements are secured to the chassis with 10 4BA screws. The bars are drilled and tapped to take the screws, in similar positions to the holes "shown" in Fig 1. The holes are used to retain a lid made from pcb material on the interdigital filter. After assembly all screws must be tightened securely, otherwise the mixer will not function properly.

The interdigital elements are made from brass or copper rod or tube. Tubing is preferred, as the soldering of the inner of the antenna socket, and the multiplier and mixer diodes is made somewhat easier. If rods are used, they may be retained by screws which fit into tapped holes in the ends of the rods. Tube elements may be mounted similarly, if a tight-fitting plug is fitted in the end of each element, or may be soldered into place. Screw fitting is best, as the soldering operations outlined above are made easier, since heatsinking by the mixer assembly can be reduced by loosening the retaining screws during the operation.

The i.f. amplifier is built in a screened enclosure made from pcb material, soldered to the chassis. After assembly and preliminary testing, a lid made from thin brass or copper sheet should be soldered in place over the preamplifier enclosure. A small hole should be provided to allow the trimmer to be adjusted with the lid in place.

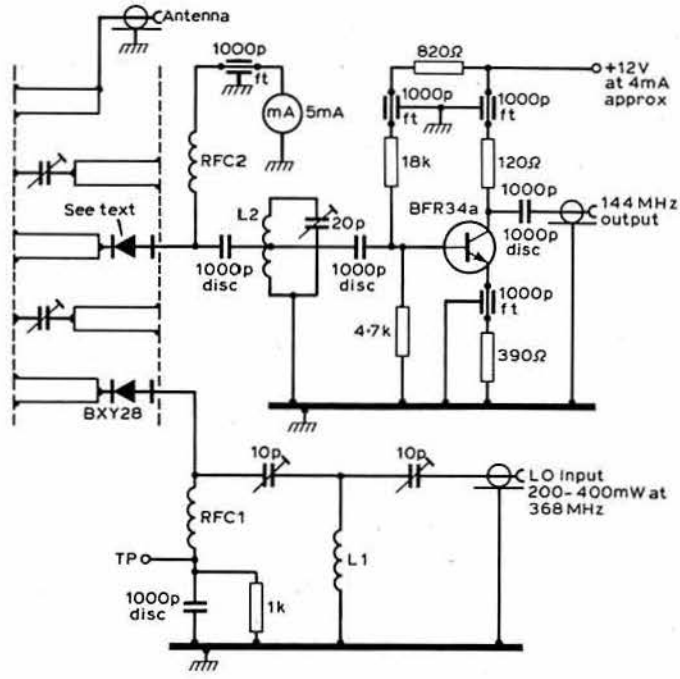


Fig 1. Circuit diagram of the 3·4GHz interdigital mixer. L1: 45mm 20swg bent to form 1t loop. L2: 5t 20swg 6mm dia tapped 2·5t. RFC1: 3·5t 30swg on FX1115 ferrite bead. RFC2: 20t 30swg 3mm dia closewound

The tuning up of the converter is as follows. Connect the 368MHz drive and adjust the two 10pF trimmers for maximum voltage at the test point (1·1·5V). The tuning is fairly critical, and some instability may be encountered if the settings are not quite correct. Next, fully unscrew the signal tuning screw and adjust the lo tuning screw for maximum mixer current (1·4mA). The correct tuning point should be with the screw set approximately to the position shown in Fig 2. It is possible to select the wrong harmonic, and the method described in *Microwaves* (November 1982) can be used to check the frequency if no other test equipment is available.

A 144MHz receiver is then connected to the i.f. output socket, and the 20pF trimmer adjusted for maximum noise. Correct operation of the mixer can be checked by detuning the lo screw, when the receiver noise should fall slightly. Removal of lo drive should have the same effect. A large change in noise level is indicative of unstable multiplier operation and the 10pF trimmers should be readjusted to stop this. Finally, the signal tuning screw should be adjusted for maximum signal, by monitoring another station, a suitable harmonic from other equipment, a noise generator etc.

Using an HP2800 diode in the mixer, a noise figure of 16dB was measured

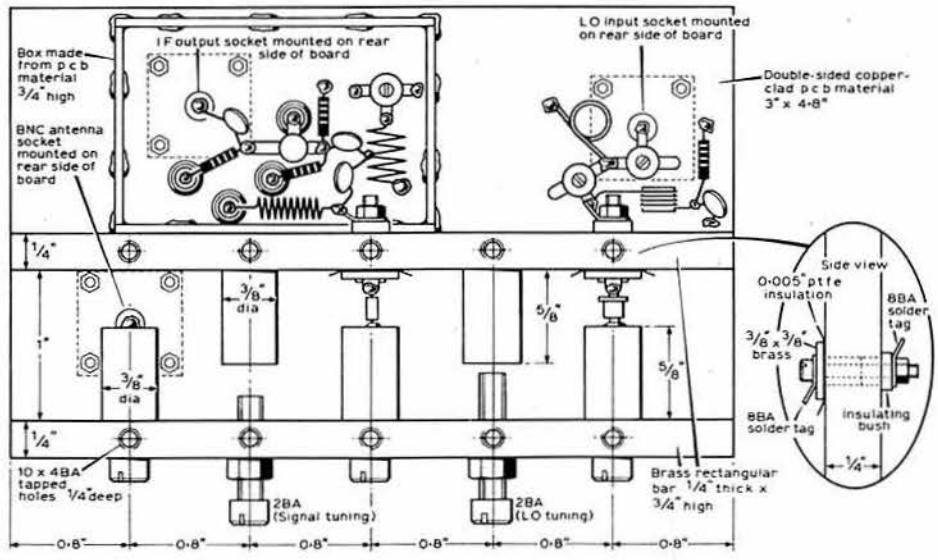


Fig 2. Mechanical details of the 3·4GHz Interdigital converter

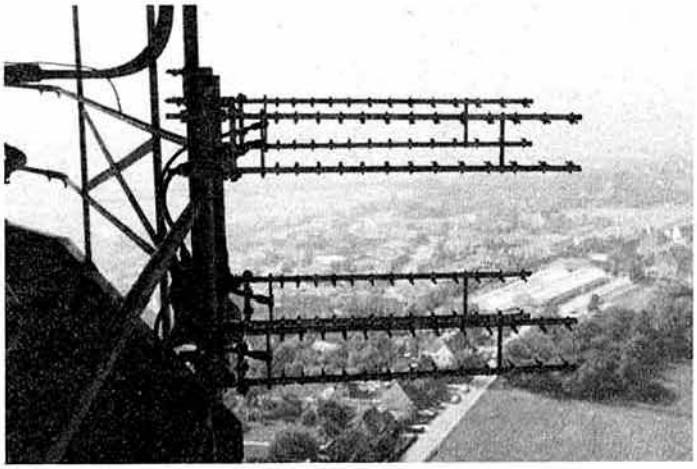
*46 Windsor Close, Towcester, Northants

for the writer's prototype. The use of a better diode, eg, an MBD102 or a "10GHz mixer diode", would probably improve the noise figure but this has yet to be tried.

Beacon news

Jürgen Dahms, DC0DA, has sent details of his 1·3GHz beacon, which now has the callsign DB0JO. This beacon is of considerable interest to UK stations, as it beams towards the UK (on 275°, with a 16° beamwidth) with 350W erp! It is located at DL48a, some 106m agl; the site is 218m asl. The transmitted frequency is 1,296·854MHz. The equipment consists of a solidstate transmitter using a BLW98 device in the pa producing 11W output. The antenna, shown in the photograph, is an array of four Jaybeam 15/15 Yagis, with an estimated gain of 16dBd.

Jürgen is very interested in receiving reception reports of the DB0JO beacon, and can be contacted at Brandbruchstraße 2, D-4600 Dortmund 30, tel 0231460161. He is considering further beacons at the same site, using the same callsign, on 2·3, 3·4, 5·7 and 10GHz—a very interesting project indeed.



A view of the Jaybeam antenna system of the DB0JO beacon

The beacon keeper's lot is not generally a very rewarding one—a lot of work goes into putting a beacon on the air and then only few reception reports are received (usually only when the beacon is off frequency or otherwise misbehaving!). The beacon builders and keepers deserve all our thanks; for example, by sending in reception reports. One way of doing this relatively painlessly is to use the QSL Bureau. Beacon keepers interested in receiving reports in this way can send envelopes to the GB (special callsign) sub-manager Mr C. Turner, G8NL, Tottington, Berry, Lancashire BL8 3HL. Stations wishing to send reports can then simply include them with their outgoing QSL cards.

Awards

The ingenuity and variety that go into the equipment used by operators on 10GHz make interesting reading in the vhf awards manager's latest report:

G8HPU/P: 24in dish plus a G3JVL transverter with IC202 and talkback on 144 and 432MHz.

G3PHO/P: a double claim for the "five squares" plus the "first time beyond 150km" for 10GHz was made after operations from Merriton Low (which is high, not low) in Staffordshire. The distance award was, unusually, for a cw contact. It was made with GW3YGF/P using 200mW output!

G4FRE/P: 18in dish fed with 0·5mW of ssb at a site only 10m asl. The QSO partner, PE1BLE/A, also used an 18in dish, with 0·2W of phase-locked ssb.

Back on 1·3GHz, G4LRT, from his country site in Northamptonshire, reached the 30 squares worked during October; the appropriate sticker was duly sent to him to add to the large Microwave Certificate he already holds. Some idea of the difficulty in achieving these more-rarified square categories may be had from the fact that to date only one "30 squares" claim per year has been forthcoming, No 1 to G4BEL in 1980, No 2 to G8BFX in 1981 and No 3 this year to G4LRT. And one of these, namely G8BFX, now G4KIY, sits alone at 40 squares confirmed on this band.

Back at the basic 1·3/5 category, special reference must be made to the claim put in by GW3CCF of Mold in Clwyd: He is the first home-based GW operator (as distinct from portables) to achieve the award; in addition to his local squares, Russ turned in cards for remote EO, AL and ZL squares, in spite of those mountains, to gain his award. □

SWL NEWS

Bob Treacher, BRS32525*

HAC in 6min!

The challenge your scribe set for last October produced moderate interest. The most interesting response came from Paul Tittensor, A8808 (now G4PVM). He thought CQWW would be the best time to see how quickly "Heard All Continents" could be achieved. He managed to log all continents on 28MHz on 31 October in just 6min between 1118 to 1123. The stations logged were VK6AJW, UK5MCP, ZS3HL, W3LPL, LU4F and RA9MBH. Unfortunately the stations listed by Paul on 21MHz would have beaten the 6min, but he did not submit information on a station in Asia (DU is classed as Oceania, Paul).

Also submitted were times for 3·5MHz—4h 3min, during the WR ARS Contest in 1982, and for 7MHz—3h 44min, in CQWW. On 10MHz, Paul offered HAC in 37h 19min! If any reader can better these times, we will feature them during the course of the year.

Eric Trebilcock, BCRS195 also commented on his best HAC time. It was as long ago as 30 March 1938, on 14MHz cw, and also in 6min between 2236 and 2241. As the level of activity was less in those early days, Eric's achievement must be the greater.

Cray Valley 1982 Contest results

The results of this contest have been received from G4DFI: 34 ssb and five cw entries came in from 11 countries, including HZ and 4X4. The cw winner was a listener on the east coast of the USA, while the ssb winner was from Belgium. The highest placed Society listeners were Jim Dunnett, BRS30694 (cw-2nd), and John Sutton, BRS35509 (ssb-3rd).

DX beam-heading charts

G4HYD kindly forwarded details of N5KR's dx beam-heading charts. The print-outs are custom-made by computer for your QTH. For those swls equipped with beam arrays, the service might be invaluable for only $11. For further details, N5KR's QTH is 1808 Pomona Drive, Las Cruces, New Mexico, 88001, USA.

G4HYD also passed on information on activity from 5Z4 and 5H3 by both G3TEU and G4HYD. Applications for licences had been processed, and activity from 5Z4 commenced early in January. All swl reports will be QSLd 100 per cent by their manager, G4NJP.

144MHz dx report

The only event which our reporters managed to catch last October occurred on the 30th—right in the midst of CQWW. Dave Whitaker, BRS25429, took several hours off from monitoring the hf bands during the contest to log F1DLT (CH60d), OK1KHI/P (HK29b) and OK1JKT/P (GK46c). Several reporters mentioned QSLs received as a result of forays on the band at other times—GU4NYT/P (Alderney, YJ29c), EA3LL (AB56b), F1DOF (BG46a), HB9D/P (EH65g), ON7GY (CK01b), DK0SF (FL33b) and DJ0QZ (DK58d).

3·5MHz slp

A disappointing response to the 3·5MHz slp resulted in only two entries being received, one in each of the ssb and cw sections. Scores were as follows:

		Countries	Points			Total
			15	10	5	
SSB	ARS45184	14	2	1	44	3,640
CW	BRS44395	26	2	0	55	7,930

Several ZL stations provided the best loggings in the ssb section, while in the cw section, a PY1 and a UA9 were the best dx logged.

DX review

Poor conditions continued throughout November, and early December was not much better judging from the comments of reporters. G5ACI/Abu Ail provided several with a new one, including Eric Trebilcock for whom it was No 328 all-time (how about an all-time table entry, Eric?). The other

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

1982 HF COUNTRIES TABLE

Station	28	21	14	7	3·5	1·8	Total	Mode
BRS25429	195	197	205	157	117	46	917	ssb
BRS8841	200	215	228	139	106	25	913	ssb/cw
BRS47745	177	199	211	139	123	40	889	ssb/cw
BRS25901	157	187	202	101	105	37	786	ssb/cw
BRS44703	145	170	173	112	110	37	747	ssb
ORS46084/7Q7	162	205	204	81	35	1	688	ssb
A8808	138	138	135	120	94	43	668	ssb/cw
ORS45992/7Q7	160	205	199	75	27	0	666	ssb
BRS46228	115	108	170	134	107	32	666	ssb
BRS1066	118	152	141	105	70	46	632	ssb/cw
BRS35509	123	142	159	95	95	6	620	ssb
BRS48675	109	128	129	80	65	24	535	ssb
BRS30694	115	135	108	53	51	28	490	ssb/cw
BRS18529	53	88	75	120	116	37	489	ssb
BRS31440	118	85	106	74	67	27	477	ssb
BRS45033	161	123	183	3	6	0	476	ssb
RS45466	51	102	92	54	57	16	372	ssb
G6LAU (ex-BRS30493)	54	95	115	40	32	6	342	ssb
ARS50886	63	101	88	30	28	2	312	ssb
RS44984	43	40	106	26	13	1	229	ssb
RS49327	44	43	94	11	10	14	216	ssb
ARS45184	42	58	56	17	25	3	201	ssb/cw

interesting item to mention concerns new activity from FB8W, FB8X and FB8Z. At the time of writing, FB8WI had been heard on 14,112kHz at 1730, while FB8XAB had been active on 14,118kHz at 1625, and at 1825 on 7,043kHz. FB8WH should now be active, and there should be some activity from FB8Z. F6GXB is the QSL route for FB8WI and FB8XAB, while F6BFH is handling cards for FB8WH.

John Goodrick, BRS44395, reported 5N8ARY on 1·8MHz for country No 42. During CQWW, 54 countries were audible on cw, including HZ1AB, NP4A, OY7ML, P42E, UH8DC and UK9AAN. The 7MHz band provided FB8XAB, for the best dx for some time. Also mentioned were N7UA and K7DZ, both on cw. On ssb 9X5SL was consistently good copy, as were VK2AVA (1850), ED9ICH (Chafarinas Is, off the coast of Melilla —QSL via EA9JV direct only), A92F, 6W8DY and TN8AJ. Later in the evenings HP3FL, FM7WS and VP2MCK were all good copy around 2215.

On 3·5MHz the real dx had still not materialized by mid-December, but TR8DX, 5T5TO, 5N8ARY and EP2TY had been copied during early evenings. Conditions were particularly good to JA on 6 December, with over 15 stations copied at the writer's QTH at around 2115–2130. East coast W0 were very solid 59 signals from 2200, and WOs 57 as early as 2140. VS6DO was heard around 2315, and by the time this is read XZ9A might have been heard at around the same time.

Steve Muster, BRS47745, reported an imminent move of QTH, with his station being dismantled three weeks before the turn of the year. He just failed to top the 900 mark for 1982, but new ones for him at the end of November were HC8RS, PY0FA and 9N1WW.

Norman Jennings, BRS48675, provided an update for the table, and suggested a vhf squares table for 1983. If sufficient interest is shown, there is no reason why a table cannot be run which covers vhf activity on all the uhf/vhf bands from 1·3GHz to 432MHz.

Here and there

Tim Lake, ARS45184, reported a change in his receiving set-up. An R1000, KX2 atu and Mizuho audio processor have been acquired. Tim will be contributing to the countries table this year, school work permitting, but studying for the RAE is to wait until the school exams are behind him, although cw practice will continue.

Another with a new receiver is the writer's xyl, BRS62088, who has started some serious dxing with an FRG7000. She had been taking advantage of good hf conditions, but preferred to listen on 14MHz while "getting her feet under the table". She is another who is threatening entry into the countries table this year, and has often, in the past, remarked on the lack of yl contributors to *SWL News*.

G3VLX kindly translated Peter Norris, BRS47513's, letter from PO Box 88. This will be of interest to those who still need some of the Russian republics on 1·8MHz. It might not be generally realized that 1,850–1,950kHz can be used for cw, while 1,875–1,950kHz is available for a.m. and ssb. Those still needing EA6 should look on 1,835–40kHz.

Dave Tanswell, ex-BRS30493, passed the RAE and can now be heard on vhf as G6LAU. He is concentrating on morse classes in preparation for a Class A licence. Dave was one of several who commented on the pleasing decision by the HF Contests Committee to allow G6 and G8 licensees to enter the Society's swl contests in future. He also updated his 1982 table score which is shown with ex-BRS number in parentheses.

Your scribe has been advised of a new source for QSL card printing. If only a relatively modest number of cards are required, ie 200 or 400, then G4KQH, QTHR, will be able to provide further information on receipt of an sae.

QSL techniques

In 1982 your scribe took up a good deal of space providing tips on QSLing techniques. Following a letter from G3DRN enclosing a QSL card used by a BRS52. . ., it seems that we will have to start all over again. The QSL card, one of 500 sent to G3DRN to sort as part of a "QSL world record attempt", was, to add insult to injury, a cb card, which only gave the callsign of the station heard and date. Although the card had provision for time, RS(T), frequency, mode, receiver and antenna, none of this information was given. To flood an already overcrowded QSL Bureau with such worthless rubbish can only do immense harm to the real swl who tries hard to provide an accurate and informative report to the world's amateur population. The writer has no doubt that amateurs would certainly not QSL such a poor report, indeed an RS(T) report was not even given. It cannot be emphasized too often, or too strongly, that swl reports must be accurate and informative. For those such as BRS52. . ., if this advice is not heeded, there can be only four words of further advice . . . "Don't bother to QSL".

10 and 18MHz

Eric Trebilcock, BCRS195, has been concentrating on 10MHz, and by early December had logged 715 different stations in 56 countries. Ninety of these stations were Gs, six GWs, three GMs, one GD and one GJ.

Brad Bradbury, BRS1066, reported four more countries on 10MHz: VP8ANT, J3AE, plus GI and GJ. He had heard 35 countries on the band by early December, and also reported that his total on 18MHz had risen to five.

Finale

News, views and table scores for 1983 should reach your scribe by Tuesday, 22 February, with short late items by Wednesday 3 March. □

JAMBOREE ON THE AIR 1982

Jim, G3OJI, chairman of Cheshunt & DARC, with members of Ware District Scouts. The club operated the special event station GB4WSG throughout the weekend

Members of the 1st St Andrews Scouts taking part in JOTA 1982, from the station of RR6, G2DRT. Contacts were made worldwide using the call GB4SAS

THE MONTH ON THE AIR

John Allaway, G3FKM*

A REMINDER that the Society's HF Convention will be taking place next month, on 5 and 6 March, as part of the RSGB National Amateur Radio Convention being held at the National Exhibition Centre in Birmingham. There will be a number of items of hf interest, and the writer hopes to have the pleasure of meeting many readers of this column. It is likely that on this occasion the winners of hf contests and other hf achievement award winners will be presented with their trophies on the Saturday—a practice long followed by the vhf section of the Society.

Mr T. R. Spain, G3NSS, of Petersfield, Hants, who has not been active for a number of years, reports that his callsign is being pirated.

Readers will share the writer's pleasure with the news that Tom Christian, VR6TC, was honoured with an MBE in the recent New Year Honours list. Tom has provided one of Pitcairn's most reliable contacts with the outside world for very many years, and his service to the islanders has been outstanding.

Overseas news

Dave Anderson, ZD8DA, and Mel Fitchett, ZD8MF, have written to allay any fears that they are pirates. They are servicemen working on Ascension Is and may be found between 14,005 and 14,050kHz and also between 21,002 and 21,035kHz. QSLs should be sent via the Ascension bureau ZD8AR (see "QTH Corner").

The Amateur Radio Society of India has sent along information on the current state of things in India. It seems that Indian amateurs are now allowed the equivalent of US $1,000 each year to import radio equipment. There is a high customs duty (which may exceed 68 per cent for anything other than transceivers), but there are now several sources of equipment made by major Japanese manufacturers in the country. Special offers of vhf equipment has caused an upsurge in interest in vhf. The Indian beacon VU2BCN is operational continuously now on 28,295kHz (fm) and should be QSLd via VU2VIM. There are now over 1,100 licensed VUs, and there is an Air-Net India daily at 1530 on 14,150kHz. The new bands 10, 18 and 24MHz are not yet released.

John Simons, 5Z4CX, has returned to the UK from Mombasa, where he enjoyed operating on all bands 3·5 to 28MHz, with delta loops on the lower frequency bands and fixed-beamed Yagis on 14, 21 and 28MHz. He used an FT101B transceiver. He found "lists and nets" very useful on the lower bands but not needed on the higher bands. He was in Mombasa from 1 February to 1 December 1982 and made 5,200 QSOs, worked 157 countries, missed WAS by one state, and made WAC on all bands except 3·5MHz—and he also made a lot of friends! He has a lot of respect for "the real dx operators" who keep their cool in a permanent pile-up, and he hopes that one day some European operators will inherit the good manners of the Japanese and American amateurs. John notes that postal services in Kenya were such that it is possible that QSLs have gone astray. The only other amateur in Mombasa was Leo, 5Z4CV (who tends to be on 21,285kHz after 1530), but there is much more activity in Nairobi where there are about 15 stations mostly operated by European or Japanese visitors.

Leo, 5Z4CV, and John, 5Z4CX, in Mombasa

*10 Knightlow Road, Birmingham B17 8QB

DX news

Stations in the Netherlands will be using special prefixes during the PACC Contest this month (see "Contests"). Those whose normal prefix number is 0 will use PA4, PA1s will use PA5, PA2s PA7, and PA3s PA8.

The ARRL DXCC Advisory Committee has decided against allowing contacts with Rotuma Is to be claimed as with a new DXCC country. The island is 260 miles from Fiji and is therefore not eligible under criterion 2b because there is not 500 miles of open water between the island and Fiji. This means that contacts with 3D2XN will count as contact with Fiji.

The Canadian DX Association runs a regular net for the purpose of collecting and exchanging dx information. It meets each Sunday on 14,173kHz at 1630 in summer, and one hour later in winter. All interested stations are invited to join in.

Another net, this time run by the writers of *DX News Sheet*, G3XTT and G3ZAY, is to be found near 3,772kHz at 1930 on Mondays. Anyone with information on items of dx interest is invited to join in.

Long Skip reports that QSL manager VE3EUP did not receive his supply of QSL cards for the VE1SPI/1, VE1CER/1 and VE1ASJ/1 operations from St Paul Is until October. Cards in reply to those sent direct with return postage should have reached their destination by now, but bureau QSL cards would not be sent to the VE bureau until early in the new year.

DX-NL reports that some of the QSL cards for 9L1EX contacts sent to Sierra Leone were stolen from the mail. All cards actually received there were answered by the end of October, and it is suggested that those still waiting might like to re-apply to LA2EX's address in "QTH Corner".

VP8ANT says that an amateur operator currently on Adelaide Is will be visiting South Georgia in the early months of 1983. He may stay there throughout the Antarctic winter.

VS5GA wishes it to be known that he does not act as the VS5 QSL bureau —there is in fact no bureau operating in Brunei at present.

28MHz activity

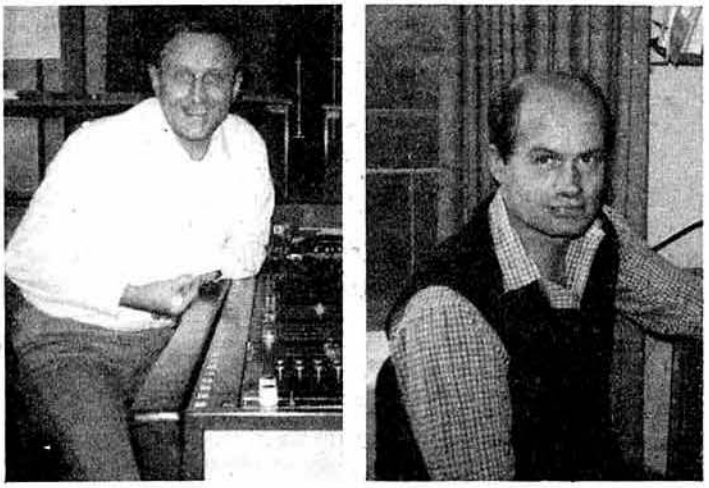
MRASZ, the Hungarian national society, is organizing special activity periods to increase the usage of 28MHz. It is suggested that these take place on the first and third Fridays of the month from 1600 to 2000 throughout 1983. All modes will be used according to IARU band plans. Stations should exchange RS/T and "XX" (standing for 10m 10 times). Each cw or phone contact counts one point, and each fm contact three points; "dx" counts double. The same station may be worked once per activity period. Points scored during the best 10 months should be added at the end of the year and full log data should be sent to the organizers: MRASZ HF Manager, PO Box 115, H-3100 Salgotarjan, Hungary. Awards will be sent to winners in each country, and the incoming logs will be used for propagation evaluation.

14MHz beacon experiment

According to the *DX Bulletin* a group in the USA has funded a chain of eight 14MHz beacon stations—all of which should be on the air by the time this is read. They will operate sequentially on 14,100kHz for 1min every 10min in the following order: (00) 4U1UN/B (New York); (01) K6OBO/B (Stanford, Cal); (02) KH6O (Honolulu); (03) JA2IGY (Tokyo); (04) 4X4TU/B (Tel Aviv); (05) OH2B (Espoo); (06) CT3B (Madeira); (07) ZS6DN/B (Transvaal). Each beacon transmits the following message on A1A at 20wpm (note the progressive reduction in power levels): (100W) "QST de (callsign) beacon, (100W) 9s dash, (10W) 9s dash, (1W) 9s dash, (0·1W) 9s dash, (100W) SK (callsign)". Antennas are single-element quad loops. Timing is such that the "Q" of each beacon's "QST" begins very close to the WWV time ticks for the beacon's assigned air time. It is understood that FCC regulations concerning unattended transmissions were revised on 1 January this year, and that special authorization in the USA is no longer needed. The position in the other countries taking part is unclear. It is hoped that more beacons will be added later, and sequences and intervals will be adjusted accordingly.

Top band . . .

Considerable change is taking place on 1·8MHz, and allocations already announced include the following: **France**—1,830-1,850kHz (avoiding 1,832 and 1,834kHz); **FR of Germany**—1,815-1,835kHz and 1,850-1,890kHz (J3E allowed between 1,832 and 1,835kHz only); **Luxembourg**—1,830-1,850kHz; **Netherlands**—1,830-1,850kHz; **Yugoslavia**—1,810-1,830kHz (A1A only), 1,830-1,850kHz (all modes); **Sweden**—1,830-1,845kHz (A1A only); **Austria**—1,830-1,850kHz (A1A only);



Two well-known German dxers: Frank Turek, DL7FT (left) and Ulrich Adelung, DK2OC

Norway—1,820-1,850kHz (A1A only); **Denmark, Faeroe Is** and **Greenland**—1,830-1,850kHz (A1A only, no contests); and **Switzerland**—1,810-1,850kHz.

Japanese stations received permission to use 1,830-1,850kHz from 1 January this year, and *DX News Sheet* says that the lower limit of the band in the USSR is now also 1,830kHz.

Information on allocations in other countries would be greatly appreciated.

. . . and 3·5MHz

Since 16 December 1982 stations in Australia have been allowed to operate with ssb between 3,794 and 3,800kHz. Indian stations have also been given more space—they may now be found between 3,500 and 3,540kHz, as well as in their old section between 3,890 and 3,900kHz.

IARU conferences have agreed from time to time that 3,500-3,510kHz and 3,790-3,800kHz "shall be used exclusively for intercontinental working". However, there is a tendency these days for European stations to call dx in these areas and then, in the absence of a dx reply, continue to talk to locals. Regular dxers would be grateful if this could be avoided.

G-QRP Club activity weekends

All amateurs are invited to participate, and results should be sent to A.D. Taylor, G8PG, 37 Pickerill Rd, Greasby, Merseyside L49 3ND. The first weekend is 26-27 February, and times and frequencies of activity will be as follows: 0900-1000—14,060kHz; 1000-1100—21,060/28,060kHz; 1100-1200—7,030kHz; 1200-1300—3,560kHz; 1300-1400—10,106kHz; 1400-1500—3,560kHz; 1500-1730—21,060/28,060kHz; 1730-2000—14,060kHz; 2000-2100—7,030/10,106kHz; 2100-2200—3,560kHz; 2200-2300—14,060kHz.

Awards

European Community Award

This is an official diploma issued by RL to celebrate the 25th anniversary of the European Community. It is available to licensed amateurs and listeners for contacts with EEC member countries after their date of entry. Each QSO counts one point, each station may only be counted once, and not more than 20 per cent of total points may be obtained with contacts/reports from any one country. European applicants need 100 points, each country must be worked at least once, not more than 10 stations from one's own country may be worked, and the list must include five LX stations. Non-Europeans need 50 points—only three LX QSOs are needed. Dates of entry are as follows: 25 March 1957—DL, I, ON, F, LX and PA; 1 January 1973—EI, G (includes GD, GI, GJ, GM, GU, GW) and OZ; 1 January 1981—SV. Applicants should send a list of QSLs, certified by two amateurs or a club official, plus LF150, 10 ircs, US $4, or DM7 to: Diploma Manager, LX1CC, REIFF, Mill, PO Box 1764, L-1017 Luxembourg. There are no mode/band restrictions but contacts via repeaters are not counted. A QSO with LX0RL may be counted in place of a missing country.

The Kenyan Award

The RSK will issue this award to anyone acquiring 10 points as follows: one for each 5Z4 station who is an RSK member worked, and five for working the club station 5Z4RS. QSOs must have been since 31 December 1977. Send photocopies of log entries (certified by a responsible radio society official) plus US $5 (or US $10 for airmail delivery) and a self-addressed label to Radio Society of Kenya, PO Box 45681, Nairobi, Kenya, marked "Kenyan Award" on the top left corner of the envelope. Cheques or bankers drafts should be crossed and made payable to the Radio Society of Kenya.

Diplome de l'Unvers Francophone (DUF)

DUF manager Edmond Dubois, F9IL, has written to point out that new rules apply to this award. DUF1 is awarded for contacting (or hearing) at least five different DUF countries in three continents, DUF2 requires eight countries in four continents, DUF3 needs 10 countries in five continents, and DUF4 20 different countries in six continents. Fees are as follows: for any one part, seven ircs; for any two parts, nine ircs; for any three parts, 12 ircs; and for all four parts, 15 ircs. Endorsements are six ircs, and the price of the medal is 20 ircs. 5BDUF fee is 65 ircs. All enquiries and applications go to F9IL, BP 7, Aubencheul Au Bac, F 59265 Aubigny Au Bac, France.

RSGB Awards

Please note that the cost of all Society hf awards to non-members is eight ircs, US $3 or £1.

Five Band WAP

As part of NZART activities for World Communications Year, a five-band WAP is being made available. To qualify, at least 30 different Pacific countries (ie those counting as Oceania for WAC) must be worked on each of five bands—a total of 150. Send list of log extracts to NZART Awards Manager, 152 Lytton Rd, Gisborne, New Zealand, together with NZ $6. The award is a wooden shield surmounted with the NZART badge and appropriately inscribed. If airmail delivery is desired please include an extra NZ $3. Note that all other NZART awards now cost NZ $1, except for WAP and 5X5 which cost NZ $2.

NZ Golden Shears Award

Sponsored by Branch 46 (Wairarapa) of NZART for contacts with members during March 1983. Five points required for European applicants—any bands/modes. One QSO per member, which counts one point. QSOs with ZL2AHU count three points, and with ZL2OA, or with a lady operator or Farming Branch operator count two. Send log data plus NZ $2 (or equivalent) to Awards Manager, PO Box 860, Masterton, NZ, before 31 August 1983. (The award celebrates the worldwide sheep-shearing competition being held in Masterton.)

G-QRP Club CW Novice Award

Available to stations licensed on or after 1 June 1982. All contacts must be made during 1983 and may be on any amateur band for which the station is licensed, and all on cw. The applicant must have contacted at least 50 other stations. There are two classes—Class A for applicants who made their contacts using less than 5W dc power input, and Class B for higher powers. Send list of QSOs signed by another amateur and the applicant. For Class A a signed declaration that dc input did not exceed 5W when making the contacts must be included. UK applicants should enclose £0.50 in stamps, others three ircs. All must reach Communications Manager, G-QRP Club, 37 Pickerill Road, Greasby, Merseyside, L49 3ND, no later than 31 March 1984.

Greek Awards

Difficulty in obtaining replies from RAAG, PO Box 564, Athens, has been reported. Any information from members would be greatly appreciated.

Contests

PACC Contest

1400 12 February-1700 13 February

1·8 to 28MHz, cw and ssb (no cross mode) adhering to IARU band plans. Single- and multi-operator and listener sections. Exchange RS/T plus serial number (from 001). Netherlands stations will also indicate province (GR, FR, DR, OV, GD, UT, YP, NH, ZH, ZL, NB or LB). Stations may be worked once per band, and each QSO with PA/PB/PI counts one point. The multiplier is the number of provinces worked on each band (maximum $6 \times 12 = 72$). Listeners should log different Netherlands stations and note code group given by both sides of the QSO. Summary sheets and specimen log forms are available from G3FKM (sae please). Logs must be posted no later than 31 March to PA0INA, F. Th. Oosthoek, Fred. Maystraat 36, 4614 Bergen op Zoom, Netherlands.

ARRL International DX Contests

0000 19 February to 2400 20 February (CW)

0000 5 March to 2400 6 March (Phone)

Single-operator single- or multi-band, multi-operator single- and multi-transmitter, and QRP (less than 5W input) categories. Exchange RS/T plus figures indicating power input. W/VE stations will indicate state or province. Each QSO counts three points, and the multiplier is the total number of contiguous USA states and Canadian provinces worked (and added together in the case of multi-band entries). Note that it is now in order

QTH CORNER

A22DC	via VE3BIS, Box 351, Southampton, Ont, N0H 2L0, Canada.
BY8AA	PO Box 6106, Beijing, Peoples Republic of China.
CR9CT	via KB2XS, PO Box 1150, Princeton, NJ, 08540, USA.
DP0LEX	via DL6NI, Meeninger Berg, D 8431, Moening, FR of Germany.
FB8WH	via F6BFH, 21 rue de la Republique, 76420 Bihorel, France.
FB8WI, FB8XAB, FB8ZQ, FB8ZR	via F6GXB, 8 Rue Messager, 91240 St Michel sur Orge, France
GJ5DSD, GJ5EOV	via N4EA, 16313 Poplar Hill Rd, Haymarket, Va, 22069, USA.
GU5DSD, GU5EOV	Via WA4WPO, Linda Seals, 3417 S, Plaza Trail, Virginia Beach, Va, 23452, USA.
J3AH	via W2GHK, 2417 Newton St, Vienna, Va, 22180, USA.
JY9RV	via GW3RVG, 50 Minffrwd Rd, Penpryag, Pencoed, Bridgend, Glam.
LA2EX	Barlivine, 34, N-5033, Fyllingsdalen, Norway.
VS5AM	via JM1FHL, J. Kamijoo, 3413-1 Torisawa, Ohtsuki, Yamanashi 409-05, Japan.
VS5GA	via G4CCM, D.DuV. Ashcroft, 86 Avondale Av, London N12 8EN.
ZD8DA, ZD8MF	via ZD8AR, PO Box 4308, Patrick AFB, Fla, 32925, USA.
DL5DAB/3X	via DL1QD, W. Rothkranz. Postamt, D 5948 Schmallenberg, FR of Germany.
9N38	via W1GAY, Box 637, Dukes County, Vineyard Haven, Mass, 02568, USA.

to work USA phone stations operating above 7,100kHz. Certificates will be awarded to leading stations in each country and to those making 500 or more QSOs. Note that the latter must now include duplicate sheets with their entries. Entry forms are available from ARRL DX Contest, 225 Main St, Newington, Conn, 06111, USA—please enclose large envelope and several ircs. No stationery is available from G3FKM. Entries must be postmarked no later than 5 April.

2nd Annual RTTY Championship Contest
0000 to 2400 26 February
Sponsored by *73 Magazine* and the *RTTY Journal*. 3·5 to 28MHz. Single-operator single-transmitter, multi-operator single-transmitter categories. The former may only operate for 18h and take breaks of at least 30min recorded in their log. Single-band and all-band entries are permitted. Send RST and serial number (from 001). One point per QSO, the multiplier being the total of contiguous USA states, Canadian provinces, and DXCC countries worked on each band. Enclose separate log for each band, a "dupe" sheet, summary sheet, and details of equipment. Post before 26 March 1983 to: RTTY World Championship Contest, c/o The RTTY Journal, P.O. Box RY, Cardiff, Cal, 92007, USA. Summary sheets/rules are available from G3FKM (sae please).

Arizona QSO Party
1800 5 February to 0600 6 February
Exchange RS/T and DXCC country, Arizona stations will indicate their county. Suggested frequencies to monitor are 14,280, 21,365 and 28,560kHz on ssb, 60kHz above low band edges on cw, and 25kHz above low band edges for Novice stations. QSOs on phone count one point, on cw two points, and with Novices four points. Multiply QSO points by number of counties (13 maximum) worked. Those working W7NQ and all 13 counties double their multiplier. Send entries to S. Arizona DX Ass'n, c/o P. M. Stickney, N7BUP, 1890 W Paseo Cuenca, Tucson, Az, 85704, USA, to arrive by 5 March.

Results of the **1982 CQ WW 160M Contest** (CW section) have been received from W1WY. UK scores were as follows: **GW3NYY** (79,759 points), **G3VRW** (38,124), G3XTT (34,669), G3XWZ (25,312) and GW3GWX (10,758). In the multi-operator section **G3RPB** scored 107,590 points and **GM3IGW** 95,877. In the phone section **GW4IOI** scored 20,790 points, **G3XTT** 11,200, and G3LNG 10,469. G3RPB was world top in the multi-operator cw contest, and GW3NYY world eighth in the single-operator class. GW4IOI, G3XTT and G3LNG were sixth, seventh and eighth in the single-operator phone competition.

The Bermuda AR Contest 1983
0001 19 March to 2400 20 March
3·5, 7, 14, 21 and 28MHz. No cross-band or cross-mode contacts. Please note that phone contacts between the USA and the UK may not be made on 7MHz. All stations shall be single-operator only, and actual operation may not exceed 36h—the off periods must be clearly logged and be of not less than three consecutive hours. All stations must operate from their own private residence or property. UK stations should contact USA, Canadian and Bermudian stations. Exchanges consist of RS/T plus state, province or county. VP9s will indicate their parish. Each completed QSO counts five points, and each station may be worked once only on each band—either on cw or phone but not both. The multiplier is the total number of different VP9s worked on each band totalled together. Separate logs must be used for each band, and duplicate sheets provided if more than 200 QSOs were made. Claiming duplicate contacts may result in disqualification. Each page must be clearly marked with callsign, year and band, and should be numbered.

Bill Hawthorne, G3MCS, Britain's first five-band WAZ holder and recipient of the Society's Rotab Trophy for 1982

The usual signed statement must be included, and logs must reach the Contest Committee, Radio Society of Bermuda, Box 275, Hamilton 5, Bermuda, no later than 31 May 1983. The top scorer in the UK will receive a trophy to be awarded at the society's annual dinner in October. Round-trip air transportation plus accommodation will be provided (the latter at the Harmony Hall Hotel).

Apologies to **G4MVA** whose callsign was incorrectly given as G3MVA in the results of the **1982 Helvetia 26 Contest** in January *MOTA*—he scored 3,726 points using only 10W input—a most commendable effort.

Results of the **12th SARTG Worldwide RTTY Contest** (1982) show **GW3EHN** with 48,510 points and **G4FUT** with 41,625 in the Class A section. In the listener class **G8CDW** scored 5,605 points. The 1983 event will take place on 20–21 August.

Around the bands

The disorganization of the postal system caused by the Christmas and New Year holidays has meant the absence of several regulars this month—including G8KG, whose report on the progress of Cycle 21 will hopefully catch up with us next month. G3KSH reports a great deal of activity from the "Woodpecker" and also from the "Motorbike"—similar but with higher speed of pulses and only spreading some 35kHz—on the 28MHz band.

Those who did manage to send in reports included G5JL, G2HKU, G3s BDQ, GHY, GIQ, GVV, GM3ITN, G3KSH, GM3YOR, G3YRM, GM4ELV, GW4KGR, GM4KHE and G5CFJ, to whom sincere thanks.

A special feature of GM4KHE's report was that stations listed were all using rtty. On 14MHz he noted: **0800** KL7HDS, VK9NS, ZL3AFY. **1100** TF3IRA, VP9GE, **1600** FP8DF, HZ1AB. **1700** VS6CT, YB0BEG. **1800** A4XIZ. **1900** EA9JL. **2000** HI3ADI, and **2100** FY7BC. On 28MHz he worked ZS6CC at **1000**, HC5EA at **1300**, and VP5KK at **1500.**

Stations listed in italics were using A1A.

1·8MHz. 0000 *EA8AK, RG6G, SP1ADM, ZB2EO, 4U1ITU.* **0100** *UK9FCM, UL7ECH.* **0300** *VE1BVL, W2OO.* **1700** *LX2BQ.* **1900** *OH0W.* **2000** *4X4NJ.* **2100** *EA9EU, OY7ML, VE1BVL, UK2BA/UG6, VK6HD, 5N8ARY.* **2200** *EA8AK, RA9FKW, UK0AMM, UL7CAD.*

3·5MHz. 0500 *W7, XT2AW.* **0600** *3V8AL, 5T5TO.* **0700** KQ5E, *PY1HQ, W8CUP.* **1900** *UA9FDW, VK3QI.* **2100** JR4KGR, *UL7.* **2200** *3A2LB.* **2300** JT0GM, OY5J, *UA0AG, GM3YOR/ZB2.*

7MHz. 0000 *HZ1AB, JT0GM, KV4FZ, 8P6J.* **0600** *L8D/X* (Staten Is), *ZL.* **0700** *CN8AD, JA1SGX, UA0ZCJ* (Kamchatka), *3V8ALU.* **0800** *JA5BJC,* TG9NX, VP5EE, *W7FU, 4M3BRF, 9Y4s VT, VU.* **0900** *JA4CQS, JJ1SOC, KU7Y* (Idaho), *VK, ZL2s SQ, UW.* **1300** *JA1FB.* **1500** *AA6AA* (LP), *HL2JN, JA5BJC, KN6M, VE7CC* (LP), *VU9ARZ, W6QUV, W7s FU, XN.* **1600** *UK9XBM.* **1700** *EW6V, RG6G.* **2000** *JH4ELP, TN8AJ, UA0FBE* (Sakhalin), *VK3MR, VU9GVY, DK7PE/4S7,* **2100** *5H3BS.*

10MHz. 0800 *JA8XR, most W.* **0900** *PY2ACT, VK2,3,6.* **1100** *NL7J.* **1400** *CO2PY.* **1700** *VE7CA.* **1900** *JW5VAA, OY7ML, VE1ASJ, VK3MR.* **2000** *4Z4AB, 5N8ARY.* **2100** *HK3BBK, KP4CKY, W7FU.* **2200** *DL2GG/YV5.* **2300** *J3AE.*

14MHz. 0000 F6FIZ/TZ, VP8SB. **0700** *SU1IM.* **0800** *FO8FW,* P29WT, VK, YI1BGD, *ZB2DO,* ZL, *9M8VM.* **0900** *FY7BO, 4K1H.* **1000** VK, *WL7E,* ZL, 5W1DG. **1500** *CN8CX, HZ1AB, XE2MX, OE2TWM/YK, ZL2SQ.* **1600** G5ACI/AA. **1700** FB8XAB, 3B8FE. **1800** *W6KG/A4, KH6IJ, OX3UD, YB3ON, ZL1AH.* **1900** *FR7CL,* ZD8MP, *3B8DB,* 7X4BL. **2000** VP8AQJ. **2200** 4K1A. **2300** *J20BL.*

18MHz. 1100 *5N7HKR.* **1500** *DL, F, HB, LA, G4CTQ/ZB2.*

21MHz. 0800 HL0R, JA, *JT0GM,* VK. **0900** CR9CT, K0JZM/DU2, HL4YJ, TL8EL, VK9NL, YI1BGD, ZL. **1000** A71AD, FY7CH, JT0GM, P42E, VK, ZL, 5H3BH, 7P8CL. **1100** DK2XN/TZ, VK, 3V8PS. **1200** G5ACI/AA. **1400** 9V1VH. **1700** VE6-VE7, W6-W7, 4U1UN. **1800** N2CBU/C6A, *PY0ZZ.* **1900** VP8API.

28MHz. 0800 YI1BGD, *ZL1s BV, SX.* **0900** KB7IJ/KH2, *ZL4CS.* **1100** 9N38. **1200** *FR0GGL,* LU, *VU2BK, 5Z4DE, 8R1J, 9K2DX.* **1300** G5ACI/AA. **1400** A71BJ, *WB4O SN/C6A,* J73DF, *K5NA/KP2, P42E.* **1500** *TI2PI, VU9LO,* W1-W5, W8-W0, ZF2AG. **1600** VP2KBU, 9L1MS. **1700** W6, W7, W0.

Thanks to all who contributed to this month's column, and also to the writers of the following for items extracted: the *Ex-G Radio Club Bulletin* **(W3HQO)**, *Long Skip* **(VE3EUP)**, *DX'press* **(PA0GAM)**, *CQ Magazine* **(W1WY)**, *DXNL* **(DL3RK)**, the *DX Bulletin* **(K1IN)**, the *Long Island DX Bulletin* **(W2IYX)**, and *DX News Sheet* **(G3XTT/G3ZAY)**.

Please send all items for **April** issue to **reach G3FKM by 4 March.** □

Propagation predictions

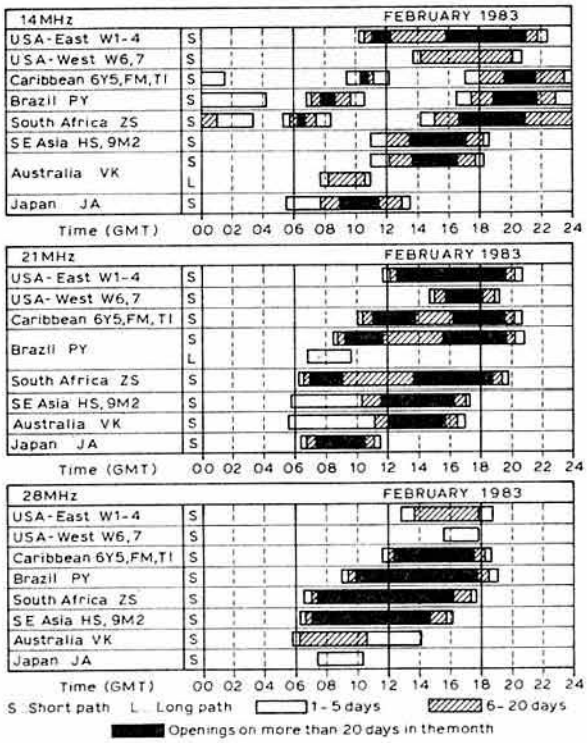
Winter is beginning to end during February and, as the days start to lengthen, the 28 to 14MHz bands will remain open longer in the evenings compared with the previous months.

Solar activity continues to decline and this will lead to further worsening of conditions on **28MHz**. Only traffic with Central and South America, Africa and South-East Asia will be certain on this band.

The decline in solar activity will not be so noticeable on **21MHz**. Traffic with all continents will be possible. From about the time of the equinox in March there will be less chance of dx via the indirect path on this band.

Towards the end of the month **14MHz** will remain open until shortly before midnight. Only under exceptional circumstances will dx be possible during the latter half of the night.

There will be no noticeable change in conditions for **7** and **3·5MHz** from those of last month. Traffic with the USA will probably be possible from shortly before midnight until 2-3h after sunrise on **7MHz**, and on **3·5MHz** from 4-5h before sunrise until dawn.



HF propagation study

Band predictions for February 1983

Using the table

The time is presented vertically at two-hour intervals 00(00)gmt to 22(00)gmt for each band.

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 "plus" sign in the 28 and 3·5MHz columns respectively.

	28MHz	21MHz	14MHz	10MHz	7MHz	3·5MHz
GMT	000001111122 / 024680246802	000001111122 / 024680246802	000001111122 / 024680246802	000001111122 / 024680246802	000001111122 / 024680246802	000001111122 / 024680246802
EUROPE						
Moscow	....25651...	....79997...	...4877787..	431765557864	985532224788	+++42.....4++
Malta	....35543...	....898883..	11.387778941	663765557997	998632225799	+++3....24++
Gibraltar	.....3322...	....388773..	....8877895.	352276556896	998753224799	+++++2....4++
Iceland	......121...	.....37761..	....2888982.	12..76667872	884354335688	+++++2...24++
ASIA						
Osaka	....1.....	....54.....	...2763111..	1..143224522	....2...2563	.....24.
Hong Kong	....462.....	...18872....	...1555542..	1...22225742	1.....2576	253
Bangkok	....6874....	...278884...	....255574..	3....2225755	3.....2578	255
Singapore	....45551...	...268886...	....255575.1	3....2225755	2.....2577	254
New Delhi	....7773....	...368871...	...2235561.1	521..1225556	73.....2578	4.....25+
Teheran	...178771...	...577887...	2..522457611	7432..125777	872.....2588	+4.....25+
Colombo	...178772...	...367887...	...112457722	42....125877	61.....2578	3.....24+
Bahrain	...187772...	...5668871..	31.411457732	8631..124788	872.....2588	+4.....255
Cyprus	....88885...	...4989994..	421765668964	986532346898	99621..13688	+++3.....3++
Aden	...188775...	...5667884..	511311257865	9631...24798	872.....2577	+4.....254
OCEANIA						
Suva (S)	......11....	.....3561...	....355564..	...14322451.	...12...23..	.....
Suva (L)	....2.....1.	1..7531.252	111375444741	..144211451.	...22...12..	.....
Wellington (S)	.....12.....	....16652...	....665573..	....25323551.	...12...22..	.....
Wellington (L)	.....	....31....1.	112174211542	..124211352.	...12...12..	.....
Sydney (S)	....4323....	...188775...	...3755574..	42225721	....1...252.	.....2..
Sydney (L)	.....	....231...21	..1.65421363	43113641	....2...142.	.....
Perth	...166431...	...478776...	1..135457711	2....2125875	2573	.....25.
Honolulu	.....	.....2..	.....1.261.	.11.322144..	..2421..21...	...3.....
AFRICA						
Seychelles	...134551...	...4557874..	51.2.1257865	952....24799	85.....2578	+2.....24+
Mauritius	....57775...	...45678851.	53.2.1257986	952....24799	83.....2588	5.....25+
Nairobi	....666741..	...45568862.	631411147997	9841...14799	883.....1587	+5.....255
Salisbury	....356762..	...255579831	761411137998	9841....4799	873.....1588	+5.....25+
Capetown	....347774..	1...66678852	861421125899	9953....3699	884.....378	+5.....5+
Lagos	....7888851.	11..86668963	882451115899	89862...2699	7883.....378	4++.....5+
Ascension Is	....475563..	11..87556752	885162111699	99963....379	88861....158	5++3.....2+
Dakar	....2887861.	78667862	775174112699	989551...389	87862....158	54+3.....2+
Las Palmas	....288774..	....7998994.	454187666897	999664334699	9897411.1479	+++4.....4+
S AMERICA						
South Shetland	.....134551.	26777752	675175433356	57755211..23	34542.....1	..22.....
Falkland Is	.....367861.	37876751	675.75421246	7985521...14	57762.....1	2453.....
Rio de Janeiro	.....442341.	8655661	665.5521.268	999552....37	88862.....15	+++3.....2
Buenos Aires	.....264661.	27866651	565.75411146	8994521...14	68862.....2	3++3.....
Lima	......77761.	......87654.	233.32421114	6883521....3	58862.....	2++3.....
Bogota	......77751.	......87654.	223.13521.25	7882432....4	68762.....1	3+53.....
N AMERICA						
Barbados	.....187761.	.....586665.	233..6411156	8883331...26	88762.....3	+++43.....
Jamaica	......4775..	......87664.	122.12531124	67724321...4	68762.....1	3+54.....
Bermuda	......5765..	.....187675.	122..5532355	7772332...26	88862.....3	5+54.....
New York	......2664..	......68773.	111..3553354	67612322.125	78852.....3	4++3.....
Mexico	......564..	.....8752.	111.1.353112	47614222....1	27852.....	.4+3.....
Montreal	......1563..	......68773.	111..3554464	676123221135	788521....13	4++3.....
Denver	.....32..	.....2761.	11.....55332	46513.122..2	268521.....	.4+3.....
Los Angeles	.....21..	.....751.	11.....36321	254131.231.1	158521..1....	.2+3.....
Vancouver	.....	.....14..	.1.....16541	353.31.24322	147421..1....	..43.....
Fairbanks	.....	.....	....1111352.	231.32224542	134421..2321	..23.....

The provisional mean sunspot number for November 1982 issued by the Sunspot Index Centre, Brussels, was 98·5. The maximum daily number was 141 on 22 November, and the minimum was 71 on 27 and 29 November. The predicted smoothed sunspot numbers for February, March, April and May 1983 are respectively: (classical method) 99, 96, 94 and 92; (SIDC adjusted values) 96, 93, 91 and 89.

YOUR OPINION

RF HAZARDS

The Editor
Radio Communication

Sir—We write in reply to two items in *Rad Com* December 1982 concerning rf hazards: the letter from P. G. Johnson, RS41331, and the penultimate item in *TT*, both of which refer to our article in *Rad Com* February 1982. Although we are radio amateurs, we write on this topic in a *professional* capacity as members of the staff of the National Radiological Protection Board, the UK advisory agency which keeps all kinds of radiation hazard under continuing review.

As we noted in our article, the most important effect of rf energy on the body is heating. This has been known for several years, and forms the basis of the present UK power density limit of 10mW/cm². More recently, the possibility of the other kinds of effect mentioned by Mr Johnson has been examined very closely indeed, but research has tended only to confirm the view that heating appears to be the only potentially *hazardous* effect. Therefore the most modern standards are still based on controlling the rf energy absorption by the body to levels well below those at which any significant heating would occur.

While the present UK standard is quite venerable it never was "arbitrary" as Mr Johnson put it, and the standard has been retained because it has survived repeated review and combines the virtue of simplicity with an adequate degree of protection. However, at the expense of introducing complications, it could be improved: in particular, it does not maintain a uniform "safety margin" at all frequencies, mainly because of body-resonance effects which increase absorption of energy in the 30-300MHz region. The same criticism applies to the Swiss standard mentioned by Mr Johnson.

An indication of the most modern thinking in rf exposure standards is the new advisory US ANSI Standard which, while based on heating effects, introduces frequency-dependent exposure limits. In the 30-300MHz region the limit is 1mW/cm², and is less stringent at hf and in the microwave region. An extensive *rationale* reviews the evidence and explains the underlying reasoning. On the basis of that evidence, the ANSI Standard permits the limits to be exceeded in exposures to low-power devices (emitted rf power of 7W or less) at frequencies up to 1GHz.

What are the implications for radio amateurs? The fact that the ANSI limit in the 30-300MHz region is 10 times lower than the present UK limit is not very significant because even the lower limit is not approached in the vast majority of situations encountered by radio amateurs. And although vhf/uhf handy-talkies with "rubber duck" antennas remain the most common source of appreciable rf exposure, the low powers commonly involved have been found to be insufficient to lead to any appreciable hazard. HF operation is particularly unlikely to lead to rf hazards because the absorption of energy by the body decreases rapidly with frequency below 30MHz.

It is still of course possible to expose oneself to undue rf hazards. As we explained in our article, these usually arise from neglect of the basic principles of good rf engineering: that rf energy intended for radio communication ought to be radiated from an antenna which is unobstructed by rf absorbers—including people—and otherwise ought to be kept enclosed by shielding.

R. P. Blackwell, G3PMK
I. F. White, G3SEK

KISS CIRCUITS

The Editor
Radio Communication

Sir—Following the letter by G6FRZ ("Your Opinion" September) about the lack of simple (kiss) circuits available, may I point out that many such circuits appear in the journal of the G QRP Club, an RSGB affiliated club. Our journal *SPRAT* contains two thirds circuits and practical ideas for transmitters, receivers and transceivers (cw, ssb and dsb). Membership is open to all, and a sample of SPRAT can be sent to anyone who sends me a stamp. A good many members of the G QRP Club run completely home-built stations.

Rev George Dobbs, G3RJV

COUNCIL PROCEEDINGS

A brief report of the Council meeting held on 20 November 1982

Present: Dr E. J. Allaway (President, in the chair), Messrs R. G. Barrett, R. Bellerby, Dr D. S. Evans, Messrs K. A. M. Fisher, F. Hall, L. N. G. Hawkyard, Mrs J. Heathershaw, Messrs G. R. Jessop, T. I. Lundegard, W. J. McClintock, B. O'Brien, H. S. Pinchin, D. M. Pratt (members of Council), D. Baptiste, CBE (President-elect), D. A. Evans (secretary/general manager), A. W. Hutchinson (editor), and Mrs H. M. Allin (minutes secretary).

Apologies for absence were received from Messrs Bazley, Cornish, Knight and Kyle.

Financial report

In the absence of the honorary treasurer, Mr O'Brien brought Council members up to date with the situation regarding the purchase of Alma House and sale of 35 Doughty Street. The following figures were noted:

Alma House: purchase price		£350,000
Reduction in respect of roof	5,000	
Reduction for two offices currently occupied by C. P. Roberts' staff in connection with their use of the yard.	1,250	6,250
Total		£343,750

The Society would get an option to purchase the yard for £50,000 after one year, or could require C. P Roberts to leave after two years. A £5,000 deposit had already been paid by the Society.

35 Doughty Street: sold for £265,000.

Retention of £25,000, recoverable if planning permission is obtained for the top floor of 35 Doughty Street.

£110,000 recoverable on securing established use certificate for 35 Doughty Street.

£250 added to the purchase price to cover the use of the flat at Alma House by a director of Abbey Homesteads until the end of the year.

Final net price (excluding yard) £78,500

Paid from the Society's own resources.

(Planning permission for the top floor, and established use certificate were subsequently obtained.)

Secretary/general manager's report

Mr Evans noted that for the entire history of the Society it had operated from small premises. Certainly for the past two years it had operated from a building which was far too small for its operational needs. Business and membership had expanded at a fantastic rate during the past five years, and while the Society had been building up its cash reserves (to approximately £250,000) this had to some extent been done at the expense of services to members and delays to customers. He considered that members had had a pretty raw deal, and working conditions for the staff at 35 Doughty Street had been appalling.

The Society now had a building of which it could be proud, and he could now begin to put the Society's activities on a professional footing. He noted that in many cases the levels of work were primarily determined by members, and it was always important to adopt a most flexible approach to staff and their duties because it was not always possible to predict the level of queries from members and non-members, book orders, committee work etc.

One factor which enabled this reorganization to take place was that it was now physically possible to group together staff working in the same section. There were now four main sections:

1. Accounts
2. Membership services
3. General management (which at present included the circulation of *Radio Communication,* and book sales)
4. Chelmsford *Radio Communication* editorial operation.

The GM detailed some of the work of two of the sections at HQ:

ACCOUNTS

Cash-with-order processing
Order input processing.
Production of despatch notes.
Production of audit records.
Overpayments.
Underpayments.
Special items (morse records, badges, *QST* subscription etc).
Out-of-stock items.
Customer liaison.

Trade sales processing
Order input/processing.
Invoicing.
Monthly statement.
Credit control.
Proforma invoice.
Queries.
Journals and other adjustments to accounts etc.

General accounting
Wages.
Cash control.
Giro.
Foreign payments.
Bankers orders.
Subscriptions for *DX News-sheet, Microwave Newsletter.*
RAE.
Ledger control (including nominal ledger).
Budgeting.
Accounts etc.

MEMBERSHIP SERVICES

Despatch to prospective members/distribution of all standard information, including leaflets, reciprocal licensing data, and most standard letters.
GB2RS.
Teletext.
Headline news.
DX News-sheet distribution.
Microwave Newsletter and other newsletter distribution.
Beacons and repeaters.
Antenna planning.
Intruder Watch.
Special event stations' callsigns.
Maintenance of membership services section data on the computer.
Counter sales.
Telephone answering and straightforward subscription/cash with order queries which can be answered from the computer system.
Stolen equipment.
Undelivered copies of *Radio Communication.*
Liaison for QSL Bureau and Audio/Visual Library.
RAE.
Publicity and the media.
General queries about amateur radio and licensing by correspondence.
Diary of events.
Representation at exhibitions and rallies.
Raynet work required at HQ.

Mr Pinchin expressed his personal appreciation to Mr Evans and the staff at HQ for their work with the move and the extra hours they had worked to get things into order.

Dr Allaway thanked Mr Pinchin for his advice and assistance in connection with the new telephone installation at HQ, and for helping staff shortly after the move. He also echoed Mr Pinchin's remarks regarding the staff's efforts and asked Mr Evans to convey Council's gratitude.

Some discussion ensued on the subject of "Oracle", which had just discontinued the amateur radio page. It was felt that the Society's contribution tended to be too narrow, being aimed more at radio amateurs than potential amateurs.

The recent Telecommunications Bill was also discussed, and it was recognized that the Society should have a specified course of action to deal with this matter. An action was placed on the secretary and the chairman of the Licensing Advisory Committee to produce an item for "QTC" in the January *Radio Communication.*

Membership and representation

Council noted that:

(i) Reduced subscriptions had been granted to 10 members,

(ii) the following area representatives had been appointed:
S. A. Berry, G4IWR, Hull/Humberside;
B. Crisp, G5PW, Halifax/Spen Valley;
A. W. Faint, G6GWH, Leicester;
D. H. Lander, G4LQL, Mansfield.

Honorary membership

Mr Bellerby proposed acceptance be given to the recommendation for Mr Noel Eaton, VE3CJ, to be made an honorary member of the Society. This was seconded by Mr Hall and agreed unanimously.

Awards

The following awards were agreed for 1982:

Founders Trophy	Mr J. P. Hawker, G3VA
Calcutta Key	Mr L. R. Mitchell, G3BHK
Marconi Medal	I0SNY and I0YLI (subject to agreement by the Marconi Company)
Mullard Award	Jointly to S. J. Davies, G4KNS, J. N. Gannaway, G3YGF, and H. Griffiths, G4CNV.
RSGB Microwave Award	As Marconi Medal.

It was suggested that trophies be retained at HQ in future and the winners awarded with the RSGB diamond plaque.

Council agreed the recommendation from the Raynet Committee to present the Raynet Cup to GW8ENT for valuable service to the community in January 1982, when the group provided continuous emergency communication for 14 days during bad weather conditions.

Publications

Mr Jessop raised various matters about which he was concerned.

In reply Dr Evans said that delays in publishing books were regretted; this had been caused by the overloading on the Society's book editor and the lack of an editorial assistant.

Dr Evans also pointed out the difficulties faced by the Technical & Publications Committee in finding people to generate suitable material for publications.

Membership of the Finance & Staff Committee

Mr Bellerby opened this discussion be referring to his proposals on the supplementary agenda. A discussion took place, during which various views on the F & S Committee were put forward, and Dr Evans drew attention to a report on committee structure recently prepared by the Forward Planning Group, as directed by Council, requesting that this be considered prior to any major decision taking in this matter. It was decided to consider the FPG report at the next Council meeting.

Council Letter

Mr Lundegard had circulated a paper, suggesting that the *Council Letter* be made available to RSGB members on the same basis as the *DX News-sheet.* Mr O'Brien said he felt this was superficially an attractive proposition, but after consideration he felt there were strong reasons against this scheme. Mr Evans agreed that newsletters were valuable, and added that there was scope for at least six new ones in addition to the current three specialist letters. However, he also felt this was something to bear in mind for the future because of the present level of work.

Mr Hutchinson pointed out that late news items could be included in *Radio Communication* up to three weeks before publication, not "months" as was often quoted.

Mrs Heathershaw suggested that committee chairmen be asked to produce reports of their committee's work, with a view to publicising this information.

G3DME's proposal for a beacon in memory of G2BVN

Council was anxious not to rush any decision, and it was agreed that the secretary would write to the HF and VHF Committees, requesting that they send their comments to G3FKM to assist Council in its deliberations.

Reports from honorary officers

Dr Allaway reported:

(*i*) that the 10MHz band had been released to USA amateurs; and

(*ii*) that the South African Radio League had authorized its members to use telephony on 10MHz. There was general agreement that this was a regrettable decision.

Dr Evans reported on the progress being made with microwaves with 10-12GHz now being widely used for domestic equipment. He added that since the recent landmark set by the Italians, the new distance target set for 10GHz contact was 5,000km.

Mr Pratt said he had written to the observers in the Observation Service, thanking them for their year's work and requesting suggestions for the future.

Mr Fisher gave a report on the current situation regarding 50MHz experimental licences. About 260 questionnaires had now been sent to those expressing an interest in obtaining an experimental licence. He had received 90 completed questionnaires, and a meeting would be held with the Home Ofice to decide on the allocation of licences. Mr Fisher said he was pleased at

the excellent liaison between the Society and the HO in this matter.

Mr Fisher further reported:

(i) 24h operation had been approved for GB3SIX,

(ii) satellite services band plan—145·8-146MHz had been accepted internationally for satellite use only.

Review of committee business

As time was short, it was decided that any matters arising from the committee minutes which Council members wished to discuss, should be notified to the President within the next seven days.

Raynet

Mrs Heathershaw requested Council's opinion on the continuance of the zonal representative scheme. It was agreed that the scheme was useful and should therefore be continued for a further two years.

Recommendations arising from committee minutes were then considered. Agreement was given to the following:

In view of the success of the 1982 event, the Woburn Rally would be included in the Society's 1983 calendar. (*Exhibition & Rally Committee*)

That obituaries published in *Radio Communication* should continue to be limited in length. (*Membership & Representation Committee*)

That the following awards for 1982 be made:

Ostermeyer Trophy	A. L. Bailey, G3WPO
Courtney Price Trophy	UOSAT team
Norman Keith Adams Prize	J. Gannaway, G3YGF
Wortley Talbot Trophy	J. Royle, G3NOX, and M. Emmerson, G3OQD

(*Technical & Publications Committee*)

That GD4IOM be awarded the VHF Manager's Trophy for 1982. (*VHF Contests Committee*)

OBITUARIES

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

Mr W. Browning, MIAA, MIMI, FMI, G2AOX

Bill Browning died on 3 December a few days before his 80th birthday. He was first interested in wireless in the early days of broadcasting, and in 1924 he was the only maker of broadcast receivers in the City of London. He held an AA licence 2AOX before the war. Spinal injuries he received during a motorboat race led to his great interest in the Radio Amateur Invalid & Blind Club, of which he was president for many years. He also ran the RAIBC 3·5MHz net for some years, and obtained G4IBC for the club.

Apart from his considerable activity in RAIBC, he will be remembered for his work in connection with satellites. He developed a method of tracking Oscars from a small globe and a piece of string, which proved to be very accurate, and he was a correspondent of NASA, which sent him its daily reports. His booklet *Keeping track of Oscar* will be remembered by all who are interested in satellites in this country.

He was elected a vice-President of the RSGB in 1974.

Major R. N. B. Gatehouse, G3CZI

Richard Gatehouse died on 28 April 1982, aged 63. He entered the radio field as a Marconi apprentice, and later became a Merchant Navy radio officer. During the second world war he was commissioned in the REME and after transfer to the RA worked at RRE Malvern, being involved in the development of radar defences.

He resigned from the army in the early 'fifties and concentrated his efforts on designing, developing and marketing electronic navigational aids for small craft. He was a fellow of the Royal Institute of Navigation, which presented him with its gold medal, for outstanding contribution to small craft navigation, in 1975.

Mr J. MacIntosh, GM3IAA, formerly VS2AF, VS1AA

Jim MacIntosh died on 28 October 1982, aged 85. He was one of that select band of amateurs whose call (VS1AA) has become firmly attached to a type of antenna, in his case the off-centre-fed system he first described in *The T&R Bulletin,* November 1936. His article, "Some experimental work with aerials", introduced the concept of the "one-third tap" (one-sixth from centre), which transformed the 1929 Windom antenna into a multiband system that still remains popular in many countries.

A proficient cw operator who took the craft seriously, he held strong, forthright views on many aspects of amateur radio. He helped many to obtain their licences.

Mr G. Pearson, G3AWZ

George Pearson died on 14 November 1982, aged 61. He was active on all bands from 1·8MHz up into the uhfs. After serving in the REME as a WO2, he obtained his full licence immediately after the second world war. He gave a lot of time and teaching ability in running free classes for anyone interested in amateur radio. Many amateurs owe their licences to his generosity. He was very successful in the dx field, and had won most of the worthwhile awards.

Although his station was equipped with the best of modern gear, he still spent a lot of time designing and building. During recent years low power dx working claimed his attention, and he was still planning construction work until a few days before his death.

Mr J. H. Reed, BRS31742

John Handsleigh Reed died on 11 September 1982, aged 65. He joined the Society on 8 November 1969. His main interest in the hobby was listening, monitoring all modes of transmissions on hf, and more particularly vhf.

Mr F. H. Walker, G5AX/G4TX

Fred Walker died on 15 November 1982, aged 78. During the second world war he had been a Silent Listener, and had been an amateur since the early 'twenties. His name appears in the Guinness Book of Records under "earliest antipodean reception"—which took place on 12 November 1924, using a homemade two-valve receiver on 75m.

Also:

Mr K. Blundell, G8SHO;
Mr P. J. Boyd, RS51115;
Mr E. Jones, GW4CQP; and
Mr L. Pepperell, G8EHT.

Mobile rallies calendar

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

6 February—Bury RS Rally-with-a-difference. Mosses Community Centre, Bury. Open 11am. There will be an abundance of second-hand and surplus equipment, and a larger than usual bring & buy. Ample car parking and refreshments available. Details from G6HBF, c/o Bury RS, Mosses Community Centre, Cecil Street, Bury, Greater Manchester.

11 March—Lagan Valley RS Hamfest 1983, Lisburn Markets (beside Lisburn Swimming Pool). Opens 7pm. Talk-in, bring & buy, and trade stands. Refreshments available. Details from sec GI8SXN, QTHR.

13 March—Pontefract & DARS Components Fair, Carleton Community Centre, Pontefract. Open 11am. Talk-in on S22. Licensed bar, refreshments, bring & buy. RSGB publications. Emphasis on build-your-own. Details from G4AAQ, tel 0977 791071.

27 March—White Rose ARS Rally. The Refectory, The University of Leeds. Opens 11am. Full range of facilities. About 40 top dealers. Full catering, huge car parks on site. Details from R. Hughes, G4DZI, QTHR.

10 April—Swansea ARS Rally. Patti Pavilion, Swansea, (next to St Helens Cricket Ground on A4067 Swansea-Mumbles coast road). Open 10.30am-5pm. Trade stands. RSGB books, local repeater groups, bring & buy, licensed bar, refreshments, hf station and S22 talk-in. Good car parking. Further details from GW4HSH, QTHR, tel 0792-404422.

1 May—Maidstone YMCA ARS Mobile Rally. Y-Sportscentre, Melrose Close, Cripple Street, Loose Road, Maidstone. For details and stand bookings contact G3ISD, QTHR, tel Sittingbourne 77431.

15 May—Northern Mobile Rally. The Great Yorkshire Showground, Harrogate. Organized by the Otley ARS. Doors open 11am (10.45am for wheelchair and blind visitors). Many attractions: Punch and Judy, films for junior ops, bring & buy stall, licensed bar, and excellent refreshments. Talk-in on vhf and uhf. Further details from G4KDV (G8DFZ) QTHR, tel 0943 463083.

15 May—Swindon & DARC Mobile Rally. Park School, Marlowe Avenue, Swindon, Wilts. Open 10am. Talk-in on 144MHz (S22) and 432MHz (SU8). Many trade stands. Film shows for children, and other displays of hobbies from groups in the area. Ample car parking, and refreshments. Details from K. A. Saunders, G8SFM, QTHR, tel 0666 89307.

22 May—Barry College of Further Education RS Welsh Amateur Mobile Rally. Memorial Hall, Barry. Open 11am to 5pm. Talk-in on S22, licensed bar, refreshments, bring & buy. Enquiries to Reg Rowles, GW4FOM, tel Cardiff 565656.

29 May—East Suffolk Wireless Revival. Civil Service Sports Ground, Bucklesham, nr Ipswich. Traders, non-radio stalls, attractions for all the family. Fleamarket and car boot sale (instead of "bring & buy"). Details from Jack Tootill, G4IFF, 76 Fircroft Road, Ipswich IP1 6PX, tel 0473 44047.

5 June—Spalding & DARS Mobile Rally. Springfields, Spalding. Details from I. Buffham, G3TMA, QTHR.

12 June—RNARS Mobile Rally. HMS Mercury, nr Petersfield, Hants. Opens 10am-5.30pm. Refreshments will be available all day. Arena events, and trade stands. Details from G4DIU, QTHR.

19 June—Denby Dale & DARS Mobile Rally. The Shelley High School, Skelmanthorpe, nr Huddersfield. Open 11am. Something for all the family including excellent refreshments and bar. Details from J. Clegg, G3FQH, QTHR, tel 0484 862390.

26 June—Longleat Mobile Rally, Longleat Park, Warminster. Preliminary enquiries to G4FRG or G8GLQ, both QTHR.

10 July—Worcester & DARC Annual Mobile Rally, Droitwich High School, Ombersley Road, Droitwich. Open 11am-5pm. Attractions will include "strawberry fields", fancy dress competition, model aircraft displays. Details from rally manager, Brian Jones, G8ASO, QTHR, tel Worcester 351565.

31 July—Rolls Royce ARC (Barnoldswick) Mobile Rally, Sports & Social Club, Barnoldswick. Open 11am. Details from Leslie G. Logan, G4ILG, QTHR.

7 August—RSGB National Mobile Rally, Woburn.

14 August—Derby Mobile Rally. Lower Bemrose School, Derby. Further details nearer the date. Details from G3VGW.

18 September—Peterborough R&ES Mobile Rally. Wirrina Sports Stadium, Bishops Road, Peterborough. Situated on the river embankment with good car parking, good food, and bar meals, with bar in the adjacent Gildenburgh rooms. Open 10.30am-5pm. Details from D. T. Wilson, 4 Conway Avenue, Peterborough, tel Peterborough 76238.

Looking ahead

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

5-6 March—RSGB National Amateur Radio Convention, National Exhibition Centre, Birmingham.

26 March—RSGB National VHF Convention, Sandown Park Racecourse, Esher, Surrey.

Special event station

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

GB2SDD, 1 March

The station will celebrate the St David's Day holiday in Wales. Operation will be on all hf bands, conditions permitting, and will commence at midnight the previous evening, for 24h. Details from R. R. Jones, GW4HOQ, QTHR, tel Swansea 781926.

CONTEST NEWS

1·8MHz Town and County Contest rules

This contest has been devised to meet a requirement for an inter-G phone contest. The exchange differs from other RSGB hf contests in that the entrant's QTH must be sent, reflecting the HF Contest Committee's move towards information exchange in some short duration contests.

TRANSMITTING SECTION

1. Eligible entrants. All paid-up members of the RSGB resident in the British Isles (G, GD, GI, GJ, GM, GU and GW) holding a Class A licence. Single-operator entries only. Entrants must operate in accordance with the terms of their licences.
2. Period. 2100-2400gmt Saturday 19 March 1983.
3. Frequencies/mode. 1·915-2·0MHz phone only.
4. Contest call/exchange. CQ contest. RS and serial number starting from 001, followed by the operator's town and county, or administrative region in the case of GM stations. In the case of "country" operators the nearest town in the same county/region must be given.
5. Scoring. Three points for each completed contact with a station within the British Isles, with a bonus of five points for the first contact with each new county/region. Stations outside the British Isles will not count for points.
6. Entries. Log sheets to be headed: date/time gmt; callsign; RS/serial number sent; RS/serial number received; town/county received; bonus points; QSO points. The standard log sheet (Form HFC1) meets this requirement. The entry must be accompanied by the following declaration: "I declare that this station was operated strictly in accordance with the rules and spirit of the contest, and I agree that the decision of the Council of the RSGB shall be final in all cases of dispute." The declaration must be signed and dated. The hf contest cover sheet (Form HFC2) meets this requirement.
7. Address for logs. HF Contests Committee, c/o D. J. Andrews, G3MXJ, 18 Downsview Crescent, Uckfield, East Sussex.
8. Closing date for logs. Logs must be postmarked no later than 4 April 1983.
9. Awards. Certificates of merit will be awarded to the leading three stations.

RECEIVING SECTION

1. Transmitting section rules 1, 2, 3, 5, 7 and 8 will apply.
2. Logging. A station may only appear once in the column headed "station heard". The callsign of the stations being worked may only repeat once in every three contacts logged. Entrants should log the callsign of the station heard; RS/serial number and town/county given by that station; and the callsign of the station being worked.
3. Awards. Certificates of merit will be awarded to the leading three receiving stations.
4. Holders of British Class B licences may also enter the receiving section.

National Field Day 1983 rules

Please note the changes in rules 2 and 10.

Packets of contest stationery will be sent to prospective entrants during May.

1. The general rules for RSGB hf contests, published in the January 1983 issue of *Radio Communication,* will apply.
2. Notification of site. Each group intending to compete must send details of the site to be used to: RSGB HF Contests Committee, c/o Mr M. Harrington, 123 Clensham Lane, Sutton, Surrey SM1 2ND, to arrive not later than Saturday 30 April 1983. Details must include name of the person responsible for the entry; the address to which contest stationery should be sent; section to be entered; name of group; callsigns to be used; national grid reference and sufficient access information for an inspector to be able to locate the site.
3. When. From 1700gmt Saturday 4 June 1983 to 1700gmt Sunday 5 June 1983.
4. Eligible entrants. Any group of RSGB members within the prefix zones G, GD, GI, GJ, GM, GU and GW. NFD is a multi-operator contest.
5. Operation must be from a portable station not located in a permanent building and not using a mains supply. No equipment or antennas may be installed on the site prior to 24h before the start of the contest. This does not apply to the storage of equipment.
6. Mode. CW(A1) only, in the 1·8, 3·5, 7, 14, 21 and 28MHz bands.
7. Sections.

a) Open section. The station shall consist of a transceiver (or transmitter and receiver) with an additional receiver if desired, which may only be used for monitoring purposes. There is no restriction on the number or type of antennas, but the maximum height must not exceed 60ft (18·5m).

b) Restricted section. The station shall consist of a transceiver (or transmitter and receiver) with one antenna which must be a single-element such as a dipole, vertical, long wire, etc, having not more than two elevated support points and not exceeding 35ft (11·5m) above ground at its highest point.

Both sections. Standby equipment may be at hand but not powered or connected in any way simultaneously with the main equipment.

The presence on the site of additional amplifiers or modified commercial equipment capable of excess power, may result in the entry being disallowed.

8. Scoring. Points will be scored as follows:

(a) Fixed stations in Europe (including the British Isles)	2 points
(b) Fixed stations outside Europe	3 points
(c) Portable and mobile stations in Europe (including the British Isles)	4 points
(d) Portable and mobile stations outside Europe	6 points

The contacts on 1·8MHz and 28MHz should be scored as above and the totals multiplied by two to obtain the claimed score.
9. Group contacts. Points must not be claimed for contacts made by a competing station with members of its own group.
10. Entries. These are to be in accordance with general rule 6 with the following exceptions:
a) Separate logs must be used for each band using the standard RSGB hf log and NFD cover sheets.
b) An additional standard cover sheet, summarizing the overall multiband entry, must be included.
c) Entries must be postmarked no later than Monday 20 June 1983 and sent to RSGB HF Contests Committee, c/o M. Harrington, 123 Clensham Lane, Sutton, Surrey SM1 2ND. Entries sent to RSGB headquarters or having insufficient postage will not be accepted.
d) Duplicate contacts must be marked as such without any claim for points. Unmarked duplicates will be penalized at 10 times the claimed score and logs containing in excess of five will be disqualified.
11. Trophies.
a) The National Field Day Trophy to the station having the highest checked score, regardless of section.
b) The Bristol Trophy to the station having the highest checked score in the other section.
c) The Gravesend Trophy to the group having the second highest checked score in the section with the largest number of entries.
d) The Scottish NFD Trophy to the Scottish group having the highest checked score.
e) The Frank Hoosen Trophy to the group having the highest checked score on the 14MHz band.
f) Certificates of merit to the groups in each section with the highest checked scores on the 1·8, 3·5, 7, 14, 21 and 28MHz bands.
12. Check logs. While overseas stations are not eligible to enter NFD, check logs are very welcome. A certificate will be awarded to the overseas station in each continent whose check log shows the most points contributed to competitors.
13. Inspections. All stations are subject to inspection by nominated representatives of the HF Contests Committee. The inspector's brief will be to ensure that the rules and spirit of the contest are being observed. Should the inspector be unable to locate the site due to inadequate or incorrect information being given, the entry will be disallowed. In the event of a last-minute change of site, it is the responsibility of the members of the group to make suitable arrangements for the inspector to find the new site.

Low Power Contest 1983 rules

1. Aim of contest. To encourage QRP operation.
2. Eligible entrants. Single-operator stations only. UK entrants must be fully paid-up members of the RSGB.
3. When. Sunday 17 April 1983, 0700-1100gmt and 1300-1700gmt.
4. Sections. **(a)** British Isles stations using 5W input or less.
(b) Overseas stations using 5W input or less.
5. Frequencies. 3·5MHz and 7·0MHz bands only.
6. Mode. CW(A1A) only.
7. Contest call and exchange. CQ QRP. Exchange RST and serial number starting at 001, plus input power, eg 579001 3W.
8. Scoring. 15 points for each completed contact with another QRP station. Five points for all other contacts. Overseas stations may only claim points for UK contacts.
9. Logs. Separate logs must be submitted for each band. All exchanges to be shown.
10. Declaration. Each entry must be accompanied by the following declaration: "I declare that my station was operated in accordance with the rules and spirit of the contest and in the event of any dispute the decision of the Council of the RSGB will be final." The declaration must be signed and dated.
11. Address for logs. RSGB HF Contests Committee, c/o R. A. Treacher, BRS32525, 79 Granby Road, Eltham, London SE9 1EH.
12. Closing date for logs. Logs must be postmarked not later than 9 May 1983.
13. Awards. The 1930 Committee Cup will be awarded to the leading station in Section (a). Certificates of merit will be awarded to the leading three stations in each section, and to the highest placed entrant in each section using 1W input or less.

144MHz Trophy & SWL Contest results

In many ways the September 144MHz Trophy Contest was a re-run of the May 144MHz open event, with most of the highest scoring stations gaining places which might have been predicted quite accurately from their past records and from their geographical location. The east coast criterion for a place in the top ten, however, is not quite as simple as is often believed and were it so, stations satisfying the essentials of that criterion in N Ireland, Mull of Galloway, Isle of Man and perhaps SW coastal regions of Devon and Cornwall should figure more prominently in the result tables.

The VHF Contests Committee has already begun a "think tank" to review vhf/uhf contest rules and in this context, the comments of contestants from these areas would be welcomed.

Conditions, in spite of many opinions to the contrary, were above average. No station in the first 25 claimed a best dx below 700km, and five of these exceeded the 1,000km. Many stations worked more than 15 countries and 50 QTH squares, and for the first time on record two managed to break the 1,000 QSOs mark for an RSGB vhf contest.

The logs from most of the regular contestants were of a high standard, even though it is realized that few are bothering today to keep a running check log. There is food for thought here, since without a good logger, not only are time and points being wasted, but the risk of duplicate QSOs in the final log is greatly increased. Photocopies of corrected "real time" logs are becoming more common, and while this practice may save the contestant much time and effort, the logs are frequently more difficult to read. Some are an adjudicator's nightmare and will, in future, not be given the benefit of any doubt.

There was some confusion between the RSGB National and the IARU International events. Although the rules for each were compatible, they were different, and required separate 427 cover sheets. Many stations scored in points/km and radials, but failed to record their totals independently. Some scored in radials only and asked for their logs to go forward to the IARU event. Others were content to let the adjudicator's crystal ball decide if the section they thought they were entering was applicable to either or both events. Most of these difficulties were resolved on this occasion, but regrettably any repeat exercise on this scale is likely to result in the entry not being accepted by either the RSGB or by the IARU.

Leaving aside all considerations of power, site and other advantages, real or imaginary, the Parallel Lines Group, G4LIP/P, are to be congratulated on a phenomenal performance. Not only did they break the 1,000 QSOs barrier to amass more than 15,000 radial points, but were the only station known to have worked more

than 60 QTH squares in 24h. The Martlesham RS, G4MRS/P, with another record-breaking score from 1,129 QSOs, deserve equal congratulations for the runners-up position in the multi-operator, portable station section.

The entries in the other sections would have offered little or no challenge in an overall result table. GJ4ICD in the single-operator, and G8RZO in the multi-operator 150fixed station sections were the only exceptions. Each won their respective sections by a clear margin, and with all other winners, will receive a certificate. Section A was won by GW6JJU/P; the leader of only five entries. The swl section was very poorly supported with only two entries: BRS32525 the clear winner. The Mitchell Milling Trophy will be awarded to the Parallel Lines Contest Group and the Thorogood Trophy to Geoff Brown, GJ4ICD. The leading GM entry was from GM4CCC/P, who may be eligible for the GM4HAM Trophy.

G2HIF

SECTION P

Posn	Callsign	Score	QSOs	QTH	Best dx	Km
1	G4LIP/P	15,597	1,038	AN61c	OE5XPL/5	1,120
2	G4MRS/P	13,131	1,129	AM67f	Y28AL/P	888
3	G4DEZ/A	12,509	943	AL34h	DC7KM	875
4	G4APA/P	12,405	775	ZO48e	HB9AHD	1,049
5	GW4NXO/P	11,850	993	YL25j	DL8HAT	935
6	G4BWG/A	11,144	859	AL67d	SK7OA	940
7	GW3OXD/P	11,036	918	YM54d	DF9QT	807
8	G3EFX/P	10,960	824	ZK10d	DK0CQ	939
9	G3ZIG/P	10,277	916	AM37j	DL0JR/P	916
10	G6EKR/P	8,758	718	AL56b	Y23BD	797
11	G3YMD/P	8,708	733	AL76b	Y23BD	822
12	G8BQX/P	8,559	744	AK03d	DL8HAT	725
13	G4KDL/A	8,139	753	AM49b	DK0HA	722
14	G4NVA/P	7,872	806	ZN53g	DK6AQ	822
15	G6JIM/P	7,449	690	AL02b	Y23SB/P	801
16	G8HRC/P	7,387	641	AL17a	DL2HX	856
17	GW6GW/P	7,248	804	YL06d	EA2AA	950
18	G3UES/P	7,199	755	ZL66g	DK3FW	748
19	GI4OMK/P	7,153	575	WO40j	DF0VK/P	1,014
20	G4DZO/P	7,039	571	AK11a	EA1BLA	1,032
21	G4CDC/P	6,995	586	ZN49j	DK0OX	821
22	G3SEK/P	6,752	697	ZL34j	DJ9YE	798
23	GM4CCC/P	6,547	542	YP42f	F1FPL/P	717
24	G4GKS/P	6,509	581	AM65c	DL0JR/P	842
25	G8SDS/P	5,911	557	YK28c	Y48ZD/P	1,091
26	G6UT/P	5,792	554	AL12h	Y31ZM/A	1,054
27	GW4CZZ/P	5,696	631	YN64d	Y59ZI/P	994
28	G4HUP/P	5,693	653	YM10j	DL0KKA/P	866
29	G4LIN/P	5,638	565	ZM70j	Y31BMA	865
30	G3WRS/P	5,509	546	ZO46f	DF0VK/P	699
31	G8SRC/P	5,220	594	ZL32e	F1AHO	749
32	G4JFW/P	5,164	566	ZM26e	DK0OX	780
33	GI4KIS/P	5,150	390	XO11g	ON1RN/A	843
34	G4CAR/P	5,112	550	ZM21j	DL4OL	809
35	G8LNC/P	5,033	458	YK38c	EA1BYA	923
36	G3ZRS/P	4,771	451	ZQ77c	DK0OX	859
37	G8DDC/P	4,686	536	ZL18h	DK0IK/P	711
38	G8EBT/P	4,465	457	ZO55j	F1FHI	796
39	G8WYR/P	4,419	528	YO69f	DK0OX	955
40	EI2VLC/P (G4AEQ)	4,402	324	WN79f	DF0VK/P	1,001
41	G3UHF/P	4,395	543	ZN61a	DK0BT/P	995
42	G4ARE/P	4,352	433	YK13a	EB1IC	967
43	G6BSE/P	4,433	437	AM64g	DL0VW	685
44	G3ZMS/P	4,309	504	ZK10e	F2LY/P	705
45	G8YDW	4,084	546	ZN11f	Y59ZI/P	927
46	G6DRT/P	3,909	365	AK11e	DK0IK/P	711
47	G8WXA/P	3,773	461	YN38h	F1DFE/P	792
48	G8OHM/P	3,891	478	YM50d	DK0OX	843
49	G6GXF/P	3,648	434	YL19d	DJ0QZ	704
50	G5LK/P	3,199	461	ZL60f	DJ9YE	663
51	G3TBK/P	2,976	365	ZN78f	DK0BC	875
52	G6ABT/A	2,811	357	ZL24j	DK7VK/P	648
53	G8SAD/P	2,794	364	ZL10g	DK0OX	705
54	G4LLR/P	2,546	352	ZL07g	DL0AD	578
55	G8XEM/P	2,404	307	YN30h	F1TNB	1,010
56	G4ISN/P	2,293	305	ZM14e	DF0VK/P	640
57	G3ISO/A	2,260	269	ZK27h	GM4CCC/P	624
58	G3GSL/P	2,030	314	YM70f	DL9GS	645
59	G6GRG/P	1,642	246	YL57f	PA0GUS/P	596
60	G3KUE/P	1,557	214	YN16e	ON5UG	544
61	G4KVI/P	1,527	270	ZL27a	DL0BX/A	514
62	G6HYF/P	1,139	100	AN61g	DK0VL	809
63	G4ONP/P	1,118	174	AL11c	DL9ZF	676
64	GM6JNJ/P	804	82	XP39f	Not given	
65	G4GQR/P	495	176	ZK10d	GI6JSL/P	246

SECTION S

Posn	Callsign	Score	QSOs	QTH	Best dx	Km
1	GJ4ICD	10,291	699	YJ70a	EA1RCA/P	821
2	G4NQC	5,064	514	ZL50c	DL8HAT	747
3	GM8YJU	4,599	431	YO05a	F1FPL/P	645
4	G4ASR	3,933	453	YM76d	DK0GR/P	771
5	G6ECM	3,932	388	AL56b	DB8YAI	645
6	G8RXK	3,375	377	ZL28j	DC1ZN	683
7	GI4OPH	3,119	271	XO33j	ON5UG/P	723
8	G4ARI	2,931	437	ZM24j	F1FHI	616
9	G4ITR	2,827	328	YN16j	F6GAF	735
10	G8WRB	2,169	319	ZL40c	DK0OX	660
11	G6FDW	1,983	199	AM17c	F1DFE/P	566
12	G4JCX	1,908	180	XK49c	PA3BPC/P	682
13	G6ELH	1,860	251	ZL29f	DK0OX	704
14	G3ZLQ	1,672	183	ZK17d	F1AHO/P	644
15	G8SVF	1,476	231	YM30b	F1FHI	622
16	G8VPE	1,400	148	AM29f	DK0IK/P	544
17	G4KGC	1,278	199	ZM65d	DF0VK/P	633
18	G8RBT	1,249	193	ZL20h	GI4KIS/P	502
19	G6CUK	1,096	134	ZN65j	DF0VK/P	658
20	G6HVC	860	138	ZL37f	DK0OX	724
21	G8UYD	814	124	ZN64d	DF0VK/P	666
22	G6DSA	686	120	YN68g	F6HMQ/P	686
23	G8XYN	639	117	ZL37f	F6BQX	460
24	G6CSY	623	99	AL41e	Not given	
25	G8OMI	597	85	ZM41d	ON1RN/A	480
26	G8LYC	563	98	ZL50d	PA0CKV/P	350
27	G8AKB	541	83	ZM27h	GI4KIS/P	412
28	G8XLH	449	67	AL53a	DK0MU	478
29	G8LXY	385	85	ZL09f	PE1CMO/P	382
30	G6FUZ	316	102	YN79c	GI4KIS/P	325
31	G8TZJ	261	43	YN07f	G3UES/P	324
32	G4AGQ	188	16	ZL66d	F1FHI	456

SECTION M

Posn	Callsign	Score	QSOs	QTH	Best dx	Km
1	G8RZO	9,444	778	AL45f	OK1DKO/P	914
2	GD4IOM	8,551	702	XO67d	F6BQX	819
3	G8ZHP	7,072	536	ZM29h	Y59ZI/P	795
4	G8KUC	6,119	583	AL56j	EI5OD/P	706
5	GW2OP	3,060	281	XL26g	PE1BNK/P	680
6	G6HGC	2,714	388	ZL39g	F1GXY	594
7	G8XVJ	2,573	347	YN48f	DL0VK/P	758
8	G6CHK	2,210	331	ZL27c	F1GXY/P	611
9	G8TRS	2,122	367	ZM32e	F6BQX	601
10	G4GTT	1,699	275	ZL38d	EI5DD/P	579
11	G4GGD	1,433	169	ZN18b	DL0BX/A	532
12	G8JAM	1,290	204	ZM25e	F1KLQ	515
13	G4FUO	973	123	ZM07j	DK0OX	790

SECTION A

Posn	Callsign	Score	QSOs	QTH	Best dx	Km
1	GW6JJU/P	1,411	207	YN64a	PE1BNK/P	580
2	GW4JTG/P	1,359	162	YM23c	Not given	
3	G3UHK/A	1,211	142	ZL04j	PA3AVL	470
4	G4CRC/A	747	82	XK72a	EA1RCA/P	806
5	ON9WI/A (G8NMQ)	30	6	BL65c	G4MRS/P	160

SWL SECTION

Posn	BRS No	Score	QSOs	QTH	Best dx	Km
1	32525	1,706	280	AL41a	DK0OX	642
2	28198	206	36	AK04h	DF3WH	400

Check logs gratefully acknowledged from G6GTC, G2DHV, G8COI/P, G6HGE, G8XTV, G8LEF, G4ORF, PE1EVR, BRS45205.

G4NUL/P accepted as check log only; no declaration.
G4PDP/A accepted as check log only; no name/signature of operators.
G8UAQ accepted as check log only; no section; score in pts/km only.
G4NUT/A accepted as check log only; no cover sheet for RSGB contest; score in pts/km only.

RSGB HF Contests Championship 1981-2 results

Posn	Callsign	Contests 1	2	3	4	5	6	7	8	9	10	Total
1	G3OZF	80	60	0		50	70	70		30	0	360
2	G3MXJ		80					90			0	170
3	G3FXB							100			30	130
4	G3OAY			0	15	60				35	10	120
5	G3SXW		0			5		50		60	0	115
	GW3NYY			40	40						35	115
7	G3PDL			15	30	25				15	20	105
8	G3SJJ					40				50		90
9	G3HVX		50	10						20		80
	G3PEK							80			0	80
11	G3RPB		0	35	35							70
12	G2QT	40	0					20				60
13	G3FKH		10	0						40		50
	G4BUO			0	25	0	0	0		25	0	50
15	G4BLX			0		0	40					40
16	G3IGW			0	10	10					15	35
17	G3PSM		30	0		0						30
18	G3RBP			0	20							20
	GW4BLE	0					20					20
20	G3NKS		0			0				5	0	5
	G4ELZ			0					5			5
	GM3YOR		5			0						5

Contests:

1 21/28MHz Telephony
2 21MHz CW
3 Second 1·8MHz
4 First 1·8MHz
5 7MHz CW
6 7MHz Telephony
7 Commonwealth
8 Low Power
9 Region round-up
10 Summer 1·8MHz

Awards:

The G2QT Trophy to D. F. Beattie, G3OZF. Runner-up certificate to D. J. Andrews, G3MXJ.

RSGB DF National Final 1982 results

At 12.50pm on 19 September 1982, 19 teams assembled at Peat Tye Common, to the south of Colchester, for the DF National Final, which was jointly organized by the Colchester and Chelmsford Radio Clubs on behalf of the RSGB. Three hidden stations were needed for the event, and previous tests ensured that good signals were available at the start.

Station A, operated by G3KPJ/P, was located in Thrift Wood, Woodham Walter, approximately 14·75 miles south-west of the start. Such was G3KPJ's ability at camouflage that one very well-known and experienced df competitor spent almost the entire afternoon searching the wood for the hidden station, with eventual success.

Station B, operated by G4JIE/P, was located at Furze Hill, Manningtree, approximately 10·75 miles north-east of the start, and presented competitors with some difficulty due to a long antenna and very thick gorse bushes.

Station C, operated by G4JJH/P,was located in Chalkney Wood, Earls Colne, about 10 miles north-west of the start. This station was hidden in a fir plantation, and such was their cover that even the organizer, who had previously visited the site a few days before, had difficulty in locating the station during the course of the contest!

Despite the difficulty of the event eight teams successfully located all three transmitters, and there was a very close finish, with Mike Hawkins and Bill North trying to get into the same bush from opposite sides, Mike's technique proving the more effective. Meanwhile, 25 miles away, Colin Merry had found his third station, so he and Bill North took joint second place.

After the event a substantial tea was taken at "The Prince of Wales" PH, Great Totham, and the RSGB DF Trophy and prizes were presented to the winners by David Evans, the RSGB general manager and secretary, who had been able to spend most of the day with the organizers watching the whole contest and the antics of the participants.

Posn	Name	Club	Time of arrival Station A	Station B	Station C
1	M. Hawkins	Chelmsford	1425·5	1616	1516
2	W. North	Mid-Thames	1405·5	1617	1515
	C. Merry	Dartford Heath	1617	1404	1454
4	C. Plummer	Mid-Thames	1619	1405	1509
5	R. Parsons	Burton-on-Trent	1620	1519	1407
6	C. Wells	Mid-Thames	1409	1623	1512
7	B. Bristow	Mid-Thames	1627	1518	1408
8	A. Simmonds	Mid-Thames	1629·5	1430	1538
9	G. Whenham	Coventry	—	1520	1406
10	W. Pechey	Mid-Thames	—	1520·5	1408
11	P. Tyler	Mid-Thames	1425	—	1536
12	G. Taylor	Ariel	1610	—	1407
13	P. Lisle	Mid-Thames	1447	—	1611
14	E. Mollart	Mid-Thames	1536	—	1629
15	P. Woolett	Dartford Heath	—	—	1407
16	J. Drakely	Slade	—	1423	—
17	D. Newman	Slade	1436	—	—
18	A. Williams	Braintree	—	1521	—
19	R. Vickers	Slade	1608	—	—

WAB Contests 1982 results

1·8MHz MIXED MODE

SINGLE-OPERATOR

Posn	Callsign	Points	Posn	Callsign	Points
1	G3HS	66,105	3	G4FQO	49,005
2	G3ONT	58,300	4	G4JPM	39,600

MULTI-OPERATOR

Posn	Callsign	Points
1	G4LAB	35,700
2	G4BJM	33,210

MOBILE

Posn	Callsign	Points
1	G4HPU	4,945

SWL

Posn	Station	Points	Posn	Station	Points
1	J. R. Roberts	29,640	2	J. P. Goodrick	450

LOWER FREQUENCY PHONE

MULTI-BAND SINGLE OPERATOR

Posn	Callsign	Points	Posn	Callsign	Points
1	GW3XHG	192,000	3	G4IUF	102,245
2	G4MMQ	130,410	4	G4HNL	100,100

SINGLE-BAND OPERATOR

Posn	Callsign	Points
1	G4JPM	39,130

MULTI-BAND OPERATOR

Posn	Callsign	Points
1	G4LAB	160,200

MOBILE

Posn	Callsign	Points
1	G4FQO	6,460

SWL

Posn	Station	Points
1	P. Helliwell	102,300
2	R. Pols	48,480
3	J. Singerton	48,450

OVERSEAS

Posn	Callsign	Points
1	ON7TH	63,270

VHF 144MHz/432MHz PHONE

SINGLE-OPERATOR

Posn	Callsign	Points	Posn	Callsign	Points
1	G4JZF	71,820	3	G6GUW	50,880
2	G8XVP	54,000	4	G8YBR	49,470

MULTI-OPERATOR

Posn	Callsign	Points
1	G8RZO	140,980
2	G6COL	68,930

MOBILE

Posn	Callsign	Points
1	G4IUF	4,625
2	G4FQO	2,795

SWL

Posn	Station	Points
1	J. Singerton	19,380

LOWER FREQUENCY CW

SINGLE-OPERATOR

Posn	Callsign	Points
1	G3HS	11,000
2	G4HNL	7,560
3	G4OBK	6,125

SWL

Posn	Callsign	Points
1	J. P. Goodrick	2,640

The winner of the President's Trophy is David Boffin, G3HS.
The winner of the Lochinvar Trophy is David Griffiths, GW3XHG.

BARTG Spring RTTY Contest 1983 rules

1. When. 0200gmt Saturday 19 March to 0200gmt Monday 21 March. The total contest period is 48h, but not more than 30h of operation is permitted. Time spent as listening periods counts as operating time. The 18h of non-operating time can be taken at any time during the contest period, but off periods may not be less than 3h at a time. Times on the air must be summarized on the summary sheet.

2. Who. There will be separate categories for single-operator, multi-operator and short wave listener stations.

3. Bands. 3·5, 7, 14, 21 and 28MHz amateur bands.

4. Stations. Stations may not be contacted more than once on any one band, but additional contacts may be made with the same station if a different band is used.

5. Countries. The ARRL DX Countries List will be used, and in addition, each W/K, VE/VO and VK call area will be counted as a separate country. **Note.** W/K, VE/VO and VK count once each only for QCA purposes.

6. Messages. Messages will consist of:
(a) Time gmt. This must consist of a full four-figure group, and the use of the expression "same" or "same as yours" will not be acceptable.
(b) RST and message number. The message number must consist of a three-figure group starting with 001 for the first contact made.

7. Points. Points can be claimed as follows:
(a) All two-way rtty contacts with other stations within one's own country will earn two points.
(b) All two-way rtty contacts with other stations outside one's own country will earn 10 points.
(c) All stations can claim a bonus of 200 points for each country worked, including their own. Note that any one country may be counted again if worked on a different band, but continents are counted once only.

Note: Proof of contact will be required in cases where the station worked does not appear in any other contest log received, or the station worked does not submit a check log.

8. Scoring. **(a)** Two-way contact points times the total of countries worked.
(b) Total country points times 200 times the number of continents worked (max six).
(c) Add (a) and (b) together to obtain the final score.

Sample calculation:

Exchange points (302) × countries (10)	= 3,020
Country points (10) × 200 × continents (3)	= 6,000
(a) and (b) added together to give a score	9,020

9. Log and score sheets. Use a separate sheet for each band and indicate all times on the air. Logs to contain: Date; time gmt; callsign of station worked; RST and message number sent; time; RST and message number received; and the points claimed. **Note:** Logs received from short wave listeners must contain callsign of station heard, report sent by that station, and callsign of the station being worked. Also date and time gmt that the QSO was logged. Incomplete loggings are not eligible for scoring and will be classified as check logs. The summary sheet should show the full scoring, the times on the air, address for correspondence, and in the case of multi-operator stations, the names and callsigns of all operators involved with the operation of the station during the contest.
All logs must be received by 31 May 1983 in order to qualify.

10. Summary and log sheets are available from the contest manager at the address shown below as follows:
In the United Kingdom on receipt of a large (A4) sae. All other countries outside the United Kingdom require no envelope but will need two ircs to cover the cost of postage.
Send your contest or check log to Ted Double, G8CDW, 89 Linden Gardens, Enfield, Middx, England EN1 4DX.
The judge's decision will be final and no correspondence can be entered into in respect of incorrect or late entries. All logs submitted shall remain the property of the British Amateur Radio Teleprinter Group.
Certificates will be awarded to the leading stations in each of the three groups, the top station in each continent, and to the top station in each W/K, VE/VO and VK call area.
Additional notes. If a contestant manages to contact 25 or more different countries on two-way rtty during the contest, a claim may be made for the Quarter Century Award (QCA) issued by BARTG, and for which a charge of US $3 or 15 ircs is made. Holders of existing QCAs should indicate and list any new countries to be added to their existing records. Make your claim at the same time that you send in your log.
However, in view of the high volume of work which the contest manager will have to deal with, it will not be possible to prepare and despatch any new awards or to up-date any existing records until the final results of the contest have been evaluated and published.
Additionally, if any contestant manages to contact stations on two-way rtty within each of the six continents, and the BARTG contest manager receives either a contest log or a check log from each of the six stations concerned, a claim may be made for the WAC Award issued by the American *RTTY Journal*.
The necessary information will be sent to the *Journal* after the contest results have been evaluated and despatched and the *Journal* will issue the WAC Award free of charge direct to the operator concerned.

Contests calendar

January/April	70MHz Cumulative *(Rules in January issue)*
5-6 February	G. Marconi QRP/SSB *(Rules in January issue)*
5-6 February	7MHz (Phone) *(Rules in September 1982 issue)*
5-6 February	Arizona QSO Party *(Rules in February* MOTA*)*
6 February	432MHz Fixed *(Rules in January issue)*
12-13 February	First 1·8MHz *(Rules in January issue)*
12-13 February	PACC *(Rules in February* MOTA*)*
19-20 February	ARRL International DX (CW) *(Rules in February* MOTA*)*
25-27 February	CQ WW DX (Phone) *(Rules in January* MOTA*)*
26 February	Second Annual RTTY Championship *(Rules in February* MOTA*)*
26-27 February	REF UBA (Phone) *(Rules in January* MOTA*)*
26-27 February	7MHz (CW) *(Rules in September 1982 issue)*
5-6 March	144MHz/432MHz/SWL *(Rules in January issue)*
5-6 March	ARRL International DX (Phone) *(Rules in February* MOTA*)*
12-13 March	Commonwealth *(Rules in November 1982 issue)*
19 March	1·8MHz Town & County *(Rules in February* MOTA*)*
19-20 March	Bermuda AR 1983 *(Rules in February* MOTA*)*
19-21 March	BARTG Spring RTTY *(Rules in February issue)*
April-September	10GHz & Microwave Cumulatives
2 April	1,296MHz Trophy
3 April	432MHz Trophy
3 April	ROPOCO 1
9-10 April	BARTG Spring RTTY *(Rules in January issue)*
10 April	Stevenage & DARS 144MHz FM
17 April	144MHz CW
17 April	Low Power *(Rules in February issue)*
7-8 May	432/1,296/2,304MHz
8 May	144MHz Low Power
15 May	Region Round-up
21-22 May	144MHz
4-5 June	NFD *(Rules in February issue)*
12 June	70MHz/SWL
25-26 June	Summer 1·8MHz
2-3 July	VHF NFD
17 July	3·5MHz FD
31 July	432MHz Low Power
14 August	70MHz Trophy & SWL
28 August	ROPOCO 2
3-4 September	144MHz Trophy & SWL (IARU)
3-4 September	SSB Field Day
October/ November	432MHz Cumulative
1-2 October	432-24GHz & SWL (IARU)
9 October	21-28MHz Phone
16 October	21MHz CW
16 October	1,296MHz Cumulative
5-6 November	144MHz CW
12-13 November	Second 1·8MHz
4 December	144MHz Fixed

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 in the July issue.

RSGB affiliated organizations are requested to report all programmes and news items to their regional representatives regularly. Information for inclusion in the **April** issue should reach them by **19 February** and for the **May** issue by **17 March.**

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 W. R. Parkinson, G3FNM, 141 Norris Road, Sale, Cheshire M33 3JR. Tel 061-973 1472.

Accrington (North Western Repeater Group)—17 February, 8pm. Globe Bowling Club, Willows Lane, Accrington. Sec Howard Aspinall, G3RXH.

Ainsdale (AARC)—1, 15 February, 1 March. Ainsdale Scouts HQ. Sec Norman Horrocks, G2CUZ, tel 0704 77604.

Barnoldswick (Rolls-Royce ARC)—2 February (A talk on computers applied to amateur radio, by Albert Leaver, G4ECB), 2 March (Construction contest), 4 March (Club social and annual presentation, all welcome, tickets from Les, G4ILG), 8pm. Rolls-Royce Sports & Social Centre, Barnoldswick. Sec Leslie Logan, G4ILG, tel 0282 812288.

Blackburn (East Lancs ARC)—1 February (Talk and demonstration on atv by S. J. Cooper, G3YTI), 1 March (Surplus equipment sale), 7.30pm. Shadworth Leisure Centre, Blackburn. At the December AGM there was almost a complete change of officers. These are now: chairman, Colin Green, G8VJO; vice-chairman, David Cadman, G8UVE; treasurer, Harold Dyball, G4FOJ; PRO, B. Pountain, G4MWY; secretary, Simon Eatough, G4GVQ.

Leyland (LHARG)—14 February, 7.30pm. Astley Park Sports Club, Hallgate, Astley Village, Chorley. Sec Arthur Jolly, G4JCO.

Liverpool (L & D ARS)—1 February ("PCB technique", by Bill MacKune, G8CFM), 8 February ("Public speaking", by Bert Donn, G3XSN), 15 February ("Contests '83"), 22 February (Junk sale), 1 March (Quiz forum), 8pm. Wavertree Conservative Association, Church Road, Wavertree, Liverpool. Sec Gordon Purslow, G6MHG, tel 051-263 5837.

Liverpool (UoLARS)—Lunchtimes in the Shack. The university now has a new committee: chairman, Nick Sanvoisin, G8TPF; treasurer, Bob Smith, RS45389; sec, Chris McGuire, G8XEB. All the QSLs for the summer expedition have now been despatched. Forthcoming projects are re-erection of the hf beam, the 144 and 432MHz Tonnas on the shack roof, and repair of equipment. Correspondence to the sec, Liverpool University ARS, c/o Students Union, 2 Bedford Street North, Liverpool L7 7BD.

Manchester (South Manchester RC)—4 February (Radio clinic—bring your faulty equipment for expert diagnosis), 11, 18, 25 February (TBA), 19 February (SMRC Second Quad Night DF Contest—see January *Rad Com* for details), 8pm. Sale Moor Community Centre, Norris Road, Sale. Informal meetings in the shack on Monday evenings. Sec David Holland, G3WFT, tel 061-973 1837.

Rossendale (Rossendale Valley ARC)—Wednesdays, 8pm. The club have now moved to a new meeting venue at 4 Bacup Road, Rawtenstall. Intending visitors are advised to ring sec Mrs Celia Adams, tel 0706 220935, for precise directions to the location in the office block. With the acquisition of these premises the club hopes to be able to concentrate on more practical and construction work.

Thornton Cleveleys (TCARS)—7 February (Film, subject to be announced), 14 February (Satellite working—explained by Alan Bullock, G8MKQ), 21 February ("Help the committee", come and tell them what you want from your club and what you can offer to it), 28 February (A talk on earthquakes by Gerry Vallely), 7 March (A visit from Tony of Dewsbury Electronics). Note, meetings now start at 7.45pm. Scout Hut, Norbreck 1st Scout Group, Carr Road, Bispham. Sec Mrs Jen Ward, G8YOK, tel 0253 890114.

Warrington (WARC)—8 February ("Japanese morse", by Norman Kendrick, G3CSG), 15 February (The club project—23cm transverter), 22 February and 1 March (To be announced), 7.30pm. Grappenhall Community Centre, Bellhouse Lane, Warrington. Sec Chris Crotty, G4PDJ.

Warrington (UK FM Group Western)—3 February, 3 March. Grappenhall Community Centre, Bellhouse Lane, Warrington. Sec Gordon Adams, G3LEQ, tel 0565 4040.

Wirral (WARS)—2 February ("Switched mode power supplies", by Cedric Cawthorne, G4KPY), 16 February (A film night), 2 March ("The world of amateur tv", by Alan Smith, G4EFP), 7.45pm. Minto House School, Birkenhead Road, Meols, Wirral. Sec Cedric Cawthorne, G4KPY, tel 051-625 7311.

Woodford (RATEC)—Mondays, 8pm. British Legion, Moor Lane, Woodford, Cheshire. An up-date on the club officers has been received as follows: chairman, Chris Skidmore, G8ZCJ; treasurer, George Mountney, G8TAZ; editor *RATEC News*, Dave de Souza-Kirby, G3VFP; artwork, Mike Crossfield, G8NRV; technical liaison, Nigel Spear, G6JQA. Bob Marsh, G8TYH, continues as sec, tel 061-439 1422.

REGION 2—RR D. S. Smith, G4DAX, Red Roof, Goathland, Whitby, North Yorks YO22 5AN. Tel 094-786 333.

Halifax (H&DARS)—First and third Tuesdays in each month, 15 February (Small arms), 15 March ("Top band dxing", by G3IGW and G4MH), 7.30pm. Clairmount Liberal Club, Belgrave Avenue, off Clairmount Road, Halifax. Sec G4LEC, tel 0422 33080.

Halifax (Northern Heights ARS)—9 February (Social night), 23 February (Junk sale), 9 March ("Amateur radio", by G4MH), 8pm. Bradshaw Tavern, Bradshaw, Halifax. Sec G6CJL. Club net frequency is 145·275MHz. The NHARS 144MHz project, a monitor receiver, seems to be proceeding well, with kits of parts selling for £18.

Leeds (L&DARS)—Mondays, 8pm. Old Hall Golf Club, Woodhall Lane, Calverly, Leeds. Sec G6CJI, tel Dewsbury 455516. The annual Christmas rally on 12 December was a great success, definitely standing room only. Coupled with good weather and car parking, it made a good day out all round.

Leeds (White Rose RS)—Wednesdays, 8pm. Moortown Rugby Football Club, Moss Valley, Alwoodly, Leeds 17. Club net, 8pm, Thursdays, 3·775MHz, or 21·35MHz depending on propagation. On 4 December members and friends enjoyed the usual excellent Christmas dinner and in a short address following the meal, Council member Joan gave the election results and an update on HQ happenings. Members then either danced the night away or put the world to rights, depending on their fancy (or energy).

Pontefract (P&DARS)—10 February (On the air), 17 February (Quiz night), 24 February (Project night), 3 March ("HF antennas", by G3HCW), 8pm. The Carleton Community Centre, Wakefield. 13 March (Component Fair, a must for all the home brewers in the region, details from Phil, G4AAQ). Sec G4ISU.

Ripon (R&DARS)—Thursdays, 7pm. New venue: St John Ambulance Hall, North Road, Ripon. Details from G3WOV, tel Ripon 701324, or G4NUY, tel Ripon 2127.

Scarborough (SARS)—Mondays, 14 February (AGM), 7.30pm. Scarborough Cricket Club, North Marine Road, Scarborough. Sec G4JAQ, tel 862638.

Spen Valley (SVARS)—Thursdays, 3 February ("What is Raynet?", by G3KWT), 17 February (Committee/project night), 3 March ("Assembly language, theory and practice", by G8ZXF and G6JLI), 8pm. Old Bank Working Men's Club, Mirfield, W Yorkshire. Sec G4MLW.

Wakefield (NWRC)—Thursdays, 10 February (Home brew), 24 February (G3SDY hf mobile), 10 March (G8PUT on computers), 7.45pm. Carr Gate Working Man's Club, Wakefield. Note the sec has changed his callsign to G4RCH, tel Morley 536633.

Wakefield (W&DARS)—8 February (Visit to Radio Aire studios), 22 February (On the air/natter night), 8 March (Power generation films), 8pm. Holmfield House, Denby Dale Road, Wakefield. Sec G4BLT, tel Wakefield 255515.

York (YARS)—Fridays, 7.30pm. United Services Club, Micklegate, York. Sec Keith Cass, G3WVO. At the annual dinner the President's Cup was awarded to swl John Toolan, while G3BNO, G4NEM, G4NFE, and G4NPQ received the President's Key. The president in his address welcomed the recent relaxation in licence conditions, and looked to further easing in this direction.

I am not sure how much snow we will have had by the time members read this, but certainly the indoor construction season will be in full swing. The Pontefract Components Fair will soon be with us to refill our shelves—hope to see you there. *RR2.*

REGION 3—RR L. W. Craven, G4EQI, Grass Moor, Radford Road, Alvechurch, Birmingham B48 7DT. Tel 021-445 1347.

Birmingham (South Birmingham RS)—2 February ("Burglar alarms", by Bob Morris, G4GFK), 5 March (Surplus sale auction), 7.45pm. Hamstead House, Fairfax Road, West Heath, Birmingham B31. Sec G8RGQ, tel 021-459 8312.

Bromsgrove (B&DARC)—11 February ("Satellites", by Tom Higgins, G4NWQ), 8pm. Avoncroft Art Centre, Bromsgrove. Sec G4LVK, tel 021-445 2088.

Hereford (Hereford ARS)—4 February (AGM), 8pm. Civil Defence HQ, Gaol Street, Hereford. Sec G4CNY, tel Hereford (0432) 3237.

Malvern Hills (MHRAC)—8 February (To be announced), 8pm. The Red Lion Inn, St Ann's Road, Great Malvern. Sec G4GFX, tel Malvern (06845) 62900.

Much Wenlock (Wenlock ARES)—Meeting night changed to second and fourth Monday in each month to avoid clash with Telford club. 14 February ("Radio controlled aircraft and aerial photography", by Martin Walsh), 28 February ("Subscriber trunk dialling", by Edwin Arnold, G6AKE). Raven Hotel Clubroom, Much Wenlock. Sec G3ZSL, tel Bridgnorth (0746) 861332.

Stourbridge (STARS)—7 February (Discussion evening), 21 February (Lecture, subject and speaker to be announced), 8pm. Cross Inn, Hagley Road, Oldswinford, Stourbridge. Sec G8JTL, tel Lye (038482) 4109.

Stratford-upon-Avon (S-upon-A&DARC)—10 February ("Introduction to 10GHz microwave equipment and operating", by Glen Ross, G8MWR), 28 February (Surplus sale), 7.30pm. The Control Tower, Bearley Radio Station, Bearley, Nr Stratford. Programme sec G6CWK, tel Stratford (0789) 68863.

Sutton Coldfield (SCRS)—14 February (Discussion evening), 28 February ("Sea has many voices" and "Voices in orbit", two films by courtesy of British Telecommunications). Central Library, Sutton Coldfield. Sec G8TUR, tel 021-353 2061.

Telford (T&DARS)—First Wednesday of each month. Phoenix Centre, Webb Crescent, Dawley. Sec G8UGL, tel Telford (0952) 584173.

Walsall (WARC)—Wednesdays, morse classes every fortnight, 8pm. Forest Community Centre, Hawbush Road, Leamore, Bloxwich. Sec G4FAJ, tel Brownhills (05433) 2169.

Worcester (W&DARC)—21 February (Informal evening), 8pm. The Old Pheasant Inn, New Street, Worcester. Sec G4NRD, tel Evesham (0386) 41508.

REGION 4—RR M. Shardlow, G3SZJ, 19 Portreath Drive, Darley Abbey, Derby DE3 2BJ. Tel Derby (0332) 556875.

Bolsover (BARS)—2 February (Natter night), 9 February (Club contest), 16 February (Visit to SMC, Chesterfield), 23 February (Club contest results), 8pm. The Angel Hotel, Bolsover. Sec David Brocklehurst, G8KIF, tel Chesterfield 811666.

Derby (D&DARS)—2 February (Junk sale), 9 February (Night on the air), 16 February (Technical topics), 23 February (Film show), 2 March (Junk sale), 7-30pm. 119 Green Lane, Derby. Sec Jenny Shardlow, G4EYM, tel Derby 556875.

Leicester (LRS)—Mondays, 7.30pm. Sundays, 10.30am. Gilroes Cottage, off Groby Road, Leicester. Sec Frank Elliot, G4PDZ, tel Leicester 553293, or 871086.

Loughborough (L Falcon ARC)—4 February (Members' discussion), 11 February (Guest speaker, tba), 18 February (Video evening), 25 February (General knowledge quiz), 8pm for 8.30pm start. Fennel Street, Loughborough. Sec Peter Crooks, G4KGG, tel Loughborough 268561. At the recent AGM the following officers were elected: chairman, John Sketchley, G4DCE; treasurer, G8AYG, contest organizer, G4IAR; PRO, G8SNF; sec, G4KGG.

Lincoln (LSWC)—9 February ("RTTY", by G3VRD), 23 February, 8pm. City Engineers Club, Waterside South, Lincoln, Sec Pam Rose, G8VRJ, tel Gainsborough 788356.

Melton Mowbray (MMARS)—18 February (Quiz night). St John HQ, Asfordby Hill, Melton Mowbray. Sec Richard Winters, G3NVK, tel Melton Mowbray 63369.

Newark (N&DARS)—3 February ("RSGB", a talk by Martin Shardlow, G3SZJ), 7.30pm. Palace Theatre, Appleton Gate, Newark. Sec Roger Hiscock, G4MDV.

Nottingham (ARCON)—3 February (Forum), 10 February ("SWR", talk by Geoff Dover, G4AFJ), 17 February (Activity night on air), 24 February (The other man's shack), 3 March (Forum), 7.30pm. Sherwood

Community Centre, Mansfield Road, Nottingham. Sec Paul Chapman, G4IJL, tel Nottingham 623828.
Scunthorpe (SARC)—1 February ("Crossword", by G8TIY), 8 February ("Astronomy", by G4GZA), 15 February ("Quiz", by G8DOQ), 22 February (Natter night), 1 March ("Video editing", by G8HUA), 7.30pm. Grange Farm Hobbies Centre, Franklin Crescent, Scunthorpe. Sec G8TIY, tel Scunthorpe 732438.
Spalding (S&DARC)—11 February ("Construction of solidstate hf amps", by G3UWD). Maple Room, White Hart, Market Place, Spalding. Sec Ian Buffham, G3TMA, tel Spalding 3845.

News of two new clubs in Region 4. One in Grantham, contact Treetops, 13 Saltersford Road, Grantham, Lincs, and one in Buxton, information from D. Carson, G4IHO. *RR4.*

REGION 5—RR John Allen, G3DOT, 77 Rosslyn Crescent, Luton LU3 2AT. Tel 0582 21151, work or 0582 508515, home.

Bedford (B&DARC)—2 February (Talk on tv by G8MGP), 8pm. The Club House, Ravensden, Bedford. Details from sec Jane Ferguson, G6JJT.
Leighton Linslade (LLRC)—Mondays, 7 February (Junk sale), 21 February (G3XJO takes the stage), 7pm. Vandyke Community College, Room A64, Vandyke Road, Leighton Buzzard. Sec P. Brazier, G6JFN, tel Heath & Reach 270.
Luton (Kent Process Controls ARC)—2 February (Discussion on the new Telecom Act), 8pm. Kent Club House, Tenby Drive, Luton. Sec G3DOT.
Northampton (NRC)—2 February (Visit by Garex Electronics of Tring), 8pm. Kingsthorpe Community Centre. Sec G3VMU, tel Northampton 28516.
Peterborough (GPARC)—17 February (Video evening), 7.30pm. Southfields Junior School, Stanground. Sec Frank Brisley, G4NRJ.
Shefford (S&DARS)—3 February (Programme planning), 10 February (Natter night), 8pm. Church Hall, Shefford. Chairman, G3DOT. Sec Brian Elliot, G4MEO.
St Neots (StN&DARC)—7 February (Talk on rtty, by G4PFF), 21 February (Talk by a representative of the CEGB on nuclear energy). Details from sec, G4FOH.

REGION 6—RR F. S. G. Rose, G2DRT, 84 Cock Lane, High Wycombe, Bucks HA3 7EA. Tel Penn (049481) 4240.

Aylesbury Vale (AVRS)—22 February (D. Evans, general manager/secretary, RSGB) 7.30pm. Stone Village Hall, Stone. Details from G8BQH, tel 0296 641783.
Chesham (C&DARS)—Second Wednesday in each month. The Stable Loft, Bury Farm, Pednor Road, Chesham. At the AGM recently two new officers for the committee were elected: treasurer, G8FCS; and vice-chairman, G4OST. Chairman G3NCL and sec G6LKS were re-elected for a further year's term. A reminder that subscriptions for new and old members are now due. Details from sec J. Alldridge, G6LKS, tel Chesham 786935.
Maidenhead (M&DARS)—3 February (TBA), 15 February ("Current developments in satellite communications", by Richard Eaton of the Post Office), 7.30pm for 8pm. Red Cross Hall, The Crescent, Maidenhead, Berks. Sec Roger Hemmings, G3VCT, tel 06285 21036.
Milton Keynes (MK&DRS)—14 February (Brains trust quiz), 8pm. Lavat Hall, Silver Street, Newport Pagnell, Bucks. Sec A. R. W. Date, RS48849, tel Bedford 711950.
Vale of the White Horse (VWHARS)—1 February ("Getting going on 23cm", by Roger Blackwell, G4PMK). Details from sec Ian White. Please note new telephone No, 0235 31559.

My sincere thanks to members who gave me their support in the 1983 Council elections. *RR6.*

REGION 7—RR Pat Walker, G8HMG, 12 Brownlow Road, Redhill, Surrey RH1 6AW. Tel Redhill 64035.

Biggin Hill (BHARS)—Last Tuesday in each month, 15 February ("Secret Listeners", by Pat Hawker, G3VA), 8pm. Biggin Hill Memorial Library. Details from sec Ian Mitchell, G4NSD, tel Biggin Hill 75785.
Croydon (Surrey Radio Contact Club)—First and third Monday in each month, 7 February (Talk and discussion on Oscar 8 measurements with Robert McEwan Reid, G4GTO), 7 March (Surplus equipment sale), 8pm. TS Terra Nova, 34 The Waldrons, Croydon. Sec Ray Howells, G4FFY, tel 01-642 9871.
Crystal Palace (CP & DRC)—19 February (AGM), 8pm. All Saints church parish rooms, Church Road, South Norwood SE25. Sec Geoff Stone, G3FZL, tel 01-699 6940.
Guildford (G&DRS)—Second and fourth Friday in each month, 8pm. Model Engineers HQ, Stoke Park, Guildford. Sec Helen Mullenger, G4OJO, tel Aldershot 20384.
Redhill (Reigate ATS)—15 February ("The UOSAT project", by G4CWH), 8pm. Constitutional & Conservative Club, Warwick Road, Redhill. Sec Chris Barnes, G8FEE, 25 Hartswood Avenue, Reigate RH2 8ET.
Sutton & Cheam (S&CRS)—Fridays, twice monthly, 11 February (Construction contest (SCOLA)), 7.30pm. Sutton College of Liberal Arts, Nicolas Way, Sutton, and at the Carshalton Sea Cadets HQ, Church Path, Beddington. Sec G4CMU, tel Banstead 54497.
Thames Ditton (Thames Valley ARTS)—1 February ("DX expedition to Andorra", by B. Coleman, G4NNS), 1 March (AGM), 8pm. Thames Ditton Library, Watts Road, Giggs Hill, Thames Ditton. Sec Julian Axe, G4EHN, tel 01-946 5669.
Wimbledon (W&DRS)—Second and last Friday in each month, 25 February (Quiz with Crystal Palace club), 8pm. St John Ambulance Hall, 124 Kingston Road, Wimbledon SW19. Sec Geoff Mellett, G4MVS, tel 01-644 8249.

Please would the secretaries of clubs not mentioned let me have details of their programmes and dates and times of meetings. *RR7*

REGION 8—RR K. A. Crouch, G8KEN, 14 Victoria Road, Capel-le-Ferne, Folkestone, Kent CT18 7LR. Tel 0303 55241.

Burgess Hill (Mid-Sussex ARC)—Alternate Thursdays, 10 February (Surplus sale), 7.30pm. Marle Place Adult Education Centre, Leylands Road, Burgess Hill. Details from Bob Hodge, G4MMI, tel Hurstpierpoint 833559.
Dover (SEKYMCAARC)—2 February (Natter night and committee meeting), 9 February ("Motor rallying", by G8YMN and co-driver), 16 February (Searching for awards), 23 February (Aerial working party), 2 March (Natter night and committee meeting), 7.30 for 8pm. YMCA, Leybourne Road, Dover. RAE course runs on Mondays, with G4EGQ. For talk-in listen on GB3KS or S20. Details from G3VSU or G8EGT.
Eastbourne (Southdown ARS)—1 February ("Amateur radio in ZL", by Ron, G4KYQ (ZL2BJF)), 1 March ("Cassette mechanisms", by Mike, G6GOS), 7.30 for 8pm. Chasley Home, Eastbourne. Please note club has new sec, Tom, G4MVN.
Gravesend (GRS)—Mondays, 8pm. Windmill Tavern, Shrubbery Road. Sec G4NBQ. G6MBO has taken on job of editor of club mag called *Grapevine.*
Hastings (HERC)—16 February ("DXpeditions to Andorra", by G4BIA), 16 March (AGM), 7.30pm. Third Wednesday in each month (Main meeting), West

Members of Spalding & DARS at a recent construction contest, the G2BQC Memorial Trophy. The winner, Cliff Collins, G3THX, is shown centre front of the photograph. *Photo:* **G6HTW**

Hill Community Centre. First, second, fourth, and fifth Wednesdays (Micro nights), Ashdown Farm. Details from Alan Beecher, G8VEM, tel Hastings 216516.

Maidstone (MYMCAARS)—4 February (Slow morse & RAE study groups/natter night), 11 February (Slow morse and technical forum), 18 February (Slow morse & RAE study group), 25 February (Slow morse and demonstration of atv by Martin Nash), 7.30pm for morse class, main meeting starts at 8.15 or 8.30pm. "Y" Sports Centre, Loose Road. Details from G4GKW or G4EMC.

Thanet (RCT)—4 February (Talk on test gear), 11 February (visit to Police HQ at Maidstone), 18 February (Talk on history of vhf operating), 8pm. Birchington Village Hall. Sec Ken, G4PTE, tel Thanet 32198.

Tunbridge Wells (WKRS)—4 February (Energy conversion competition), 18 February ("Micros—a wider view", by Richard Scott of Open University), 8pm. Adult Education Centre, Monson Road, Tunbridge Wells. Informal meetings Tuesdays following the main meeting. Drill Hall, Victoria Road. Details from Brian, G4DYF.

REGION 9—RR W. J. Colclough, G3XC, "Highview", Indian Queens, St Columb, Cornwall TR9 6LL. Tel 0726 860485.

Camborne (Cornish CRC)—3 February (Main club meeting), 21 February (Computer section: "FAX", by Lionel, G3PPT), 7.30pm. SWEB Club Room, Pool, Camborne. Pro S. Rodda, G4PEM, 1/2 Penrose Terrace, Penzance, tel 0736 3948 or 3524.

Exeter (EARS)—14 February (Open meeting), 7.30pm. Community Centre, St Davids Hill, Exeter. First and third Mondays (Informal). The Scout Hall, Emmanuel Road, Exeter. Pro Andy Lake, G8YOA, tel 0392 39597.

North Devon (NDARC)—23 February (AGM), 7.30pm. Odd months: Community College, Abbotsham Road, Bideford, Devon. Even months: Community College, Pilton, Chaddiford Lane, Barnstaple, Devon. Sec G. Hughes, G4CG, tel 0271 3683.

Trevor Day, G3ZYY, and his wife Trisha, G4KYY, who were reunited after Trevor's return from the south Atlantic. It was the first time G3ZYY had seen son Antony John, who was born while he was away at sea. The couple are both GB2RS news readers for the Devon SW Area. ***Photo:*** **Western Morning News**

Plymouth (PRC)—7 February ("Aerial circus", tape by G2BCB and G6CJ), 21 February ("Satellite communication", by G3ZYY), 7.30pm. Tamar School, Paradise Road, Millbridge, Plymouth. Contact Peter Connor, G8XTE, tel 0755 37319.

Torbay (TARS)—Fridays, 26 February ("Teletex", by G8HHS), 7.30pm. Bath Lane, rear of 94 Belgrave Road, Torquay. 12 March (Annual dinner, tickets £6.50 from sec). Mrs M. Rider, 7 Kingstone Close, Kingskerwell TQ12 5EN, tel 0804 75130. The club now has three new callsigns: Bill, G6PYK, Derek, G4PTH, and Ron, G4PYF. In 1982 the club had 14 new calls. Nets Mondays, Wednesdays, Fridays, 3·756MHz, 1030h, Saturdays at 1000h. Club callsigns G3NJA and G8NJA.

Treverbyn (English China Clay RC)—Alternate Mondays, 14 February (Details not available), 7pm. Pentewan Labs, Pentewan Road, St Austell, Cornwall. Other Mondays, 7pm. The Club Room, Treberbyn. Contact Jack Redfearn, G8HSZ, tel 0726 3647.

REGION 10—RR to be appointed.

Mr Philip Jones, the representative for Region 10, has resigned for personal reasons.

Any affiliated clubs or groups in the region who would like to have an entry in "Club News" should send it direct to the Editor until a new regional representative is appointed.

Four members of the Winchester ARC with the GB2LFS special event station at Littleton Flower Show. From l to r: John, G4AXO; Graham, G6EEJ, pro; Stuart, G8WPM, and Alec, G6BOP. ***Photo:*** **G6FBR (sec)**

Cardiff (CRSGBG)—14 February ("Television production—'The deep end'", by Dave Thomas, GW3RWX), 7.30pm. Pantmawr Hotel, Tyla Teg, Pantmawr Estate, Whitchurch, Cardiff. Details from sec Cyril Laws, tel Cowbridge 3212.

Abergavenny and Nevill Hall (A&NHARC)—Thursdays, 7.30pm. Above Male Ward 2, Pen y Val Hospital, Abergavenny. RAE exams can be taken at this club, registration date for 16 May exam is 15 February. Late entries for May exam can be taken up to 10 March with additional fee payable. Registration can be made with club sec or "Aircom", Brecon Road, Abergavenny. RAE course runs Tuesdays, 7.15pm. Seminar Room, Nevill Hall Hospital. Sec Dave Jones, GW3SSY, Blaenavon 791617.

Aberystwyth (ARSGBG)—5 February (Subject to confirmation), 7.30pm. The Bay Hotel, The Seafront, Aberystwyth. All interested persons are urged to give this small group their support in this sparsely populated area of Wales. The sec would like to remind members and visitors to check with him the venue nearer the date, as a change in meeting place is possible. Sec Simon Mee, GW4CTV, tel Aberystwyth 828365.

Pembroke (PRSGBG)—25 February ("Private mobile radio systems", by Mike Hunt, GW4CBR). The Defensible Barracks, Pembroke Dock. Sec Martin Shelley GW3XJQ, tel Pendine 267.

RR10 wishes to inform the membership in this region that due to family circumstances he is unable to continue as representative for the Society. He thanks all who have given their support and regrets having to make this decision.

REGION 11—RR B. H. Green, GW2FLZ, 1 Clwyd Court, Tan-y-Bryn Road, Colwyn Bay, Clwyd LL28 4AH. Tel 0492 49288.

Anglesey (ARG)—There is a proposed visit by members to the studios of RTE Dublin, a one day trip by boat. For details contact Mr C. Williams, GW6DOK, tel 77603.

Colwyn Bay (Conway Valley ARC) (GW6TM)—10 February (Discussion night and answers to on-the-spot-questions), 10 March ("Advance warning", by Dr Last of University College of North Wales), 7.30pm. Green Lawns Hotel, Bay View Road, Colwyn Bay. Sec J. N. Wright, GW4KGI, 46 The Dale, Woodlands, Abergele, Clwyd LL22 7DS, tel 0745 823674.

Rhyl (R&DARC)—11 February (Social night at Grange Hotel, Rhyl), 24 February (Slide show), 7.30pm. 1st Rhyl Scout HQ, Tynewydd Road, Rhyl. Sec Mr B. Jones, 6 Rhodfa Maes Hir, Rhyl, tel 0745 37284.

REGION 12—RR M. R. Hobson, GM8KPH, 4b Tummel Crescent, Pitlochry, Perthshire. Tel 0796 2140.

Aberdeen (AARS)—Fridays, 4 February (Junk sale), 7.30pm. Club premises, 35 Thistle Lane. Details from sec Don Travis, GM4GXD.

Tayside (Raynet Group)—Contact controller GM8RTI for details.

REGION 13—RR A. B. Givens, GM3YOR, 41 Veronica Crescent, Kirkcaldy, Fife KY1 2LH. Tel Kirkcaldy (0592) 200335.

Edinburgh (Lothians RS)—10 February ("Jack's black box night", by GM8GEC), 24 February ("QRP—a way of life", by GM3OXX), 10 March (TBA), 24 March ("Field days", by GM4COX), 7.30pm. Drummond High School, Broughton Street, Edinburgh. Details from GM6JAG, tel 031-664 5403.

Fife Raynet Group—As from December 1982 this group has officially disbanded due to lack of response from amateurs in the area.

Glenrothes (G&DARC)—Wednesdays and third Sunday in each month, 16 February (Visit BBC mw transmitter, Falkirk), 20 February (TBA), 20 March (TBA), 7.30pm. Provosts Land Centre, Leslie, Fife. Details from GM8ZTV, tel Kirkcaldy 203582.

Lothians Raynet Group—Details from GM3OVU.

Scottish Borders Repeater Group—25 April (AGM), 7.30pm. Abbey Centre, Kelso. Details from GM4BDJ, Hillcrest, 1 Lockhart Place, Hawick.

St Andrews (UofStAR&ES)—Details from N. Lyons, G4JWV, Conochy House, Room 50 St Salvators Hall, St Andrews, Fife KY16 9AJ, tel 74507 (evenings only) or c/o Physics Dept, North Haugh, St Andrews. Non-University amateurs in the area are welcome to attend lectures and become members of the society.

REGION 15—RR J. T. Barnes, GI3USS, Whitegables, 95 Crawfordsburn Road, Bangor, Co Down BT19 1BJ. Tel 0247 3948.

Bangor (B&DARS) (GI3XRQ)—4 February ("Wire antennas", by GI3USK, and "Simple atu", by GI3TLT), 4 March ("Repeaters", by G4BWM). Sands Hotel, Bangor. Sec GI4JTF.

Belfast (BRSGBG)—16 March (Mobile radio clinic, GI8AYZ, GI3USS and GI4BWM), 8pm. 90 Belmont Road, Belfast. AR GI6DGP.

Belfast (Queens UoBRC) (GI3LLQ)—Tuesdays, in term time. 37 Fitzwilliam Street, Belfast. Contact GI6JHF, tel 0232 703027, or 0232 661111, ext 4017, daytime.

Colraine (NWIARC) (GI4DBB)—1 February (Film show), 1 March ("Amateur radio as it was", by GI3ZX), 8pm. Whitehall Chambers, New Row, Colraine. Contact GI8NBW.

Lisburn (Lagan Valley RS) (GI4GTY)—11 March (Hamfest '83, bring & buy, trade stands and refreshments), 7pm. Lisburn Markets, beside Lisburn Swimming Pool. 14 March (Open forum on antennas), 7.30pm. Rathvarna Teacher's Centre, Pond Park Road, Lisburn. Sec GI8SXN.

Londonderry (NWolARC) (GI4MFT)—First Tuesday in each month, 7.30pm. The New Boathouse, Victoria Road, Prehen, Londonderry. Sec GI4OUN.

REGION 16—RR T. D. Howe, G3PLF, 18 Vange Hill Drive, Basildon, Essex SS16 4DD. Tel 0268 24453.

Colchester (CRA)—10 February (Construction of amateur radio equipment by members of the club), 24 February ("Club motor racing", by G4LSP), 7.30pm. Colchester Institute, Sheepen Road. Details from Frank Howe, G3FIJ, tel Colchester 70189.

Ipswich (IRC)—9 February ("Video tapes of local amateurs", by G8HUE), 23 February (South Anglia Repeater Group open meeting), 8pm. Club Room, Rose & Crown, Norwich Road. Details from Jack Tootill, G4IFF, tel Ipswich 44047.

Martlesham (MRS)—2 February ("Why GaAs", by G8FQO), 7.30pm. British Telecom Research Labs, Martlesham Heath. Please contact G3ZNU first.

Norwich (Norfolk ARC)—2 February (Short meeting), 9 February (Initial HF Field Day meeting), 16 February (Short meeting), 23 February (Talk on Raynet, by G3HRK and G3PYN). Crome Community Centre, Telegraph Lane East. Details from Paul Gunther, G8XBT, tel Norwich 610247.

Southend (S&DRS)—Fridays, new QTH, Civic Suite, Council Offices, Hockley Road, Rayleigh. Details from G3YOA.

(continued on page 163)

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 £1 for 40 words or less: advertisements containing more than 40 words will cost an additional £1 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.

Closing dates in 1983 for issues in brackets, are **24 February** (April); **22 March** (May); **20 April** (June); **18 May** (July); **16 June** (August); **14 July** (September); **24 August** (October); **22 September** (November); **20 October** (December); **17 November** (January); **15 December** (February).

Post to: MEMBERS' ADS, RSGB, 88 BROOMFIELD ROAD, CHELMSFORD, ESSEX CM1 1SS
Do not post to RSGB HQ or Advertising officer.

FOR SALE

70cm multimode Yaesu FT780R, late model, gasfet front end, 1·6MHz shift, absolutely as new, 12 months guarantee, £350. Wood & Douglas 70cm 10W combined amp and preamp, 0·5W drive, cased, with full data, £15. 70cm antennas, triple five-eighths mobile, £5. Small base co-linear, £5. 48-el multibeam, slight damage, £6. G6ECO, QTHR. Tel 0706 841665 (Manchester).

Yaesu FT201 tx/rx, 80-10m, ssb, cw a.m., 600Hz cw filter, fan, mic, spare pa valves, manual, first class cond, £250. Willing to deliver or meet within 50 mile radius. G4GXF, QTHR. Tel 03752 2089.

KW2000B, just overhauled and revalved, vgc, Shure 201 mic, mains psu, manual, £190. C4, hf coaxial vertical antenna, £25. Marconi valve voltmeter, £10. G4ILA, QTHR. Tel Lymm 2388.

Daiwa AF 406K active audio filter, eliminate QRM on cw, notch and ssb filters incorporated, as new cond, £47.50. MM 144MHz converter, £15. *Wanted:* HF linear SB201 or similar, in good cond. G4PJJ, Tudor Cottage, Minsterworth, Glos. Tel Nigel, 045275 376.

Old timer rack-mounted 6 by 4ft a.m. tx, heavy power supplies, fully metered, comp with valves, must clear, yours to collect. G3DTB, QTHR.

TR2400 2m h/h, mint cond, orig packing, incl case, remote mic, earpiece, charger, spare λ/4 telescopic whip, £125. G8MDP, QTHR. Tel Lindfield (04447) 2884.

FTDX560 560W ssb tx/rx, 10-80m, one owner since new, not overworked, only serviced by SMC, vgc, some spare valves, £175. Prefer collected, near Ware, Herts. G3WMB, QTHR. Tel 0992 46055, daytime, 0920 3564 after 6pm and weekends.

Trio 7800 and 2300, both rigs perfect, comp with extras, £180, and £130. Going QRT on two. G4HBD. Tel Bournemouth (0202) 767583.

Oscilloscope, Heathkit OS2, ideal basic instrument, £35. Beautiful Vibroplex paddle for elec keyer, £13. Tandberg 3000X stereo tape deck, 19,000ft quality tape, £135. Seiko quartz stainless steel watch/alarm/stopwatch, analogue display, digital insert, £20. G3UYK, QTHR. Tel Winchester 67819.

Filters, Daiwa AF606K all mode active filter, pll tone decoder, brand new, in orig packing, £40 plus postage. Kenwood Trio cw xtal filter unit, YK88C, 550Hz, £17. G3PKR, QTHR.

Kokusai MF455-10C mechanical filter, valves, bandwidth 1·16kHz, 6dB upper and lower sidebands, xtals by Brookes, xtals 453·62kHz, 456·44kHz, seven-pin vacuum sealed, £18 plus postage. Tel 01-366 8106, after 6pm.

FT107M, FP107E dms units, grey finish, £680. FC902, £120. AR240, £85. Storno 622 12ch 70cm, £120. UK101, boxed, £100. Philips VCR1500, tapes, £100. All items boxed, manuals, pristine cond. G3KSW, QTHR. Tel 0992 23452.

Two LG50 a.m./cw txs, clean cond, top band conversion info available, will deliver 25 miles, suit cw dxers, £30 for both. G3JIC, QTHR. Tel 0744 23916.

Daiwa Search SR11 vhf fm 2m rx, vfo, six channel scan incl eight xtals, λ/4 antenna, exc cond, boxed, £45. Sale due to licence. G6MLG. Tel Burton-on-Trent (0283) 813320.

50W 2m multimode, new FDK 750E, linear amplifier, £240, will split. AR240 synthesized handheld 2m tx/rx, accessories, £110. Aircraft (mid-band) a.m. Pye Bantams, £18 each. G8FBU NOT QTHR. Tel 0748 811812.

Trio JR599 rx, 160-10, built-in 2m and 70cm converters, all modes, cw filter fitted, £160 ono. G4HAI NOT QTHR. Tel 0909 473006 (Worksop, Notts).

FRG7, exc cond, no mods, manual, £135. Tel Jack, 031-669 6652.

FT290R, nicads, charger, case, carry-strap, rev rept, psu, £190. MML 144/100, 1-3W in, 100W out, linear amp, preamp, ssb, fm, three months old, £110. 15A regulated power supply, £35 ono. Icom IC255E, 1-25W fm, fully synthesized mobile tx/rx, £145. Revco, Bartex magnetic mounts, £10 each. G6HKD. Tel Weymouth 787747.

88mH toroids, suit BARTG, ST6, etc, £2.25 each incl. *Wanted:* Datong PC1 or UC1 receive converter; 14AVQ or 18AVT; *CQ Magazine* 1975-80. Chris Pedder, G3VBL, Thorncliffe, 5 Royalty Lane, New Longton, Preston, Lancs PR4 4JD. Tel Preston (0772) 612289.

TenTec Argosy hf tx/rx, mint cond, two months old, orig packing, etc, £350 ono. Standard C78 70cm fm, vgc, orig packing, £150 ono. Yaesu FT/FP200, hf tx/rx, vgc, orig packing, £195 ono. Tel Weymouth 786930.

Trio TR3200, 70cm portable tx/rx, SU8, SU20, RB0, RB2, rev RB14, RB14, SU18, nicads, charger, antenna, £120. Revco 5/8 over 5/8 70cm magnetic mount, £10. *Wanted:* FT480R, must be cheap, any cond or part exchange any above. G6HKD. Tel Weymouth 787747.

Drake R4A, 160-10m, three extra sw bands, variable selectivity, notch filter, comp with MS4 spkr, good cond, £100. Gone Drake B-line. G3ZZD. Tel 0892 34117.

FT290, one year old, mint cond, comp with nicads, soft case, mobile mount, charger, linear, base power supply, £280. GI8XWF, QTHR.

Trio R1000, exc cond, hardly used, orig packing, still available, genuine reason for sale, good value at £215 ono. Tel 061-436 6512.

KW E-Zee Match, £30. SML twin meter, £8. Buyer collects. G3RRR, QTHR.

KW2000B ac psu, external vfo, Shure mic, spare xtals, manual, £185. G6CPT, QTHR. Tel 0909 771173, evenings.

Advance Q meter, £30. Scope I3A, £20. Linear amp, components, rotary inductors, vacuum variable capacitors, transformers etc. Heathkit monitor HO10, £25. Pye vhf swr meter, £10. 4CX1500B, base, £75. 4/400 with base, £10. G2FSP, QTHR.

Yaesu FT480R, exc cond, £330. Thoren's TD160B Mk2 turntable, SME Mk3 arm, Coral MC81 cartridge, Lentek preamp, £210 ono. G6DZQ, QTHR. Tel Norwich (0603) 614167.

Devon: superior detached residence, 3/5 bedrooms. Set in approx half acre, between Torquay and Teignmouth. Unrivalled rural and panoramic sea views, an outstanding site for amateur radio, especially vhf, £74,000. Barrie James, G4PCK, Nimbus, Ashley Priors, Torquay TQ1 4SE.

TR2200GX 2m tx/rx, fitted S20-22, R6-7, orig packing, comp with nicads, charger, helical antenna, £45. Heathkit HA201 10W linear amp, £20. The two together, only £60. G3ZZL NOT QTHR. Tel 01-508 7573.

FT707, hardly used, £520. Matching psu, £85. Matching atu, £55, or £630 for all three, mic included. Michael Boyce. Tel Wolverhampton (0902) 764293, or 758161.

Make me an offer for my Trio TS520 in perfect order, my Dentron linear amp MLA2500 and 10kHz-30MHz DX302 digital rx, both hardly used, delivery extra at cost. G3KUF, QTHR. Tel 0272-296544, days, or 027581-3648, evenings and weekends.

Alumast, 30ft sectional, reluctant sale, brand new, offers around £250. MM 432/144R transverter, £120 ono. Speech processor, £10. CR100 rx, £25. G8XHL NOT QTHR. Tel Boxted (Essex) 853, evenings.

IC30A 70cm mobile fm, xtalled up for all repeater channels, SU8, SU16, SU18, SU20, comp with mobile colinear antenna, good wkg order, best offer over £200. G4AIV, QTHR. Tel 0536 710519.

Burndept vhf/fm, not converted, suitable 2m conversion, £25 ono. Pye Europa, not converted, suitable 70cm fm conversion, some info, £35 ono. Assorted xtals around 5Hz, 50p each. Four-el Jaybeam, 2m quad, £9. Carriage etc by arrangement. G6GSH, QTHR. Tel Bob, Yateley (0252) 871077.

Fifty year's collection of radio, television sets, valves, components, mags, all must go. Send sae with needs. Greenberg, 8 Hillersdon Avenue, Edgware, Middx HA8 7SQ. Tel 01-958 4710.

Trio 7500 2m 15W, £120. C5 2m colinear, £25. 12V 2A stab psu, £7.50. MM 2m converter, £10. 432-28 transverter, £90. 70cm 40W linear, £45. TH3 hf beam, needs attention, £25. *Wanted:* Bird Thruline. G4GSR. Tel Dave, 051-227 1919, or 051-428 1845.

Shack clearance: Dynamco 2001 Mk2 digital voltmeter, £25. Marconi uhf sig gen, TF1060, 450-1,200MHz, £55. Marconi TF455E wave analyser, £30. Racal CT488 frequency counter, £25. 10cm tuned cavity test set 288, £10. Prefer buyer collects. G3MOL. Tel Brighton (0273) 777716.

Azden PCS3000, 12 months old, used only on receive for 10, 25 or 5W output, 144-146MHz, memory scan, band scan, mobile bracket, orig packing, £165 ono. G6MZW. Tel Dave, Bath (0225) 314815.

Trio 7200G 2m tx/rx mobile, 10W, in mint cond, mains psu, exc value, £95. Buyer collects or pays carriage. G4ABT. Tel Nottingham 234797.

10·7GHz doppler radar modules, MA86501 Microwave Ass, cost £48 each, spare rx diode, WG16, bends, flange, offers. Swop, want 4CX250, 06-40 hf vertical 2m beam. G3KPW NOT QTHR. Tel Camborne (Cornwall) 717612.

FT290R, nicads, charger, case, helical, MM 144/25 power/preamp, one year old, used little, £160. Tel 01-670 4277, evenings and weekends only.

Icom IC210, vfo operation, xtals R7, R6, R4, ic pu fitted, mic, MC30S, manual, exc cond, £150 ono. New MML 144/50S, 50W linear amp, £70. GW4IUY. Tel Aberdovey 367.

IC240, vgc, £110. IC202S, as new cond, £125. Buyer collects. Would swap either for IC2E, G8YCW, QTHR. Tel Ashington 818773, after 7pm.

FR50B amateur band rx, 160m and 2m added, £80. QM70 transverter, 432/28, 10W output, £70. Oscar-amp 10m preamp, £5. G4ALV, QTHR. Tel 01-460 3852.

50Ω carbon resistors, brand new, dissipate 150W in air, 250W in oil, suit coaxial construction, £13. G3PVD, 30 Edmonton Road, Woodsmoor, Stockport, Cheshire SK2 7BG. Tel 061-487 1376.

Canon A1, f1.4 lens, motor drive (ma set), Tamron SP35-80, f2.8 zoom, Speedlight 199A, all in alloy case, many accessories, will sell or preferably exchange for high quality hf or vhf equipment. Anything considered. G6AGV, QTHR. Tel Whitstable (0227) 273660, after 6pm.

WB9LY1 fs sf converter built by G3MNQ and W0LMD, sstv keyboard via G3WW built by G3GGJ, the pair for £100 plus carriage. Reason sale xyl stroke, no time to use. H. Burton, G2JR, QTHR. Tel Coventry (0203) 455021.

Voluntary emergency group has eight Dymar 0·880 fm lowband hand portables, with chargers, to exchange for similar lowband a.m. handportables or PMR licenceable mobile sets, lowband a.m. or offers. W.H.Y? Newbold, 124 Hillcross Avenue, Morden, Surrey. Tel 01-543 5489.

18AVT/WB vertical antenna, 10-80m, £40. TET vertical antenna, MV4BH, 10-40m, £42. Carriage extra. G3UQZ, QTHR. Tel 021-373 8806.

Kenwood TS520, fitted 250Hz cw filter, immac cond, £320. G4IDL, QTHR. Tel Rotherham (0709) 874100.

Apple 2+ microcomputer, 48k, disc drive, dos 3·3, 3·2, Aztec modulator, books, loads software, inc cw/rtty/ASCII/sstv/Hellschreiber/QRA etc, mint cond, £700. Owner going 16 bit. SAE details. G3ZPF, QTHR.

Creed 7B teleprinter, comp with ST5 terminal unit, full wkg order, £35. Buyer collects. G3IBH, QTHR. Tel Hitchin (0462) 56714, evenings.

Trio TS830S, vgc, or exchange w.h.y. *Wanted:* vertical antenna for 10, 15, 20. G4IZG. Tel 0903 41109.

KW Vespa Mk2 tx, fitted alc, good cond, mods only to mic and pe SK7, cw spare valves, brand new pa tube, never used, psu, mic, mains plug, ready to run, £60. Tel 01-651 1410.

Silent key: G8IHZ gear for sale: LA2 2m 200W linear amp, new, unused, £100. EC10 rx, £50. TC7 rx with 2m converter, £40. TC101 Burns wavemeter, £20. AT5 Codar tx and psu, £30. RF1V Heathkit sig gen, £10. Model 7 avometer, £35. Europa transverter, £40. EL3300 Philips cassette recorder, psu, £25. HT7 Hallicrafter freq standard, £15. LM14 freq meter, £20. All ono. All good cond and working, buyer inspect, collect. Apply G4AP, QTHR. Tel Frogmore 474.

Hansen in-line 144MHz preamp, BF981, below 1dB nf, perfect, as new, no longer needed; Mutek board in IC211E, gift at £18. G3BDQ, QTHR. Tel Pett 2262, evenings.

Bird Thruline element type 500H 2-30MHz 500W, £30. Pye Pocketphones PF1, one pair, SU8, comp with nicads, £20 ono. *Wanted:* Yaesu SP901P, offers. GW4HAT, QTHR. Tel Swansea (0792) 290770, evenings.

G8CQC sale: Icom IC255E 2m fm tx/rx, regulated power supply, used very little, orig packing, £150 ono. Tel Brookside 2894.

Codar AT5, matching ac psu, £25. RA17 Mk2, brand new spare 6F33/E180F valves, £75. *73* mags, 1981-2, comp; *QST* Nov '75-Oct '77, offers. *Wanted:* FV101B. G3ICH, QTHR. Tel Hemyock 680234.

Racal RA17 communications rx, 0·5-30MHz, fully checked out, serviced, magnificent unit, £180. 28MHz preamp for Oscar, £12. *Wanted:* atu for Yaesu FT101ZD, any suitable unit considered. 70cm linear amplifier. 2m portable rig up to £80. G6ASA. Tel Oxford 863333.

RTTY terminal, homebrew Creed 7B, power supply, leads, spare Creed, comp station, good cond, £80. KW Q-multiplier, £10. Command rx, topband, £10. GM3NCS, QTHR. Tel Burghead 635, after 6pm.

Trio 2300 80ch 2m portable tx/rx, rev/repeater charger, nicads, case, mobile mount, box, manual, perfect, £125 ono. G3WLG, QTHR. Tel Bristol (0272) 681068.

Microwave Modules MML144/30LS 1 or 3W to 30W linear, £45. Jaybeam D8/2m 8-over-8, £15. G8HRO. Tel Crawley (0293) 33712.

Trio JR599CS incl 6m/2m converters, used to work much crossband, £200. Heathkit IO18U 5MHz scope, manual, £30. Shure 444 mic, hi-z, £10. Buyer collects. G4BPY, QTHR. Tel 0922 413193.

FT227R 2m fm tx/rx, autoscan, rev/repeater etc, £120 ono. Nascom 2, cased, psu, 32k, Nasys-3, Naspen, graphics, toolkit, dozens of programs, £225. *Wanted:* low band fm Pye Europa. G3NPZ, QTHR. Tel Fareham (0329) 283736.

UHF equipment: Standard C78 fm portable, comp with CPB78 10W p.a./preamp, CM8 mobile bracket, £195 (will split). Liner 430 ssb tx/rx fitted *R & EW* preamp, exc cond, £110. MMC 432/144 converter, £25. G8OUU, QTHR. Tel 0780 740456, evenings/weekends.

Trio TS130V 25W hf eight-band tx/rx, only five months old, in perfect cond, mic, £395. Homemade pu to suit, £35 if purchased with TS130V. Tel Fareham 236906, weekends or evenings only please.

Towermast, 28ft, all cables, rotator (not tilt), £75. 600MHz frequency counter, £75. Marconi sig gen a.m./fm vhf/uhf, £65. Portable colour tv, boxed, 12/240V, £165. Part exchange or swops considered. G4JKP. Tel Russ, Leicester (0533) 899958.

Blaupunkt Frankfurt car radio, sw/mw/lw/vhf fm, push button/manual tuning, exc cond, £45. Beautiful FT101 quality leather carrying case, £35. FT207R, handbook, spkr/mic, nicads, antenna, mains charger, £140. NC2 battery eliminator/quick charger, £30. Write to Taylor, G3UCT, QTHR.

1982 *USA* and ***DX Callbooks,*** £8 each plus postage. High pass filters, *Rad Com* design in tobacco tins, £1.50 each. Four SL640Cs, 75p each. G3IZJ, QTHR. Tel 0252 548561.

Historic radio magazines, 1924-32, approx 250, collection late A. Fletcher, best offer. 15yrs *Radio Communication*, Yaesu 227R tx/rx power supply, magnetic whip, £135. Heathkit electronic double beam switch ID101, £15. Manuals included, sae please with postal enquiries. G8DD, QTHR. Tel 0602 255493.

TR2300, nicads, charger, rev repeater, helical, MML/30LS 30W amp, £160. Ex-eqpt valves, tested: 6080, 50p; 85A2, 12AX7, 20p. All plus postage. *Wanted:* Drake TR4CW with rit. Collins 75A series rx. G3RFI, QTHR. Tel 0767 260800.

RTTY program for BBC microcomputer model B, separate scrolling text areas for transmit and receive, type ahead facility during receive, single key pre-programmed messages, cw identifier, tape and instructions, £9.50. P. Harris, G3WHO, QTHR. Tel Great Alne (078981) 377.

Sony ICF2001L pll synthesized rx, 150kHz-30MHz, memory, auto scan, six preset channels, many other interesting features, £120 ono. G3AOS, QTHR. Tel 061-980 2415.

Icom IC255E, 25W, two vfos, memory, scan facilities, £170. Yaesu FT225RD, fitted with Mutek rf board, orig packing, £475, no offers. Will deliver 30 miles or buyer collects. G3WZT, QTHR. Tel Partridge Green, (West Sussex) (0403) 710565.

FT75 80-10m tx/rx, ac/dc psus, mic, mobile bracket, handbook, orig boxes, £95 ono. DX008 Mizuho frequency counter, direct input, programmable offsets, for tx/rx conversion to digital display. G3YTU, QTHR. Tel Haywards Heath 458992, evenings.

HRO500 solidstate partial frequency synthesizer, professional rx, 1965, £250. FT901DM, £575. FTV901R, 2m/70cm, unused, £345. FV901DM, £150. SP901P, £40. FC901, £95. FL2100, £200. YC305, £55. CPU2500RK, key, mic, £160. FRG7000, £165. BC221 240V psu, £15. G3AAG. Tel 01-499 0264.

Creed 54 teleprinter, 6S/6m auto tx, in good wkg order, £30. Can arrange delivery. Very large roller coaster silvered tape, drum-to-drum type, beautiful counter mechanism, £15. *Wanted: RSGB Teleprinter Handbook.* G4PJI. Tel Gainsborough (0427) 752312.

Yaesu FT7B hf tx/rx, FP12 psu, £365. Yaesu FRG7700 rx, £275. Standard C78 70cm 10W power amp, tx/rx, mobile mount, case, charger, nicads, all mint, £285. Plus carriage. G4JAX. Tel 0703 842000.

Heathkit HW100 ssb tx/rx, £120 ono. This equipment was owned and operated by the late J.H. (Jack) Lord, G3BIA. Write to 7 Hall Farm Drive, Whitton, Twickenham, Middx TW2 7PG. Tel 01-898 5668, evenings only.

FT290R, nicads, charger, case, helical, immac, still under warranty, in orig packing, £200. G4OJR. Tel Andrew, 01-572 0742.

EVR teleplayer, Hitachi, good flying spot scanner for amateur tv, described in *CQ TV* No 103, works OK, £75. Buyer collects. G2FVA, QTHR. Tel 051-336 4687.

Yaesu FT707 Coutant 12V 20A power supply, manuals, good cond, reason for sale going QRP on hf, £450 or would accept QRP rig such as FT7, TS130V etc, in part exchange, plus cash adjustment. GW4KWV, QTHR. Tel 0656 880 723, after 6pm.

TS120V, TL120 linear, 200W p.e.p. input, £375 ono. PS30, 13·8V, 20A psu, all vgc, cables, manuals, packing, £60. Tel 04536 3994, after 6pm.

Collins tx/rx, exc cond, FC902 atu, new. *Wanted:* Collins KWM380, in wkg order. G4OWC, QTHR. Tel Derby 557705.

HW8, factory made by Heathkit, Glos, no mods, comp with psu, Amtech 300 atu, Hansen swr meter, Raymart morse key, all above in first class wkg order, £125 ono. G4FMH, QTHR. Tel 0272 697687.

Trio TR7730 2m fm tx/rx, hardly used, £190 ono. Sale due to new harmonic. Icom IC2E, case, spkr mic, £100 ono. Buyer to collect. G8NOP. Tel Pip, Great Cubley 506, after 6pm.

Yaesu FR50B rx, mint cond, manual, £75, buyer collects. Heathkit DX40 tx, cw/a.m., 80-10, mains transformer, rewound 1979, new spare valves, manual, mic, best offer. Buyer collects. E. Taylor, G3FK, 9 Forest Road, West Moors, Wimborne, Dorset. Tel 0202 873175.

G2DAF rx Mk1, xtal filter, £65. G2DAF tx Mk1, xtal filter, £35. Well built 2m transverter, homebrew, rack mounted, built-in power-supply, 250W p.e.p., 28MHz in from tx, 2m converter required, two relays for tx/rx use, buyer collect. G2FQP, QTHR. Tel 32788.

FRG7, as new, used a few hours only, mint cond, purchased few weeks ago, bargain. G8ZWW. Tel Swanley (Kent) 63968.

TR2200G, helical antenna, carrying case, nicads, charger, mobile mounting brackets, xtalled for S16, S20-22, R3-7, together with VB2200 10W linear and λ/8 mag mount, exc cond, £85. G3ZNI, QTHR. Tel Oxshott (037 284) 3321.

FT401, cw filter, fan, spare pas, FV401, FTV650 (modded for 4m), SP400, all leads, £360. Would prefer to sell as one lot. G4DIE, QTHR. Tel Hawthorn 810644, after 6pm.

Property of the late A. Fletcher: signal generators CT394B, £70; TF1307, £20; 1066/B1, £75; 1060 3A, £30; Racal RA117A, £150; ssb converter, £40; H. Packard oscilloscope 130C, £40. Datong active antenna, £20; HAL rtty/vdu converter, £60. Other items to callers. SAE please. G8DD, QTHR. Tel 0602 255493.

MBA-RO morse rtty ASCII reader, fascinating to watch, still under guarantee, £150 for quick sale. GD3ESV, QTHR. Tel 0624-5026, evenings.

Immaculate KW2000 cw manual, ccts, notes, etc, recently overhauled by Decca, £120. Many boxed new valves inc 6146, 6CH6 etc, price negotiable, not sold separately. Buyer inspects and collects. G3JBS, QTHR. Tel 01-508 4296.

TE300 printer, keyboard, 10cps, vgc, RS232 interface, OK with BBC micro etc, £50. Matrix printer 165cps, centronics interface, £120. G4GZH. Tel 02406 3460 (Bucks).

Yaesu FT102 tx/rx, a.m./fm fitted, new September, in perfect order, any test, £625. Call or QSO 3,730kHz, 1400h any day. Gregg, G3SQS, 2 Park Road, Granborough, nr Aylesbury, Bucks MK18 3NS.

Yaesu FC707 antenna tuner, nearly new, £65. G3WMO NOT QTHR. Tel 01-363 0286.

G4MH mini-beam, DXCC proven, £55. AV5 vertical, £45. 5XY, £10. Can deliver at cost 25 mile radius. G4NCW, QTHR. Tel 021-351 6417, after 6pm.

FT75 hf tx/rx, 10-80m, good cond, FP75 mains psu, DC75 mobile psu, both incl spkr, VC75 (faulty) voice control unit (incl vox), spare valves, new, unused, manual, £95 ovno. G4OYO (ex-G6FSX), QTHR. Tel Nottingham 399849.

TR2400, ST1 base stand, quick charger, BC5 12V quick charger, spkr/mic, carrying case, belt clip, nicads, used little, exc cond, £170. G3ZNI, QTHR. Tel Oxshott (037 284) 3321.

FT101B, comp with cw filter, all in as new cond, £325. M. Skelding, 2 Church Avenue, Clent, Stourbridge, W Midlands. Tel 0562 73084.

Trio R1000 communications rx, SP1000 extension spkr, Datong AD270 active antenna, £210. Microwave Modules 2m converter to 28MHz, £15. G6LPT. Tel 01-458 1523, day.

Robot 800 terminal unit, 12in green video display unit, only nine months old, £550. Will split. G4OAX, QTHR. Tel 0438 61329.

FT207R synthesized hand portable, comp with spkr mic, slow charger, exc 2m fm rig, brand new, perfect, bargain, £150. D. Morton, G4LQT NOT QTHR. Tel Stafford (0785) 52604.

AR22 portable 2m rx, fully synthesized, 141·000-149·000MHz, helical antenna, internal nicads, charger, as new cond, £70 ono. Magnetic mount mobile antenna, 5/8 whip, good cond, £10 ono. G6ETA NOT QTHR. Tel 0843 293263.

Collins S-line, incl linear, Trio 7500, psu, all equipment of the late G3BQH, offers in writing only to Mrs A. Sherlock, Roselawn, Weston Lullingfields, Shrewsbury, Salop.

FT101ZD, six-band, mint cond, orig packing, service manual, fan, £450. G3TRB, QTHR. Tel 0905 775206.

KW2000A ac psu, spkr, manual, spare valves, £150. G3MWQ, QTHR. Tel 0952 55735.

Bearcat 250F (USA version), 70cm antenna, omni, £180 ono. Yaesu FT207R, spkr, mic, spare batts, two charger/power supplies, £175 ono. Ian Davis, G8XCL, NOT QTHR. Tel Lydd 20954.

FT150 hf tx/rx, 80-10, 100W, £150. Creed 75 rx only, £20. FT202R, 2m fm handheld, 6ch, ext mic, charger, etc, £90. Iambic keyer, wkg fb, £15. SWR bridge, £5. Creed 6S6 tape reader, £7.50. Cassette recorder, £10. All ono. G4DRS, QTHR. Tel John, 0525 60478.

KW204 tx, 1·8-28MHz, £95. Sommerkamp TS280FM, 8-40W, £85. Eddystone 940 rx, 480kHz-30MHz, base spkr unit, exc cond, £100. Various pre-war domestic rxs. G4OOW/G6ACK, QTHR. Tel 0455 612091.

Trio 7500 2m 15W, £120. C5 2m colinear, £25. 12V 2A stab psu, £7.50. MM 2m converter, £10. 432-28 transverter, £90. 70cm 40W linear, £45. TH3 hf beam, needs attention, £25. *Wanted:* Bird Thruline. G4GSR. Tel Dave, 051-227 1919, or 051-428 1845.

TS778DX 26-30MHz, all mode psu, 12A, 0-15V, SP102, swr power meter, 1,000W Turner EX500 base, mic, Yaesu headphones, all boxes, manuals, comp station must go, orig pirate going legal, £550 ono. Tel John, 01-674 0947, office hours.

FRDX400 hf tx, all options, 2m-6m converters, fm, filters, £125 or part exchange or swop 70cm gear—preferably ssb, transverter or w.h.y. 16-el beam for 2m 16dBd. G6ICD, QTHR Manchester area. Tel 061-653 9597, evenings.

TRS80 16K level 2, vdu, software galore, editor's assembler, monitors (four), d/bases, games (graphic) Inw expansion interface, fully built, socketed, some logic, going cheap, the lot, £225. Newman, 2 Carlton Drive, Benfleet, Essex. Tel 0702 556891, evenings only.

Realistic DX160 gen coverage communications rx, 150kHz-30MHz, £59 ono. Katsumi electronic keyer EK121, £15. MR7 metal rack for Yaesu FT707 series, £8. Portable antenna mast, 16ft, four sections, £8. All items as new. Buyer collects. G4GIG, QTHR.

Yaesu FT707 tx/rx, mobile or base station, 100W output, used regularly for world-wide contacts, £425. G4NFL, QTHR. Tel Stoke-on-Trent (0782) 658827, after 6pm.

DX300 communications rx, 10kHz-30MHz, quartz controlled synthesizer, triple conversion, powered by mains or batteries for portable use, good wkg order but

no longer required, £100. G6ONZ NOT QTHR. Tel 021-526 3351.

CDE TR44 rotator, post/mast fittings, 16m eight-wire cable, £70. Balun, £5. 16m RG8U coaxial, £6. Hansen mobile swr meter, £10. Sparkrite electronic ignition, £12. Metrohm, measures insulation, 25MΩ resistance, 0·5-100Ω, £12. Tektronics probes, P6010 10X, P6011 X1, P6006 uhf, set of fittings, £20 the lot. Lambda psu, 5V, 10·5A, £16. Variac-controlled bench psu, 0-260V ac, 0-30V dc, £18. Farnell dual 12V + 12V 2A psu, £16. Mains tranny for Drake psu, £10. Carriage extra. Tel Bourton 840138.

KDK 2025 2m fm tx/rx, unmarked, covers never removed, £120. MMA144V 2m preamp, cables, £22. Durst M605 b&w enlarger, comp with EL Nikkor lens electronic timer, £160. Other dark room gear for sale. Buyers collect. G3ZNF, QTHR. Tel Shepshed 2432.

Trio TS520S, hf tx/rx, 160-10m, cw filter, matching atu AT200, spkr SP520, all first class cond, cw manuals, boxes, £450. Wood & Douglas 2m fm tx/rx kit, all boards completed, fitted in smart case, just needs finishing touches, £50. G4GRU, QTHR. Tel 061-440 0556.

IC25E, Icom, 2m fm, as new, never used mobile, orig packing, £175. G8YVW, QTHR. Tel Sheffield 375790.

TR7800 2m fm 25/5W, 15 memories, priority channel, memory scan, up/down mic, manuals, 5/8 whip, mag mount, £170. Tel John, 01-553 4459 (London), after 6pm.

Trio 9R59D, £40. JR500S with 160, £50. KW Vespa Mk2 with psu, £75. With manuals, rxs fitted, spkrs, buyers collect or rxs, £5. TX, £10, Securicor. DFM kit with case, 50MHz, post free, £20. G3WAL, QTHR. Tel Rugby 70385.

FRG7, mint cond, no mods, orig packing, £125 ono. Dismantled N-gauge model railway, approx 80ft flexible track, points, buildings, engines, trucks, coaches, £100 the lot or w.h.y? G4NIZ, QTHR. Tel Cambridge (0223) 892672.

AEC SWR50 power meter, twin 100μA meters, 3·5/150MHz, 1kW, mint, £10 incl post. Eddystone dials, 6 by 4in, good cond, £3. G2DPA, QTHR. Tel Beverley (0482) 882673.

Good home required for Heathkit SB102; IC201; IC22A; KF430; Vortehon WVB; Creed 7E; BARTG tv; tape reader; spare carriage; Kyokuto 2m hybrid with 30W pa; Cambridge 70cm, Cambridge 4m; dual beam Tektronix scope. G8IFC, QTHR, now VK3XIE. Tel Waltham Cross 28144.

R1000, matching spkr, in immac cond, £225 incl Securicor delivery. Coombe Cottage, Pitchcombe, Stroud, Glos. Tel Stroud 3081.

TS520S, mic, exc cond, any reasonable offer considered, delivery possible. G3XHK, 8 Marlborough Road, Hampton. Tel 01-941 5250, or 01-430 7358.

Yaesu FT707, comp station incl FP707, FC707, mic, instruction book, limited delivery available, £540. G4DGG. Tel 0235 20230.

Yaesu FT207R 2m handheld tx/rx, NC2 deluxe charger/psu for base station, wkg, £150. G4PEV, G8XUG, QTHR. Tel Oxshott 3201.

TS520, good cond, used by GM3BSQ, ops manual, hand mic, £240. GM3VEY, QTHR. Tel Aberdeen 868263.

FT101EE, Datong rf clipper, YD844 mic, all £320. SWR bridge, £9. EK121 electronic keyer, £15. LA1 arrestor (unused), £15. HF absorption wavemeter, £8. Codar atu, £9. Clock, £10. G4FKE, QTHR. Tel 0753 654011, days, 25416, evenings.

Antennas: Jaybeam Q6/2M 6-el quad, £15. x6/2m/x12/70cm dual-band crossed Yagi, £19. 2m hand held colinear, £10. 2m 7/8 mobile whip, bracket, £8. G6CIG, QTHR. Tel Bedford (0234) 41013.

Trio 2300, reverse repeater, nicads, charger, helical, case, manual, boxed, £130. BC221 charts, psu, boxed, vgc, £20. Storno Viscount 2m fm 10ch unit, four fitted, circuits etc, £25. Prefer buyer collect/inspect. G8URP NOT QTHR. Tel Graham, Cheltenham 510546.

KW107 atu, £75. FS500H Hansen peak reading power meter/swr meter, £40. Shure 444 with transformer mod for 600Ω, £15. G3TND, QTHR. Tel 027587 2241.

X-band doppler module, AEI DA525/6, as used with *PW* EXE, new from manufacturer, £50 ono. G4DPZ, QTHR. Tel 0787 476925.

KP202 vhf handheld 2m portable tx/rx, £50 ono. KW Vanguard tx, 160-10m, a.m./cw 50W, £25 ono. Ladies hearing aid, £10 ono. Wanted: info on Eddystone S640 rx please for G3THX. Cliff Collins, 60 Alexandra Road, Skegness, Lincs PE25 3RE.

Drake MN7 130W atu, mint cond, £80 ono. *Wanted:* rtty and cw programs for Nascom 1 in eprom 2708-2716 to replace monitor or tape. G3TEJ, QTHR. Tel 0480 54560.

Trio JR10 amateur b bands rx, narrow filter fm detector, £75. MM 432/144 rx converter, £20. 2m linear amplifier, 25W, £20. Wood & Douglas 2m tx, £25. 144/432 varactor tripler, £10. G8DYK, QTHR. Tel Bradford 883465.

Collins KWM2 tx/rx, 3·4-30MHz, 312B5 station control providing second vfo, ls, 0/200W, 2kW forward/reflected power wattmeter, 516F2 power supply unit, 30L1 1kW grounded grid linear, 240/115V mains transformer, comp station with connecting harness, all service and operating manuals, will demonstrate under wkg conditions, prefer buyer to collect, £1,150. G8KS, QTHR. Tel 0323 21919.

Trio TS520S hf tx/rx, 160-10m, VFO520S, both vgc, plugs, manual, £430. G2BAR 10m 3-el beam, boom to mast plate, vgc, £25. RS48051. Tel Dave, Bristol (0272) 836562, after 6pm.

TR2200GX 2W fm portable, R0, R3-7, S16, S20-23, nicads, charger, helical, case, mobile mount, Liner 2, 2m, ssb, PA3, accessories, both fb cond, £140 ono for the pair. G4JTP NOT QTHR. Tel Southport (0704) 67910.

FT200/FP200, vgc, used only for receiving, £200. Tel 0228 35177, after 6pm.

Sullivan & Griffiths universal inductance meter, 1μH-1H, S&G Wheatstone bridge, both good cond, best offer secures. BCC221, no psu, £15. G3PSY, Tenterden, Kent. Tel 05806 4531.

Drake TR7 and power supply, in vgc, £650, no offers. GW3LOD, QTHR. Tel 0267 5490.

Telequipment oscilloscope S54U, battery or mains, exc cond, £100. Might px w.h.y? G8YCJ, QTHR. Tel Orpington 73014.

Mk123 clandestine tx/rx, rx 2-20MHz, rockbound tx, 25W cw, comp with spare valves, headset, 12V inverter, copper braid antenna, perfect for new bands, £50. G4KNM NOT QTHR. Tel Helston 64251.

Trio TR9000 multimode, exc cond, BO9 base, £295. Might px handheld. G8YCJ, QTHR. Tel Orpington 73014.

FT230R, mint, 25W mobile, purchased September 1982, 19 months' warranty left, orig packing, going hf hence only £175. Datong D70 morse tutor, £35. G6MHA, QTHR. Tel 01-200 1839.

FT707, FC707, FP707, YM35, FSP1, MMB2 G-whip, BL40X, wire, comp with boxes, vgc, £650. Mr R. S. Glover, RS51337. Tel Basildon 284550.

Trio TR7625 2m fm, fully synth, 2·5 or 25W, £150 ono. G6HDD, QTHR. Tel Bolton (0204) 791918.

50Ω dummy load carbon resistors, brand new, dissipate 150W in air, 250W in oil, £15. G3PVD, 30 Edmonton Road, Woodsmoor, Stockport, Cheshire. Tel 061-487 1376.

FT227RA 2m fm synthesized tx/rx, very sensitive rx, 10W tx, 5/25kHz step/scan, rev repeater, auto toneburst, four memories, mobile mount, boxed, bargain at £175. G4RMC, ex-G8ZNC, QTHR. Tel David, Garston (09273) 79567.

Yaesu FT225RD 2m multimode, fitted one xtal channel, £380. Microwave Modules 144/432R transverter, used little, £100. Both items immac, moving house forces sale. G8OGV, QTHR. Tel 0733 46209, evenings.

FRG7700, mint cond, boxed all fittings, genuine sale, £280. G4JLU. Tel 01-349 1122, days.

Heathkit HW100 tx/rx with psu/spkr, £135. Buyer collects. G6PA NOT QTHR. Tel 021-360 7031.

56pF trimmers by Jackson, ideal for vhf/hf tx, 100 available, 50p each. P&P extra. 1-5, £1; 6-10, £2; or buyer collect. G3OYU, QTHR.

Icom ICML1 10W mobile booster for IC2E, £25. G6CIG, QTHR. Tel Bedford (0234) 41013.

FT208R, mint, fast charger, spkr mic, PA3 car adaptor, mobile mount, λ/4, 15 months warranty left, in orig packing, £165. Microwave Modules MML 144/30LS 30W linear, 1/3W input, switchable preamp, £40. G6MHA, QTHR. Tel 01-200 1839.

Eddystone 750 rx, £55. PF1s, dual channel, RB14/SU8, £25. 75 Creed two-speed, £60. FT2F, £20. Uher four-speed reel portable, £40. Heathkit dual trace scope, af/rf generators, cheap, KP202, £45. Palm 2, £47. FT101, £175. AOR240, £130. New TR2400, £120. IC215, £96. All ono. G3LZN, QTHR. Tel 05643 2014.

Does no-one want my Trio 2300? No replies to ad in December issue. Incl two sets of nicads, case, charger, etc, now only £100 ono. G6INQ NOT QTHR. Tel 0245 468149, evenings.

TenTec Omni-D, boxed, as new, 160-10, 100W out, £425, or with deluxe power supply, also as new, £525. Genuine bargain. G3XKF NOT QTHR. Tel Aylesbury (Bucks) 748256.

FT101ZD Mk3 fm, fitted fan, mic, spare pa valves, unmarked cond, £525 ono. Delivery negotiable. Consider 2m or 70cm portable/mobile rig in part exchange. G3GHB, QTHR. Tel Inkberrow 792582, evenings or weekends.

Icom IC290E 2m all mode tx/rx, exc cond, mobile mounting bracket, orig packing, £280. G6EZI NOT QTHR. Tel Jim, 06662 2861 ext 2356, daytime.

R107 vintage hf rx, recently overhauled, exc cond, offers? Icom IC240, comp with 7/8 whip and Adonis mobile mic, £100 ono. G4MEZ, QTHR. Tel Milton Keynes 319250, after 6pm.

STE 102 2/10m rx, 144-146, 28-30MHz, fm, a.m., ssb, comp with STE 154 12V psu, £71. Up-converter, 10m on 2m, £12. Mobile bracket type MB9, suit Icom rigs, never used, £7. All ono. G4ANW, QTHR. Tel 098386 6687.

Collectors: old radios, wooden cased, wkg: Murphy A72, 1936 superhet; Philips TRF 1935 three-valve; Murphy A30 1935 superhet; Marconi MPX/1-93 1935 superhet; Pye tv LV30, 9in, 1950; all in good cond, offers. G8MTQ. Tel Salisbury (0725) 21485.

FR200 tx/rx, psu, swr meter, desk type mic, manual, £200. G4CSX. Tel Emsworth 3957.

FR50B, FL50B, vgc, rx 80-10m, aux 10MHz, xtal cal tx 80-10m, 50W p.e.p., mic, manuals, £125. TenTec RX10 80-15m dc rx, suit beginner, £25. Kokusai 455kHz i.f. filter, 2·5kHz bw, £12. G5BQR, QTHR. Tel Biggleswade 316294.

Drake TR7 with power supply, £680. Tel 021-643 6884, office hours.

DX300 communications rx, full coverage up to 30MHz, mains or 12V dc operation, a.m./ssb, mint cond, £125. Tel 01-889 3952.

Trio 9000, 2m multimode tx/rx, good cond, mobile mount, mic, no mods, orig packing, £235. G4HLW, QTHR. Tel 0933 224741.

Marconi TF801D, 10-470MHz, manual, £70. CT218 a.m./fm, £35. Salford 106 5-55MHz, £10. Siemens reflectometer bridge, 10kHz-30MHz, £40. Multico hs deep throat pc drill, £85. Scope tubes, 1-15in wide-spaced capacitors, transformers, many smaller items, sae list. G2CPM, QTHR. Tel 0635 40464.

KW2000A tx/rx, 180W p.e.p., ac psu, immac cond, any trial, spare pair new pa valves, £200. GW3YVC, QTHR. Tel Cardiff 755190.

Icom 251E 2m multimode base station, mint cond, only two months old, orig packing, Cushcraft A147-20T crossed Yagi, UR67 coaxial, £425. G6JZM NOT QTHR. Tel Derek, 0924 405476, evenings and weekends.

FRG7 communications rx, 500kHz-29·9MHz, fine tune, in mint cond, used little, manual, Heliscan antenna, recently obtained G4, £140. Tel Lichfield 51851.

Transverter MMT 432/144R for 2m rig, new, £100. 48-el multibeam Yagi MBM 48/70cm antenna, £12. Postage extra. Jim Henderson, GM4HKW, 1 Rossiebank Crescent, Westmuir, Kirriemuir, Angus. Tel Kirriemuir 3455.

Contest winning rtty package comprising Creed 54, Creed 6S6M reader, homebrew ST6 tu, xtal controlled tone generators, spares etc, £50. Sinclair ZX81, 16k memory, i/o ports, proper keyboard, psu, books, software, £70. G3SJX, QTHR. Tel 01-656 9054.

Yaesu FT75, 80-10m tx/rx, comp with two psus, £100. Trio 2300, 2m tx/rx, nicads, charger, £110. MMT28/144, 10m transverter, £75. G4OIM, QTHR. Tel 01-464 4927.

TRS80 level 2 basic computer, comp with vdu, CTR80 cassette recorder, tapes, books of instructions, programs, all as new, used little, £325. G4MLI, QTHR. Tel 084 03282, evenings.

FT101EE, spare set tubes, one careful owner, modified to tx/rx on 10 and 24·5MHz, cw filter, not used mobile, £350. Prefer buyer collects. G4GUO, QTHR. Tel Charles, Worthing 45400.

Icom IC24G incl mic, nine months old, exc cond, £135. Tel Upavon 376, days, Melsham 703666, evening.

Microwave Modules 144/100S linear amp, unwanted gift, new, still boxed, £120. Tel 0772 57076, day, 0704 36360, evening.

Trio TS520S, fitted with cw filter, £295. Jaybeam VR3 vertical 10/15/20m, £30. Jaybeam 4-el 2m quad, as new, £17. Quality 3A 13·8V psu, £15. All plus carriage. G4LFT. Tel Billericay 52581.

WANTED

Suitcase or miniature tx/rxs; any spares, incomplete or damaged sets. WS (Canadian) No29 spares, particularly connecting leads. Army tx No53. Any commercial or military a.m. fone tx or tx/rx covering 80-40m continuous. Taylor, G3UCT, 27 Glen Road, Fleet, Hants GU13 9QS.

For Codar mobile psu type 12MS, torroid transformer or name of a supplier, or exact specification to build one. G4BCJ, QTHR. Tel 01-478 5303.

Attempting my own "real" radio collection. Good price paid for mint 19 sets, 38 sets, 1154, 1155, BC348, anything of this era accepted. W.H.Y? G3ZYC, QTHR.

Iambic keyer, with or without paddles, up to £20 paid. G6MKF, 39 Hartington Road, Liverpool L8 0SD. Tel David, 051-734 3759, after 6pm.

Valve data manual, AVO model CT160, loan or purchase. Maxwell, G3BGA, QTHR. Tel 0484 604546, evenings.

Bird Thruline elements types 50C, 5C, 25E. One SK620A uhf valve base. G4AWU, QTHR. Tel Doncaster 710987, evenings.

FT221 or FT221R. Will collect. Chris Youens, G4GDW, QTHR. Tel Watford 32211, day, Hemel Hempstead 42817, evenings.

KW vox unit for 204 tx. Also interested in 2000B or

separates 202 rx, 204 tx, KW 160 tx, no rubbish please, good cond only. G3MUF, QTHR.

Mobile/portable ssb cw tx/rx, also suitable QRP operation. Tel 0725 (Downton, Wilts) 21730, evenings.

For the Wireless Museum: radio books, mags, catalogues, QSL cards, service sheets, morse keys, valves, any old knobs! Cartridge player, B2 attache case, phones, Wassell key. Collection arranged. Details please to hon curator G3KPO, QTHR. Tel Ryde (0983) 62513.

1928 R32 Marconi rx. Genuine collector wishes to purchase or borrow for detailed photography. Peter Peach. Tel Axminster (0297) 34259, after 6pm.

EA52 valve, XB1 Barretter for TF1041 valve voltmeter, manual/circuit for Avo portable sig gen No2, ZDV3813 (on loan to photocopy). Can trade photocopies various equipments. Martindale, GM8MLH, QTHR. Tel 08382 304.

RX type Hallicrafter SX28 or similar frequency coverage. G8BWI, QTHR. Tel Cambridge 314532.

PS No 213A morse key. Details and price to Peach. Tel Axminster (0297) 34259, after 6pm.

Info, help, circuits, data, etc. Wish to use Vic 20 micro for rtty tx/rx. *RTTY Handbook (73 Magazine).* G6EKL, QTHR.

Enthusiastic beginner wants to buy reliable rx, morse tuition aids, useful ancillary and test equipment to set up his first station. Mallett, Cedar Cottage, Half Acre Lane, Thelwall, nr Warrington. Tel Warrington 62819.

KW2000 mains power supply. G8CWB, QTHR. Tel 0476 4763.

Borrow or buy circuit diagram for the 2m fm Azden tx/rx model PCS2000, either European or USA version. Control head to rig extension cable for the above. G6RBJ. Tel Bob, 01-907 3406.

Catholic amateur radio group would like new members. Skeds arranged to suit everybody, hf or 2m, anytime. Particulars to G3AKG, 116 Lowfield Road, Caversham, Reading. Tel Reading 476718.

Still required: *ARRL* or *Jones Radio Handbook,* before 1944. Hammarlund ceramic ux valve-holder with suitable coil formers. G4IMT, QTHR. Tel Marshfield 254.

CW filter for Heathkit HW101 etc, 3·395MHz. G4OAA (G8DJU) QTHR. Tel 0992 464795.

KW500 linear in gwo by white stick operator who wants to dx on 80/40m bands (has poor antenna location). Mutek preamp SLNA144S. Bencher paddle, black base. GM4JLD/GM4OBJ. T. Murphy, 14 Glencairn Avenue, Wishaw, Strathclyde ML2 7RG.

MZ80P3 printer and/or MZ80I/0 interface and/or MZ80FD floppy disc. Will purchase or exchange Yaesu FL2100B linear plus cash adjustment. Letters only please. GW3KLU, QTHR.

TH3JNR or similar triband beam. G4NCW, QTHR. Tel 021-351 6417, after 6pm.

Beg, borrow or even buy circuit diagram for Trio 9R59 rx. *Short Wave Magazine* articles on mods for Trio 9R59DS. BRS50834. Tel Graham, 01-864 7762.

National HRO rx manual. A. R. Bartle, 105 Mayfield Road, Thornton Heath, Surrey. Tel 01-684 0610.

Microwave Modules converters, 144/28, 28/144, 70/28, 432/28, 432/144, 1,296/28, 1,296/144. G6CHB, QTHR. Tel 0632 462606.

Service manual or circuit only for 9R59 rx. Photocopy will do; in effort to assist swl. G4BMX, QTHR. Tel 04536 5042.

CLUB NEWS

(Continued from p169)

Stowmarket (S&DARS)—7 February (Junk sale), 7.30pm. Red Cross Hall, Station Yard. Details from Jim Lowe, G8SCB, tel Needham Market 721296.

Vange (VARS)—3 February (Junk sale), 10 February (New programme discussion), 17 February ("2m", by G3PLB), 24 February ("RAF Part 2", by G3XPV), 7.45pm. Main Hall, Barstable Tennants Community Association, Long Riding, Basildon. Details from Mrs D.Thompson, 10 Feering Row, Basildon SS14 1TE.

REGION 17—RR H. G. Cunningham, G8FG, 235 Station Road, West Moors, Wimborne, Dorset BH22 0HZ. Tel Ferndown (0202) 876018.

Bournemouth (BRS)—4 February ("Lambda diode experiments", by G3MYM), 18 February, (Natter night), 7.30pm. Kinson Community Centre, Kinson, Bournemouth. Sec G4EKE, tel Ferndown (0202) 877945.

Guernsey (GARS)—Tuesdays and Fridays, 4 February (Annual dinner, venue to be announced), 18 February (SWL evening conducted by Andrew Hamon). 8pm. The Lodge, La Corbinerie, Oberlands, St Martins. At the AGM held on 29 October 1982 the following officers were elected: president, GU3MBS; sec, Carolyn Wild; treasurer, GU4NYT. Sec as above, tel 25858.

Horndean (H&DARC)—10 February ("Year of radio and things", by G4BEQ), 7.30pm. Merchiston Hall, Horndean. Sec G6GBM (awaiting a G4 call), tel Horndean (0705) 593429.

Portsdown Hill Repeater Group (GB3PH)—On RB2. For details contact G8GNB, tel Fareham (0329) 239702.

Swindon (S&DARC)—3 and 17 February (RAE course), 10 and 24 February (Lectures), 7.30pm. Park School, Marlowe, Swindon. Swindon Radio & Electronics Rally will be held on 15 May. Sec G4IYW, tel Swindon (0793) 27227. For details of the rally contact AR G8SFM, tel 066689 307.

Weymouth (SDRS)—1 March (Constructor's contest and junk sale), 8pm. Civilian Canteen, Army Bridging Camp, Wyke Regis. Sec G3ZGP, tel Weymouth (0305) 812893.

Members of Wimborne Flight Refuelling ARS at their club station, G4RFR. L to r: G8VFY, sec; G8FG, representative for Region 17; and G3CPN, area representative for Bournemouth

Wimborne (Flight Refuelling ARS)—6 February ("HF operation", by G3VBL), 12 February (Dance and social evening), 13 February ("Understanding power transistors", by G4JET), 20 February (Informal evening with G8MCQ), 27 February (RSGB video "The Secret Listeners"), 7.30pm. Flight Refuelling Social Club, Merley, Wimborne. Club callsign G4RFR now issued. At the AGM held on the 28 November 1982 the following officers were elected; chairman G6JAW; sec, G8VFY. Sec as above, tel Wimborne (0202) 882271.

REGION 19—RR R. J. C. Broadbent, G3AAJ, 94 Herongate Road, Wanstead Park, London E12 5EQ. Tel 01-989 6741.

Cheshunt (C&DARC)—2 February (Natter night), 9 February ("State of the art video recording systems", by Nick, G8NDR), 16 February (Natter night), 23 February ("Engineering workshop practice", by Keith, G4MIU). The Church Room, Church Lane, Wormley, nr Cheshunt, Herts. The club holds morse classes. Details from Bob Gray, G6CNV, tel Dane End 254.

A group of amateurs from Martlesham RS who attended the wedding of John Regnault, G8FQO. From l to r: G3XST, G8GOS, G8HGG, G4FTC, G4GVW's xyl, G4GVW, G4FZZ, G8MJK, G8FQO, his wife Anne, G8ONH, G8LBS, G3XDY, G4CVI, G3ZNU, G8KYR and G3XDY's xyl

Ealing (E&DARS)—Tuesdays, 7.30pm. The club room has recently been damaged by fire, and although they hope to be in the Northfields Community Centre again early this year they have no idea when this will be. Until then the meetings are being held at the Hanwell Community Centre, Room 5, First Floor. Details from R. A. Lester, tel 01-997 2143.

Edgware (E&DRC)—15 February (G3CCD's F0UT site in France), 7.30pm. The Committee Room, Chiswick Town Hall, High Road, W4. Sec W. G. Dyer, G3GEH, tel 01-992 3778.

Edgware (E&DRS)—10 February (Beginners night—details to be announced), 24 February ("Direction finding", by John Plested, G4GYS). The Watling Community Centre, 145 Orange Hill Road, Burnt Oak, Edgware. Sec Howard Drury, G4HMD, tel 01-952 6462.

Southgate (SARC)—10 February ("Radio interference and harmonic radiation", by I. Quiney), 7.30 for 8pm. St Thomas's Church Hall, Prince George Avenue, Oakwood, London N14. Sec G8EWG.

RR19 has very little to report on the club scene this issue. It must have been the rush of Christmas that stopped club secs sending a programme on time. Please also note that non-affiliated clubs are not included.

REGION 20—RR B. L. Goddard, G4FRG, 2 Greenfield Park, Portishead, Bristol BS20 8NQ. Tel 0272 848140.

Bristol (BRSGBG)—This month's lecture will be on "Motorway communications", by Colin Rose, G8YCV. Queens Building, University Walk, Bristol University. Details from Chris Short, tel 0272 621253.

Bristol (North Bristol ARC)—Fridays, 25 February (Two PO films, "The sea has many voices" and "The Post Office Tower"), 7pm to approx 9.30pm. c/o Self Help Enterprise, Braemar Crescent, Northville, Bristol. Details from Ted Bidmead, G4EUV, tel 0272 691685.

Cheltenham (CARA)—First Thursday and third Friday in each month, 7.30pm. Please check with John Holt, G3GWW, for the new address of the club. John's address is the Old Rectory, Brimpsfield, tel Witcombe 3435.

Gloucester (GARS)—Wednesdays, 2 February ("Teleprinters and rtty operation", by N. Negus and J. Wingate). 23 February (No meeting), 2 March ("Crime prevention", by the local police), 7.30pm. New venue for the club is at St Barnabas Church, Stroud Road, in the church hall. The club have a top band net every Sunday morning from 10.30 to approx 12 noon on 1·837MHz. Details from Tony Martin, G4HBV.

Portishead (Gordano ARG)—23 February ("Sun spots", by John Meek, G6BGY), 7.30pm. Ship Hotel, Down Road, Portishead. Details from Robin Coles, G8ROC, tel 0272 877789.

Shirehampton (SARC)—Fridays, 7pm. Twyford House, High Street, Shirehampton. Lectures for February include "Computers" and "High quality test instruments". The dates for these are not fixed at time of writing. Details from Ron Ford, G4GTD, tel 0272 770504.

Yeovil (Y&DARC)—Thursdays, 3 February ("Objectives in amateur radio", by G3MYM), 10 February ("How to build a simple short wave receiver", by G3MYM), 17 February ("Estimating D-region absorption", by G3MYM), 24 February (Natter night and committee meeting), 7.30pm. Building 101, Houndstone Camp, Yeovil. Details from Don McLean, tel 0935 24956.

DATONG

MODEL PTS-1

TONE SQUELCH UNIT MODEL PTS-1

Designed to wire-in to the microphone and loudspeaker lines of existing FM or AM transceivers, Model PTS-1 provides a second independent squelch system.

The squelch operates only when the incoming signal carries a pre-arranged tone of precisely the correct frequency. Thus two transceivers, each fitted with Model PTS-1, will respond only to each others transmission protecting the user from undesired interruptions.

The system is ideal for Raynet groups, club nets, or groups of friends who wish to monitor for each others signals over long periods.

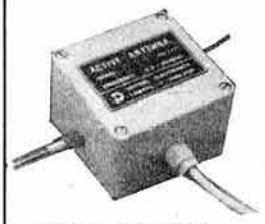
Sixty-four tones in the range from 1747 to 2330 Hz are selectable by a DIL switch and a built-in notch filter removes the tone from received signals.

Model PTS-1 is built to high standards using 9 ICs on a glass fibre PCB. A full data sheet is now available.

Unit price: £39.99 + VAT (£45.99 inclusive) (Note – a unit is required for each radio in the group).

NOTE: All transmissions must be identified as required by licence conditions.

COMPACT RECEIVING ANTENNAS MODELS AD270/370



MODEL AD270/370

Datong Active Antennas solve the age-old problem of finding space for a 'good' receiving aerial.

Model AD370 mounted on a roof top or Model AD270 in a loft will give similar sensitivity to much larger conventional aerials yet are only 2½ and 3 metres long respectively.

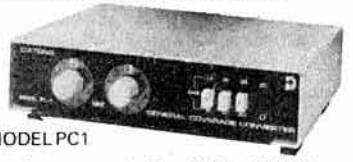
Moreover they do not suffer from interference picked up by the feeder cable; such pick-up can be a problem with conventional dipoles because it is hard to maintain good balance over a band of frequencies.

Although active antennas were introduced to the amateur market by Datong only a few years ago they have long been used by military and commercial receiving stations. The performance specifications achieved by the Datong AD270/370 are very close to those of "professional" active antennas selling for ten times the price – a point which is not lost on our many professional customers.

The advanced design ensures two things: that you don't miss signals through inadequate sensitivity and that the antenna does not invent signals which are not there.

Datong Active Antennas represent an advanced solution to a common problem and so far as we know have no serious competition in terms of performance at the price. (Reviewed in Rad. Com., June 1982).

GENERAL COVERAGE RECEIVER CONVERTER MODEL PC1



MODEL PC1

Once upon a time it was the norm to use a ten metre receiver to receive the two metre band. Now, large numbers of special purpose two metre SSB rigs are in use and conversion the other way becomes a very attractive possibility.

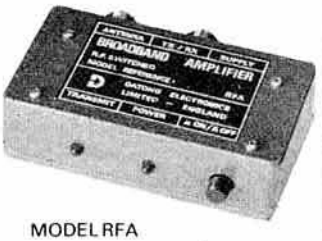
With the addition of Model PC1 each of these two metre SSB rigs becomes a really good general coverage receiver (from 50 kHz to 30MHz!).

Two metre SSB rigs are not cheap and it makes good sense to get the most out of them. They also tend to have very good performance in terms of sensitivity, selectivity, and big signal handling. Each of these features is just as vital for short wave reception and Model PC1 is designed not to degrade them at all. The result, your two metre SSB rig receives below 30 MHz as well as it receives on two metres. And compared to many medium cost general coverage sets, that is saying a lot!

Try this test. Listen on twenty metres after the band goes dead in the evening. With many general coverage receivers the band never dies. It remains populated with phantoms generated by the receiver from the many very strong signals on forty metres. This is the kind of effect that the higher quality receivers minimise, and that goes for PC1 plus a good two metre rig. Reviews: Rad. Com., April 1982,

BROADBAND PREAMPLIFIER

MODEL RFA



MODEL RFA

Model RFA is designed to improve slightly 'deaf' receivers within the range 5 to 200 MHz. It includes r.f. activated in/out switching so that it can be used to improve the sensitivity of low power transceivers (less than 20 watts PEP) simply by connecting it in series with the aerial.

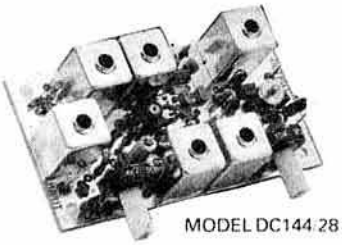
Most receivers have nearly adequate sensitivity. Adding Model RFA will give a useful improvement in signal-to-noise ratios without causing too easy overload on strong signals. The gain is fixed at 9 dbs for this reason.

Conventionally most preamplifiers have been designed for single narrow frequency bands. By using modern broadband techniques wide coverage is achieved without compromising the noise performance.

Model RFA is ideal for improving VHF scanners, HF receivers, mobile radio systems as well as for use on fixed amateur bands such as the 14, 21, 28, 56, 70 and 144 MHz bands.

HIGH PERFORMANCE 2 METRE CONVERTER

MODEL DC 144/28



MODEL DC144/28

Again strong signal performance is the key to the design of Model DC144/28.

Where conventional converters use a dual gate mosfet as a mixer, the Datong uses a balanced pair of Schottky diodes fed with nearly 10 mW of local oscillator at 116 MHz.

Where other converters use open wound coils, the Datong coils are in screening cans on a plated through board.

The result: an unusual freedom from spurious signals and overload effects together with a spurious-free dynamic range of 90 dbs.

As the Rad. Com. reviewer wrote "With a 3 db noise figure and 90 db dynamic range the Datong DC144/28 is one of the best 144 MHz converters currently available", Rad. Com., April 1982.

Model DC144/28 is available either as a tested PCB module, as illustrated, or fully cased in a diecast aluminium box.

DATONG ELECTRONICS LIMITED

PRICES All prices include delivery in U.K. basic prices in £ are shown with VAT inclusive prices in brackets

FL3	112.50	(129.37)	AD370	56.00	(64.40)	Codecall		
FL2/A	34.00	(39.67)	AD270+MPU	45.00	(51.75)	(Linked)	28.00	(32.20)
FL1	69.00	(79.35)	AD370+MPU	60.00	(69.00)	Codecall		
FL2	78.00	(89.70)	MPU	6.00	(6.90)	(Switched)	29.50	(33.92)
PC1	119.50	(137.42)	DC144/28	34.50	(39.67)	Basic DF System	149.00	(171.35)
ASP	72.00	(82.80)	DC144/28			Basic Mobile		
VLF	26.00	(29.90)	Module	28.00	(32.20)	DF System	159.00	(182.85)
D70	49.00	(56.35)	Keyboard Morse			Complete Mobile DF		
D75	49.00	(56.35)	Sender	119.50	(137.42)	System	214.00	(246.10)
RFC/M	26.00	(29.90)	RFA	29.50	(33.92)	PTS1	39.99	(45.99)
AD270	41.00	(47.15)	See previous advertisement or price list for further details.					

Data sheets on any products available free on request – write to Dept R.C.

DATONG ELECTRONICS LIMITED

Spence Mills, Mill Lane, Bramley, Leeds LS13 3HE, England. Tel: (0532) 552461

ALL DATONG PRODUCTS ARE DESIGNED AND BUILT IN THE U.K.

AMATEUR RADIO EXCHANGE

There's a lot of talk among the radio fraternity about "grey imports," but what does this term really mean?

To the UK distributors of TRIO and ICOM it means enterprising retailers by-passing them and purchasing direct from overseas sources. (The YAESU situation is somewhat different as there are two importers in healthy competition.)

To you, the customer, cutting out the monopoly middle-man in this way means quite simply lower prices, of which more later. It also means choice – the ability to come to one showroom and try out **all** the rigs on the market side by side, and then select the one that's right for you, rather than having some salesman push a particular make because that's the one he's "authorised" to sell.

Sometimes you may hear doubts expressed about the suitability for UK use of "non-approved" imports, or about after-sales service on them. Well, if you're buying from us ... relax. We haven't become London's leading Amateur Radio store by selling **anything** that's not serviceable, or by giving your repair to the first likely lad to walk in clutching a soldering iron!

We think that TRIO for example is great stuff. That's why we've always tried to have as much of it passing through our doors – back or front! – as possible, but at prices that are fair on the customer, like these ...

TS-530S Good value at £537. Even better value at £489 here.
TS-830S Why pay £678 when you can buy it from us for just £599?

Our very first advertisement – in RAD COM for November 1976, for those who keep such things – invited readers to display their surplus equipment for sale on a commission basis, and ever since secondhand sales have been an important and integral part of our business.

Now we are proud to announce out new Central Computer facility for instant matching of buyers and sellers of secondhand gear. No need to part-exchange it, or bring it to the shop, unless you're a coffee addict! Just phone us with the details, which we then enter into our computer, at a normal charge of just £10 per item.

All enquiries for a particular type or make of equipment are answered by mailing out the relevant entries in the electronic store, after which it is up to the two parties concerned to get in touch and negotiate their deal.

So, if you have things you want to sell really fast, phone us now on our direct Central Computer line – **01-992 5789** – and take advantage of our opening stockbuilding offer... a special low listing charge of only **£8** per item entered for the month of February only.

Imagine a totally portable computer that slips into your briefcase, incorporating an LCD screen, full typewriter keyboard, printer and microcassette, and runs on its own power supply for use anywhere.

Well, EPSON did... and it's here in stock now, the fabulous HX-20 with 16k RAM optionally expandable to 32k and 32k ROM expandable to 64k, RS-232C and serial interfaces. Its full-size ASCII typewriter keyboard and five programmable keys bring ten separate programme functions to your fingertips, and its built-in 50-hour PSU is rechargeable overnight and incorporates the ability to retain its memory in RAM even when switched off. Technical features of special interest to the amateur are:

	RS-232C Interface	Serial Interface
1. Connector	DIN (8-pin) TCS 4480	DIN (5-pin) TCS 4450
2. Input and output levels	RS-232C standard	RS-232C standard
3. Transfer speed	110, 150, 300, 600, 1200, 2400, 4800 bps (selectable by operator)	38, 150, 400, 600, 4800 bps (selectable by operator)

All this from about £462

MORE OVER PAGE!

AMATEUR RADIO EXCHANGE

FRG-7

YAESU's evergreen communications receiver giving continuous coverage from 500kc to 30MHz on AM/SSB/CW. Still the best value for money in the market... and even better value from us at

only £169 including FREE Heliscan aerial.

What are we keeping under wraps?

Could it perhaps be the new YAESU FT-726 VHF base station transceiver... the one we've all been waiting for since they dropped the FT-221R and the FT-225RD?

So new that we do not yet have a photo, but we do know the main specification points and the price – **£649.**

- Triple-band operation on 4m or 6m, 2m and 70cm.
- Plug-in RF heads for each band available separately.
- 2 VFOs • 10 memories • 20Hz resolution on CW and SSB.
- IF shift and width control. • Programmable offset for duplex.

FT-980

Yaesu's latest HF transceiver, which fits neatly into their range between the FT-102 and the FT-ONE... and is an obvious competitor for the mythical (or merely elusive?) Trio TS-930.

Features like general coverage receive, notch filter, pass-band tuning and IF shift will make this rig a top-of-the-market bargain at a price yet to be announced but which we anticipate will be not a million miles from **£925**

IC-720A

Introduced a year ago, this superb HF rig from ICOM has become a firm favourite because of its remarkable general coverage receive capability from 100kc to 30MHz, plus transmit facility across its entire range for commercial purposes.

OUR PRICE £849

IC-740

The latest addition to the ICOM transceiver range, this gives all mode coverage – AM/CW/SSB/FM – right across the amateur bands from 1.8 to 30MHz.

Incorporating such features as IF shift, pass-band tuning and notch-filter as standard, this is one rig that has to be seen and tried by anyone in the market for a really top-quality base station.

OUR PRICE £669

IC-R70

Presenting the best in today's receiver technology from ICOM, featuring:

- Two VFOs • Frequency range 100kc – 30MHz
- Three IFs 70MHz/9MHz/455kHz • HF pre-amp
- Sensitivity 0.5 μv AM – 0.32 μv S/N 12dB

All this... and much more... for £469

It's always been our policy to offer our customers the widest choice of amateur radio receivers and transmitters to be found under one roof anywhere in the UK **plus** the facility to try them out, one against the other, to find the one that's right for you.

Well, now we're doing the same with communication terminals for decoding RTTY, CW, ASCII and AMTOR. Where else will you find complete ranges of decoders by AEA, MICRODOT, MICROWAVE MODULES, TASCO – TELEREADER and TONO at prices starting from £175 for receive-only up to £700 for top-of-the-range receive-and-transmit equipment like the CWR-685 as illustrated?

One item you certainly won't find in many other places is the unique British-made ICS AMTOR decoder for which we have just been appointed the sole London retailers!

LICENSED CREDIT BROKERS * Ask for written quotation on HP terms. Also interest-free terms with 50% deposit.

BARCLAYCARD VISA

All prices include VAT and are correct as we go to press. However, we reserve the right to vary them if forced to do so by the time this advertisement appears.

CREDIT CARD SALES BY TELEPHONE.

Rapid mail order dispatch, with FREE carriage by insured Post or Securicor within the UK mainland.

YAESU

FT980CAT	**NEW** all-mode transceiver with AM/CW/FM/SSB/AFSK	P.O.A.
FT 102	160-10M 9-Band Transceiver **NEW**	775.00
FT ONE	Gen. Coverage Transceiver **NEW**	1345.00
FT 790R	70cm all-mode portable **NEW**	329.00
FT 101ZFM	160-10m 9-Band Transceiver	590.00
FT 101ZDFM	160-10m 9-Band Transceiver	665.00
DIGT 1012	Digital unit	90.00
DCT 101Z	DC Adaptor	42.50
FV 101Z	Remote vfo	112.00
FT902DM	9-Band AM/FM Transceiver	795.00
FC 902	9-Band atu, swr/pwr etc	135.00
FTV 901R	Transverter fitted 2m module	285.00
430 TV	70cm module for above	185.00
144 TV	2m module for Transverter	100.00
70 TV	4m module for Transverter	80.00
FV 901DM	Remote vfo for 901	260.00
SP 901	External speaker	31.00
FL 2100Z	9-Band 1200W linear	445.00
FT 70/	8-Band solid state 100W	499.00
FP 707	230 volts AC power supply	125.00
FC 707	Aerial tuner (unbalanced only)	85.00
MR7	Metal rack for above	15.70
MMB 2	Mobile mounting bracket	16.00
FRG 7	0.5-30MHz receiver	169.00
FRG 7700	SSB/AM /FM recvr. dig. readout	299.00
MEM 7700	Memory unit for above	90.00

CONVERTERS FOR ABOVE

FRV 7700A	118-150MHz	69.75
FRV7700B	50-60MHz & 118-150MHz	75.50
FRV 7700C	140-170MHz	65.95
FRV 7700D	70-80MHz & 118-150MHz	72.45
FRT 7700	Receiver aerial tuner	37.85
FF 5	LF filter for above	9.95
FT 480R	2m all-mode transceiver	379.00
FP 80A	230V AC power supply	63.00
FT 780R	70cm all-mode transceiver	399.00
FT290RD	**SPECIAL** 1983 version with ARE mods and 3SK87 f/end	259.00
NC 11C	AC charger	8.00
CSC-1	Carrying case	3.45
MMB-11	Mobile mounting bracket	22.25
FT 208R	2m synthesized portable FM	199.00
NC 9C	AC charger	8.00
FT 708R	70cm hand-held	209.00

TRIO-KENWOOD

TS430S	Gen. coverage multi-mode	P.O.A.
TS 930	Gen. coverage transceiver **NEW**	P.O.A.
TS 830S	160-10m transceiver 9 bands	P.O.A.
YK 88C	500Hz CW filter	29.60
YK 88CN	270Hz CW filter	32.60
TS 530S	160-10m trans 200w pep digital	489.00
TS 130S	8-band 200W pep	499.00
TS 130V	8-band 20W pep	445.00
AT 130	100W antenna tuner	79.00
TR 2300	2m FM synthesised portable	166.75
TR 2500	2m FM synthesised handheld	207.00
HC 10	Digital desk World Clock	58.75
DM 801	Dip meter	60.00
TR 7730	New 25W FM transceiver	247.00
R 600	Gen. coverage receiver	212.00

ROTATORS

KR 250	Kenpro Lightweight 1-1½" mast	48.00
9502B	Colorotor (Med. VHF)	56.60
KR 400RC	Kenpro—inc. lower clamps	109.00
KR 600RC	Kenpro—inc. lower clamps	149.00

ICOM

IC 740	Multimode H.F. transceiver **NEW**	669.00
IC 720A	HF transceiver and gen. cov. rec.	849.00
IC 730	HF mobile transceiver 8-band	625.00
IC R70	New multimode receiver	469.00
PS 15	Power supply for 720A	99.00
IC 251E	2m multimode base station	539.00
IC 25E	2m synth compact 25W mobile	259.00
IC 290E	2m multimode mobile	366.00
IC 24G	2m FM mobile 10w	169.00
IC 2E	2m FM synthesised handheld	169.00
IC 4E	70cm handheld	199.00
ICL1/2/3	Soft cases	3.50
IC HM9	Speaker/microphone	12.00
IC CP1	Car charging lead	3.20
IC BP2	6V Nicad pack for IC 2E	22.00
IC BP3	9V Nicad pack for IC 2E	17.70
IC BP4	Empty case for 6 X AA Nicads	5.80
IC 8PS	11.5V Nicad pack for IC 2E	30.50
IC DC1	12V adaptor pack for IC 2E	9.50

MICROWAVE MODULES

MMT 144/28	2M Transverter for HF Rig	109.95
MMT 432/28S	70cm Transverter for HF Rig	159.95
MMT 432/144R	70cm Transverter for 2m Rig	184.00
MMT 70/28	4m Transverter for HF Rig	115.00
MMT 1296/144	23cm Transverter for 2m Rig	184.00
MML 144/30LS	2m 30W linear Amp (3WI/P)	69.95
MML 144/50S	2m 50W linear amp (10W1/P)	85.00
MML 144/100S	2m 100W linear Amp (10W1/P)	139.95
MML 432/20	70cm 20W linear Amp (3W1/P)	85.00
MML 432/50	70cm 50W linear Amp	109.95
MML 432/100	70cm 10/100W linear Amp	228.65
MM 2001	RTTY to TV converter	189.00
MM 4001	RTTY transceiver	269.00
MM 4000KB	RTTY transceiver with keyboard	299.00
MMC 50/28	6m converter to HF Rig	29.90
MMC 70/28	4m converter to HF Rig	29.90
MMC 144/28	2m converter to HF Rig	29.90
MMC 432/28S	7cm converter to HF Rig	37.90
MMC 432/144S	70cm converter to 2m Rig	37.90
MMC 435/600	70cm ATV converter	27.90
MMK 1296/144	23cm converter to 2m Rig	69.95
MMD 050/500	500MHz dig. frequency meter	75.00
MMD 600P	600MHz prescaler	29.90
MMDP 1	Frequency counter probe	14.90
MMA 28	10 meter pre amp	16.95
MMA 144V	2m RF switched pre amp	34.90
MMF 144	2m band pass filter	11.90
MMF 432	70cm band pass filter	11.90
MMS 1	The morse talker	115.00
MMS 2	Advanced morse trainer	169.00

MORSE EQUIPMENT

MK 704	Squeeze paddle	10.50
HK 707	Up/Down key	10.50
EK 150	Electronic keyer	74.00

MOBILE SAFETY MICROPHONES

ADONIS AM202S Clip on	20.95
ADONIS AM202F Swan neck + up/dwn bttns	30.00
ADONIS AM202H Head band + up dwn bttns	30.95

DRAE

FULLY PROTECTED POWER SUPPLIES

4 amp	30.75	6 amp	49.00
12 amp	74.00	24 amp	105.00
VHF Wavemeter	130 450MHz		27.50
Morse Tutor			49.00

DATONG

PC1	Gen. Cov. Converter HF on 2m	137.42
VLF	Very Low Frequency Converter	29.90
FL1	Frequency Agile Converter	79.35
FL 2	Multi-mode Audio Filter	89.70
FL 3	FL 2 with auto notch **NEW**	129.37
ASP	Auto R.F. Speech Clipper (Trio or Yaesu plug)	82.90/89.70
D 75	Manually controlled R.F. Speech clipper	56.35
RFC/M	R.F. Speech Clipper Module	29.90
D 70	Morse Tutor	56.35
AD 270	Indoor Active Filter (inc. PSU)	54.05
AD 370	Outdoor Active Filter (inc. PSU)	71.30
MK	Keyboard morse sender	137.42
PTS1	Programmable tone squelch system (two units)	45.99
RFA	Wideband preamplifier	33.92
MPU	Mains Power Unit	6.90

BENCHER

BY 1	Keyer Paddle (black base)	32.00
BY 2	Keyer Paddle (chrome base)	39.95
BY 3	Keyer Paddle (gold plated)	92.00
ZA 1A	Balun 3·5-30mHz for dipoles	12.65
ZA 2A	Balun 14-30MHz for beam ant	13.80

TONO

THETA 9000E	RTTY/CWASC11	669.00
THETA 550	The latest—a winner!	299.00

AMPLIFIERS

UC 70	430MHz 55W + preamp	159.00
2M-50W	144MHz 30-50W	69.00
2M-100W	144MHz 100W + preamp	129.00
MR 150W	144mHz 130-150W + preamp	159.00
MR 250W	144MHz 250W + preamp	325.00

MUTEK

SLNA 144s	144MHz switched pre-amp	33.90
SLNA 144u	Unswitched version of above	20.38
SLNA 144ub	Unboxed version of SLNA 144u	12.41
TLNA 432s	432 MHz 1·4dB NF/13dB gain switched pre-amp	54.90
TLNA 432u	Unswitched version of above	26.40
TLNA 432ub	Unboxed version of TLNA 432u	18.50
BLNA 432ub	1·3dB NF/13dB gain sub-mini 432MHz pre-amp	12.43

TASCO

TeleReader CWR 685 RTTY/CW/ASC11	769.00
TeleReader CWR 670E As above RX only	289.00
MorseMaster CWR 600 As above basic unit	189.00

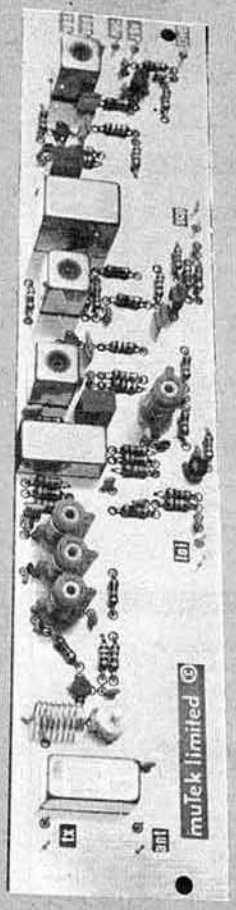
WELZ

SP 200	1·8-160MHz 20W-200W-1KW	61.95
SP 300	1·8-500MHz 20W-200W-1KW	85.00
SP 400	130-500MHz 5W-20W-150W	61.95
SP15M	1·8-150MHz 0-2·5-20-200W	32.00
SP 380	1·8-500MHz 20W-200W **NEW**	49.00
AC 38M	8 band ATU 400W	59.95
CT-15A	DC-450MHz dummy load	6.95
CT-15N	As above N-type socket	11.95
CH 20A	DC-450MHz coax switch SO239	15.95
CH 20N	As above—N type sockets	23.95

373 UXBRIDGE ROAD, ACTON, LONDON W3 9RH
Tel: 01-992 5765/6/7 *Just 500 yards east of Ealing Common station on the District and Piccadilly Lines, and 207 bus stops outside*

136 GLADSTONE STREET, ST HELENS, MERSEYSIDE
Tel: 0744 53157 *Our North West branch run by Peter (G4 KKN), just around the corner from the Rugby Ground.*

Closed Wednesday at Acton and Monday at St Helens, but use our 24-hour Ansafone service at either shop



For some time we've had people worrying us to produce a replacement front-end for 144MHz transceivers other than the FT221/225 series. Finally we've done it! Our new front-end for Icom's IC251 and 211 series transceivers offers all the performance improvements associated with the well established RPCB 144ub plus some others!

The circuit now includes an integral inert gas-filled relay to eliminate the losses associated with Icom's diode antenna changeover circuit and an improved mixer post-amplifier using a combination of noiseless and resistive feedback technologies for improved strong signal performance on today's crowded 144MHz band. Other features include a signal path using a class-1 diode ring mixer and a six pole crystal filter.

Fitting is not quite as straightforward as for the RPCB 144ub but should be within the capability of most people who can use a soldering iron competently! For those who'd rather somebody else do the work, both Thanet Electronics and Amateur Radio Exchange are offering fitting services. Contact them for details.

RBCB 251ub £69.90 inc VAT

GFBA 144e 144MHz Masthead Amplifier

For some time now we've had a stream of requests for a masthead mounting 144MHz preamplifier. To be honest its not a project which we've been ecstatic about as the mechanical and environmental aspects of the engineering aren't exactly trivial. Also our feelings about the type of Ina needed to withstand the trials and tribulations of a masthead existence were that something rather special was needed and that particularly in the area of signal handling we could do something rather better than our existing range.

We've done it! The GFBA 144e uses an advanced negative feedback circuit topology around a professional grade gasfet. This gives a combination of very low noise figure with superb dynamic performance. The relays are rather more substantial than those used in most of the imported competition whilst the use of expensive polycarbonate housing ensures that the amplifier won't corrode to oblivion over the years.

We supply the GFBA 144e complete with its matching interface box. It's not particularly cheap—but then good engineering never is—and we suspect that we'll have a waiting list. Please ring or write for a data sheet.

SLNA144s —rf switched 144MHz preamplifier — 0·9dB noise figure/15dB gain typical **£33.90**

As various reviewers have commented, our SLNA144s is a very fine preamp for the 144MHz band. It has been designed to complement most current transceivers—having the right combination of noise and gain parameters to ensure that the overall receiver sensitivity is limited by external factors such as sky and ground noise. Its dynamic performance is such that the following receiver will normally be the limiting factor with regard to large signal handling whilst the superb bandpass filtering will provide a substantial degree of protection against out of band signals.

The SLNA144s has been designed from the start as a preamplifier not as an afterthought to increase the sales appeal of a power amplifier.

Each sample is individually tested by people who understand the design in a pretty fundamental manner. This results in what we still consider to be the best product of its kind available.

THE RANGE		£
SLNA 70s	70MHz switched preamplifier	33.90
SLNA 70u	Unswitched version of the SLNA 70s	20.38
SLNA 70ub	Unboxed SLNA 70u	12.41
SLNA 144s	144MHz switched preamplifier	33.90
SLNA 144u	Unswitched version of the SLNA 144s	20.38
SLNA 144ub	Unboxed SLNA 144u	12.41
TLNA 432s	432MHz 1·4dB nf/13dB gain switched preamplifier	54.90
TLNA 432u	Unswitched version of the TLNA 432s	26.40
TLNA 432ub	Unboxed TLNA 432u	18.50
BLNA 432ub	1·3dB nf/13dB gain sub-min 432MHz preamplifier	12.43
GLNA 432u-1	432MHz gasfet unswitched preamplifier .8dB nf/13dB gain	46.90
GLN 432u-2	.65dB nf/13dB gain	56.90
GLNA 1296u	1.3GHz gasfet unswitched preamplifier 0.75dB nf/20dB gain	85.25
HDRA 95u-1	1.5dB nf/8.5dB gain professional Band II high dynamic range (i/p intercept +22dBm) preamplifier	29.90
HDRA 95u-2	11.5dB gain variant (i/p intercept + 16dBm)	29.90
BBBA 500u	20-500MHz broadband high dynamic range preamplifier	26.40
BBBA 860u	250-860MHz broadband low-noise preamplifier	20.50
XBPF 700ub	Band IV-V tvi filter (a true bandpass on microstrip!)	2.95
PPSU 112	Preamplifier (12V nominal) mains power supply	6.90
CISA 001	SO239 to BNC male adapter—if you must!	1.60
RPCB 251ub	IC251/IC211 front end board	69.90
RPCB 144ub	FT221/225 replacement front-end board—the one and only!	64.50

We also have antenna combiners for 144, 432 and 1296 MHz; dish semi-kits (1.2m & 1.6m) for 1.2 and 2.3GHz and a 125W 1.3GHz linear!!! Please ring.

All prices include 15% VAT. Postage on all items (unless otherwise indicated) is now £1.00 inc. VAT.

muTek limited — the rf technology company

Bradworthy, Holsworthy, Devon EX22 7TU (0409 24) 543

Access BARCLAYCARD VISA

ROBOT '400'

This **FABULOUS SSTV SCAN CONVERTER** with 64K of random access memory will enable you to receive and/or send TV pictures all over the world using your normal (completely unmodified) receiver or transceiver and a TV monitor. Remember there are now over 14,000 SSTV stations in operation from well over 130 countries and more being added every day. Don't miss out on all the fun. At only **£666** including VAT & Securicor delivery the '400' is outstanding value.

Send 19p stamps for full details of ROBOT gear

AERO & GENERAL SUPPLIES

Building 33, East Midlands Airport, Castle Donington, Derby DE7 2SA. Tel: (0332) 812446 (24hrs)

Special prices on surplus equipment

Eddystone Receivers 770R(VHF) 770U(UHF) £135. Model 830 £150. 730/4 500KH-30MHz in 5 bands £145. All in excellent condition. Carr. £10.

Pye Bantams High band AM untested less xtal and batt. £22. With xtal and batt tested £30. **Avo Valve Testers** £25. **Avo Multiminors** Tested and guaranteed £23. **New 28 Range Digital Mutimeters** £40.75. **PCR Receivers LW/MW/SW with built in mains PSU tested £45. Untested less PSU £25. 12' Whip aerials** £4 p and p £1.50. **Various,** Single and double beam oscilloscopes, signal generators, valve testers, output meters etc **in stock.**

Surplus Circuits new book containing many circuits and notes on various surplus receivers transceivers etc £6.50. Send 50p for **fully illustrated catalogue** (includes £1 voucher). Over 500 sets in stock. **Avos, amateur rigs wanted for cash.**

Weirmead Limited. 129,St Albans Road, Watford Herts WD1 1RA.
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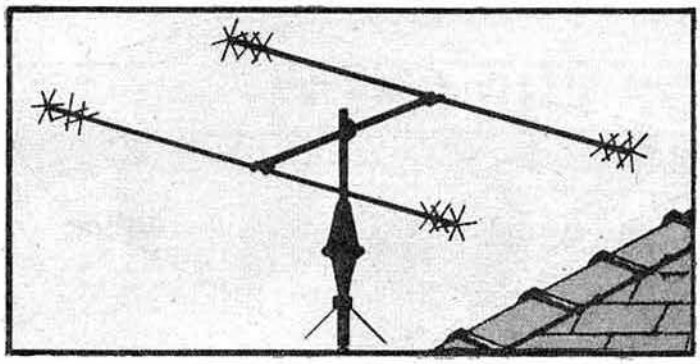

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PIN RF Switch	PSI 433	9.10	7 75
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FM Receiver	144FM2R	64.35	45.76
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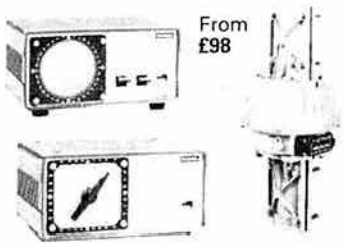

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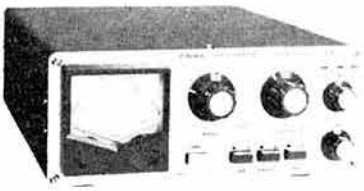

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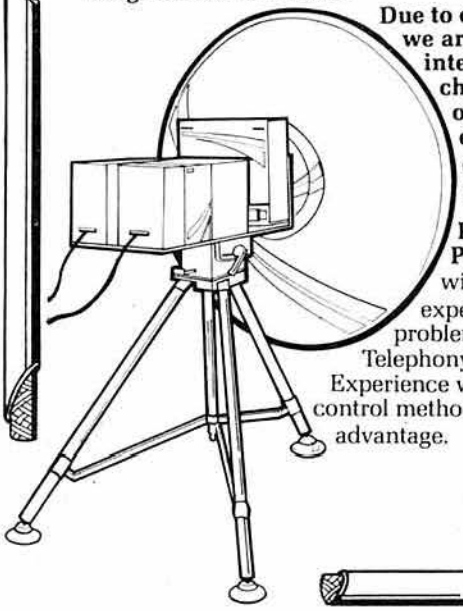

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KSO 65	Stay bearing		18.50
CS 201	2-way switch 0-500MHz		11.98
CS 201N	above w. N sockets		19.00
CS 401	4-way w. SO 239		34.95
RM 940	Infra Red mic.		45.00
CN 520	1·8-60MHz SWR/PWR		32.50
CN 540	50-150MHz SWR/PWR		35.00
RX 110G	2m GaS Fet Preamp	NEW	39.00
RX 430G	70cm GaS Fet Preamp	NEW	63.00
RF 670	RF Speech Proc.	NEW	44.00
FD 30LS	Low pass Filter		11.50
FD 30M	LP Filter HD		19.50

MISCELLANEOUS

CANTENNA Dummy Load	14.95
ARROW 15Amp PSU with meter	82.00
COAX SEAL for sealing antennas etc against weather	20p foot
SWEDISH KEY Brass on Teak beautiful straight key	49.00
VIBROPLEX various types in stock 64MHz minibeam	80.00
Microwave Modules stocked.	
KENPRO KP 100 Keyer	69.00

TET

HB 33SP	3 el. Tri-Bander HF Beam	189.00
MV 3BH	Tri-Band vertical	40.25
MV 5BH	5 Band Vertical	71.25
SQ YO 8	8 el. Quagi 2m	48.96

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YAESU MUSEN

FT-790R
FT-290R
(+FT690R, 6 metres)
MULTIMODE
MULTI-ROLE
VHF/UHF TRANSCEIVERS

MULTIMODE OPERATION
Never before possible from such a compact package, true multimode —USB, LSB, CW & FM—operation is yours to enjoy. With CW and SSB activity at an all-time high, you will not be left out of the satellite or DX action and you can still ragchew on FM simplex or even via a repeater (inbuilt shift and 1750Hz tone burst).

ADVANCED MICRO CONTROL
Advances in microprocessor circuitry allows selectable synthesizer steps, up/down scanning from the microphone, priority channel operation, and ten memories (with memory scan), all called up with fingertip ease.

LCD DISPLAY
A large, newly developed Liquid Crystal Display provides readout of the operating frequency, and an indication of a number of the control functions. It is highly readable under conditions of bright sunlight and is backed up by a lamp for night-time operation.

PROGRAMMABLE SYNTHESIZER
The optimum synthesizer steps for SSB/CW or FM operation are very different. That's why Yaesu gives you the flexibility of two synthesizer steps per mode: 100Hz or 1kHz per step on SSB and CW, and 12½/25kHz (2m), 25/100kHz (70cm). When changing modes from SSB/CW to FM, your transceiver is automatically set to the nearest standard channel when you start scanning or tuning.

TEN MEMORY CHANNELS
As many as ten frequencies may be stored into memory, for instant recall. The priority feature allows you to check a favourite frequency every few seconds, with automatic halting (FM mode) when the channel is clear or busy, as desired. Memory backup is provided by a built-in lithium cell, with an estimated lifetime of five years.

DUAL VFO SYSTEM
These transceivers feature a digitally synthesized dual VFO system which provides tremendous flexibility in day to day operation. For example, one VFO may be set up in the SSB portion of the band, and the other in the FM sub-band, for immediate QSY when changing modes.

CONVENIENT FEATURES
Among the many features adding to the convenience of the transceiver is a supplied portable antenna, a high-performance noise blanker, a high/low power switch, and a battery condition meter. A clarifier (offset tuning) allows you to follow unstable or Doppler-shifted signals.

FT690R
In addition to the two metre and 70 centimetre units detailed here, the FT690R six metre (50-54MHz) transceiver completes *for the time being*, the range. The general specifications are similar but modes are USB-CW-AM-FM, power is 2½W PEP [0.8W AM—for which a 4kHz filter is fitted]. Further details on request.

GENERAL FEATURES

Modes of operation:
SSB (USB, LSB) CW & FM
Frequency response:
300-2,700Hz @ −6dB
Carrier Suppression:
Better than −40dB
Sideband Suppression:
Better than −40dB
FM Deviation:
±5kHz (max)
Tone burst frequency:
1,750Hz
Selectivity:
SSB/CW: 2.4kHz @ −6dB
4.1kHz @ −60dB
FM : 14 kHz @ −6dB
25 kHz @ −60dB
Image rejection:
Better than −60dB
Audio output:
1 Watt @ 10% THD
Audio output impedance:
8 Ohms
Dimensions:
58H × 150W × 195D mm
1.3kg (without cells)

Power requirements:
8 × C size dry cells
8 × C size Nicad cells
External 8.5-15.2VDC
Memory backup: Lithium cell
Microphone:(YM47 supplied)
600 ohms ppt with scan
ACCESSORIES
YM49
Remote speaker mic
YM50
DTMF keyboard mic
MMB11
Mobile mounting bracket
FL2010
2 metre 10W amplifier
FL7010
70cms 10W amplifier
CSC1A
Vinyl carrying case
NC11C
Battery charger
FLC11
H.D. Leather case
YHA15
Helical antenna (FT290R)

FT-290R

Frequency coverage (MHz):
144-146 or 144-148
Synthesizer steps:
SSB/CW: 100Hz/1kHz
FM : 12.5/25kHz
Current consumption:
70mA receive
800mA Tx (2.5 W RF FM)
Antenna:
SO239 on rear
Telescopic ¼ Wave supplied
RECEIVER
Intermediate frequencies:
1st IF 10.81MHz
2nd IF 455kHz (FM)
Sensitivity (better than):
SSB/CW: 0.5μV for 20dB S/N
FM : 0.25μV for 12dB SINAD
TRANSMITTER
Power Output:
2.5 Watts at 12VDC
Spurious radiation:
Better than −60dB
Repeater split:
600kHz (+ and −)

FT-790R

Frequency coverage:
430-440MHz
Synthesizer steps:
SSB/CW: 100Hz/kHz
FM : 25/100kHz
Current consumption:
100mA receive
750mA Tx (1W RF FM)
Antenna:
BNC on top panel
¼ Wave flexi supplied
RECEIVER
Intermediate frequencies:
1st IF 67.3MHz
2nd IF 10.7MHz
3rd IF 455kHz (FM)
Sensitivity (better than):
SSB/CW: 0.16μV for 10dB S/N
FM : 0.25μV for 12dB SINAD
TRANSMITTER
Power Output:
1 Watt at 12VDC
Spurious radiation:
Better than −50dB
Repeater split:
1.6MHz (input listen)

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Printed in Great Britain for the RADIO SOCIETY OF GREAT BRITAIN, Alma House, Cranborne Road, Potters Bar, Herts EN6 3JW
by E T Heron & Co Ltd, Silver End, Witham, Essex