October 1983

RADio COMmunication

AMATEUR RADIO IN SPACE

The space shuttle *Columbia*, which is due to take off for a six-day flight on 28 October during which Dr Owen Garriott, W5LFL, hopes to make contact with other radio amateurs around the world. See page 872 in this issue for more details. *Photo:* NASA

Journal of the Radio Society of Great Britain

RSGB

ANNEE MONDIALE DES COMMUNICATIONS
WORLD COMMUNICATIONS YEAR
AÑO MUNDIAL DE LAS COMUNICACIONES
1983

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Here is a little General Coverage gem that **does it all and has it all** – Usual high consideration for the SSB man and – Lo and behold **total consideration for the CW man** – if you are into both you're on to a real winner – Look closely – no extras! Everything you'll need already installed. **Full Break In – CW Filter – Iambic keyer** – 25 Khz marker – IF/Shift width – Noise blanker – Switchable AGC and RF preamp plus a lot more including **AM and FM fitted as standard. Twin V.F.O's,** RX coverage 150kHz to 29.999 MHz – **transmit 160 to 10 metres with a commercial version** also available. Dimensions 238 x 98 x 238 mm and weighing only 4.5Kg – A real smash at a price you're going to like – send or call for full details and price. Tel: 01-422 9585.

YAESU FT102 9 Bander.

See the reviews on this rig and call us...we'll tell you some more.

ICOM 745/751/271

Three new ones just around the corner, two HF general coverage transceivers and one VHF base for 2M, stock should be with us by the time you read this, call 01-422 9585 for more information.

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Available while they last, complete with FC902 ATU at £649.

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Bob and Stan called us soon after we delivered, Bob said "At last a rig that does it all and does it right", Stan doesn't say a lot, "Magic" was his only comment.

ICOM 740 9 Band Transceiver

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OCTOBER 1983

VOLUME 59 No 10

RADio COMmunication

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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.

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We here at TRIO-KENWOOD have over the years developed a range of equipment designed by our professional engineers for you the active radio amateur. Our products range from the top notch TS930S HF amateur band transceiver to the smallest accessory. Each piece of equipment is specifically designed with the requirements of you, the radio amateur in mind. It has always been our policy at TRIO-KENWOOD to improve the specification and reliability of equipment by listening to the valuable comments of radio amateurs all over the world. The important relationship between yourself, the radio amateur and TRIO-KENWOOD is through our authorised distributor for the UK, LOWE ELECTRONICS LTD.

We give below a list of approved dealers in the UK. Any dealer not on this list has no connection with the UK distributor network and has no direct factory backing. Great care should be taken when purchasing your amateur radio equipment, to ensure that the dealer is factory approved. In any case, first contact our sole distributor for the UK: Lowe Electronics Ltd., who will be pleased to advise you of your nearest dealer.

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Tel: Belfast 647570

Although transceivers intended for mobile operation have kept pace with electronic technology and have incorporated the latest in operating facilities, there has always been the problem of where to install them in today's compact cars. With this difficulty in mind TRIO have concentrated on the size of the mobile transceiver and its relationship to performance. Certain brand new concepts in mobile transceiver design have been the result. These fresh ideas have been applied by TRIO to not one new transceiver but two; the TM201A for two metres and the TM401A for the seventy centimetre enthusiast – two new rigs for the mobile operator.

* By removing the internal speaker, TRIO have gained in two important ways, the overall size of the new rig is reduced to the minimum, 5⅞W x 1⅞H x 7⅛D (inches approx.) and the quality of receiver audio produced by the now separate speaker (77mm diameter) is extremely high. (The separate speaker is not an optional accessory but is included in the purchase price of the rig).
* The TM201A two metre transceiver produces 25 watts, the TM401A seventy centimetre version 12 watts, in the low power position the rigs give 5 and 1 watt respectively.
* Dual digital VFO's covering the full two metre band for the TM201A and the entire 10 MHz of the seventy centimetre band for the TM401A are provided, selection of the required VFO being by a front panel switch. On the TM201A VFO A tunes in 25KHz steps, VFO B in 5KHz steps and on the TM401A both A and B VFO's tune in 25KHz steps. Control of the VFO's is either by the front panel knob of the up/down microphone switch.
* Five memories are available, memory 1 holds the priority frequency, memories 2 and 3 are standard memories and memories 4 and 5 hold receive and transmit frequencies independently. An internal lithium battery backs up memory data (estimated 5 year life).
* With the priority alert switch on, once every 6 seconds, whether receiving or scanning the rig checks the frequency in memory channel 1. A dual 'beep' will sound if a signal is present.
* The MS switch initiates memory scan. Memories which hold no frequency data are skipped. Depressing the up/down microphone switch begins band scan, programmable scan is available, the upper and lower frequency limits being those as set in memory 5. In both memory and band scan, scanning stops on a busy channel and automatically resumes after approximately 6 seconds.
* A four digit yellow LED display giving improved visibility under mobile conditions indicates the operating frequency. The MHz decimal blinks whilst scanning and the KHz decimal lights to show that VFO B is being used. A S/RF LED bar meter with separate occupied channel, memory recall, priority alert and 'on air' indicators are also provided.
* The use of a GaAs FET RF amplifier plus an improved antenna switching circuit provides high sensitivity and wide dynamic range.

TM201A..... two metre transceiver ..... £269.00 inc. VAT
TM401A..... seventy centimetre transceiver ..... £299.00 inc. VAT

TRIO

TRIO-KENWOOD CORPORATION

Shionogi Shibuya Building, 17-5, 2-chome Shibuya, Shibuya-ku, Tokyo 150, Japan

TRIO-KENWOOD COMMUNICATIONS, GmbH
D-6374 Steinbach-TS. Industriestrasse,8A West Germany

TR9130 TWO METRE ALL MODE TRANSCEIVER

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

TR9130 . . . **£433.32** inc VAT.

TS780 DUAL BAND BASE STATION TRANSCEIVER

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

TS780 . . . **795.00** inc VAT.

TR7930 TWO METRE FM MOBILE TRANSCEIVER

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

TR7930 . . . **£305.21** inc VAT.

R2000 GENERAL COVERAGE RECEIVER

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

R2000 . . . **£398.82** inc VAT.

TS930S HF TRANSCEIVER WITH GENERAL COVERAGE RECEIVE FACILITIES

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

TS930S . . . **£1216.70** inc VAT.

TR2500/TR3500 HANDHELD TRANSCEIVERS

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

TR2500 . . . **£232.53** inc VAT.

TR3500 . . . **£250.70** inc VAT.

TS530S HF AMATEUR BAND TRANSCEIVER

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

TS530S . . . **£595.00** inc VAT.

TW4000A DUAL BAND FM TRANSCEIVER

I have been waiting for this rig for the last three years, now it is here and I am using one, words fail me. Send for details.

TW4000A . . . **£469.00** inc VAT.

just a part of the range

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in matlock

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Lowe Electronics in Matlock, located on the Chesterfield Road out of Matlock, that is the A632 and open Tuesday to Friday from 9am to 5.30pm (closed for lunch 12.30 to 1.30) and Saturday, open all day from 9am to 5pm. A visit to Matlock can be an outing for the family, the local scenery , the Heights of Abraham, Lovers Walk etc. Ample free parking in our car park and when you have browsed then lunch in one of the town's pleasant restaurants. Amateur Radio with the family in mind.

in glasgow

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Lowe Electronics in Glasgow, located at 4/5 Queen Margarets Road, which you will find off Queen Margarets Drive (take Great Western Road out of the City and turn right at the Botanical Gardens traffic lights). A quiet sedate part of the city, easy street parking and a warm welcome from Sim, our shop manager. Open all day from Tuesday to Saturday, 9am to 5.30pm during the week and 9am till 5pm on Saturday. Whilst in the area the Botanical Gardens are well worth a visit. The Glasgow Shop has a full display of our range of amateur radio products and a stock room to meet your every demand. For your Amateur Radio needs visit Lowe Electronics in Glasgow.

in london

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in darlington

Telephone: 01-837 6702
Lowe Electronics in London, our shop in the Capital City, easily found on the lower sales floor of the Hepworth's shop on Pentonville Road, within 3 minutes walk of Kings Cross railway station. Open all day Monday to Saturday, six days a week, from 9.30am to 5.30pm during the week and from 9.30am to 5pm on Saturday, a warm and courteous welcome, together with sound advice awaits those who enter. The entire range of amateur products is on display, backed by a considerable amount of stock. When in the City, visit Lowe Electronics.

the LS20XE from Belcom

***The rig you will forget you are carrying . . . . .**
With overall dimensions of 140mm high, 69mm wide, 26mm deep and weighing only 260 grams (including aerial and batteries), the LS-20XE fits easily into your pocket giving perfect portable communication.

***Long range communication . . . . .**
A newly developed dual gate MOS FET is used in the RF stage of the transceiver which considerably improves receiver performance. The internal 50mm diameter speaker ensures clear audio under difficult portable conditions.

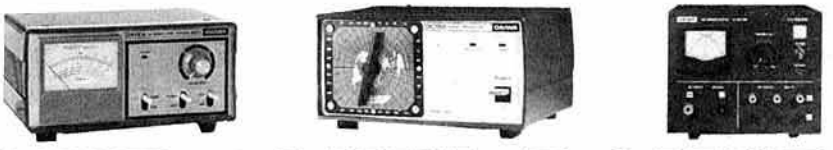
***Full coverage of 2 metre amateur band . . . . . .**
The transceiver covers 144 to 146 MHz in 5 kHz steps and has repeater shift and automatic tone burst.

***Switchable output power for extended operation . . . . . .**
In order to extend portable operation, transmission power level is switchable, 1w, 500mW and 100mW, so depending on the terrain and conditions, the most economical level can be selected.

***Simple to operate . . . . . .**
Simplicity of operation is a special feature of this rig and many optional accessories are available. Of major interest is the matching headset SH-2 having built-in vox, this convenient accessory provides simple and safe operation whilst cycling, walking etc.

AR2001 AM NARROW FM WIDE FM RECEIVER
25 to 550 MHz
send for details.

Why have I been saying that we recommend the **DAIWA** range of equipment? Because I use their products. At the top of my Strumech tower is a DR7600X rotator (£163.49 inc VAT other models available from £113.72 inc VAT). To meter the performance of the system I use either the CN620A (£57.00 inc VAT) or the CN630 (£85.00 inc VAT). To switch linears between the TS780 and the TS700S I have a CS201 (£13.95 inc VAT) two way 50 ohm coaxial switch and to power the 100 watt linear amplifiers on two metres and seventy centimetres the only power supply man enough for the job is the PS300 (30amp max. 22 amp cont. £135.00 inc VAT). I can with confidence say that I have always been a DAIWA man and those few friends I have also use DAIWA equipment. The equipment is reliable and extremely well designed.



THE DAIWA RANGE

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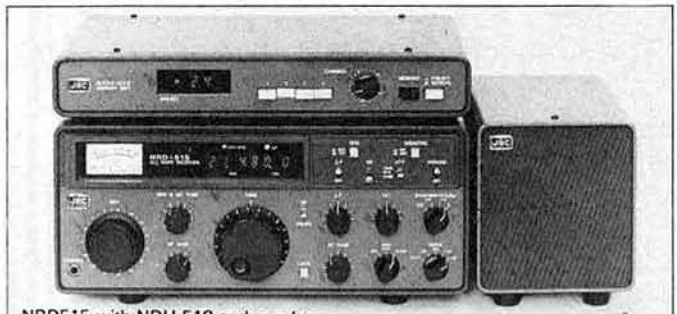
OBITER DICTA

Good morning

Well I must tell you this month about **the new TRIO 2 metre** and **70 cm. rigs,** the **TM201A** and the **TM401A.** Knowing that these two pieces of equipment were coming from Trio I must admit that I was sceptical as to whether **anything fresh** could happen **to the design** of a **mobile transceiver.** All right, I have had access to the information and specifications of the TM201A and TM401A for some months now and I must again admit that enthusiasm for the equipment was lacking. **You could say I was also suffering from "TW4000A-itis".**

Whilst I mention this rig I must tell you tomorrow is the great day when the voice synthesizer **VS1 £24.50,** including VAT, will arrive and I will have driving with me in the car on those long lonely journeys up and down the country to the **outposts** of the empire (the Lowe empire that is) **a 16-year-old Japanese geisha girl dressed in a pale blue kimono.** As I press the relevant button, in a sweet tone she will tell me the frequency memory channel, etc. Ah So!!

Back to TM201A and TM801A, the rigs arrived at Manchester Airport.



NRD515 with NDH-518 and speaker

At a loose end I decided to take a trip and collect them. Back to Matlock with the load and since the boxes looked so small I thought I might as well take one of each home and fire them up in the comfort of my own shack. After a cup of coffee and aided by my son, aged 8, a keen 70 centimetre man—**not the wife;** she was still washing up the coffee cups—I opened a box. At first I thought that TRIO had **forgotten** to pack the transceiver. I could see the **separate speaker enclosure** and the **mounting bracket** and even the now familiar **up/down microphone,** but where was the transceiver? I was amazed. It is not possible to produce such a small rig with 25 watts of signal (12 watts TM401A) in such a small package. The rig is considerably smaller than my outstretched hand and only 1½" high. Into the shack and powered up. Three things immediately impressed me: **the quality of audio** from the separate speaker, a solid unit with a 77 mm diameter speaker, such superb speech quality—nothing like that which we who use the infernal rig speakers are used to. Secondly, **the brilliant yellow display,** most eye catching and easily read in the most difficult of mobile conditions. And last, but certainly not least, the attention to detail by Trio engineers, the **system of tone beeps** when operating, the **flying lead** with SO239 for ease of fitting in a car (**N type on TM401A**) and the size, the smallest mobile rig I have ever seen. Designed for mobile installation the TM201A and TM401A a new concept in transceiver design. **The 2 metre TM201A is £269,** including VAT, the 70 cm version **the TM401A is £299,** both **remarkable prices** for **remarkable rigs.**

Sorry about that, almost got carried away!! For information on the new rigs from Trio and our other range of products send 75P. For our full catalogue; or if you are interested in a particular rig then a stamped addressed envelope asking for specific details. Do not forget please that **Lowe Electronics** is **primarily a mail order company** and we, aided by large stocks and well organized packing and delivery, can offer you, the customer, the fastest in service. It would be silly to say we guarantee delivery the following day but we can say with confidence that this type of service is what we strive for. **So whether** you place **your order by 'phone** giving your **Access, Barclaycard** or **Lowe Card** Number or write to us enclosing cheque or postal order, we promise to see your requirements are met **as quickly as possible.** Of course, there are always our Lowe shops and these are really our Matlock showroom in another location. Both new and second-hand equipment is on view and the majority of Trio rigs and associated accessories also.

For those who find Matlock a long way away **remember Beryl** on our switchboard. She'll be pleased to hear from you!!

AR-2001

Yet again I have to describe two new pieces of equipment. The first I gloss over because it's only for those radio amateurs who hold a private pilot's licence. I am really amazed—I personally know several amateurs who are pilots and the number of American QSL cards that reveal that you have had a QSO with a "flying tiger" pilot or similar is astounding. The new synthesized rig is a clever device but I mustn't mention it here. The second rig is from the **AOR stable** and is absolutely amazing. **Covering continuously from 25 to 550 MHz the AOR2001 receiver is unbelievable.** Modes of reception are **AM, narrow band FM** and **wide band FM,** thus amateur bands plus are covered in one receiver. I'll repeat the frequency range again—**25 to 550 MHz** and I'm told by those who know that it's performance is outstanding for its entire range. Send for a colour leaflet on this latest receiver from AOR.

The time in my shack recently has been spent in front of my **NRD515 receiver.** Every time I listen to the rig I am immediately satisfied with its performance and outstanding abilities to receive the obscured signal. I know that **Vatican Radio** hardly falls in this class. The signal in my shack late at night is usually never less than 20 to 30 over 9 but I quite often tune to 40 metres and to resolve amateurs alongside the "broadcasters" is not easy. However, with the NRD515 this seems no problem at all. Frequency selection is aided by the 96 channel memory unit **NDH518** and for general listening whilst leaning back in the chair the **NCM515** remote controller is ideal. I wonder how long it will be before some manufacturer of short-wave receivers produces an infra-red controller that does away with wires.

LS20XE

Perhaps I am getting lazy but I do seem to be reluctant nowadays to use a tuning knob. **Don't forget** Lowe Electronics for the fastest mail order in amateur radio. Think of some small item and try the system—a TRIO TS930S perhaps.

Have you seen the Belcom LS20XE? Many now in circulation so you probably know someone who has one. At **£128.00,** including VAT, I am not surprised. A compact simple 2 metre transceiver and with the **optional headset** that **has VOX** built in—ideal for walking, cycling or attending mobile rallies. I repeat the Belcom **LS20XE 2** metre handheld **£129.00** including VAT.

I have read with interest in current magazines references to **Boring** . I am certain I don't have to tell you **knowledgeable** amateur radio operators that it was not **Winston Churchill** who said "You can fool . . . . . but rather **Abraham Lincoln** and the date he said it was on 8th September, 1858. I don't actually recall where but no matter. Sorry, **'Sir'** Winston.

Anyway, that's about it for now as I must see how my 16-year-old Japanese **geisha girl** is getting on so Gud DXes 73es FBYLS, XYLS, esFBOM, etc. David.

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Software available for six computers
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TI-99 Board	**£87.40**

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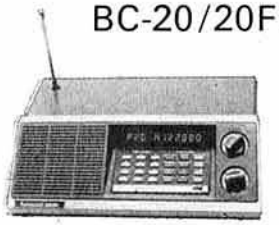
BC-100FB **£345.00**
Hand held 16 channel programmable

NEW!
BC-20/20FB



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AM/FM
£258.75

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BC-200FB 16 channel **£184.95**

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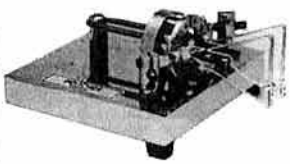
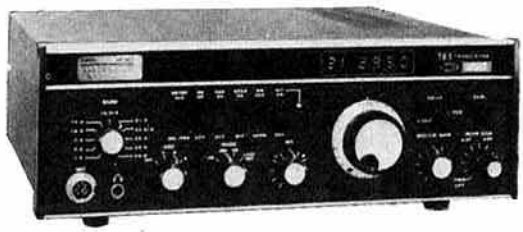
BY-3 Gold plated	**£92.00**
ZA-1A Balun	**£15.00**
ZA-2A Balun	**£17.25**
ZY-2 CW Audio Filter	**£57.50**



DRAKE TR7A

The Transceiver others try to copy
£1099.95

DRAKE TR5



DRAKE's low cost Transceiver
£552.00

DRAKE R7A

General Coverage Receiver
£1069.50

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Latest news from YAESU—Expected soon is the new **FT-757GX** all-mode HF transceiver—160 thru ten of course plus general coverage RX. FM and all options fitted including dual VFO's, eight memories, programmable memory scan, full break-in on CW, 100 watts PEP/DC output at 100% duty cycle and all this in a package measuring 238W x 93H x 238Dmm!

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We are pleased to announce a new price breakthrough on this Superb Transceiver —Phone or Write for details

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-290R/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-780R/208R SYNTHESIZED UHF/VHF TRANSCEIVERS

NC-7 - Standard charger

NC-8 - Standard/quick charger/DC Power supply

NC-9C - Compact charger (220-234V)

PA-3 - Car adapter

YM-24A - Speaker/microphone

FL-2010 - 10 watt power amplifier for FT-208R

FL-7010 - 10 watt power amplifier for FT-708R

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

- Two independent VFO's
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- Memory and band scan
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- Large LCD readout.

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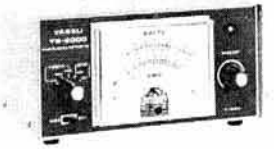
TET ANTENNA SYSTEMS

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)
MV48H	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			
RSL453S	½ wave antenna	15.50	(0.50)
ANTIFERENCE ANTENNAS			
VHF Mobile			
TAP3009	½ wave 3db snap-in hinged whip	13.00	(3.00)
TAP3677	½ wave 3db snap-in shock coil	14.56	(3.00)
TAP3002	¼ wave unity gain snap-in hinged whip	9.96	(3.00)
UHF Mobile			
TAP3462	½ over ¼ wave 3db	16.86	(3.00)
TAP3697	½ over ¼ wave 5db	20.00	(3.00)
K220	Mag mount/Feeder to suit above	11.96	(2.00)

Antennas Various/Accessories			
HQ1	Mini beam 10/15/20m 2 ele. 1kW	139.00	(4.00)
C4	Vertical 10/15/20m	48.50	(3.00)
G4MH	Mini beam 10/15/20	88.00	(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			
9502	Channel master med duty up to 8 ele.	57.00	(3.50)
9523	Alignment bearing for 9502	15.81	(1.25)
KR400	Med/Heavy duty 180° meter	90.85	(3.50)
KR400RC	Med/Heavy duty 360° meter Load 200Kg 1¼"-2" masts	114.94	(3.50)
CASTING	Lower casting set	15.00	(1.25)
KR600RC	Heavy duty 360° meter Load 200Kg Rot600Kg/cm Brake 4000Kg/cm 1½"-2"masts	163.30	(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)
BL-40X	Balun 2K PEP 1.1	11.52	(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)
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)
NB304	"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)
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	119.75	(n/c)
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)

COMPUTERS

Commodore 64. 64K, sprites, sound chip etc.	229.00	(n/c)
Vic 20 + C2N datasett + intro to base part 1 + 4 games. Special price	139.99	(3.00)
Commodore 1541 174K disk drive	229.00	(n/c)
Vic 3K ram pack	19.95	(0.25)
Vic 8K ram pack	29.95	(0.25)
Vic 16K ram pack	39.95	(0.25)
Vic 20 reference guide	9.95	(0.25)
Commodore 64 reference guide	9.95	(0.50)
C2N datasett	44.95	(1.75)
Spectrum 48K	129.95	(1.75)
Spectrum 16K	99.95	(1.75)
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OUR RANGE OF SOLID-STATE LINEAR TRANSVERTERS ARE INTENDED FOR USE WITH MULTIMODE TRANSCEIVERS (28MHz or 144MHz) TO PROVIDE EXTENDED COVERAGE OF THE OTHER AMATEUR BANDS AT A MODEST AND REALISTIC COST. THE SAME WELL PROVEN DESIGN TECHNIQUES ARE INCORPORATED INTO EACH TRANSVERTER TO ENSURE RELIABILITY AND HIGH PERFORMANCE.

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- LINEAR ALL-MODE OPERATION
- RUGGED PA TRANSISTORS
- HIGHLY STABLE REGULATED OSCILLATOR/MULTIPLIER STAGES

TRANSVERTERS FOR 2 METRE TRANSCEIVERS

MODEL No.	MMT28/144	MMT70/144	MMT432/144-R	MMT432/144-S	MMT1296/144
Output Frequency Range	28-30MHz	70.025-70.5 MHz	432-434 MHz 433.6-435.6 MHz (Repeater Mode)	432-434 MHz 434-436 MHz (Satellite Mode)	1296-1298 MHz
Input Modes	SSB, FM, AM, CW				
Input Requirements	10 Watts with standard attenuator-MMR 15/10 (3 Watts with alternative attenuator – MMR7/3)				
Output Power	10 Watts	10 Watts	10 Watts	10 Watts	2 Watts
Conversion Principle	SINGLE	DOUBLE	DOUBLE	DOUBLE	SINGLE
Receive Gain	15 dB				
Receive N.F.	2.0 dB max.	2.0 dB max.	3.0 dB max.	3.0 dB max.	1.2 dB max.
Input & Output Impedance	50 ohm				
RF Connectors	SO239	SO239	SO239/BNC/N	SO239/BNC/N	SO239/BNC/N
Power Requirements	13.8V at 2.1A	13.8V at 2.1A	13.8 V at 2.1A	13.8V at 2.1A	13.8V at 0.5A

MMT 432/144-R

MMT 1296/144

TRANSVERTERS FOR 10 METRE TRANSCEIVERS

MODEL No.	MMT70/28	MMT144/28	MMT 432/28-S
Output Frequency Range	70.025-70.5 MHz	144-146 MHz	432-434 MHz 434-436 MHz (Satellite Mode)
Input Modes	SSB, FM, AM, CW		
Input Requirements	5-500 mW (Continuously Variable)		
Output Power	10 Watts	10 Watts	10 Watts
Conversion Principle	SINGLE	SINGLE	SINGLE
Receive Gain	30 dB		
Receive N.F.	2.0 dB max.	2.5 dB max.	3.0 dB max.
Input/Output Impedance	50 ohm		
RF Connectors	SO239	SO239	SO239/BNC/N
Power Requirements	13.8V at 2.1A	13.8V at 2.1A	13.8V at 2.1A

MMT 144/28

MMT 432/28-S

PRICES—including VAT			
MMT 70/28	£129.95 p & p £3.00	MMT 70/144	£129.95 p & p £3.00
MMT144/28	£109.95 p & p £3.00	MMT432/144-R	£184.00 p & p £3.00
MMT432/28-S	£159.95 p & p £3.00	MMT432/144-S	£184.00 p & p £3.00
MMT28/144	£129.95 p & p £3.00	MMT1296/144	£199.00 p & p £4.00

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ICOM's Latest The IC-751 HF Transceiver

Think about the IC-740.
One of the most popular amateur bands transceivers, make a few improvements such as adding 36 memory channels, doing away with mechanical bandswitching and then add full HF receive capabillity (0.1-30 MHz) which is even an improvement on the famous R70 and you get a pretty good idea of what the IC-751 is like. It is fully compatible with Icom Auto units such as the AT-500 and IC-2KL and a further option for computer control can be added. There is also a digital speech synthesizer option which will be ideal for blind operators. For power supplies you have the option of the IC-PS740 (which fits inside) or the PS-15/PS20 range for external use.

As you would expect there is a built in speech processor, a switchable choice of a J-FET pre-amp, straight through or a 20dB pin diode attenuator and two VFOs allowing split frequency operation.

Other standard features include:- 36 memory channels with scan facility and start/stop timers, a marker, 4 variable tuning rates, Pass Band Tuning, notch, variable noise blanker, monitor switch, DFM (direct feed mixer) in the front end, full break-in on CW and AMTOR compatibility. The first IF is 70.045 MHz. Any XIT and RIT adjustment is shown on the display. The transmitter features high reliability 2SC2904 transistors in a low IMD (-32dB@ 100W) full 100% duty cycle. Power is restricted to 40W on AM and adjustable from 10W on all modes. FM and the IC-FL44A crystal SSB filter are both fitted as standard.

As you can see from this brief description the IC-751 is certainly a transceiver worth considering – Why not call us for further details?

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IC-R70, HF Receiver

The R-70 covers all modes (when the FM option is included), and uses 2 CPU-driven VFO's for split frequency working, and has 3 IF frequencies: 70MHz, 9MHz and 455KHz, and a dynamic range of 100dB. It has a built-in mains supply.

Other R-70 features include: input switchability through a pre-amplifier, direct or via an attenuator, selectable tuning steps of 1KHz, 100Hz or 10Hz, adjustable IF bandwidth in 3 steps (455KHz). Noise limiter, switchable AGC, tunable notch filter, squelch on all modes, RIT, tone control. Tuning LED for FM (discriminator centre indicator). Recorder output, dimmer control.

The R-70 also has separate antenna sockets for LW-MW with automatic switching, and a large, front mounted loudspeaker with 5.8W output. The frequency stability for the 1st hour is ± 50Hz, sensitivity- SSB/CW/RTTY better than 0.32 μv for 12dB (S+N)÷N, Am-0.5μv. FM better than 0.32 for 12dB Sinad. DC is optional

IC-740, HF Transceiver

Features of the IC-740 transceiver include a very effective variable width and continuously adjustable noise blanker, continuously adjustable speed AGC, adjustable IF shift and variable passband tuning built in. In addition, an adjustable notch filter for maximum receiver performance, along with switchable receiver preamp, and a selection of SSB and CW filters. Squelch on SSB Receive and all mode capability, including optional FM mode. Split frequency operation with two built-in VFO's for the serious DX'er.

The IC-740 allows maximum transmit flexibility with front panel adjustment of VOX gain and VOX delay along with ICOM's unique synthesized three speed tuning system and rock solid stability with electronic frequency lock. Maximum versatility with 2 VFO's built in as standard, plus 9 memories of frequency selection, one per band, including the new WARC bands. With 10 independent receiver and 6 transmitter front panel adjustments.

Options include:

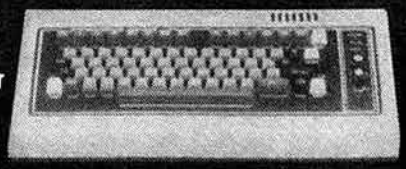
- FM Module
- Marker Module
- Electronic Keyer
- 2 - 9KHz IF Filters for CW
- 3 - 455MHz Filters for CW
- Internal AC Power Supply
- Automatic Antenna Tuner

RTTY, Morse & ASCII

Shortwave listeners and amateurs are able to take more interest in other modes of transmission than speech with the latest range of decoders and senders available. As well as amateur transmissions, there is an abundance of news and other interesting broadcasts which can be read using these space-age devices.

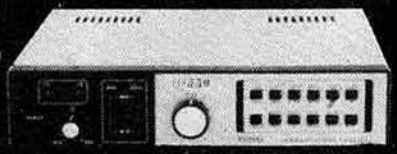
Some models in our range are the Tono 550, 9000E and the Telereader CWR-670, CWR-685E and CWR-610E. There is now available a professional version of the Tono 9000E, the PRO-1, which has a built-in scrambler. The Telereader CWR-670 is also available with a built-in VDU which can include a 40 column printer.

TONO 9000E Sender/Decoder



CWR-610E, Decoder

TONO 550, Decoder



As U.K. importers of the renowned TONO and TELEREADER products, we can offer you a wide range, from a simple morse and RTTY reader which can be plugged into your TV., to a complete send and receive system with memories and built-in displays, or outputs for high-definition VDU.

As well as stocking the complete ICOM range of equipment suitable for European use, we also sell Yaesu, Jaybeam, Datong, Welz, G-Whip, Western, TAL, Bearcat, Versatower and RSGB publications from our shop and showroom at the address below. Come in for a demonstration or just a chat, our qualified sales staff and technicians will be glad to assist you.

Securicor or post despatch free, same day if possible.

Agent Please telephone first, anytime between 0900 – 2200 hrs.
Thanet Northern, G3LEQ Tel: Knutsford (0565) 4040

Interest-free credit available

Do you know what time it is!

When the globe of this digital clock is revolved, a red lamp indicating a major city in the world will blink, and the current time of that city will be displayed in place of the date. At a glance know the current times of 24 different time zones throughout the world.

This mini-globe clock stands 195mm. high and also has an alarm fitted. This useful device should stop you getting your Amateur friends, on the other side of the world, out of bed in the middle of the night.

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

NEW! IC-271, VHF Multi-mode Base station

Icom have made improvements to the IC-251 and brought it up to date.

Power can be adjusted up to 25W on all modes SSB, CW and FM. Squelch works on all modes and a listen-input facility has been added for Repeater work. RIT shift is shown on the display.
Options include a switchable front end pre-amp.
Speech synthesizer announcing displayed frequency.
22 Channel memory extension - with scan facilities.
10 Hz tuning facility. SM5 desk mic
Internal chopper PSU, Why not call us for further details?

IC-251E, Available on Special offer

Icom produce a perfect trio in the VHF base station range, from 6 meters through 2 meters to 70cms. The IC-251E is the 2 meter station while the IC-451E is used for 70cms. The 251E is now available with Mutek front-end fitted.

IC-290H, VHF Multimode Mobile

The recently introduced IC-290H has proved so popular that we have decided to concentrate on this (25W) model 2m multimode. With its bright green display, 5 memories, scan facilities on either memories or the whole band, tone-call button on the microphone and instant listen input for repeaters, this little box really is a beauty. The 70cm version, the IC-490E has similar features (although the output is only 10W in this case).

IC-25H/25E, VHF, FM Mobiles

The FM mobile choice has to be the Icom IC-25E. It is so small yet boasts a powerful 25 Watt voice and a sensitive receiver. The new 25H now avaiable has a green display and 45 Watts output. There are five easily programmable memories, and facilities for changing the repeater shift from the default value of 600kHz. You can tune the VFO while in a memory without losing or changing the memory. You can listen on the input instantly, and there are also priority channel facilities should you want to be sure of not missing that private message. The HM10 scanning mike is supplied as standard, but the HM11 with tone call on the mike can be used.

IC-2E, VHF/FM IC-4E UHF Portables

Nearly everybody has an IC2E – the most popular amateur transceiver in the world – there is also the 70 cm version which is every bit as good and takes the same accessories.

NEW! IC-120, 1296 MHz FM

Thinking of 1296? Then Icom IC-120 could be the answer.

Now you can have the sophistication of today's technology on this up and coming band-all built into a unit the same size as the IC-25E, very compact.

Features include:	Output Power = 1 W or more
Frequency coverage 1260 - 1300	Mode:- FM
Adjustable Repeater Shift	2 VFO's
6 Memories - with scanning facility	Deviation + 5 KHz
Spurious Emissions - 40dB or better	RIT

8 W and 16W (Puma) Linear Amps available shortly.

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143 Reculver Road, Herne Bay, Kent
Tel:(02273) 63859/63850

BARCLAYCARD VISA

WATERS & STANTON ELECTRONICS

18-20 MAIN ROAD, HOCKLEY, ESSEX. Tel: (0702) 206835
12 NORTH STREET, HORNCHURCH, ESSEX. Tel: (040 24) 44765

MAIL ORDER Nobody offers a faster more efficient service. Normally orders received by 4pm are despatched same day. Credit card holders can simply phone their orders in. For orders by post please complete slip at foot of page and send to Hockley.

RETAIL CALLERS We have 2 showrooms in Essex with the widest selection of amateur radio equipment available in the South East. Both premises have full demonstration facilities and our staff will be happy to give you advice on your requirements.

CREDIT As licensed credit brokers we can offer immediate H.P. on all our equipment to holders of cheque guarantee cards or credit cards. Alternatively we can normally arrange credit within 3 working days subject to status. Credit can also be arranged for mail order customers.

PART EXCHANGE We are always interested in good condition, modern equipment, and will be happy to quote you a part exchange deal. We will happily give an indication of the part exchange allowance by phone but this will be subject to a visual inspection before completing the transaction.

TRIO

TS930S	160-10m t'ceiver with gen. cov.	1,216.00	5.00
AT930	Automatic ATU 80-10m	141.75	2.50
SP930	External speaker unit	59.00	2.00
SO1	Comp unit	138.75	2.00
YK88A-1	6kHz AM filter	33.25	0.75
YK88C-1	500Hz CW filter	33.25	0.75
YG455C-1	500Hz CW filter	77.50	0.75
YG455CN-1	270Hz CW filter	91.75	0.75
TS430S	160-10m with gen. cov. rec	736.00	5.00
PS430	Mains PSU for TS430S	112.75	5.00
SP430	Speaker for TS430S	29.50	1.50
MB430	Mobile mounting bracket	11.25	1.50
FM430	FM option unit TS430S	34.50	1.00
TS830S	160-10m trans. 100w	697.75	5.00
VFO230	Digital VFO with memories	243.75	5.00
AT230	All band ATU/meter	135.75	5.00
SP230	External speaker unit	41.25	2.00
DS2	DC pack for TS830S	50.25	1.50
DFC230	Digital remote cont	153.25	2.50
YK88C	500Hz CW filter	31.75	0.75
YK88CN	270Hz CW filter	37.25	0.75
SM220	Station monitor scope	209.00	5.00
BS8	Panoramic display	52.50	1.00
KB1	Knob for TS830/530	10.25	0.75
YG455C	500Hz CW filter	75.50	0.75
YG455CN	250Hz CW filter	77.75	0.75
YG88A	6kHz AM filter – TS430S	35.50	0.75
TS530S	160-10m transceiver	595.00	5.00
VFO240	TS530S External VFO	92.75	5.00
TS130S	200w pep mobile t'ceiver	559.25	5.00
TS130V	20w pep mobile t'ceiver	456.25	5.00
TL120	Linear for TS120/130	167.50	2.50
MB100A	Mob mount for TS120/130	18.50	2.00
YK88C	500Hz CW filter	31.75	0.75
YK88CN	270Hz CW filter	37.25	0.75
YK88SN	1.8kHz SSB filter	32.50	0.75
VFO120	External VFO unit	98.50	2.50
SP120	External speaker unit	26.50	1.75
SP40	Mobile speaker unit	14.25	1.00
AT130	100w aerial tuner	93.00	1.75
PS20	AC for TS120/130V	57.75	2.50
MA5	Trio 5 band mobile aerial	106.00	4.00
TL922	160-10m 2kw linear	724.50	5.00
MC50	Dual impedance desk mic	30.75	1.75
MC60 N4	Desk microphone	51.50	2.00
MC60 S6	Desk mic with up/down	53.50	2.00
MC60A	Desk micwith pre-amp	55.25	2.00
MC35S	Fist mic 50K imp.	14.75	1.25
MC30S	Fist microphone 500ohm imp	14.75	1.25
MC40S	Up/down mic for TR9000/7800	14.75	1.25
MC42S	Up/down mic (TS930S)	15.25	1.25
LF30A	HF low pass filter	21.25	1.25
TS780	2m/70cm all mode t'ceiver	843.00	5.00
SP70	External speaker unit	23.50	1.50
BU1	Backup battery case	8.25	0.75
TR9130	2m multi mode mobile	433.50	2.50
PS20	AC power supply (TR9000)	57.75	2.50
BO9A	Base plinth for TR9130	39.25	2.00
TR7730	25w 2m FM t'ceiver	199.00	2.50
TR7800	2m FM synth 25W t'ceiver	257.50	2.50
TR7930	2m FM t'ceiver LCD disp	305.25	2.50
TW4000	FM transceiver 2m/70cm	t.b.a.	
SP40	Mobile speaker unit	14.25	1.00
TR2300	2m FM portable t'ceiver	152.00	2.50
VB2300	10w amplifier for TR2300	65.75	1.50
MB2	Mobile mount for TR2300/VB2300	21.25	1.50
RA3	Telescopic whip ante	9.50	0.75
TR2500	2m FM synth handheld	232.50	2.50
VB2530	30w amplifier for TR2500	69.75	2.00

YAESU

FT1	Gen Cov HF t'ceiver	1,450.00	5.00
1,450.00			
5.00			
Key T 901	Curtis keyer for above	26.85	1.50
DCT1	DC power cable	9.60	1.25
RAMT1	Non-volatile mem board	13.05	1.50
FMUT1	FM unit	34.90	1.50
XF8.9KCN	300Hz CW filter	39.85	1.25
XF8.9KC	600 Hz CW filter	17.25	1.25
XF8.9KA	6kHz AM filter	17.25	1.25
XF10.7KC	CW filter	11.90	1.25
FT980	Gen cov HF t'ceiver	1,215.00	5.00
SP980	Matching speaker	54.80	2.00
FT902DM	9 band AM/FM HF t'ceiver	885.00	5.00
XF89HC	600Hz CW filter for above	24.90	1.25
XF89HCN	300Hz filter for above	24.90	1.25
XF89GA	6kHz AM filter for above	24.90	1.25
XF89GF	12kHz FM filter for above	26.05	1.25
FV901DM	External VFO	260.00	5.00
FC902	9 band atu SWR/PWR	135.00	5.00
SP901	External speaker	31.00	2.00
FT101ZDFM	HF t'ceiver with FM	665.00	5.00
FV101Z	Remote vfo for above	120.00	2.00
FAN	Cooling fan for above	14.20	1.50
FT102	9 band HF transceiver	839.00	5.00
FC102	9 band matching atu	225.00	5.00
FV102DM	Remote vfo for above	250.00	2.50
SP102	External speaker	49.05	2.00
FM AM	Unit for above	46.00	1.00
MH1B8	Scanning hand mic.	13.80	1.00
FT707	HF t'ceiver 12v DC	515.00	5.00
FP707	230v AC power supply	110.00	5.00
FC707	8 band atu to match FT707	88.50	2.00
MR7	Metal rack for above	17.25	2.00
MMB2	Mobile mounting bracket	17.25	1.50
FV707DM	Digital vfo for above	200.00	2.50
FT77	8 band 100 watt t'ceiver	515.00	5.00
Marker unit		9.60	1.00
FM Unit		25.30	1.00
FP700	PSU for FT77	110.00	5.00
FC700	ATU for FT77	99.00	2.00
FL2100Z	160-10m linear amp	475.00	5.00
FT290R	2m Multimode portable	285.00	2.50
FT790R	70cm Multimode Portable	349.00	2.50
NC WSE	FT290/790 ni-cad pack	22.00	2.00
NC11C	FT290/790 AC charger	9.20	1.00
CSC1A	FT290/790 carrying case	3.85	0.75
MMB11	FT290/790 Mob mount	24.90	1.75
FL2010	290R Linear amplifier	59.00	2.00
FT208	2m FM handheld 2½W	199.00	2.00
FT708	70cm FM handheld 1W	229.00	2.00
NC9C	Slow charger	8.05	1.00
FNB2	Spare Ni-cad battery pack	19.95	0.75
FBA3	Charging sleeve	5.35	0.75
NC7C	Base master charger	30.65	1.50
NC8C	Base master quick charger	50.60	2.00
PA3	Charger 12v DC	14.20	0.75
MMB10	Mobile mounting bracket	6.90	1.50
FT230R	2m 25W FM mob t'ceiver	255.00	2.50
FT730R	70cms 10W FM mob t'ceiver	299.00	2.50
FT726R	3 band all mode base station	699.00	5.00
430T726	70cms module	230.00	2.50
50T726	6 metre module	170.00	2.50
SAT726	Full duplex x/band unit	90.00	2.00
FRG7	0.5-30mHz gen cov rec	199.00	5.00
FRG7700	0.2-30mHz gen cov rec	335.00	5.00
FRG7700M	7700 with memory unit	399.00	5.00
MEMGR7700	Memory module	98.90	1.50
DCRG7700	DC modification kit	2.95	0.75
FRT7700	Antenna tuner unit	42.55	1.50

JAYBEAM ANTENNAS

TB1	HF rotary dipole 1kw	69.00	3.00
TB2	HF 2 element tribander	126.50	5.00
TB3	HF 3 element tribander	189.75	5.00
VR3	HF Vert triband dipole	46.00	4.00
4Y 6M	4 element folded dipole	42.00	4.00
4Y 4M	4 element folded dipole	29.90	4.00
PMH2/4M	2 way phasing harness	16.10	1.50
DC1-WB	Wide band discone	41.40	4.00
LR1 2M	Vertical colinear 4.3dB	29.90	4.00
LR2 2M	Vertical colinear 2.8dB	23.00	4.00
C5 2M	5dB glass fibre colinear	54.60	4.00
LW5 2M	5 element folded	14.40	4.00
LW8 2M	8 el folded dipole	17.80	4.50
LW10 2M	10 el folded dipole	24.15	4.00
LW16 2M	16 element yagi	35.00	4.00
PBM10 2M	10 element parabeam	44.85	4.00
PBM14 2M	14 element parabeam	55.80	4.00
5XY 2M	Crossed 5 el yagi	28.20	4.00
8XY 2M	Crossed 8 el yagi	35.65	4.00
10XY 2M	Crossed 10 el yagi	46.00	4.00
X6 2M X12			
70cm	Dual band crossed yagi	42.55	4.00
PMH 2C	2 way phasing harness	9.80	1.50
Q4 2M	4 element quad	29.30	4.00
Q6 2m	6 element quad	39.10	4.00
Q8 2M	8 element quad	44.85	4.00
D5 2M	Double 5 slot-fed yagi	25.30	4.00
D8 2M	Double 8 slot-fed yagi	34.50	4.00
SVMK 2M	Kit for vertical polar	9.20	4.00
UGP 2M	Ground plane	12.65	2.50
HO 2M	Mobile 'halo' head	6.00	2.00
HM 2M	'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
C8 70cm	8dB glass fibre colin	62.10	4.00
D8 70cm	Double 8 slot-fed yagi	25.90	4.00
PBM18 70	18 element parabeam	28.00	4.00
PBM24-70cm	24 element parabeam	42.55	4.00
LW24 70cm	24 element yagi	27.00	4.00
MBM28 70cm	28 element multibeam	21.30	4.00
MBM48 70cm	48 element multibeam	35.65	4.00
MBM88 70cm	88 element multibeam	48.90	4.00
8XY 70cm	Crossed 8 el yagi	42.55	4.00
12XY 70cm	Crossed 12 el yagi	52.90	4.00
PMH2 70cm	2 way phasing harness	10.35	1.50
PMH4 70cm	4 way phasing harness	22.45	1.50
CR23cm	Corner reflector array	40.25	4.00
D15 1296	Double 15 slot-fed yagi	39.00	4.00
PMH2 23cm	2 way phasing harness	31.00	1.50

DATONG

PC1	Gen. Cov. Con.	137.40	1.00
VLF	Very low frequency conv.	29.90	1.00
FL1	Freq agile audio filter	79.35	1.00
FL2	Multi-mode audio filter	89.70	1.00
FL3	Auto filter for receivers	129.00	1.00
ASP-B	r.f. speech clipper for Trio	82.80	1.00
ASP-A	r.f. speech clipper for Yaesu	82.80	1.00
ASP	As above with 8 pin conn	89.70	1.00
D75	Manual RF speech clipper	56.35	1.00
D70	Morse Tutor	56.35	1.00
MK	Keyboard morse sender	137.40	1.00
RFA	RF switched pre-amp	33.90	1.00
AD270	Active dipole indoor	47.15	2.00
AD370	Active dipole outdoor	64.40	2.00
AD270 - MPU	As above with mains p.s.u.	51.75	2.00
AD370 - MPU	As above with mains p.s.u.	69.00	2.00
MPU	Mains power unit	6.90	1.00
RFC-M	RF speech clipper module	29.90	1.00

FDK

M.700AX	2m FM 25W transceiver	215.00	2.50
M.750X	2m FM/SSB/CW 10W t'ceiver	315.00	2.50
EXP.430	M.750 70cm transverter	249.00	2.50
SNAP-1	Clamps joins M.750/EXP.430	7.95	1.00
PS750	M.750 230v AC PSU	69.00	2.50
FDK	12v DC lead	2.95	0.75
Palm II	2m FM 2W 6 ch. h'held	119.00	2.00
Palm II TB	As above with tone burst	131.00	2.00
Palm IV	70cm 1W FM 6 ch. h'held	119.00	2.00
Palm IV TB	As above with tone burst	131.00	2.00
TM56B	Amateur scanning rec 12v	59.00	2.00
TM56B	Marine scanning receiver	59.00	2.00
BC2	Palm II 230v AC charger	4.95	0.75
BT2	Nicad battery pack	14.00	0.75
Xtals	Palm II and Palm IV	3.75	0.40
Xtals	for TM56B	3.75	0.40
KP100	AC/DC Electronic Keyer	69.00	2.00
ATC720	Synth air monitor 110-138MHz	159.00	2.00
RX40	Synth FM mon	149.00	2.00
ATC12V	12v DC car adaptor	4.95	0.75
ATCC	Carrying case	4.95	0.75
TB1	1750Hz tone burst	12.00	0.50

HF ANTENNAS

Mini-Products HQ-1 20/15/10m 2 el.		139.00	4.00
Mini-Products C4 20/15/10m vertical		59.00	4.00
Welz-Diamond CP5 10-80m vertical		115.00	4.00
Welz-Diamond CP4 10-40m vertical		89.00	4.00
Welz-Diamond CP3 6-10-15m vertical		49.00	4.00
Mosley TD3JR 20 15 10m wire dipole		43.70	2.00
Mosley "Mini-Beam" 20 15 10m 2 el. "		135.00	4.00
Mosley TA33JR 20/15/10m 3 element		177.00	4.00
Hy-Gain 12AVQ 20/15/10m vertical		50.00	4.00
Hy-Gain 14AVQ 40-10m vertical		64.40	4.00
Hy-Gain 18AVT/WB 80-10m vertical		114.00	4.00
HF5 80-10m vertical 200 watts		55.75	4.00
HF5R Radial kit for HF5		35.00	3.00
Jaybeam TB3HF element		189.75	5.00
Jaybeam VR3HF vertical		46.00	2.00
5-band commercial grade 1kw 80-10m dipole		39.00	2.00

VHF/UHF MONITOR RECEIVERS

Sako SC7000	230v/12v scan mon	259.00	5.00
SX200N	Scanning receiver	289.00	5.00
BEARCAT 2020	Scanning receiver	259.00	5.00
TM56B	FM scanner 4 + 12 chan	59.00	2.00
Sound Air M161 16 channel FM monitor		39.00	2.00
SR9(A)	2m Amateur receiver	46.00	2.00
SR9(M)	Marine band receiver	46.00	2.00
SR1000E	Daiwa 1000 channel	83.00	2.00
MK4000	FM synth receiver	99.00	2.00
AS2320	Fairmate VHF, UHF scan rec	149.00	2.00

STATION ACCESSORIES

PP1305GS	13.8v 4 amp. AC p.s.u.	15.00	2.00
PP1307	7 amp AC power supply	32.00	2.50
PP1310	13.8v DC 10 amp. protected	49.50	3.00
Global PS15	6 amp power supply	22.00	2.00
EK121	Katsumi Electronic keyer	32.50	1.50
EKM12	Matching side tone mon	10.95	1.25

ST2	Base stand and charger	51.75	1.75
SC4	Soft case and belt hook	13.75	0.75
MS1	Mob stand and power unit	31.75	1.50
SMC25	Speaker/microphone	16.00	1.00
PB25	Spare ni-cad battery pack	25.00	1.00
LH2	Deluxe leather case	24.00	1.00
DC25	Power supply from 12V	16.00	1.00
TR3500	70cm handheld trans.	250.75	2.50
TR8400	70cm FM mob t'ceiver	299.00	5.00
PS10	Matching power supply for TR8400	64.75	5.00
TR9500	70cm multimode mob	450.75	5.00
R600	Gen. Cov. Rec 150kHz-30MHz	257.50	5.00
R1000	200kHz-30MHz rec	297.75	5.00
R2000	Gen cov rec	398.75	5.00
VC10	VHF unit for R2000. 118mHz to 174mHz	113.00	1.50
HC10	World time clock	67.50	1.50

WELZ

SP200	1.8-160mHz PWR/SWR	69.95	1.75
SP300	1.8-500mHz PWR/SWR	97.00	1.75
SP400	130-500mHz PWR/SWR	69.95	1.75
SP600	1.8-500mHz PWR/SWR	97.00	1.75
SP10X	1.8-150mHz PWR/SWR	24.45	1.25
SP15M	1.8-160mHz PWR/SWR	35.00	1.75
SP45M	130-470mHz PWR/SWR	51.00	1.75
SP250	1.8-60mHz PWR/SWR	49.50	1.75
SP350	1.8-500mHz PWR/SWR	59.95	1.75
AC38	3.5-30mHz ATU 400w PEP	65.00	1.75
TP05X	50-500mHz 0-5w meter	13.95	0.75
TP25A	50-500mHz 0-25w meter	17.50	1.50
TP20G	30-1500mHz 0-15w meter	139.00	2.00
CA35A	Static protector	10.75	1.00
CA23N	Static protector	12.60	1.00
CT15A	15/50W dummy load PL259	7.95	1.00
CT15N	15/20W dummy load N plug	13.95	1.00
CT150	150/400W dummy load	35.50	1.00
CT300	300/1kw dummy load	49.50	2.00
CT03N	3w dummy load 1.3gHz	30.00	1.00
CH20A	2 way coax switch SO239	17.95	2.00
CH20N	2 way coax switch N socket	31.95	2.00
DF72C	144/430mHz duplexer	18.95	1.00
RS 455	DC PSU 3-15v 3.6A	39.00	2.00
RS 665	DC PSU 3-15v 6A	59.00	2.00
RS1100	DC PSU 13.8v 10A	75.00	2.50
RS-1150D	DC PSU 3-15v 10A	89.00	3.00

WELZ DIAMOND AERIALS

RH2B	2m ¼ wave whip BNC	8.95	1.00
RH200B	2m half wave whip BNC	18.95	1.50
RH702B	70cm 2 × 5/8 whip BNC	16.00	1.50
M285	2m 5/8th mobile PL259	8.50	2.00
M287	2m 7/8th mobile	14.95	2.00
EL770E	Dual band 2m/70cm mobile	18.95	2.00
B285	2m 5/8th base with radials	14.95	2.00
GH22	2m 2 × 5/8th base	27.95	2.00
GH72	70cm 2 × 5/8th base	27.50	2.00
DP100S	80-10m mobile system 100w	79.95	4.00
GLS	Gutter Mount with 4m cable	8.95	1.00
GLP	SO239 vehicle mount	2.75	1.00
SPM	Heavy duty magnetic base	12.95	1.50
TRB	Heavy duty trunk lip mount	11.50	1.50
LGR	14" elevated ground plane	18.50	2.00
LBR	Heavy duty base spring	10.50	1.50
BDS	Bumper mounting strap	9.50	1.50
BSB	As LBR with ball adjustment	8.50	1.50
EL80	Base loaded whip. 3.5mHz	37.00	2.00
EL40	Base loaded whip 7mHz	32.50	2.00
CP3	6-10-15 vertical with G.P.	69.00	4.00
CP4	10-40m vertical with G.P.	89.00	4.00
CP5	10-80m vertical with G.P.	115.00	4.00
KB101	10-40m 1kw vertical	55.00	4.00
KB105	10-80m 1kw vertical	79.50	4.00

FRA7700	Active Antenna	38.70	2.00
FF5	Low pass filter	9.95	1.00
FRV7700A	118-130, 130-140, 140-150mHz	78.95	1.50
FRV7700B	118-130, 140-150, 50-59mHz	84.70	1.50
FRV7700C	140-150, 150-160, 160-170mHz	74.75	1.50
FRV7700D	118-130, 140-150, 70-80mHz	80.90	1.50
FRV7700E	118-130, 140-150, 150-160mHz	83.95	1.50
FRV7700F	118-130, 150-160, 170-180mHz	83.95	1.50

ICOM

IC740	100w HF trans 12v DC	769.00	5.00
PSUIInt	230v AC power supply	134.00	5.00
FM(EX242)	FM module for above	26.00	1.00
KEYER(EX243)	Keyer module for above	36.00	1.00
IC730	100w HF trans 12v DC	695.00	5.00
FL30	SSB pass band filter	29.00	1.00
IC720A	100w HF trans plus gen. cov.	949.00	5.00
PS15	230v p.s.u. for HF t'ceivers	119.00	5.00
PS20	230v chopper type unit	155.00	5.00
FL45	500Hz filter for 740/730	39.00	0.75
FL44	2.4kHz SSB filter	65.00	0.75
FL32	CW narrow filter for 720	34.00	0.75
FL34	AM filter for 720	29.00	0.75
EX202	LDA unit for 730	13.50	0.75
EX203	CW audio filter for 730	14.00	0.75
EX205	TRV unit for 730	11.50	0.75
B10	Memory back up for 720	5.75	0.75
IC2KL	500W solid state linear	915.00	5.00
IC2KL/PSU	Matching 230v AC PSU	256.00	5.00
AT100	100 watt HF Auto ATU	249.00	5.00
AT500	500 watt HF Auto ATU	349.00	5.00
CF1	Cooling fan	20.50	1.00
SP3	Matching ext speaker	39.00	1.50
HP1	Communication phones	25.00	1.00
SM5	Base microphone	29.00	1.50
IC-R70	Comms rec 230v AC	499.00	5.00
FM unit	Plug in module	30.00	1.00
FL63	CW Narrow filter	32.50	1.00
FL44	Xtal filter	65.00	1.00
IC251	Multimode 2m base station	559.00	5.00
IC290E	Multimode 2m 12v DC	433.00	3.00
IC25E	2m FM mobile 12v DC 25 w	269.00	3.00
BU1	Back up supply	20.00	1.00
IC451E	Multimode 70cm	689.00	5.00
IC490	Multimode 70cm12v DC	459.00	5.00
IC45E	70cm FM mobile DC 10w	289.00	3.00
IC402	70cm SSB portable 3W	257.00	2.50
IC2E	2m synth h'held 1.5w	179.00	2.00
IC4E	70cm synth h'held 1.5w	199.00	2.00
MMB2	Mobile mounting bracket	t.b.a.	
MMB5	Mobile mounting bracket	12.50	1.00
MMB9	Mobile mounting bracket	12.50	1.00
MMB12	Mobile mounting bracket	11.50	1.00
HM3	4 pin hand mic.	12.50	1.00
HM7	8 pin hand mic.	12.50	1.00
HM9	L/S mic for IC2E/4E	15.00	1.00
HM10	Up/down scan mic.	20.00	1.00
SM2	4 pin desk mic.	29.00	1.00
SM5	8 pin desk mic.	29.00	1.00
SP3	External loudspeaker	39.00	1.50
LC1/2/3	Cases for IC2E/4E	4.25	0.75
BC25	Standard mains charger	5.75	1.00
BC30	Base hod type charger	49.00	1.00
BP2	Low voltage pack	30.00	1.00
BP3	Standard pack	23.00	1.00
BP4	Empty battery box (AA cells)	6.95	0.75
BP5	High power battery pack	44.00	1.00
CP1	Charger lead for 12V supply	4.49	0.75
DC1	12v Regulator pack	11.99	0.75
ML1	2m linear	64.00	2.00

VHF POWER AMPLIFIERS

ALINCO	30w 12v DC Amp 1 or 3w	59.00	1.00
KMCC2300/2E	IC2E 25w 12v DC amp	79.00	1.50
KMCC2300/TR25	TR2500 12v DC amp	85.00	1.50
CORONA HP80VDX	80w amp/Gasfet pre-amp	(On request)	

PTS1	Tone squelch unit	46.00	1.00
ANF	Automatic notch filter	67.85	1.00
SRB2	Auto Woodpecker blanker	86.25	1.00

MICROWAVE MODULES RANGE

MML28/100-S	10m 100W lin/preamp	129.95	2.00
MML70/50	4m 50 watt lin/preamp	85.00	1.25
MML70/100-S	4m 100W lin/preamp	139.95	2.00
MML144/30LS	2m 30W linear amp	69.95	1.25
MML144/50S	2m 50W lin/preamp	85.00	1.25
MML144/100-S	2m 100W lin/preamp	139.95	2.00
MML144/100LS	2m 100W (1 or 3W i/p)	159.95	2.00
MML432/30L	70cm 30W lin/preamp	99.00	1.25
MML432/50	70cm 50W lin/preamp	109.95	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 con, VHF out	37.90	0.75
MMC435/600	70cm ATV con, UHF out	27.90	0.75
MTV435	70cm ATV 20W t'mitter	149.00	1.25
MM1000	ASC11 to Morse con	69.95	1.25
MM1000KB	Converter with keyboard	99.95	2.00
MM2001	RTTY to TV converter	189.00	1.25
MM4001	RTTY terminal	269.00	1.25
MM4001KB	RTTY term with keyboard	299.00	2.00
MMS1	The MORSETALKER	115.00	1.25
MMS2	Advanced morse trainer	169.00	1.25
MMT28/144	10m linear transverter	109.95	1.25
MMT70/28	4m linear transverter	119.95	1.25
MMT70/144	4m linear transverter	119.95	1.25
MMT144/28	2m linear transverter	109.95	1.25
MMT432/28-S	70cm linear transverter	159.95	1.25
MMT432/144-R	70cm linear transverter	184.00	1.25
MMT1296/144	23cm linear transverter	184.00	2.00
MMC27/MW	27MHz to med wave conv	19.95	0.75
MMC28/144	10m to 2m up conv	29.90	0.75
MMC50/28	6m to 10m down conv	29.90	0.75
MMC70/28	4m to 10m down conv	29.90	0.75
MMC70/28LO	4m to 10m down conv	32.90	0.75
MMC144/28	2m to 10m down conv	29.90	0.75
MMC144/28LO	2m to 10m down conv	32.90	0.75
MMC432/28-S	70cm to 10m down conv	37.90	0.75
MMC432/144-S	70cm to 2m down conv	37.90	0.75
MMC1296/28	23cm to 10m down conv	34.90	0.75
MMK1296/144	23cm to 2m down conv	69.95	0.75
MMK1691/137.5	1691mHz Meteosat conv	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
MMd050/500	500MHz digital freq meter	75.00	0.75
MMd600P	600mHz-10 prescaler	29.90	0.75
MMDP1	Freq counter amp/probe	14.90	0.75
MMF144	2m bandpass filter	11.90	0.75
MMF432	70cm bandpass filter	11.90	0.75
MMS384	384mHz freq source	29.90	0.75
MR15/10	15dB, 10W attenuator	11.90	0.75

AZDEN

PCS4000	2m FM transceiver 25W	229.00	2.50
PCS300	2m FM handheld	209.00	2.50
LC-11	Leather case for above	18.35	0.75
SDX-316	Speaker mic for PCS300	14.75	0.75
MC-1	Spare AC charger	5.85	0.75
BP500	Spare battery pack	12.50	1.00
MEX55	Mobile boom safety mic	28.50	1.75
Mic. Plugs	for PCS3000	3.75	0.50
AS-006	Mobile ext speaker	9.95	1.75

COK2	Morse osc & speaker	8.00	0.75
HK708	Telegraph CW key	12.75	1.00
MK704	Squeeze Paddle	13.25	1.00
YW3	SWR/Power/Field stren meter	12.95	0.75
FX1	Deluxe station wavemeter	33.00	1.50
FX1/K	Converts FX1 to dip meter	5.75	0.75
DM-81	Solid state dip meter	71.00	1.50
12BY7A	Driver valves	3.25	1.00
6146B/S2001A	PA valves	9.50	1.00
6JS6C	P.A. valves matched pairs	13.75	1.00
Altai	Grid dip oscillator	47.00	2.00
Ni-cads (HP11 size)		2.50	0.20
Cigar Lighter plugs		0.55	0.20
UR67 cable 50 ohm Imax carriage £5)		0.69	0.15
BL40X balun 50 ohm 1kw		11.25	0.75
APM1 Audio Peak and notch filter		33.00	1.00
HP3A TVI high pass filter (UHF T.V.)		3.99	0.50
HP4A TVI high pass filter (UHF T.V.)		5.95	0.50
Drake TV3300 LP Low Pass Filter		21.85	1.00
Shure 444D dual impedance (500 ohm-50k ohm)		41.00	1.50
DL705 Digital autoranging multimeter		80.50	1.50
FDK KP100 squeeze morse key		69.00	2.00
Belcom LS102L 26-30mHz all mode		295.00	5.00
Daiwa CNA1001 Automatic Antenna tuner		156.00	3.00
CX3A 3-way coax switch 0-30mHz		5.95	0.50
Universal Ni-cad battery charger		7.95	1.25

AERIAL ROTATORS

CDE AR40 (5 core cable)		90.85	4.00
Channelmaster 9502B (3 core)		56.92	4.00
Alignment bearing for 9502B		15.81	1.25
Kenpro KR400RC (6 core)		115.00	4.00
KC038 lower mast clamps for KR400RC		12.00	1.50
Kenpro KR250 (3 core)		55.00	4.00
KR500 Elevation type control		112.00	2.50
ALINCO Heavy duty aerial rotator		89.00	4.00

SAGANT AERIALS

AL-144FL	Portable ground plane	23.50	2.00
EL-40X	80-40m compact dip (70ft)	32.00	2.00
MT40XE	10-15-40-80 comp dipole	39.00	2.00
Super-Rod 2	Telescopic 5/8th ant.	8.50	1.00
MG-YS	Magnetic base and cable	6.95	1.50

ADONIS MICROPHONES

MM202S	Mic. with boom & clip	24.50	1.50
MM202HG	Mic. with h'phone unit	37.00	1.50
MM202FX	Mic with flexible gooseneck	35.00	1.50
AM303	Base station mic	29.00	1.50
AM503	As above with compressor	39.00	2.00
MS10	Mobspeaker & message pad	16.25	1.50

VHF MONITOR RECEIVERS

R537	Airband portable receiver	49.50	1.50
Case	Soft case for R537	3.00	1.00
Crystals for	R537	ea. 3.75	0.25
CD6000	12v DC mobile or base	99.00	2.00
ATC720	Fully Synth. portable rec.	159.00	2.00

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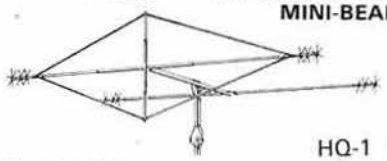

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		£	c&p
TS930S	9 Band TX General Cov Rx	1216.00	(—)
AT930	Auto ATU 80M-10M	141.00	(—)
TS830S	160-10m Transceiver 9 Bands	697.00	(—)
VFO230	Digital V.F.O. with Memories	243.00	(2.00)
AT230	All Band ATU/Power Meter	135.00	(2.00)
SP230	External Speaker Unit	41.00	(1.50)
TL922	160-10M 2kW linear	724.00	(—)
TS430S	160-10m Transceiver	736.00	(—)
PS430	Matching Power Supply	112.00	(3.00)
SP430	Matching Speaker	29.44	(1.50)
MB430	Mobile Mounting Bracket	11.27	(1.50)
FM430	FM Board for TS430	34.50	(1.00)
TS530S	H F Transceiver 9 Band	595.00	(—)
TS130S	8 Band 200W Pep Transceiver	559.00	(—)
TS130V	8 Band 20W Pep Transceiver	456.00	(—)
TL120	200W Pep Linear for TS120V	167.00	(1.50)
MB100	Mobile Mount for TS130/120	18.60	(1.50)
SP120	Base Station External Speaker	26.40	(1.50)
AT130	100W Antenna Tuner	93.00	(1.50)
PS20	AC Power Supply—TS130V	57.96	(2.50)
MC50	Dual Impedance Desk Mic	30.80	(1.50)
MC35S	Fist Microphone 50K ohm IMP	14.70	(0.75)
MC30S	Fist Microphone 500 ohm IMP	14.70	(0.75)
LF30A	HF Low Pass Filter 1kW	21.00	(1.00)
If you can't see it listed—please ask			
TW4000A	2M/70cm FM mobile 25W	469.00	(—)
TM201A	2M FM compact mobile 25W	269.00	(—)
TM401A	70cm FM compact mobile 12W	299.00	(—)
TS780	2M/70cm all mode transceiver	843.00	(—)
TR9130	2M Multimode	433.00	(—)
TS9500	70cm Multimode	419.00	(—)
BO9A	Bass Plinth for TR9130	39.30	(0.50)
TR2300	FM Portable	152.00	(—)
VB2300	10W Amplifier for TR2300	36.50	(1.50)
MB2	Mobile Mount for TR2300	21.00	(1.50)
TS780	2M/70cm all mode Base TX	843.00	(—)
TR3500	70cm Handheld	250.00	(—)
TR2500	2M Synthesised Handheld	232.00	(—)
ST2	Base Stand	51.90	(1.50)
SC4	Soft Case	13.80	(0.50)
SMC25	Speaker Mic	16.10	(1.00)
PB25	Spare Battery Pack	25.00	(1.00)
R600	Gen. cov. receiver 15-30MHz	257.00	(—)
R2000	Gen. Cov. Recvr	398.00	(—)
VC10	VHF converter for R2000 (118-174MHz)	113.00	(—)

TW4000A and TM201A now in stock

ICOM

		£	c&p
IC740	H.F. 9 Band Transceiver	769.00	(—)
IC720A	H.F. Tx + Gen. Cov. Rx	949.00	(—)
IC751	HF Tx + Gen. Cov. Rx	969.00	(—)
IC-PS20	P.S.U. for above with spkr	155.00	(—)
IC-PS15	P.S.U.	119.00	(—)
IC2KL	H.F. Linear 500 Watts O/P	915.00	(—)
IC2KLPS	P.S.U. for above	256.00	(—)
ICAT500	1·8-30MHz Auto A.T.U.	349.00	(—)
ICAT100	3.5-30MHz Auto A.T.U.	256.00	(—)
IC271E	2M Multimode Base Station	P.O.A.	(—)
IC290E	2M Multimode Mobile	379.00	(—)
IC25E	2M FM Mobile 25W	269.00	(—)
IC2E	2M Handheld	179.00	(—)
IC4E	70cm Handheld	199.00	(—)
ICBC30	Base Charger	45.00	(1.50)
ICHM9	Speaker—Microphone	12.00	(1.00)
ICML1	10 Watt 2M Booster IC2E	59.00	(1.00)
ICSM5	Desk Mic (8 pin for Icom only)	29.00	(1.00)
ICR70	General Cov. Receiver	499.00	(—)
ICOM	Dig. World Clock	59.00	(1.00)

MICROWAVE MODULES

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DATONG PRODUCTS

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VLF	Very Low Frequency Converter	29.90	(—)
FL1	Frequency Agile Converter	79.35	(—)
FL2	Multi-mode Audio Filter	89.70	(—)
FL3	Audio Filter & Notch	129.37	(—)
FL2/A	Auto Notch for FL2	39.67	(—)
ANF	Auto Audio Notch Filter	67.85	(—)
ASP	Auto RF Speech Clipper (Trio or Yaesu 4pin Plug)	82.80	(—)
D75	Manual RF Speech Clipper	56.35	(—)
RFC/M	RF Speech Clipper Module	29.90	(—)
D70	Morse Tutor	56.35	(—)
AD270	Indoor Active Antenna	47.15	(—)
AD370	Outdoor Active Antenna	64.40	(—)
MK	Keyboard Morse Sender	137.42	(—)
Codecall	Selective Call Device (Link prog)	32.20	(—)
Codecall	Selective Call Device (Switch prog)	33.92	(—)
RFA	Wideband Preamplifier	33.92	(—)
DC 144/28	2 Metre to 28MHz converter	39.67	(—)
MPU	Mains Power Unit	6.90	(—)
SRB2	Auto Woodpecker blanker	86.25	(—)

DUMMY LOADS

DL30	PL259 30W Max 150MHz	3.95	(0.75)
CT15A	WELZ PL259 50W Max 450MHz	7.95	(0.75)
CT15N	WELZ N connector 50W Max 450MHz	13.95	(0.75)
T100	SO239 100W Max 500MHz	22.95	(0.75)
T200	SO239 200W Max 500MHz	34.00	(0.75)
DL600	SO239 600W Max 350Mhz	34.00	(1.50)
CT300	WELZ SO239 1kW Max 250MHz	49.50	(2.00)

COAXIAL SWITCHES

—	2 Way Toggle Switch (H.F./2M)	6.00	(0.50)
SA450	2 Way Diecast - SO239 (500MHz)	10.00	(0.75)
SA450N	2 Way Diecast - N plugs (500MHz)	12.95	(0.75)
CH20A	2 Way WELZ - SO239 (900MHz)	17.95	(1.00)
CH20N	2 Way WELZ - N plugs (900MHz)	31.95	(1.00)
—	5 Way Western Rotary (H.F.)	14.95	(1.00)
DRAE	3 Way Rotary	15.40	(0.50)
LAR	3 Way Rotary (H.F.)	19.95	(1.25)

ROTATORS

Hirschman	RO250 VHF Rotor	45.00	(2.00)
9502B	Colorotor (Med. VHF)	56.95	(2.00)
EMR400	Alinco	89.95	(2.50)
KR400RC	Kenpro—inc lower clamps	125.00	(2.50)
KR600RC	Kenpro—inc lower clamps	175.00	(3.00)

DESK MICROPHONES

SHURE 444D Dual Impedance	43.95	(1.50)
SHURE 526T Mk II Power Microphone	53.00	(1.50)
ADONIS AM 303 Preamp Mic. Wide Imp.	29.00	(—)
ADONIS AM 503 Compression Mic 1	39.00	(—)

TEST EQUIPMENT

Drae VHF Wavemeter 130-450MHz	27.50	(—)
DM81 Trio Dip Meter	71.00	(0.75)
MMD50/500 Dig. Frequency meter	75.00	(—)

TELEREADERS (CW & RTTY)

TONO 500	299.00	(—)
TONO 9000	669.00	(—)

YAESU

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FT1	Superb H.F. Transceiver	1395.00	(—)
FT980	H.F. Transceiver	1150.00	(—)
FT102	AM Band Transceiver	685.00	(—)
SP102	Matching Speaker	49.00	(2.00)
FC102	Matching A.T.U.	225.00	(2.50)
FC902	All Band A.T.U.	135.00	(1.50)
SP901	External Speaker	31.00	(1.50)
FT707	8 Band Trans 2000W PEP	499.00	(—)
FP707	Matching Power Supply	110.00	(5.00)
MMB2	Mobile Bracket for FT707	17.25	(1.00)
FT77	Economy H.F. transceiver	459.00	(—)
FT757 GX	H.F. Trans. (Gen. cov. rec.)	P.O.A.	(—)
FRG7700	200KHz-30MHz Gen. Coverage Receiver	335.00	(—)
FRG7700M	As above but with Memories	389.00	(—)
FRT7700	Antenna Tuning Unit	42.55	(1.00)
FT208R	2M FM Synth Handheld	199.00	(—)
FT708R	70cm FM Synth Handheld	209.00	(—)
NC7	Base Trickle Charger	30.65	(1.30)
NC8	Base Fast/Trickle Charger	50.60	(1.50)
NC9C	Compact Trickle Charger	8.00	(0.75)
FNB2	Spare Battery Pack	19.95	(0.75)
PA3	12V DC Adaptor	14.20	(0.75)
FT726R(2M)	V.H.F. Multimode Base	675.00	(—)
FT480R	2M Synthesised Multimode	P.O.A.	(—)
FT780R	70cm Synthesised Multimode (1·6MHz Shift)	P.O.A.	(—)
FT230R	2M 25W FM Transceiver	239.00	(—)
FT790R	70cm Portable multimode	299.00	(—)
FT290R	2M Portable Multimode	249.00	(—)
MMB11	Mobile Mounting Bracket	24.90	(1.00)
CSC1	Soft Carrying Case	3.85	(0.75)
NC11C	240V AC Trickle Charger	9.20	(0.75)
FL2010	10W Linear for FT290R	59.00	(1.20)
Nicads	2·2 amp HR Nicads Each	2.50	(—)
FF501DX	HF Low Pass Filter 1kW	25.70	(1.00)
FSP1	Mobile Ext Speaker 8 ohm	11.15	(0.75)
YH55	Headphones 8 ohm	9.95	(0.75)
YH77	Lightweight phones 8 ohm	9.95	(0.75)
QTR24D	World Clock (Quartz)	31.45	(0.75)
YM24A	Speaker/Mic 207/208/708	18.40	(0.75)
YD148A	Stand Mic	22.60	(1.50)
YM38	Stand Mic dual imp 8 pin	27.20	(1.50)

Many more accessories in stock—please phone to enquire.

SCANNING RECEIVER

SX200N VHF-UHF

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£299.00

TV INTERFERENCE AIDS

Ferrite Rings 1½" dia. per pair		0.80	(0.20)
Toroid Filter TV down Lead		2.50	(0.50)
HPF2	High Pass Filter with tuned notch	7.95	(—)
Trio Low Pass Filter LF30A 1kW		21.00	(1.00)
Yaesu Low Pass Filter FF501DX 1kW		25.70	(1.00)
LP30 Low Pass Filter 100W		3.95	(0.50)

POWER SUPPLIES

DRAE	4 amp	30.75	(—)	12 amp	74.00	(—)
	6 amp	49.00	(—)	24 amp	105.00	(—)
BNOS	6 amp	48.00	(—)	25 amp	125.00	(—)
	12 amp	86.00	(—)	40 amp	225.00	(—)

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MODEL SRB2

is the definitive and long awaited answer to the Russian Woodpecker. Others claim to solve the problem of the distinctive RAT A - TAT TAT of the Russian radar system. **DATONG are the first to succeed with a fully automatic blanker.**

With the introduction of model SRB2 the Woodpecker is dead. Completely automatic in operation, SRB2 locks onto the Woodpecker within a second or so of its appearance and blanks it out completely. SRB2 adjusts automatically and continuously to changing pulse widths and phase changes that defeat the manual blankers. SRB2 can even deal with more than one Woodpecker at a time. User selectable between 10 and 16hz repetition rates, SRB2 connects in series with loudspeaker and antenna leads, and is equally effective on SSB, AM and CW. A power supply of 10 to 16 volts @ 150 ma is required.

Price: **£75.00 + VAT** (£86.25 Total)

MODEL ANF

The value for money, stand alone automatic notch filter that doubles as a CW filter. Model ANF is small in size but neat in looks and big in performance. Simply connect model ANF in series with the loudspeaker lead of your receiver and from then on heterodynes, whistles and other steady tones that often make listening on the crowded amateur and short wave bands hard work will vanish automatically, as model ANF notches them out.

A bargraph LED display shows you the frequency of the offending interference. At the push of a button model ANF becomes a good CW filter eliminating all but the signal you want to hear. Manual or automtaic operation in notch and peak modes, plus automatic frequency control, makes model ANF extremely versatile and easy to use.

A power supply of 10 to 16 volts DC @ 100 ma is required. Model ANF is supplied with connecting leads, and is identical in size to model SRB 2

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	Qty.	Unit Price	Unit Total
Model SRB2		£86.25	
Model ANF		£67.85	
		Total £	

Prices include Post, Packing and VAT (U.K.)

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FT102 £685 inc. VAT @ 15% & SECURICOR

NEW LOW PRICE

★ 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!
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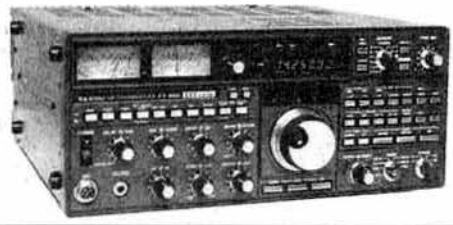
★ Fixed bandwidth filters, parallel or cascade
★ IF notch (455kHz) *and* independent audio peak
★ Noise blanker adjustable for pulse *width*
★ External Rx and separate Rx antenna provisions
★ *Three* 6146B in special configuration—40dB IMD!
★ Extra product detector for checking Tx IF signal
★ Dual meter, 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, OSY
FC102:—ATU, 1·2KW, 20/200/1200 W FSD PEP, wire
FAS-1-4R:—4 way waterproof antenna selector

FT980 ~~£1,215~~ £1,150 inc. VAT @ 15% & SECURICOR



INSTANT FINANCE

★ Notch filter in TF (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.
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★ Multi channel memory + programmable scan limits.

FT707 ~~£515~~ £499 inc. VAT @ 15% & SECURICOR

FREE FTV707 transverter frame with every FT707 List £79.00

★ 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 blanket with local loop AGC.

*Option

SMC FM MODIFIED VERSION AVAILABLE; £40 EXTRA

FT77 ~~£555~~ £495 inc. VAT @ 15% & SECURICOR

FREE CREDIT COVER

★ 80-10 metres including WARC allocations.
★ Multimode LSB-USB-CW (W) CW (N)* *and* FM.
★ 100W PEP output (IOW "S" version).
★ No tune design—inbuilt SWR meter.
★ Only 3¾ × 9½"—Less than a foot deep!
★ Dual selectable pulse width noise blanker.

FT77	Transceiver 100W output	
FT77S	Transceiver 10W output	
MARK 7	Crystal Marker board	£9.60
FMU77	FM Unit	£25.30
XF8,9HC(N)	600Hz or 300Hz (N)	£26.05
FV707DM	Digital Memory VFO	£200.00
FC700	Antenna Tuner	£99.65
FP700	Mains P.S.U.	£110.00
FTV707	Transverter, frame only	£79.00

Modules: 432 £195.00 144 £109.65 70 £84.70

SMC OSCAR 2 10M FM £49.00 inc.

Join the many others who have found that operating 10M FM can be a pleasant alternative to the overcrowded 2M band. The SMC Oscar 2 10M gives you 40 channels, channel 1 being 29.310MHz and channel 40 29.7MHz, a power o/p of 5 watts minimum and a receive sensitivity of better than 3μV for 12db sinad. Also for your enjoyment when the band opens up, we have incorporated a—100kHz repeater shift (by using the original front panel Hi/Low power switch), so from the car or at home you can enjoy 10M FM without having to pay £500 for an HF transceiver.

Accessories		*Inc*	*P/P*
SMCGP27	¦ Wave vertical with radials	£24.15	£2.50
SMCVA27	¦ Wave vertical no radials	£20.70	£2.50
SMC11V11S	Glass fibre shortened ground plane	£29.90	£2.50
SMC10SE	10M Mobile whip	£13.80	£2.00
SMCGCCA	Gutter mount and cable for 10SE	£9.95	£1.80
SMCSOCA	4M cable assembly for 10SE	£5.00	£1.20
FLEXI 10	G. Whip mobile 10-80M	£49.00	£2.00
MULTIMOBILE	G. Whip mobile 10, 15, 20M	£30.48	£1.85
FLEXIWHIP	G. Whip 10M mobile	£18.11	£1.85
GW BASE	Base for all G. Whip antennas	£5.75	
SMCT3170L	Twin meter SWR bridge	£14.95	F.O.C.
SMC100LP30	Low pass filter	£5.30	F.O.C.
SMCRU120406	4 amp DC power unit	£15.00	£2.00
FSP1	Extension L/S	£11.15	F.O.C.

Access

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FT77	Fitted with FM unit & marker unit	£435	FT902DM	£795.00
FP700	Power unit for FT77	£99.00	FT101ZDAM	£600.00

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FANTASTIC PRICE REDUCTIONS ON OVERSTOCKED ITEMS AND DISCONTINUED LINES: LIMITED STOCKS AVAILABLE

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FV101 DM KEYBOARD VFO

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2M FM TRANSCEIVER

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MULTIMODE TRANSCEIVERS EVER!!
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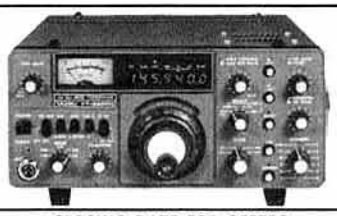

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New Whittington, Chesterfield.
Chesterfield (0246) 453340
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BUCKLEY
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Unit 27 Pinfold Workshops.
Pinfold Lane, Buckley.
Buckley (0244) 549563
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SMC (Stoke)
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Kidsgrove (07816) 72644
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SMC (Humberside)
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Grimsby, Lincolnshire.
Grimsby (0472) 59388
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ANTENNAS VHF

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4Y/4M	Yagi 4 element	7dBd	£29.90	£2.20
PMH2/4M	Phasing harness 2 way		£16.10	£1.50
H0/2M	Halo head only	0dBd	£5.98	£1.20
HM/2M	Halo with 24" mast	0dBd	£6.55	£1.50
C5/2M	Colinear omni vert	4·8dBd	£54.62	£2.50
LWS/2M	Yagi 5 element	7·8dBd	£14.37	£2.50
LW8/2M	Yagi 8 element	9·5dBd	£17.82	£2.50
LW10/2M	Yagi 10 element	10·5dBd	£24.15	£2.50
LW16/2M	Yagi 16 element	13·4dBd	35.07	£3.20
14Y/2M	Yagi 14 element	12·8dBd	£36.23	£3.20
PBM10/2M	10 ele Parabeam	11·7dBd	£44.85	£3.20
PBM14/2M	14 ele Parabeam	13·7dBd	£55.77	£3.20
Q4/2M	quad 4 element	9·4dBd	£29.32	£2.50
Q6/2M	Quad 6 element	10·9dBd	£39.10	£2.50
Q8/2m	Quad 8 element	11·9dBd	£44.85	£2.50
D5/2M	Yagi 5 over 5 slot	10dBd	£25.30	£2.50
D8/2M	Yagi 8 over 8 slot	11·1dBd	£34.50	£2.50
5XY/2M	Yagi 5 ele crossed	7·8dBd	£28.17	£2.50
8XY/2M	Yagi 8 ele crossed	9·5dBd	£35.65	£2.50
10XY/2M	Yagi 10 ele crossed	10·8dBd	£46.00	£2.50
PMH2/C	Harness cir polarisation		£9.77	£1.50
PMH2/2M	Harness 2 way 144MHz		£12.65	£1.50
PMH4/2M	Harness 4 way 144MHz		£28.75	£1.50
C8/70	Colinear Omni Vert.	6·1dBd	£62.10	£2.50
D8/70	Yagi 8 over 8 slot	12·3dBd	£25.87	£2.50
PBM18/70	18 ele Parabeam	13·5dBd	£32.20	£2.50
PBM24/70	24 ele Parabeam	15·1dBd	£42.55	£2.50
LW270	Yagi 24 element	14·8dBd	£27.02	£2.50
MBM28/70	28 ele Multibeam	11·5dBd	£21.27	£2.50
MBM48/70	48 ele Multibeam	14·0dBd	£35.65	£2.50
MBM88/70	88 ele Multibeam	16·3dBd	£48.87	£2.50
8XY/70	Yagi 8 ele crossed	10dBd	£42.55	£2.50
12XY/70	Yagi 12 ele crossed	12dBd	£52.90	£2.50
PMH2/70	Harness 2 way		£10.35	£1.50
PMH4/70	Harness 4 way		£22.42	£1.80
CR2/23CM	Corner reflector	13·5dBd	£40.25	£2.50
PMH2/23CM	Harness 2 way		£31.05	£1.50
SMC-HS				
SMCGDX1	Discone 80-480MHz 3dB¦ 3.3'		£40.25	£2.50
SMCGDX2	Discone 50-480MHz 3dB¦ 6.2'		£49.45	£2.50
GDXA	Discone 100-440MHz 3dB¦		£33.75	£2.50
SMCCVHFL	Discone 65-520MHz Rx only 5.0'		£15.70	£2.50
SMCGP23	Colinear 2M 3 × ½ wave 7.8dB¦ 14.6'		£39.85	£2.50
SMCGP144W	Colinear 2M Multi ½ wave 6.5dB¦ 10.2'		£27.60	£2.50
SMCGP2M	½ wave c/w ground plane 3.4dB¦ 4.6'		£18.00	£2.50
SMCSQ144	2M Swiss Quad for vertical mounting		£57.60	£2.50
SMCGP432X	Colinear 70cm 3 × ½ wave 6.8dB¦ 5.6'		£29.90	£2.50
SMC702V	Colinear 2.8dB¦ 2M, 5.7dB¦ 70cm 3.6'		£29.90	£2.50
SMC2HB6	6M HB9CV 2 Drven elements		£19.95	£2.50
SMCHS770	144/432 Duplexer 50W 30dB isolation		£15.35	£1.50
SMC2QW	Element 144MHz 1/4 wave ød¦		£2.30	£1.50
SMC2NE	Element 144MHz 5/8 wave 3.ød¦		£6.90	£1.80
SMC2VF	Element 144MHz 1/2 wave 3.0dB¦		£11.50	£1.80
SMC78F	Element 144MHz 7/8 wave 4.5dB¦		£13.80	£2.00
SMC78B	Element 144MHz 7/8 wave 4.5dB¦		£13.80	£2.00
SMC88F	Element 144MHz 8/8 wave 5.2dB¦		£18.80	£2.00
SMC258	Element 432MHz 2×5/8 5.5dB¦		£12.65	£1.80
SMC358	Element 432MHz 3×⅝ 6.3dB¦		£16.85	£1.80
SMC70N2M	2M 2.7dB¦ 70cm 5.1dB¦		£16.85	£1.80
SMCHS770	144/432 duplexer 50W 30dB isolation		£15.35	£1.50
SMCGCCA	Gutter clip 4 mtrs Cable		£9.95	£1.80
SMCS0MM	Magnetic base c/w 4M cable		£9.95	£1.80

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Complete with bases and cable			p/p
340COM	¼ × Standard	£6.80	£1.80
310COM	¼ × Swivel	£8.10	£1.50
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440COM	¼ × Standard	£7.71	£1.50
330COM	¼ × Swival	£10.00	£1.50
341COM	¼ × Sprung	£12.31	£1.50
092	Magnetic Mount	£10.75	£1.50
350	¼ × Standard	£14.26	£1.50
351	¼ × Sprung	£15.01	£1.50
091	Magnetic Mt ¼ ×	£10.75	£1.50

NB: PRICES INCLUDE VAT AT 15%
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ANTENNAS HF

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12AVQ	Vertical 10, 15, 20, 14.0'H	£50.60	£2.75
14AVQ/WB	Vertical 10, 15, 20, 40, 18.0'H	£64.40	£2.75
18AVT/WB	Vertical 10, 15, 20, 40, 80M 25.0'H	£113.85	£2.75
14RMQ	Roof mounting Kit, 12AVQ, 14AVQ & 18AVT	£38.52	£2.75
18V	Vertical 10, 15, 20, 40 80M 19.0'H	£36.22	£2.75
103BA	3 Ele Yagi 10 metres 17.0'LE 8.0'B	£67.85	£3.50
105BA	5 Ele Yagi 10 metres 18.5'LE 24.0'B	£155.25	£3.95
153BA	3 Ele Yagi 15 metres 23.0'LE 12.0'B	£90.05	£3.50
155BA	5 Ele Yagi 15 metres 24.5'LE 26.0'B	£236.90	£5.90
203BA	3 Ele Yagi 20 metres 35.0'LE 16.0'B	£178.25	£4.90
204BA	4 Ele Yagi 20 metres 36.5'LE 26.0'B	£286.35	£7.30
205BA	5 Ele Yagi 20 metres 36.5'LE 34.0'B	£396.75	£9.40
402BA	2 Ele Yagi 40 metres 43.0'LE 16.0'B	£247.25	£6.50
DB10/15A	3 Ele Yagi 10-15M 23.0'LE 13.0'B	£196.95	£4.80
TH3JNR	3 Ele Yagi 10-15-20M 24.2'LE 12.0'B	£202.40	£3.50
TH2MK3	2 Ele Yagi 10-15-20M 27.3'LE 6.0'B	£169.06	£3.50
TH3MK3	3 Ele Yagi 10-15-20M 27.0'LE 14.0'B	£274.85	£5.30
TH5DXX	'Thunderbird' 5 Ele 31.0'LE 18.0'B	£419.75	£6.70
TH6DXX	'Thunderbird' 6 Ele 31.1'LE 24.0'B	£396.75	£8.50
TH7DXX	'Thunderbird' 7 Ele 31.0'LE 20'TR	£511.75	£8.75
HYQUAD	2 Ele Quad 10, 15, 20M 13.5'TR 8.0'B	£354.20	£6.00
18TD	Dipole Tape 10, 15, 20, 40, 80M 132	£121.90	£2.80
JAYBEAM			
VR3	Vertical 10-15-20M. DC short 6lb 13.5'H	£46.00	£2.50
TB3	3 Ele Yagi 10-15-20M 14.6'TR 14.1'B	£189.75	£5.40
MINI BEAM			
C4	Vertical Miniature 10-15-20M 8lb 11.5'H	£59.00	2.50
HQ1	'Mini' Quad beam 10-15-20M 11.0'LE 4.5'B	£139.00	£4.00
G4MH MINI BEAM			
	Mini Beam 10-15-20M	£82.50	£4.00
SMC TRAPPED DIPOLE	10-80M 119' Potted Traps.		
SMCTD/HP	14SWG H/D c_{μ} traps 1000W PEP	£43.41	£2.50
SMCTD/P	Portable c_{μ}erylene 75' coax	£59.80	£2.50
SMCHPT	High Power 7MHz 1000W per pair	£15.52	£1.80
SMC-HS ANTENNA			
SMCHP5V	vertical 10, 15, 20, 40, 80M 15.7'	£54.80	£2.50
SMCHP5R	Radial kit loaded 6.5'-7.3'	£34.90	£2.50
SMCHP3VNB	Vertical 10-18-24M 1000W PEP 16.0'H	£51.35	£2.50

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

ANTENNA ROTATORS

RLD3	Bell	5 Core Light Duty		£40.25
Bell	5 Core Light Dury	£40.25		
AR30	Offset	5 Core Light Duty		£56.35
KP250	Bell	6 Core Lighter Duty		£54.91
9502B	Offset	3 Core Lighter Duty		£56.92
AR22	Bell	4 Core Medium Duty		£67.85
9508	Offset	3 Core Medium Duty		£80.21
AR40	Bell	5 Core Medium Duty		£90.85
BT1	Bell	5 Core 4 Preset medium		£91.43
KR400	Bell	6 Core Matches KR500		£97.75
KR500	Thro	6 Core Elevation		£112.12
AR50	Bell	5 Core 5 Position Medium		£113.85
KR400C	Bell	6 Core Medium Duty		£114.94
CD45	Bell	8 Core Heavy Duty		£136.85
KR600RC	Bell	8 Core Heavy Duty		£163.30
HAM IV	Bell	8 Core Heavier Duty		£258.75
KR200RC	Bell	8 Core heavier Duty		£314.52
T2X	Bell	8 Core Very Heavy Duty		£327.75
H300	Bell	8 Core Digital Readout		£493.35
Control Cable				
RC4W	4 Way	28p/mtr	Carriage	£1.80
RC5W	5 Way	33p/mtr	Carriage	£1.80
RC6W	6 Way	51p/mte	Carriage	£1.80
RC8W	8 Way	55p/mtr	Carriage	£1.80
9523 Support Bearing 9502 **£15.81**			Carriage	£2.50
KCO 38 Lower Mast Clamp KR400 600 **£12.05**			Carriage	£2.50

Prices including VAT and Carriage, but accessories are extra unless sent with rotators

STATION ACCESSORIES

HANSEN			
FS710H	1.8-60MHz 15/150/1500W Pep	£89.70	FOC
FS710V	50-150MHz 15/150W Pep	£89.70	FOC
FS50HP	1.8-80MHz 20/200/2000W Pep	£89.70	FOC
FS50VP	50-150MHz 20/300W Pep	£89.70	FOC
FS500H	1.8-80MHz 20/200/2000W Pep	£69.75	FOC
FS500V	50-150MHz 20/200W Pep	£69.75	FOC
FS300H	1.8-80MHz 20/200/1000	£46.40	FOC
FS300V	50-150MHz 20/200	£46.40	FOC
FS200	1.8-150MHz 20/200 Pep	£50.60	FOC
FS001M	1.8-30Mhz 20/200W Pep	£51.35	FOC
FS601MH	1.8-30MHz 200/2000W Pep	£51.35	FOC
FS800M	50-150MHz 20/200W Pep	£51.35	FOC
FS600M	430-440MHz 5/20W Pep	£51.35	FOC
FS210	1.8-150MHz 20/200W Auto SWR	£55.20	FOC
FS301M	2-30MHz 20/200W	£36.65	FOC
FS301MH	200/2000W	£36.65	FOC
FS302M	50-150MHz 20/200W	£35.65	FOC
FS711H	2-30MHz 20/200 W Head	£36.80	FOC
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RADIO SOCIETY OF GREAT BRITAIN

THE NATIONAL SOCIETY REPRESENTING ALL UK RADIO AMATEURS

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

PATRON: HRH PRINCE PHILIP, DUKE OF EDINBURGH, KG

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

Headquarters and registered office: **Alma House, Cranborne Road, Potters Bar, Herts EN6 3JW**
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Secretary and general manager: D. A. Evans, G3OUF

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Region 11	*(Clwyd, Gwynedd)*	B. H. Green, GW2FLZ. Tel 0492 49288.
Region 12	*(Grampian, Highland, Island Authorities, Tayside)*	M. R. Hobson, GM8KPH. Tel 0796 2140.
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Correspondence to RRs and honorary officers should be addressed directly to them (QTHR), not to RSGB HQ

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Affiliated societies: £14.50 (including *Radio Communication*) **£8.70** (excluding *Radio Communication*)
(Subscriptions include VAT where applicable)

RSGB QSL BUREAU

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

A list of QSL Bureau sub-managers was published in the January 1983 issue of *Radio Communication*, and amendments are published under "Amateur Radio News".

RSGB NEWS SERVICES

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

GB2RS Broadcasts
Sunday news broadcasts from stations throughout the UK using the callsign GB2RS on frequencies in the 3·5, 7 and 144MHz bands.

Details of frequencies, locations and times were last published in the June 1983 issue.

Amendments are published under "Amateur Radio News". A full schedule can be obtained free on request by sending a large sae to the Membership Services Dept, RSGB HQ.

EDITORIAL

SHUTTLE DIPLOMACY?

Those of us well and truly involved with amateur radio need little convincing about what a remarkably good activity it can be at any number of levels. But herein lies a real danger: it is all too easy for us to presume that the value of amateur radio is equally obvious to those outside the hobby, whether as a leisure activity or as a serious form of self training. It seems fair comment that our record in public relations leaves much to be desired: it has been suggested on more than one occasion that cb achieved more impact on the general public in a few years than amateur radio did in decades.

The one-and-a-half-million radio amateurs in the world conduct their hobby in a way which normally has little publicity value. Contrast this with the early cb activity, before it was legalized, which flouted the law and was thus a natural for media coverage; an approach which radio amateurs could hardly have emulated.

At the same time, the last thing we can afford to be is complacent: in the long term whether we retain (let alone extend) our amateur allocations depends on the status of amateur radio among those outside the hobby who actually make the decisions about it. The recent events in Belgium, in which it appeared for a time that they would lose several of their amateur allocations almost overnight, is a dramatic reminder of our vulnerability in this respect.

As readers will be well aware, the next mission of the space shuttle *Columbia*, which is now expected to begin on 28 October, will have on board W5LFL. It is planned that he will spend up to an hour each day of the flight making contacts on 144MHz with fellow amateurs. Bearing in mind the political, defence, technical and commercial pressures surrounding each shuttle mission, it must be regarded as very much a feather in the cap of amateur radio that such a proposal was even considered by NASA, let alone regarded as part of the mission. To the outside world, the inevitable association of amateur radio with the prestige and appeal of the high technology of the shuttle must be regarded as publicity of the best sort for amateur radio—as well as fun for the amateurs themselves.

How best can we capitalize on the opportunity? Well, RSGB HQ will do its part by ensuring that informative press releases are made available to the media at the national level. However, to capitalize fully, we also need to maximize the effect at the local level, and here we must look very much to the representatives in the field and to affiliated societies to make this happen. To assist their efforts, the recent *Council Letter* circulated to RRs, ARs and affiliated societies included a quite comprehensive "press kit" which should form a useful basis for taking advantage of what is really a unique opportunity to publicise amateur radio in such an imaginative context.

David Evans, G3OUF

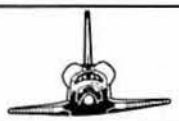
Amateur Radio News

Licensing news

Since 19 September 1983, all amateur radio licences have been issued and renewed by Post Office Headquarters in Chesterfield, Derbyshire, on behalf of the Secretary of State for Trade & Industry. The transfer of the operation from the Radio Regulatory Division was announced on 28 July 1983 by Mr Alex Fletcher, the minister responsible for corporate and consumer affairs in the DoTI, in reply to a Parliamentary question from Mr Geoff Lawler MP. Mr Fletcher said that the Post Office would computerize the operation as soon as possible, and would be prepared to guarantee a turn-round time of five working days in normal conditions and 10 working days at peaks. This would help to ensure that the recent improvement in the speed of issue of amateur licences would be maintained, and it is seen by the Society as part of some badly-needed improvements: of course the recent increases in the licence fee is related to these changes.

Currently the Post Office carries out the issue of cb licences on behalf of the Secretary of State, but there will not be a facility for the issue of amateur radio licences over the counter at Post Offices: all applications will be processed by post. Application for a new licence should now be sent to the Radio Amateur Licensing Unit, Chetwynd House, Chesterfield, Derbyshire S49 1PF. Application forms can also be obtained from this address. The telephone number is Chesterfield (0246) 207555. An amateur holding a current licence which falls due for renewal in October or thereafter will be sent a fee reminder by the Post Office. Renewals for October will have been issued during the week commencing 19 September 1983.

Finally, the RSGB now issues all special event callsigns using the GB prefix on behalf of the Secretary of State for Trade & Industry.



Shuttle news

The STS-9 space shuttle mission is still due to take off on 28 October 1983 as we go to press (see last month's item). The Society has been working closely with ARRL and, through them, NASA, and it will be remembered that Dr Garriott's original intention was to use frequencies in the 144MHz band which either were not convenient for the amateur service in Region 1 or which were in the beacon and repeater sub-bands. It transpires that the only Region 1 simplex frequency which is compatible with W5LFL's Motorola 20kHz-step handheld transceiver is 145·550MHz (S22), and this will therefore be the main frequency used when overflying Region 1.

As far as possible, the Society will publish full details of operating and overflying times on GB2RS and in the Headline News Service, since these final details have not yet been confirmed. All final details will be broadcast as soon as we have them.

The flight of STS-9 carrying W5LFL represents a major opportunity to publicise amateur radio, and the Society has already sent preliminary press releases to all major daily newspapers and the broadcasting media. This could be a good opportunity for your club to gain some excellent publicity for itself and for amateur radio and please do not hesitate to contact John Nelson at headquarters for assistance and advice in this field. (See also "Editorial" this month.)

IRAS

The Society has heard that early in August the IRAS satellite launched from Vandenberg AFB last January began to produce some significant results. IRAS, or Infra-Red Astronomical Satellite, has a powerful infra-red detector system on board: it has discovered that there is planetary-type debris surrounding the star Vega some 26 light years away.

Members could be forgiven for wondering what this has to do with amateur radio! The connection is admittedly a little tenuous, but the front cover of the November 1981 issue of *Radio Communication* carried a colour photograph of the dish antenna which is used to receive all the data from the satellite: it is located at Chilton in Oxfordshire, and the photograph was taken during an RSGB visit. A senior engineer on the IRAS project is a well-known American radio amateur.

Raynet frequencies

As is well known, the 144MHz band is very popular and, indeed, in large cities and under good propagation conditions it can sound more like 14MHz: the IARU band plan is designed so that users of different modes and with differing interests can co-exist happily as far as possible. One area of difficulty, however, had been those 144MHz frequencies used by Raynet in the UK which are allocated in the IARU band plan to the beacon sub-band, ie 144·850MHz, and 144·875MHz. Certain beacons, notably HB9HB on 144·865MHz, become unusable to the dx fraternity when Raynet uses either of these frequencies, and there have obviously been conflicts of interest. On the one hand, Raynet must have secure frequencies on which to operate and exercise, whereas on the other the Society has a commitment to IARU to observe, as far as possible, the international band plans which have always worked well and been beneficial as far as the vast majority of operators is concerned.

Obviously there is no question that in a genuine emergency situation, priority should always be given to emergency traffic on ANY frequency, whichever band or part of a sub-band it is in. Genuine emergencies are, mercifully, fairly rare, but Raynet puts a good deal of effort into planning for them, and four frequencies are used in the 144MHz band—this number of channels has been found necessary so as to minimize mutual interference between adjacent groups. All four frequencies, therefore, are used for training exercises, and are continuously monitored for activity. In order to resolve the conflict, the Raynet Committee has agreed to recommend to Raynet members that they conform with the IARU band plan and, as a first step, the vacation of 144·875MHz in favour of 144·775MHz. The usage of this frequency will obviously be subject to local custom, and there is also a financial aspect: some Raynet operators are required to operate comparatively simple crystal-controlled fixed-channel equipment provided by local authorities.

Raynet activity on the 144·875MHz is expected to cease by 1 January 1984 at the latest. While it, and 144·850MHz, remain in use, Raynet members have been asked to use a maximum of 25W erp and vertical polarization only. In the longer term, the Society's VHF Committee has been asked to attempt to secure frequencies for Raynet use within the UK, and also to consider the problem of the conflict between the Raynet 144·850MHz frequency and the fact that the IARU beacon sub-band commences at 144·845MHz.

The Society is anxious to see a resolution of this long-standing conflict with satisfaction to all parties.

Regional representatives

Region 10. The result of the recent ballot to fill the vacancy for a representative in this region was:

E. J. Case, GW4HWR	54 votes
M. Jones, GW4HOQ	31 votes

Mr E. J. Case has therefore been elected.

Region 14. Mr V. J. Kusin, GM4HCO, has resigned from the post of Region 14 representative because of pressure of work. An election will therefore be necessary to fill the vacancy.

Any five corporate members resident in Region 14 (Central, Dumfries and Galloway, Strathclyde) may nominate any other qualified corporate member resident in Region 14 for the office of Region 14 representative. Each nominator may not nominate more than one person to fill the vacancy.

All nominations must be made in writing and be delivered together with the written consent of the nominee to accept office if elected to: Mr D. A. Evans, Secretary/General Manager, RSGB, Alma House, Cranborne Road, Potters Bar, Herts EN6 3JW, on or before Monday 14 November 1983.

In the event of more than one person being nominated, a ballot will be held, details of which will be published in the January 1984 issue of *Radio Communication*.

RSGB PRESIDENT 1984

The RSGB Council has elected Mr R. G. Barrett, GW8HEZ, to be the Society's President next year

"Bob" Barrett is currently executive vice-President and zonal Council member for Wales. Before being elected to Council in 1980 he was Region 10 representative for five years.

He will be installed as President at a social function to be held at Cardiff Castle on 14 January 1984, details of which will be published in the December issue of *Radio Communication*.

Merriman Report published

The report of the Merriman Committee, otherwise known as the Independent Review of the Radio Spectrum (30-960MHz) has been published and can be obtained from Her Majesty's Stationery Office at a cost of £8.40. Broadly speaking, its conclusions are that a more positive approach to regulation of the radio frequency spectrum is needed and that, contrary to popular belief, there is no prospect of any significant reserve of under-used spectrum being found to meet the growing needs of radio services.

An analysis of the main features of the Merriman Report will be given in a future issue of *Radio Communication*, but as far as the radio amateur is concerned there are no proposals or recommendations which will immediately affect amateur allocations. The recommendations of the interim report, which was published in September 1982, are still current and some are being actioned at the present time—the accelerated cessation of television broadcasting in Band 1, for example. The interim report recommended an amateur allocation at 50MHz following an RSGB submission, and we continue to feel optimistic about the possibilities of an allocation in this area of the spectrum.

10, 18 and 24MHz

Headquarters is sometimes asked to give details of which countries have access to the 10, 18 and 24MHz bands. The latest information available is as follows:

10MHz—Algeria, Australia (not 10,137·5-10,145·5kHz), Austria, Bermuda, Botswana, Canada, Cayman Islands, Colombia, Costa Rica, Denmark, Djibouti, Commonwealth of Dominica, Faroe Islands, France, Federal Republic of Germany, Honduras, Indonesia, Israel, Japan, Luxembourg, Malaysia, Malta, Monaco, Netherlands, Netherlands Antilles, New Zealand (10,100-10,125kHz and 10,135-10,150kHz), Nicaragua, Nigeria, Norway, Panama, Papua New Guinea, San Marino, Solomon Islands, South Africa, Spain (10,107·5-10,113·5kHz), Surinam, Switzerland, Syria, Tonga, Trinidad & Tobago, United Kingdom, USA (10,100-10,109kHz and 10,115·150kHz), Western Samoa and Yugoslavia.

18MHz—Algeria, Australia (not 18,071-18,079kHz, 18,101-18,109kHz, 18,121-18,134kHz, 18,141-18,149kHz and 18,156-18·164kHz), Austria, Botswana, Cayman Islands, Colombia, Costa Rica, Denmark, Djibouti, Faroe Islands, France, Federal Republic of Germany, Honduras, Monaco (not 18,103-18,116kHz, 18,129kHz, 18,135kHz and 18,165kHz), Netherlands, Nicaragua, Nigeria, Norway, Oman, Panama, San Marino, South Africa, Switzerland, Syria, Tonga, Trinidad & Tobago, United Kingdom and Yugoslavia.

24MHz—Algeria, Argentina, Australia (not 24,896-24,904kHz), Austria, Botswana, Cayman Islands, Colombia, Costa Rica, Denmark, Djibouti, Faroe Islands, France, Federal Republic of Germany, Honduras, Monaco, Netherlands, Nicaragua, Nigeria, Norway, Oman, Panama, San Marino, South Africa, Switzerland, Syria, Tonga, Trinidad & Tobago, United Kingdom and Yugoslavia.

The above information was obtained from the IARU Calendar No 117 dated 30 June 1983, and has quite possibly been added to since that date.

The Society is delighted that, through its work, radio amateurs in the United Kingdom had early access to all three bands.

QSL Bureau

The QSL Bureau will be closed during the whole of November, and members are requested NOT to send cards to G3DRN, QSL Bureau manager, during that period.

G4CAA-CZZ series. Mr P. Jobson, G3HLF, sub-manager for this series, now lives at 52 Old Road West, Gravesend, Kent DA11 1LN.

G3EAA-HZZ series. Mr S. L. Newport, G4DEV, sub-manager for this series, now lives at 18 Chacewater Crescent, Barbourne, Worcester WR3 7AN.

GB series. After many years of sterling service, Mr C. Turner, G8NL, has retired from the position of sub-manager for this series, and the Society thanks him for his services. The new sub-manager for this series is Mr G. Newman, RS39157, "Little Gables", Flordon Road, Newton Flotman, Norwich, Norfolk NR15 1QX.

The organizers of special event stations are requested to utilize this section of the Society's QSL Bureau if they wish to collect their incoming cards—the appointment of a "QSL manager" by the organizers only results in unclaimed cards taking up valuable space in the Bureau because routeing instructions are invariably omitted from the cards.

Unclaimed cards. It has previously been Society policy to retain unclaimed cards for three months before destroying them. However, space is now so much at a premium that, in future, cards will be retained for one month only, which should give ample time for those wishing to receive cards to keep their sub-manager well supplied with cards.

All sub-managers are therefore being asked to dispose of all unclaimed cards on hand at the end of 1983, and thereafter to take similar action each time they receive a parcel of cards from the Bureau.

RSGB Region 12 ORM

An official regional meeting will be held on

Saturday 15 October 1983

commencing at 2pm

at the

Caledonian Hotel, Inverness

Mr F. Hall, GM8BZX, Zone G Council member, and a member of RSGB HQ staff will be among those attending.

Further information from Mr M. R. Hobson, GM8KPH, 4b Tummel Crescent, Pitlochry, Perthshire PH16 5DF.

29MHz fm operation

FM operation on the 28MHz band in the UK has, until recently, centred around 29,600kHz—a frequency generally accepted as the fm simplex calling channel. However, the introduction of legalized 27MHz fm cb has caused the situation to change rapidly. Cheap transceivers which cover 27,600 to 28,000kHz in 10kHz steps to provide the 40 authorized cb (fm) channels are now readily available, and most of them are capable of being modified—some very simply and easily—to cover a 400kHz part of the 28MHz band. Such equipment already modified for use on the 28MHz band is now available from several sources, and many of these transceivers cover 29,300 to 29,700kHz, ie the top 400kHz of the amateur 28MHz allocation. Unfortunately this segment encompasses the long-established amateur satellite downlink sub-band of 29,300 to 29,550kHz.

The RSGB HF Committee believes that the use of fm at 29MHz should be encouraged, especially during the approaching sunspot minimum, in order to stimulate activity in that part of the spectrum. But because the amateur satellite service is an established user, frequencies between 29,300 and 29,550kHz must be kept clear of terrestrial transmissions for the downlink signals. The downlink transmissions are normally weak ssb or cw signals which will not be readily identifiable on fm equipment. Therefore although these frequencies may appear to the fm operator to be unoccupied, *they should be avoided at all times.* Otherwise severe interference to satellite users may well occur. The RSGB is taking the initiative within IARU Region 1 on this matter. Papers are being prepared for circulation to other national societies to stimulate discussion

RSGB-IRTS EI-GI CONVENTION

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and debate in order to obtain, at next April's IARU Region 1 Conference, an agreed recommendation for an fm (and repeater) sub-band at 29MHz.

In the Commons

Sir Patrick Wall asked the Secretary of State for Trade & Industry on 7 July 1983 whether he would take steps to guarantee the future of the Radio Interference Service. Mr Alexander Fletcher replied that British Telecom had given notice that it wished to withdraw from operating the Radio Interference Service: he added that his department fully recognized the need for an effective service and was urgently considering what form it should take in the future.

This is the first indication the Society has seen concerning the future of the Radio Interference Service. Members may remember that late last year British Telecom gave notice of its intention to withdraw from the operation of the RIS, and this is a potentially very worrying situation: the service already has a heavy workload, principally from illicit cb, and the Merriman Committee was of the opinion that the amount of monitoring and other work carried out in this area was already too small.

Obviously the requirement is for a more effective service, not no service at all, and the Society should very much like to see a strengthened Radio Interference Service operating in conjunction with more effective legislation such as that proposed in the Telecommunications Bill. However, no proposals of this nature appear to have been made, and it is something of a relief to discover that the Department of Trade & Industry recognizes the need for an effective service.

In another written Parliamentary reply, Mr Alexander Fletcher mentioned the Merriman Report. He said that his department was very grateful to Dr Merriman and his colleagues for their thorough and wide-ranging analysis of the problems of regulating the radio spectrum. He noted that the conclusions and recommendations of the report covered both the pattern of use in the range 30—960MHz and the machinery for frequency management, and said that the recommendations would be given careful study and the conclusions announced in due course.

"Golden Needle" for G3FKM

RSGB Council member Dr John Allaway, G3FKM, has become only the third foreign recipient of the "Golden Needle" award, presented by the Austrian society (OVSV). The award is normally given to members of OVSV for outstanding service to the society or to amateur radio as a whole, and previous foreign recipients have been Jean Wolf, LX1JW, and Philip Lessig, DK3LP—both prominent IARU personalities.

In the citation for the award, Dr Allaway is mentioned as having consistently found "...that, very small path between a hobby and international co-operation"—he is also referred to as a "radio gentleman". The Society congratulates Dr Allaway for his well-deserved receipt of this award.

Forthcoming exhibitions

The ARRA Exhibition takes place this year at the Exhibition Centre, Doncaster Racecourse, on 6, 7 and 8 October 1983. An exhibition at the traditional venue of the Granby Halls, Leicester, is being mounted by the Leicester Repeater Group and the Leicester Radio Club on 28 and 29 October.

The 1984 RSGB National Amateur Radio Exhibition and Convention takes place at the NEC on 28 and 29 April.

Long-standing members

The headquarters computer recently produced the interesting information that about 150 people had been members of the Society for over 50 years: some weeks ago the special gilt badge for 50 years of continuous membership was sent to all of them. A flood of thank-you letters resulted, with many members mentioning their early experiences in radio (or wireless) and supplying a fund of information to the Society. One gem came from G8WC, who said: "I first heard of the RSGB in a radio broadcast in 1929—there were no jiffy bags in those days, and my badge was sent in a Players' cigarette packet".

Membership badges in different colours to denote varying lengths of Society membership are available from RSGB Publications (Sales)—see the last page of any issue of *Radio Communication*.

Coals to Newcastle? (or "rising son" of *VHF/UHF Manual*)

With the blessing of the Japanese national society, JARL, the RSGB has sold the Japanese language rights for its new edition of the *VHF/UHF Manual* to the CQ Publishing Co Ltd on a royalty basis. It will certainly be most interesting to see one of our publications translated into Japanese —does 4CX250B look the same?

New books

We now have three new titles in stock which are sure to interest hf and vhf operators. *Secrets of Ham Radio DXing* explains how to get the most dx with limited operating time and a minimum budget: it also explains how to upgrade a station without wasting money and lets out some of the secrets of "big gun" operators. *10 Metre FM for the Radio Amateur* is a complete manual for this increasingly-popular mode on 29·6MHz. Finally, the 1983 edition of the *International VHF FM Guide* is an up-to-date guide to repeaters here and overseas, including coverage maps for UK vhf units.

Do you receive weather satellite data?

Ron Parsons, GI3HXV, 45 Erinvale Avenue, Belfast BT10 0FP, is interested in receiving data transmitted by polar orbiting weather satellites, and is constructing equipment for that purpose. He would be pleased to hear from other UK amateurs who are interested in this subject, and perhaps form a correspondence group to act as a clearing house for information on weather satellite direct readout reception and processing.

A letter authorizing reception is required from the DoT&I.

Amateur radio in Poland

Some questions have been received at headquarters concerning the status of radio amateurs in Poland. According to the Polish Embassy in London, Polish amateurs are legitimately operational again and have been for some time—in fact, GB3RS narrowly failed to work one during good conditions on 144MHz in August.

"Lightning and emp protection of amateur radio equipment"

Mr G. R. Jessop, G6JP, the author of this article published in the December 1982 issue of *Radio Communication*, has informed us of an error in the circuit diagram of the lightning flash counter type RSA10. The second transistor BC320, shown as an npn type is, in fact, a pnp type. G6JP also advises that the BCY70 is a near equivalent of the BC320, and the BC107 is a near equivalent of the BC317.

Stolen equipment

On 31 May 1983 from a car in Bristol: Yaesu FT290R, serial number 1K60726. Information to Bristol Police, tel 0272 22022, or George Howes, tel 0454 416673.

On 15 July 1983 from an address in Caterham: Icom 202E, serial number 4102561. Information to DC Leek, Kenley Metropolitan Police station, tel 01-680 6212.

From a car in Stafford on 29 June: Icom 25E serial number 14601404. Information to Stafford CID, tel 0785 58151.

Residential weekend course

A residential weekend course, "Broadcasting—Marconi to Channel 4", will be held at the Theobalds Park College, Bulls Cross Ride, Waltham Cross, Herts, during the weekend 11-13 November 1983, commencing with dinner at 7pm on the Friday and ending with lunch at 1pm on the Sunday.

Sessions will be entitled "Early Days", "The Start of Broadcasting", "Worldwide Radio", "Savoy Hill and 2LO", "Radio and Broadcasting House", and "TV and the Television Centre". One session will be free for research and debate, and another for a soirèe and open discussion on radio and television. The sessions will be enlivened by demonstrations and working equipment.

The fee for the weekend, including full board, is £28 sharing, or £50 single. Early booking is essential. Write to the college, or phone Waltham Cross 37255, for further details.

SERT lecture

Peter Jones, G2JT, well known for his highly entertaining antenna lectures, will be addressing members of the Society of Electronic & Radio Technicians at the Manchester Polytechnic on 20 October on "Cable television—an historical review". Although primarily intended for members of SERT, RSGB members will be welcome. For full details contact Stewart Revell, G3PMJ, QTHR, enclosing an sae.

In brief . . .

. . . The **British Rail ARS** will hold its agm at Stanier House, Stephenson Street (adjacent to New Street station), Birmingham, on 8 October, commencing at 1pm.

. . . The **Thames Valley ARTS** will hold its Golden Jubilee Dinner at the Cardinal Wolsey Hotel, Hampton Court, on 22 October 1983. Tickets available from Victor Brand, G3JNB, 17 Southwood Gardens, Hinchley Wood, Surrey KT10 0DF, at £12 per person.

. . . Students at or coming up to Oxford University who might be interested in joining the **Oxford University Radio Society** are invited to contact the secretary, Robert Henshaw, G4GCM, at Trinity College.

. . . **Ron Garwood, G6FBR,** thanks all those who 'phoned in response to his "Wanted" advert in the July 1983, issue, particularly DL1XJ and G3XWV for sending the tape.

. . . **Erling Seatravik, LA6NDA,** 6420, Aukra, Norway, would like to obtain a handbook or other information on the National hf receiver type NC-2-40D of approximately 1946 vintage.

. . . **and finally,** heard on the Kent repeater, GB3KN, "I'm down by the prison—not an easy place to get out from".

Mobile Rallies Calendar

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

2 October—Great Lumley ARES Rally, Community Centre, Great Lumley, nr Chester-le-Street, Co Durham. Open 11am. Talk-in on S22. Usual attractions including bring & buy. Further information from Ian Blackman, G4OCQ, QTHR, or tel 0385 45425.

5 November—North Devon Radio Rally. Bradworthy Memorial Hall, nr Holsworthy, Devon. 10.30-5pm. Talk-in on 144MHz (S22). Bring & buy stand etc. Details from G8MXI, QTHR.

11 December—Leeds & DARS Third Annual Christmas Rally, The Civic Centre, Pudsey, nr Leeds. Open 10.30am. Admission free. All the usual facilities. Enquiries from traders to A.A. Alexander, G6CJI, QTHR.

1 April 1984—White Rose ARS Rally, The University of Leeds. Details from A. N. Bramley, G4NDU, QTHR.

6 May 1984—Lincoln Hamfest, organized by the Lincoln Shortwave Club, on the Lincolnshire Showground (4 miles north of Lincoln City on the A15). Opens 11am-5.30pm. Talk-in on 144MHz (S22) and 432MHz (SU8). Ample car parking, caravan and camping facilities, refreshments, licensed bar. More trade stands than in previous years, many attractions for junior ops. Facilities for the disabled. Further details from G8VGF, c/o City Engineers Club, Central Depot, Waterside South, Lincoln.

20 May 1984—Drayton Manor Mobile Rally. Drayton Manor Park, nr Tamworth, Staffs. Organizer N. Gutteridge, G8BHE, QTHR, tel 021-422 9787. Full details to follow.

29 July 1984—Rolls Royce ARC (Barnoldswick) Mobile Rally. Sports & Social Club, Barnoldswick. Open 11am. Details from Leslie Logan, G4ILG, QTHR.

Special Event Stations

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

8-14 October, GB2MOD
The station will operate in association with the National MOD of Scotland (which encourages the study and practice of national song, poetry, and Gaelic). The station will be operational continuously as propagation allows on any one or two of the following, 1·8-144MHz, ssb or cw.

A special bilingual QSL card will be available from the bureau or direct on receipt of an sae and ircs. Details from GM3PXK, Mid-Lanark ARS, Wrangholm Hall, New Stevenson, Motherwell, Scotland.

15-16 October, GB2ST
The station will be operated for the Scouts of Tomintoul, the highest village in the Scottish Highlands, as part of JOTA. Operation will be on all the bands 1·8-28MHz ssb, and perhaps cw. Special QSL cards will be available. Details from Barry Horning, GM4TOE, The Old Schoolhouse, Tomachlaggan, Kirkmichael, Tomintoul, Banffshire.

15-16 October, GB4SGB
The 18th Bromley Scout ARG will operate this JOTA station at the Deptford Scout Campsite, Biggin Hill, Westerham, Kent. The group will be on all modes and all bands, including rtty, sstv, and 432MHz atv. There will also be a practical electronic workshop. All are welcome. Special QSL cards will be available. Details from S. R. Goodwin, G6TQB, 44 Lansdowne Road, Bromley, Kent, tel 01-460 2806.

11-12 November, GB2SCS
To celebrate 60 years of Scouting at the 10th Birkenhead St Catherines Scout Group, local amateurs will operate this station at St Catherines Church Hall. It will operate continuously from 2000-2000 on hf and vhf ssb. A special QSL card will be available. Details from Mr E. Gethin, G6HWD, QTHR, tel 051-645 7904.

Other Events

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

6-8 October - ARRA 12th Amateur Radio & Electronics Exhibition, Exhibition Centre, Doncaster Racecourse.
8 October - Midlands VHF Convention, British Telecom Training School, Stone, Staffs.
8-9 October - EI-GI Convention, Ballymascanlon.
15 October - Region 12 ORM, Caledonian Hotel, Inverness, commencing 2pm.
10 December - RSGB AGM, IEE, Savoy Place, London.
14 January 1984—RSGB Presidential Installation, Cardiff Castle, Cardiff.
28-29 April 1984 - RSGB National Amateur Radio Exhibition, National Exhibition Centre, Birmingham.

RAE Courses 1983-4

Seaton. St Clare's Centre, Fore Street, Seaton, East Devon. Commencing Thursday 7 October at 7.30pm. Further information from G3AOJ, QTHR (course tutor), or the warden, St Clare's Centre, tel Seaton 21904.

The following courses have already started but it may still be possible to join them:

Borehamwood. De Havilland College, Elstree Way, Borehamwood, Herts. Tuesdays 7-9pm, commenced 20 September. Further information from the college, tel 01-953 6024.

Welwyn Garden City. De Havilland College, Applecroft Centre, Applecroft Road, Welwyn Garden City, Herts. Thursdays 7-9pm, commenced 22 September. Further information from the college, tel Welwyn Garden City 26318/31344.

OBITUARIES

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

Mr H. Bollands, G5DW
Harry Bollands died in June, aged 77. He was first licensed in the early 'thirties and was, with the exception of the war years, continuously active on the air until shortly before his death.

With the release of the 144MHz band in 1948 Harry quickly became a devotee of vhf working, and was chiefly known for his contribution to the study of vhf propagation, particularly for his participation in the International Year of the Quiet Sun programme.

Following his retirement from the Home Office Directorate of Telecommunications in 1971 Harry returned to the hf bands, renewing friendships throughout the world, many of pre-war standing.

Mr J. D. W. Davidson, GM3ATB
Jack Davidson died in December 1982. He had been a member of the RSGB for many years, and had a tremendous interest in communicating with others.

Mr J. Davies, G2OA
Jim Davies died on 22 July. He was a real old-timer and he had been a member of Ainsdale RC for a number of years, keeping skeds with his UK and VK friends until very recently.

Mr W. K. Hill, G2VT
Mr Hill died recently. He was one of the earliest members of the Society and had a life-long interest in amateur radio.

Mr S. Knock, G8NLX
Stan Knock died on 20 June 1982, at the age of 69. His hobby gave him great comfort during his illness. Although interested in radio for many years, having passed his RAE, he did not begin operating until he retired. In those few years on the air he became very well-known by visitors and people passing through the area, as well as locals.

Mr K. Price, G3WYJ
Ken Price, who died recently, was treasurer and a founder member of the Plymouth RC. He was active both as an operator and behind the scenes, and always sought to preserve the highest standards of amateur radio operating.

Mr K. Schofield, GW3KYT
Ken Schofield died on 3 August, aged 58. He was licensed in 1955 and was active on the hf and vhf bands. He had always been very keen on constructional projects.

Mr T. L. Smith, G3UHP
Terry Smith died on 2 July. He was active on all bands, and lately spent considerable time assisting with the construction of the uhf repeater GB3ZI. He was a keen home constructor, known for his technical competence, cheerful enthusiasm and ready assistance to all.

Mr F. J. E. Starkey, G6KY
Mr Starkey died on 19 May. His radio had been his consuming interest until the time he was taken ill.

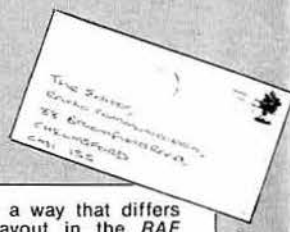
Mr J. Stock, G3PKS
Jack Stock died on 26 March, aged 75. He was a most helpful and pleasant man, and was known to many, both locally in Somerset and on 3·5 and 1·8MHz, where he took part in regular nets. He enjoyed experimenting with antennas and had much correspondence both on air and by post on the subject.

Mr E. Weaver, BRS751
Edward "Pop" Weaver joined the RSGB in January 1932, becoming BRS751, and remained an enthusiastic listener until his death on 11 April, aged 75. He was very well-known for his support for all local activities including the Longleat Mobile Rally. For many years he welcomed new members to the Bristol Group meetings.

Also:

Mr J. A. Beck, G3ZKU, on 3 July;
Mr F. Broadbent, G6CDY;
Mr W. E. Bullock, G6DUR;
Mr T. A. Egerton, G3DFS;
Mr J. E. Fynn, G4UX, on 7 May;
Mr G. H. Gentle, G8UFZ, in October 1982;
Mr L. Hill, ex-G5WI, on 30 July;
Mr W. P. Hutchinson, G4MKA;
Mr P. Ireland, RS51003, on 3 August;
Mr L. S. Jordan, G8NTF;
Mr W. D. Kieller, G6HR, on 28 July;
Mr C. C. Millar, GM2MG, on 4 June;
Mr F. W. Norman, EI5BA;
Mr J. E. Saunders, G6GVK, on 25 September 1982;
Mr W. Skilling, GM3YVE; and
Mr A. Watson, G6UJ.

Members' Mailbag



JOY TO COME

Sir—On 1 August the first of the new series of vehicle registration plates, in the form "A1ABC" appeared. In 1989, the G-series will presumably be launched. The curious prospect of seeing our own callsigns on someone else's car will, no doubt, already have occurred to many English amateurs. It is surely not too early to consider the implications.

Under present arrangements the vehicle licensing authority is no longer able to allocate specific licence plates on request. If you want one badly enough, you must buy it from the owner or a dealer.

There is in any case the possibility of confusion arising from the co-existence of the amateur callsigns and their vehicular doppelgangers! Could we, for instance, be prosecuted for displaying our callsigns on the windscreen? ("A false number plate, m'lud, and placed in an incorrect position.")

Several possible ways of resolving this situation, include:

(1) Miss out the G registration numbers.

(2) Do not issue those which correspond to amateur callsigns.

(3) Offer these numbers to amateurs for personal use.

(4) Give us all new callsigns based on a different system.

It is perhaps the last of these that is the most likely, and which may come sooner than 1989 if current growth in the amateur population is sustained. In that event, in 1989 we may find our old callsigns sufficiently nostalgic to provide some useful extra business for the cherished-numberplate brokers!

Gordon J. Bennett, G3DNF

Clearly this is worth following up!

AFTER CHIPS, SOON MICROS WITH EVERYTHING

Sir—I do so agree with Colin Richards's article on micro Amtor (*Rad Com* June 1983). This is partly because I have a USA version of the microcomputer he talked about, a Tandy Model 100 complete with instruction book, and its capabilities are truly amazing. The ability to "upload" and "download" a complete file of information—even a computer program, without reference to the machine or its dialect —comes within the scope of the hobby, and there are even further opportunities for the radio amateur.

These machines were, I believe, mainly designed for communication between computers by means of the telephone network. In fact, my model has a built-in "modem", although unfortunately this uses American tones which differ from the CCITT ones used in Europe. However, it is only a matter of time before the necessary changes are made, and there seems no reason why we shouldn't utilize these signals directly over the air instead of a "twisted pair", with considerable savings in certain bills!

Amtor was designed for the marginal path, for which it is superb, but involves much transceive switching. I would like to see more use made of standard telephone-type "modem" signals on the airwaves, because we can do so much more with the wider available bandwidth and with the security of transmission on, say, local 144 and 432MHz fm. In the Thames Valley area we have been sending computer programs at least 1,500 baud with no problem, and the improvement in speed in comparison with rtty is very considerable indeed.

One can download a complete "file", such as an RSGB news bulletin, in a matter of a few minutes. Because it is self-powered it can be programmed to switch itself on, listen on a channel, take in or send data and go to sleep again—unattended. The memorized news bulletin can be used directly to up-date such things as beacon lists and satellite predictions and instead of having to record on tape or listen to the whole bulletin, one can "search" for any information, when and if it is required.

Such operation does not require a marvellous black box. Any home computer which outputs serial data, eg an RS232 interface, can be used in this manner with a "modem" consisting of a few chips. To make the modem usable on telephone lines as well requires a few additions. Is anybody else interested in experimenting along these lines?

R. J. Redding, G3VMR

Headquarters is rather wistfully wondering whether GB2RS newsreaders could download their scripts in a couple of minutes, instead of having to take a couple of hours to pack them all at HQ: perhaps something like this is an obvious line of development. Any comments? Incidentally, newsreaders in Australia take their copy off-air and rebroadcast hf bulletins on vhf channels.

RAE, NEW AND OLD

Sir—Hardly a month passes but yet another magazine article or letter condemns the new style RAE exam by comparison with the old. The most popular fallacies seem to be that, by the laws of probability, either anyone can count on a 25 per cent mark or that there is a 1-in-4 chance of passing the examination. G3XIZ's comments (August *Mailbag*) covered most of the unfounded and erroneous rumours currently in vogue. It is now time to set the record straight.

First, the aim of the examination is to ensure that candidates possess a reasonable background knowledge of all topics relevant to the operation of an amateur station, within the terms of the licence. Second, that anyone, whatever his/her background, who is prepared to work to that end should have a reasonable chance of success. It was never intended that the possession of an amateur licence be limited only to the highly qualified elite. With the old-style examination it was relatively easy for someone used to examinations and with a technical (non-radio) background to take and pass the examination and gain a licence while possessing no real knowledge of radio at all. This could be achieved by a simple process of "question-spotting" and learning by heart circuits, formulas and selected sections of theory—but not necessarily with any real understanding of what was learned. I say this from experience—that is precisely what I did —and with the level of knowledge I possessed then, nine years ago, I doubt very much if I would have passed the new style examination. The old essay-style questions did in fact penalize many potentially valuable contributors to the field of amateur radio. Many, currently in the 50+ age group, suffered educationally due to the war and, although perfectly capable of dabbling successfully in the construction of complex radio circuits, lacked the ability to set their undoubted knowledge down on paper—even if they could sort out the requirements of the sometimes involved questions. The new-style paper has finally given such people a real chance of obtaining that coveted radio licence, and not before time.

The RAE has NOT become easier to pass—rather the reverse. Comparing the requirements of the syllabus nine years ago with the syllabus of today shows clearly that the modern student has to cover considerably more ground than was previously the case. Nor can any sections be safely left out nowadays. As a long-time examiner (not for the RAE) I also know that handwriting, English and good clear circuits and diagrams were never a first priority —as long as the required facts appeared (even almost buried in rubbish) then the marks could be gained. The modern candidate is not only required to answer questions over a much wider field than formerly, he must also be able to recognize the function of parts of circuits and of components in circuits. He must be capable of "rearranging" formulas because they can appear in an unfamiliar form, and a crib sheet is of no help then. In fact there are far more circuits to learn nowadays—and they too can appear drawn in a way that differs considerably from the layout in the *RAE Manual*, thus making them more difficult to recognize. Additionally, operating practices and procedures now form part of the syllabus —so ensuring that new licensees have at least some knowledge of procedures. Learning parrot fashion will no longer suffice—the candidate of today requires a reasonable level of understanding.

Now to look at the FACTS regarding those much misapplied laws of probability. Presuming a candidate has zero knowledge, it IS a fact that his chance of getting a 25 per cent mark is greater than his chance of getting any other mark—but the chance of this happening would be about 16 per cent on Part 1 and less than 12 per cent on Part 2, hence only two per cent of such candidates would manage 25 per cent marks on both papers. Years ago I was told, at a meeting of RAE instructors, that the pass mark was 50 per cent on each part. On this basis, and assuming that an ill-informed candidate could actually answer correctly 10 of the easiest questions in each part, the probability that he would actually achieve a pass mark on Part 1 would be less than 17 per cent—and for Part 2 less than 0.8 per cent. Consequently the chance of such a candidate getting a licence is less than 0.13 per cent. I think it is safe to maintain that a pass can only be counted on if a candidate possesses both knowledge and common sense—which is precisely what the exam aims to discover.

Two criticisms could be levelled at my daring to voice my opinions in this way. One, that my husband must have helped me with my work for the exam! Not so—my husband is not a licensed amateur. Two, that I have not been licensed for a sufficient time to know what I am talking about. As to this—I have been teaching the RAE course for several years, initially to blind yl students and, additionally, for the last four years at Amersham College. Two years ago I was joined in this work by G3NCL who, for more than 20 years, has been concerned with coaching candidates for the exam. He has asked me to say that he is in complete agreement with my views—but would have used stronger language to qualify them!

A final word. My class this past year, mainly complete beginners, worked extremely hard and with excellent results (the majority gained credits or distinctions). Their achievement deserves considerable praise, and I resent the current fashion of misquotation of the laws of probability to detract from that achievement. I personally wonder how many of those who passed the old-style exam would be equally successful with the new!

Shirley Hesketh, BSc, G4HES,
Endorsed by Ron Ray, G3NCL

This letter is typical of no less than 18 others received in reply to G3XIZ's letter in the August issue. All correspondents express their disagreement with the ideas expressed by G3XIZ, and a representative sample of comments is as follows:

". . .along with many other licensed operators he would like the 'closed shop' principle to exist in amateur radio and instead of it being a hobby, make it a job of work. . . .the attitude of 'make the exam harder' is a typical example of trying to keep out many good people who are interested in radio" (*BRS48412*)

". . .the City and Guilds examination is just right at the moment since it stretches most candidates either in one paper or the other. Mr Osborn should try teaching a busy housewife with little starting knowledge but who wishes to become, and will make, an excellent radio amateur" (*G3LBS*)

"Mr Osborn's knowledge of probability is obviously well below his knowledge of electronics, since even a candidate taking 'O' level statistics would be able to calculate accurately the probability of obtaining 25 per cent of the marks assuming that the candidate had no knowledge of the syllabus. . .it is 0.000012 per cent" (*G4LMG*)

". . .I would. . .suggest to G3XIZ and those of similar persuasion that the best interests of amateur radio lie in fostering a spirit of unity, not sniping at all newcomers to the hobby" (*G6EPL*)

"A multiple-choice examination does have certain advantages. The current RAE has the ability (perhaps not always exercised) to examine the syllabus much more widely than could be done with the small number of questions on the old paper. It could also be suggested that true technical knowledge can be examined rather than the ability to write essays. . .are 'the ability to allocate time to questions', 'a reasonable command of English' and 'legible handwriting' of such importance in deciding if someone is 'safe to be allowed on the air'?. . .the present RAE is not perfect (there are too many badly phrased and confusing questions, printing errors, repetitions etc) and the City & Guilds authorities have not helped their own case concerning security of questions by their failure to provide a full and representative specimen question paper" (*G4HYY*, professional mathematics and physics teacher and RAE tutor)

". . .by all means attack the present RAE if you want, but first of all look at what it is supposed to do. If the technical standard really has gone down then there may well be cause for concern. If, as I suspect, all that has happened is that anyone with suitable technical ability, rather than only those who happen to be skilled in passing examinations, can get through it, then the rise in pass rate is hardly surprising" (*G4ANB*)

". . .I think that the current RAE is simple enough for the vast majority with sufficient interest and motivation to pass. I went to evening classes at my local college for tuition, which cost about £25 plus books and travelling. I do not think there is any point in having a novice licence. The introduction of such a licence would be to surrender to the demands of the relatively idle and impatient who would like their desire for anything to be sufficient reason for somebody to grant their wish" (*G4SLU*)

". . .I would like to point out that in these days of modern technology the teenage instructor such as GU6BGI most probably knows more about the subject. . .than most amateurs of five or six years' experience. . .I think that the modern RAE is better than the old RAE, and it proves that the modern amateur is possibly better qualified than his older counterparts" (*G4MVN*)

". . .let me say to G3XIZ that to some of us the RAE does not come easily when you do not have the natural aptitude and you are the wrong side of 50. But I do feel that we do have something to offer the hobby, enthusiasm if not knowledge" (*GU6NMT*, a pupil of GU6BGI)

". . .Mr Osborn's comments on the ability of GU6BGI to instruct an RAE class were totally uncalled-for. The technical standard of Mr Morris' students will be every bit as good as anyone else who passed the same exam. Twelve weeks is a long time to study for an exam if your preparation is good and you are backed up by an able instructor such as John Morris" (*GM8YIK*)

". . .G3XIZ has perhaps grasped the situation wrongly. I don't think the RAE is easier or more difficult, just different. . .why don't we all start giving encouragement to people who have taken the plunge, taken and passed the RAE, instead of sitting back criticising and thinking how clever it was to pass the RAE when it was 'different'?" (*G6TKH*)

"I am hoping that G3XIZ's comments are not normal thought among other radio amateurs . . .modern students would be totally unflummoxed by a written RAE, 1967 or otherwise" (*BRS46950* awaiting G4 callsign)

The above edited extracts represent the mainstream of response to the letter from G3XIZ, and others letters have also made the point that both types of RAE could be said to be deficient insofar as neither include any form of practical test.

BUILDING ONE'S OWN

Sir—The recent suggestion that one should "build one's own to save money" is way off the beam. It is far cheaper to buy on the secondhand market. Rigs like KW2000, NCX5, Swan 350 etc all work very well, and with careful looking around can be bought in the range £100 to £150. Unless one has a *huge* junk box it is unlikely that a rig that does as much could be built for less.

If the aim is to do some amateur radio, though, rather than simply getting on the air, I would suggest the purchase of an ssb transmitter or receiver and the building of a receive or transmit adapter for it. This would be quite an ambitious enough project for the new amateur but would still result in a total expense near the figure above.

I believe many who claim to build cheaper tend to forget the test gear and components, to say nothing of experience, that has been collected over the last 30 years! A newcomer does not have this.

Stephen Dyke

Sir—In the letters page of the August issue the question "Why not build your own equipment?" was raised twice. When you actually come to build something other than, say, a power supply, many of the designs are quite off-putting. Once you have your Class B licence you look in something like the *VHF/UHF Manual* and find that you need a vast amount of test equipment and good metal-working facilities as well before you can build anything worthwhile. Even at hf you are expected to have an oscilloscope and a grid dip oscillator before you start. the "schoolboys, schoolgirls and old age pensioners" frequently mentioned in the Society's publicity usually cannot afford such an initial outlay when they still have to get all the components for the projects as well. Could the Society please give the beginner more support? More simple but effective projects would encourage "home-brewing", rather than trying to compete with the manufacturers on their own grounds.

H. G. Sasse, G8TYF

The Society is aware of the need to publish more articles and features for the beginner, and hopes to be in a position to generate technical material "in-house" before the end of the year.

LICENCE FEE INCREASE

Sir—The recent editorial on the 50 per cent increase in licence fees has surely missed a number of alternatives that could keep the increase in line with inflation. This 50 per cent increase is a further example of the way public sector inflation is outstripping that in the private sector.

Why can we not copy the example of the USA and abolish licence fees. The abolition of fees would lead to a reduction in staffing levels. In this age there is no need to have one department issuing licences and another collecting fees. After all, we pay for the administration of the Home Office department out of the VAT we pay on equipment. Another saving would be to issue, say, 10-year licences, which would again lead to savings in not having to issue reminders every year.

It is not in order to say that the fees will go towards providing a better service. Why was the service so bad in the past?

Please let our society present these cost-saving proposals to the government and assist the government aim in keeping public sector inflation down.

Dr R. J. Nash, G4GEE

This, and five other letters, criticise the Society for apparently defending the recent increase in the amateur licence fee. It was certainly not our intention to defend what is, by any standard, a large increase. As is the practice with all price increases, the "consumers" are seldom consulted: the Society's immediate reaction upon hearing the news was to ask the obvious question—"Why?". Having obtained some preliminary information from the licensing authority, our August editorial was meant to give members the initial answers to the question. We explained that the main reason for the increase was to provide a better service and licence documentation and that this involved the computerization of amateur licence records. The short-term cost of implementing this improved administrative structure would be chargeable to the radio amateur. In the longer term, we have been assured that future increases will not be at anything like the same level, reflecting the cost-effectiveness of computerization.

It is true that a few countries do not charge a licence fee to radio amateurs: where this occurs, one assumes that the cost of the licensing administrative process is borne by taxpayers as a whole. Traditionally, this is not the way in which government administration is funded in the UK, and in Britain the amateur licence fee effectively pays for the administrative work required to issue and renew the licence.

There are, however, a number of questions which remain, and the Society will be discussing these with the DoTI. Should the young and old pay a lower fee? Should our licence be issued for more than one year to reduce administrative costs? These questions, and others, are being discussed by the RSGB.

HF OPERATING

Sir—Such emotive and malicious views as expressed by G8BQX are unwanted in the pages of *Rad Com*, or indeed anywhere else: operating standards and behaviour in HF NFD are generally at a high level. If your correspondent, albeit a contester, is unable to compete in cw contests on crowded hf bands then it is entirely his perogative to remain on vhf. Meantime his nasty and ill-informed comments are indicative only of a disturbing antagonism which is completely out of place in amateur radio.

The Class A versus Class B licence issue, which so clearly incenses Mr Ridd, is hardly reason for taking an extremist stance on an unrelated matter, in this case HF NFD. Or is it just that he smarts at being unable to compete?

R. K. Western, G3SXW

Sir—I was disturbed to note two separate attacks on hf cw operators in the pages of the August *Rad Com*. I refer of course to the comments by G3ZAY in *The Month on the Air*, and to the letter from John Ridd, G8BQX, in "Members Mailbag". These comments display a considerable amount of ignorance concerning hf cw operating, and a rather alarming lack of tolerance.

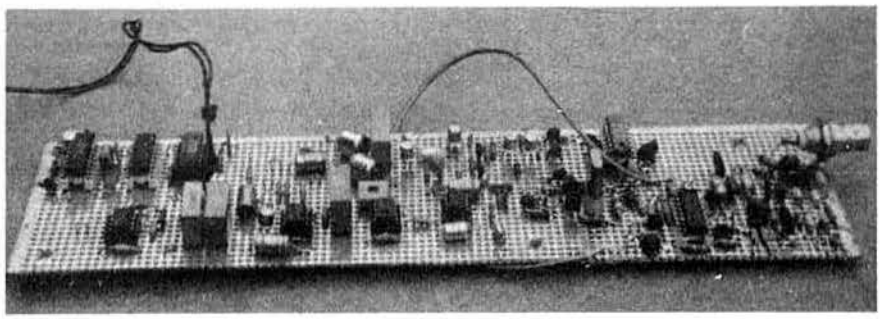
Concerning G3ZAY, his comments seem to show considerable ignorance of the art of working dx on cw. Certainly he is not going to have much success in working dx on cw if his techniques are the same as employed on the ssb end, with all the "lists" and the lack of comprehension displayed by so many operators on that mode. It should be pointed out that intensive listening and the correct timing of calls is absolutely crucial in working through the "pile-ups", be it cw or ssb. Certainly some dxpeditions in the past have left something to be desired in their operating techniques, but on the whole standards are good and operators possessing reasonable skills on cw should never have any problems cracking the "pile-ups". It is unfortunate that these comments were given such prominence in *Radio Communication*, particularly in a column edited by the immediate past-President and hf manager. The space could have been better employed in explaining the art of working dx, be it on cw or ssb, to the newer generation of radio amateurs. (see comment in *MOTA* in this issue—Ed.)

While I have the greatest respect for Mr Ridd and his performances in vhf contests, his letter shows an alarming lack of tolerance and, indeed, ignorance of cw. As with all operating it is true to say that HF NFD does leave something to be desired, but from what I gather this is certainly also the case in vhf events. Unless Mr Ridd can copy cw at a reasonable speed he has no right to use the strong language contained in his letter. To listen to a competent cw operator "running a string" is sheer music to the ears. Judging by Mr Ridd's comments he knows nothing of this "music". Before embarking on such strong language Mr Ridd would be well advised to become more familiar with his subject. It is fortunate for the hf fraternity that he is gong to remain "an efficient Class B licensee", but it is unfortunate that in writing such letters he attempts to drive a wedge into the hobby which should surely be held together by a common bond.

A. J. Slater, G3FXB

A sampling fm monitor

by I. Braithwaite, G4COL*



The complete monitor

Ian Braithwaite was born in 1955. Educated at Clitherce Grammar School and Manchester University, he obtained an honours degree in physics in 1976. Since then he has been employed as a design engineer with Marconi Instruments, and has been project leader on the new 2305 modulation meter which inspired the design in this article. His major interest in amateur radio is the design of equipment and relatively low power operation on the hf bands, particularly 28MHz.

THE UNIT TO BE DESCRIBED is designed to enable an amateur with some constructional experience to build a simple fm monitor, capable of monitoring fm transmissions from his station from hf to uhf. The use of a sampling mixer allows a very wide frequency coverage with a simple low frequency local oscillator.

Principle of operation

The sampling mixer essentially consists of a switch which is opened and closed by short pulses derived from the local oscillator signal (see Fig 1). When the switch is closed, the input signal is fed to the hold capacitor so that, when it opens again, the capacitor holds a charge proportional to the value of the input signal during the sampling interval. Operation is shown in somewhat idealized form in Fig 2. The low frequency (lf) signal which appears on the hold capacitor is filtered and forms the intermediate frequency (i.f.).

There are several assumptions implicit in Fig 2:

1. The sampling pulse is short compared with the period of the input signal.
2. The switch resistance is small so as to allow the input signal to charge C to the correct value during the short period when the switch is closed. Finite resistance in the switch means that the hold capacitor is not charged to the peak of the input signal, and manifests itself as loss in the mixer which increases as the intermediate frequency is raised.
3. The leakage resistance must be sufficiently large that capacitor voltage does not fall appreciably in between samples, causing mixer loss.

The sampling mixer can also be considered in the frequency domain (see Fig 3). The local oscillator (lo) pulse, if infinitely short in duration, would have a spectrum extending out to infinity, a so-called harmonic "comb", with a "tooth" spacing equal to the lo frequency. Practical pulses of finite duration have a comb which is not flat but falls at high frequencies. The wider the pulse, the lower the roll-off frequency.

Also depicted in Fig 3 is the fact that each lo harmonic can produce an i.f. with any signal spaced an i.f. away on either side. The sampling mixer thus has a multitude of responses, and is not therefore recommended as a receiver front-end! For transmitter monitoring, there will (it is hoped) be only a single frequency present, and this is then of no concern. The sampling mixer described below enables transmitter monitoring to frequencies beyond the 432MHz band.

Monitor block diagram (Fig 4)

The sampling mixer, consisting of a diode gate fed by an lo pulse generator is followed by a high impedance fet buffer amplifier. The i.f. signal is selected by a lowpass filter and amplitude limited. The fm signal is rendered intelligible by a pulse-counting discriminator. This form of discriminator is used because it is wideband, and removes the need for excessively tight tolerance on the lo frequency. For example, an lo operating in the region of 4MHz will produce an i.f. with a 432MHz signal on around its hundredth harmonic. A narrow-tuned discriminator would require very careful setting of the lo.

*28 Oxford Avenue, St Albans, Herts AL1 5NS.

Circuit description

Economy was a major design consideration, and the unit uses relatively cheap components throughout. A diode gate (D1 to D4) acts as the switch, with C4 the hold capacitor. Germanium diodes are specified on cost grounds, although Schottky diodes give good performance if available. A fet amplifier, TR1, buffers the sampling gate. IC1, an ecl triple-line receiver, forms a somewhat unorthodox pulse generator. The first two sections square up the oscillator signal. The square waves then feed the third section with a delay to one input caused by the insertion of a short length of coaxial cable (12in being suitable). The square wave edge at pin 7 causes the output at pin 14 to go "high". After the very short cable delay, the delayed edge returns pin 14 to the low state, giving a very narrow pulse. An antiphase signal is available at pin 15. The two outputs are very convenient for driving the sampling gate, and the symmetrical drive to some extent balances out the lo and reduces breakthrough into the i.f.

The lo is not shown. Frequencies from 4 to 100MHz have been used, with levels above about 20mV being suitable. Hence, the lo may be based on a large number of designs appropriate to the frequency chosen. A crystal source is to be recommended.

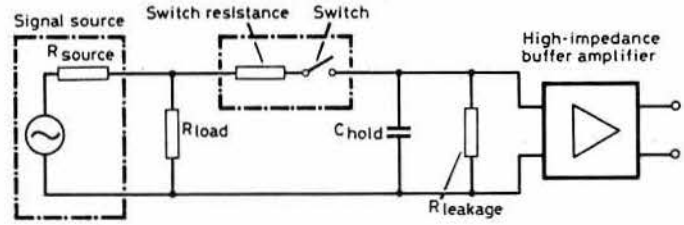


Fig 1. Simple model of a sampling gate

The i.f. at TR1 is lowpass filtered to remove any lo signal, and applied to a limiter IC2. The limited i.f. signal is then fed to a pulse-counting discriminator, based on the design by G3JGO [1, 2].

The value of C20 shown on the circuit allows operation with an i.f. up to 500kHz. The sampling gate, however, is capable of operating with an i.f. of more than 1MHz. If this extended range is required, the capacitor value should be reduced in proportion to the maximum i.f.; eg if 1MHz maximum i.f. is used, C20 should be reduced to 90pF.

The penalty paid for this is that the discriminator then produces a smaller output for a given deviation, and more audio gain must be used to restore the level. IC5 provides audio gain with the gain set at 48. This is given by (R30 + R31)/R30 and should be adjusted if C20 is changed. With component values as in the circuit, the audio output will be approximately 1V peak for 1kHz peak deviation. A signal with ±2·5kHz deviation will therefore give an audio output of 5V peak-to-peak. The op-amp will clip outputs some way under 12V peak-to-peak which (fortunately) limits the amount of noise when the input signal is disconnected.

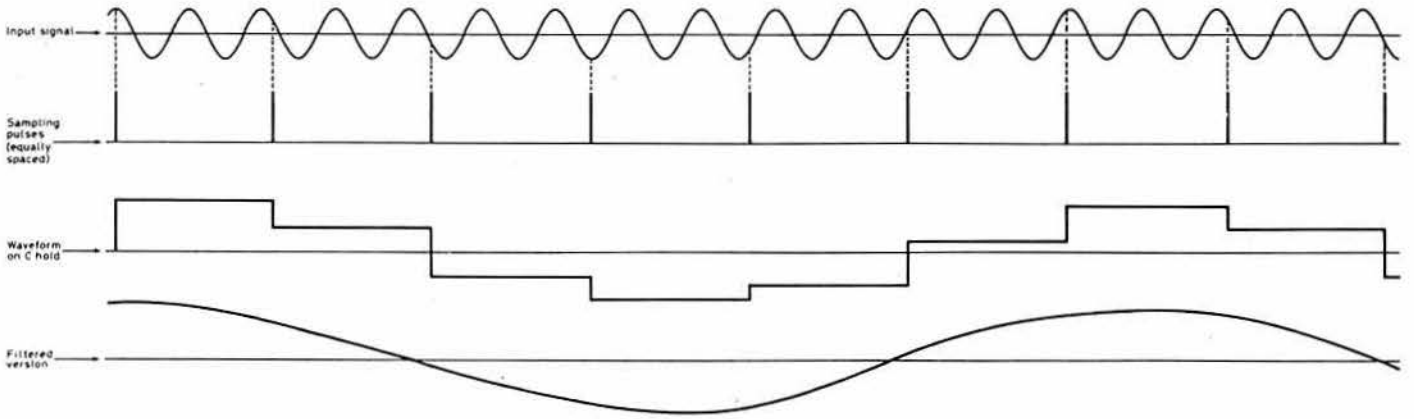


Fig 2. Idealized sampling action

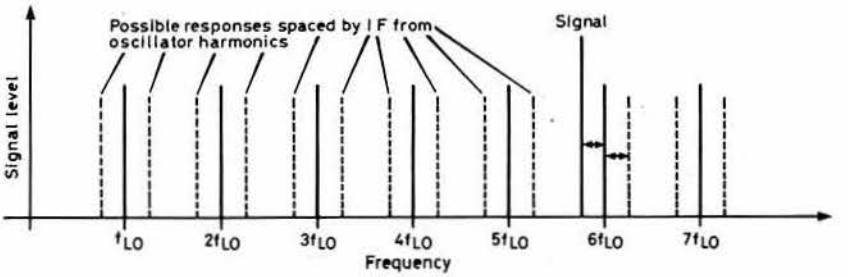


Fig 3. Spectrum of sampling gate showing multiple responses

Construction

Several prototypes have been built. The quickest, surest method of construction of the high frequency circuitry of the sampling gate and pulse generator is to build them on an earth plane of plain copper-clad glass-fibre board, with components soldered together using minimum lead lengths, and decoupling capacitors and other earthed parts soldered directly to the board. IC1 should be mounted upside down and connections made direct to the pins. The result is an ugly working circuit. The braid at each end of the delay cable should be soldered direct to the copper (see Fig 7). The input and lo leads can be soldered similarly. If 75Ω cable is used, R16 should strictly be increased to 75Ω or a close value to provide a match. This is not critical, however. No advantage is gained by shortening the cable. Fig 8 shows the original prototype and illustrates this form of construction.

The other photograph shows a later version of the complete unit which was built on a breadboard with an earth plane on one side and holes with pads on the other side, connections being made using short lengths of wire between pads. Performance of this unit was entirely satisfactory and indicates that if good rf layout is followed, there should be no difficulty in producing printed boards for those thus inclined.

Following the fet buffer stage, construction becomes non-critical, and any of the large range of constructional techniques available may be used.

Choosing the local oscillator frequency

Using a single lo frequency, the availability of a range of several hundred kilohertz of i.f. allows a similar range of frequencies within an amateur band to be used. For example, suppose that the discriminator capacitor is set for a maximum i.f. of 500kHz. We should attempt to find an lo oscillator frequency which gives an i.f. from about 100 to 500kHz, and thus a 400kHz band coverage. Of course the image response will give another 400kHz on the other side of the local oscillator harmonic if this is useful. The relation between the various frequencies is:

$$\text{Input frequency} = N.f_{(lo)} \pm f_{(i.f.)}$$

where N is the harmonic number in use.

Let us take a realistic case:

f (lo) = 12·0333MHz (crystal)
36f (lo) = 433·1988MHz

Thus fm simplex channels SU15 to SU20 (433·375 to 433·500MHz) can be covered with an i.f. of 176·2 to 301·2kHz, and discriminator values shown would be suitable. The 12th harmonic of the same oscillator frequency is 144·3996MHz. An i.f. up to 1MHz would then give coverage up to 145·400MHz (S16). An 8·0222MHz gives the same results with N = 54 and 18 respectively.

As the i.f. is lowered below 100kHz, more i.f. signal appears in the audio output, and the application determines whether this is tolerable.

Operating the unit

Having chosen the lo frequency, apply this signal to the unit at a level exceeding 20mV emf. If a fast oscilloscope is available, the pulses should just be seen at pins 14 and 15 of IC1. Arrange for a signal of 30mV to 300mV rms (potential difference) (−13 to +3dBm) from the transmitter. Excessive drive will cause conduction of the gate diodes and degrade performance. The limiter should now produce square waves from the i.f., and audio should be available at the output. This audio can be used in a number of ways:

1. The audio can simply be used for listening to the modulation.
2. A scope can be used to check on the peak deviation.
3. A peak detector can be used (see suggested circuit in Fig 9) to give readings proportional to peak deviation. If the recommendations in the text are followed, the 1V/kHz of peak deviation will be maintained.

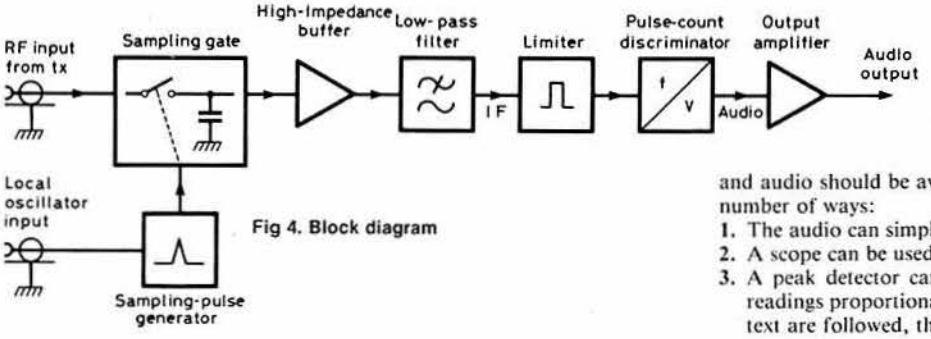


Fig 4. Block diagram

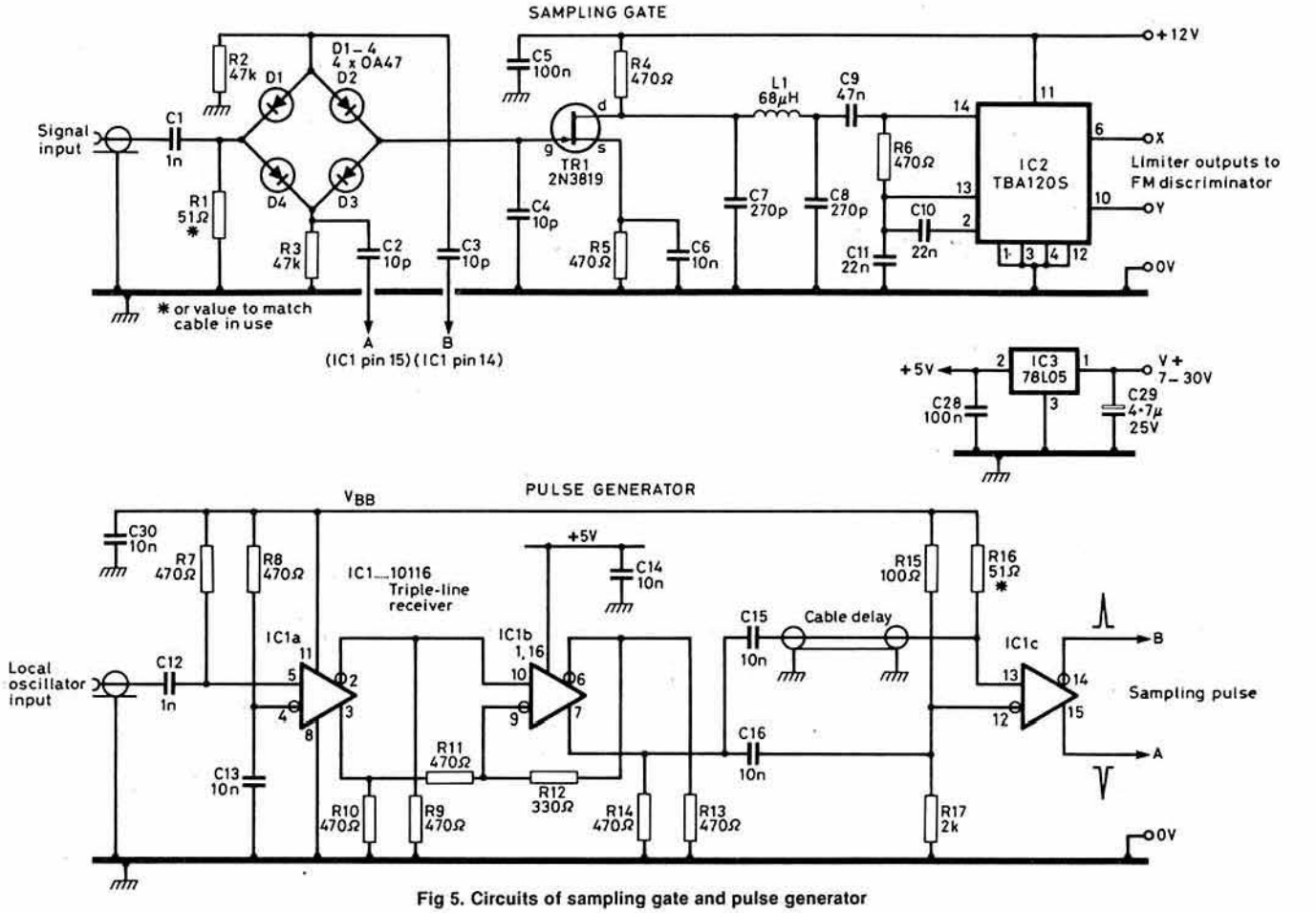


Fig 5. Circuits of sampling gate and pulse generator

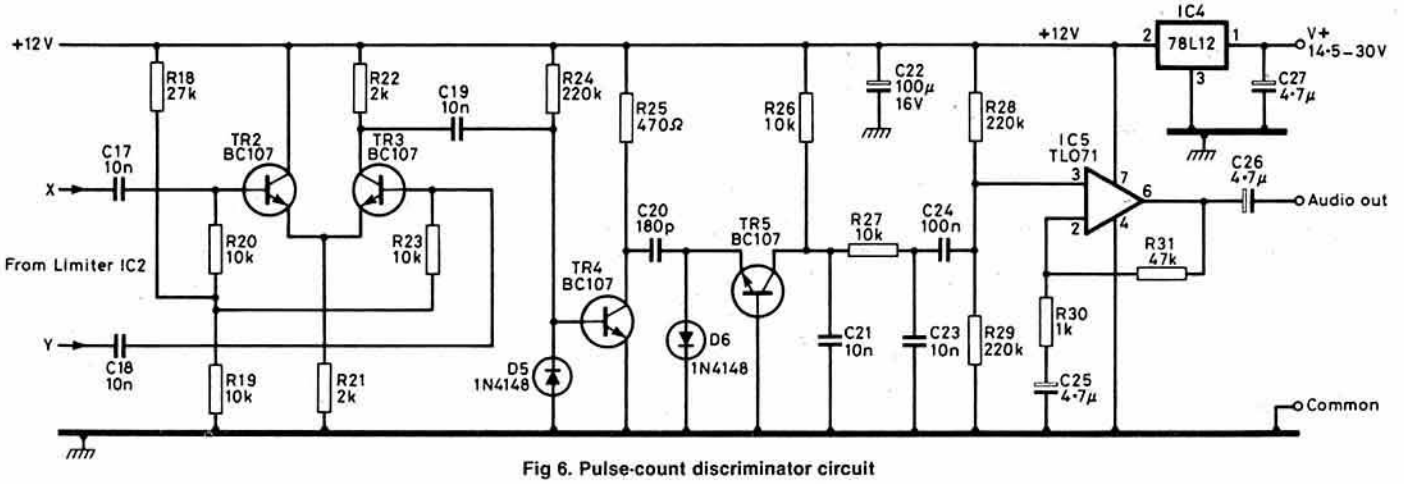


Fig 6. Pulse-count discriminator circuit

Components list (Figs 5 and 6)

R1, 16	51Ω	**D1, 2, 3, 4**	OA47 or similar germanium (or Schottky diodes—see text)	**C1, 12**	1,000pF min ceramic disc	**C20**	180pF polystyrene
R2, 3, 31	47kΩ			**C2, 3, 4**	10pF ceramic plate	**C22**	100µF 16V electrolytic
R5, 6, 7, 8, 9, 10, 11, 13, 14, 25	470Ω			**C5, 24, 28**	0·1µF ceramic disc	**C25, 26, 27, 29**	4·7µF at least 25V electrolytic
R12	330Ω	**D5, 6**	1N4148 or similar silicon junction	**C6, 13, 14, 15, 16, 17, 18, 19, 21, 23, 30**	0·01µF ceramic disc	**IC1**	10116 ECL triple-line receiver*
R4, 15	100Ω			**C7, 8**	270pF ceramic plate	**IC2**	TBA 120S
R17, 21, 22	2kΩ	**TR1**	2N3819	**C9**	0·047µF ceramic disc	**IC3**	78L05
R18	27kΩ	**TR2, 3, 4, 5**	BC107, 2N2369 or similar general-purpose silicon transistor	**C10, 11**	0·022µF ceramic disc	**IC4**	78L12
R19, 20, 23, 26, 27	10kΩ					**IC5**	TL071
R24, 28, 29	220kΩ					**L1**	68µH rf choke
R30	1kΩ						

Resistors may be metal oxide or carbon film types.

Delay cable: Type should not be critical: a miniature size such as RG174 or RG178 is easy to wire. *Obtainable from Micromark Ltd, 157 Boyn Valley Road, Maidenhead, Berks SL6 4DT.

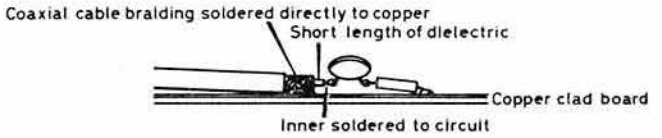


Fig 7. Soldering coaxial cable to earth plane

Conclusion

It is hoped that the unit described will be taken as the basis for further experimentation, and used by amateurs to ensure that the quality of modulation and efficient spectrum use are kept to a high standard. The complete unit, shown in the photograph on page 878, contained an on-board calibrator, and the author hopes to describe this in due course.

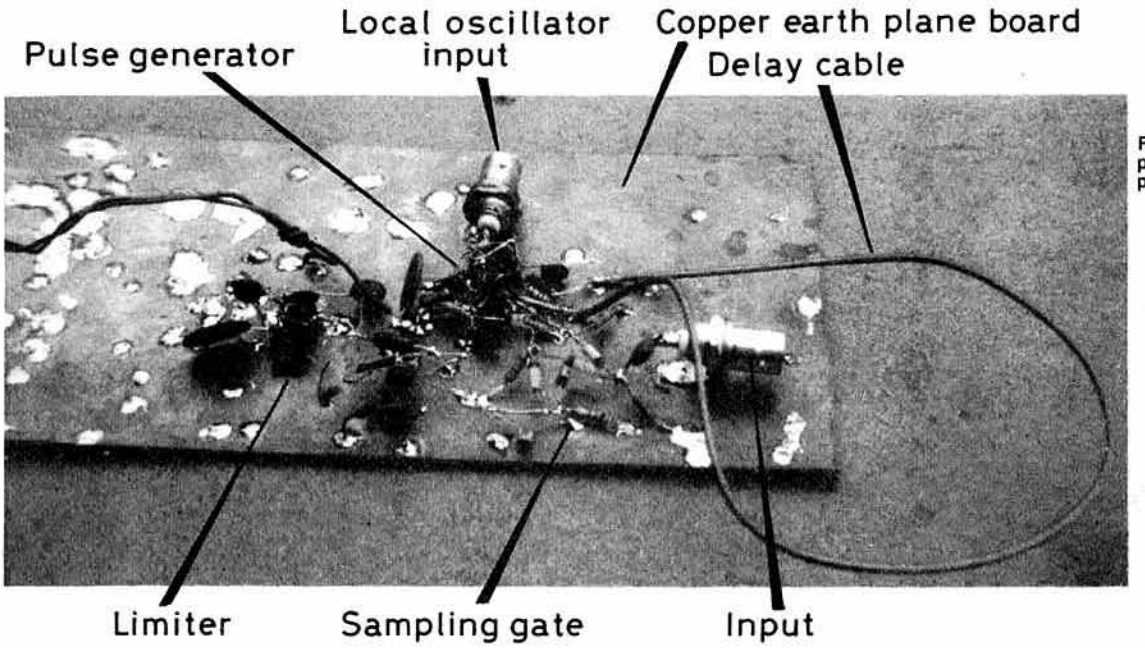


Fig 8. Two views of the first prototype, showing the sampling gate and pulse generator construction

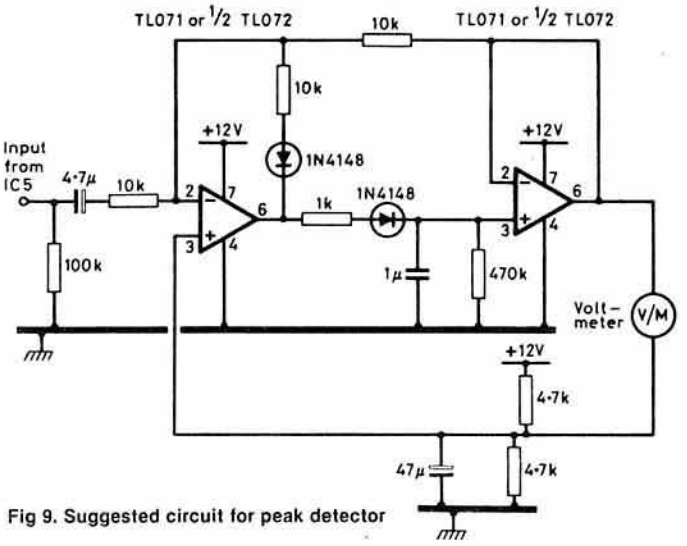


Fig 9. Suggested circuit for peak detector

Acknowledgement

The author wishes to acknowledge the use of the laboratory facilities of Marconi Instruments in testing the prototypes.

References

[1] "A pulse count discriminator unit", B. Priestley, G3JGO. *Rad Com* September 1971, p603.
[2] *VHF-UHF Manual*, 3rd edn pp451-2.

BOOK REVIEW

25 Simple Amateur Band Aerials by E. M. Noll. 63 + viii pages. First edition 1983. Published by Bernard Babani (publishing) Ltd. Pocket format (178 by 110mm). Limp covers. Price £1.95.

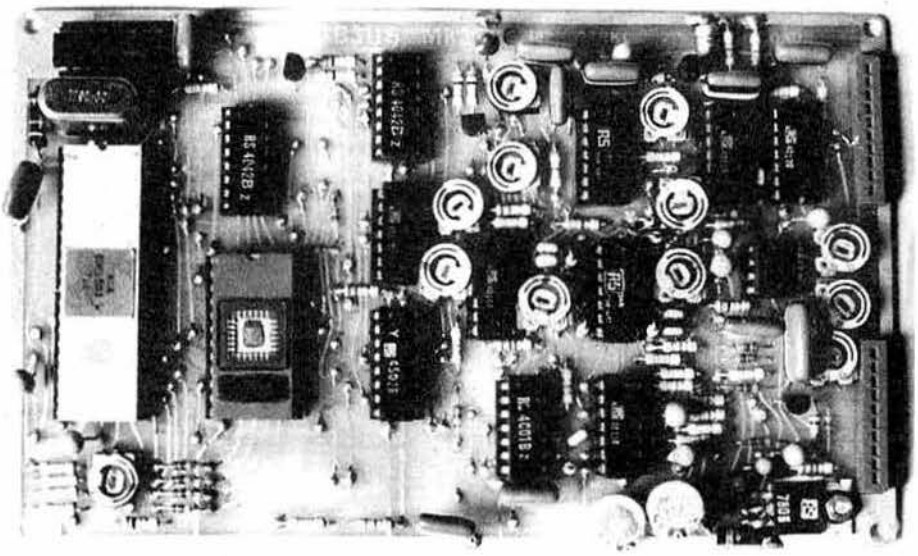
What can one say about this new book? The 25 simple hf wire antennas, based on about a dozen well-known basic types, and almost all presented as single-band designs, undoubtedly are capable of living up to the author's claim that "Many cheap and simple aerials perform very well". Unfortunately the accompanying text is mostly a mismash of truths, half-truths and no-truths that will leave the reader with little or no real insight into simple hf antennas—and omits any serious discussion of transmission lines, matching, atus, radiation resistance, feedpoint impedance, simple multi-band antennas etc. The technical level is set by the opening statement "The dipole is a half-wavelength aerial. . . . ." a definition that forces the author to describe the useful 1·5λ dipole as a "3/2 wavelength aerial". The use of an swr meter rather than a gdo or noise bridge to trim antennas to resonance is deprecated. A few years ago the Spalding & District Amateur Radio Society published a cheap duplicated 46-page booklet (edited by D. Hoult, G4OO) *Digest of horizontal wire aerials* consisting mainly of annotated diagrams. This is probably long out of print but, to this reviewer, was infinitely better than this latest disappointing effort by an American writer, presumably anglicised by the publishers. It cannot be recommended. *G3VA*

Arising from reviews in the August issue (page 701):

1. Price in the USA of the 224-page *Confidential Frequency List* is $9.95 and not $0.95 as shown. The two Gilfer Associates publications are available in the UK from Amateur Radio Exchange.
2. Peter E. Chadwick, G3RZP, draws attention to a number of unfortunate errors in Ulrich Rohde's *Digital pll frequency systhesisers—theory and design* that appear to result from inadequate proof reading. He writes: "A useful book, certainly, but requiring to be treated with a great deal more care and suspicion than the review leads one to believe. The amateur is easily lead astray by the assumption of infallibility in such a text book." G3RZP notes *inter alia* that section 5-1-2, describing a synthesizer for an hf receiver, bears little relationship to Fig 5-4 to which it supposedly refers.

G3VA comments: "G3RZP is right of course, but there can be few first printings of books of this complexity that do not contain any errors."

THE GB3US Mk2



A microprocessor repeater logic system

PART 1

by A. J. T. Whitaker, G3RKL*

Tony Whitaker obtained both his BEng and PhD in the Department of Electronic and Electrical Engineering at the University of Sheffield during the 'sixties. After several years as a research assistant, he took up his present post as a senior experimental officer in 1976, and is concerned with a wide variety of projects involving microwaves, ultrasonics, computing and electronic circuitry.

Licensed while still at school, operation was mainly confined to top band, but interest in vhf was kindled with the acquisition (and necessary modification) of a B44 for 70MHz. This led to the setting up in 1969 of the 70MHz beacon GB3SU (now GB3BUX), initially in Sheffield, before moving to its present site at the department's microwave antenna test range near Buxton. With the introduction of repeaters in the early 'seventies, the associated technical challenge resulted in GB3HH (R4, 1976) and GB3US (RB0, 1978), with particular emphasis on the control logic. Present activity is almost entirely devoted to the building of the first pssb repeater, GB3SF, which should be operational around the end of 1983.

G3RKL was a member of the Repeater Working Group during its early years, and now serves as a corresponding member of the VHF Committee, concerned with GB3SF.

Introduction

All repeaters need some form of automatic control, which determines when the through-audio is relayed, identification made, and other features entered such as timeout, overdeviation indication etc. As long as this control complies with the requirements of the licensing authority, the complexity of the system is at the discretion of the repeater group concerned. Most control systems to date are purely hardware devices; that is, the required features have been permanently built-in, with very little or no capability of change. The microprocessor, however, offers the opportunity of producing a unit with a great deal of flexibility since, providing the relevant hardware exists, the operation of the repeater can be made solely dependent on software, ie the program which controls it. This article describes the hardware design and construction of a simple, low-cost, micro-based system, which is a direct replacement for the GB3US Mk1. A machine code listing of the original GB3US program is also included, which, when copied with a few appropriate changes, will produce a working unit. To help people develop their own software, a full listing of this program can be obtained from the author by sending a self-addressed 8 by 12in envelope stamped with either a 30p (1st class) or 21p (2nd class) stamp to him at the address below.

Design considerations

Since many GB3US Mk1 control logics [1], some with the filter/timeout addition [2], are now in use, it was decided to make the Mk2 printed circuit board of the same physical size, with identical connector pin designations, so that one board could just replace the other. As with the Mk1, low power consumption was necessary, so the RCA cmos CDP1802C, eight-bit microprocessor was chosen, together with standard cmos logic ics. A memory size of 2k bytes (1k = 1,024 = 2^{10}, 1 byte = one eight-bit word) is sufficient to hold even a complex program, for which the popular TMS 2516JL (single rail 2716-5V) erasable programmable read only memory (eprom) is ideally suited. The micro should also have sufficient input/output lines to respond/talk to the outside world, the number depending to some extent on the degree of control required. Because of space considerations, the conventional input/output system of the 1802 was not used, an effective memory map being employed instead, giving six input and four output lines. The crystal clock was chosen as 1,792kHz, giving a machine cycle time of 4·5μs and, using a single CD4020BE 14-stage binary divider, outputs of 1,750, 875 and 109Hz were available, the latter being used to drive the interrupt line.

The main hardware features are thus as follows:

(a) A completely self-contained unit on one double-sided printed circuit board, 6·5 by 4in (same size as the GB3US Mk1).

(b) Low impedance audio output up to several volts peak-to-peak. Transmit key output will drive a small low-voltage relay (same as Mk1).

(c) Remote closedown, eg an externally-located key switch, which prevents the transmitter from being keyed but leaves the rest of the station unaltered (same as Mk1).

(d) Low power consumption, +13·5V, ±1·5V at approximately 70mA, mainly determined by the eprom current.

(e) Two independently-keyed sine-wave tones, 1,750 and 875Hz, with shaped envelopes.

(f) High/low amplitude level control of keyed tones.

(g) Software generated output tone, square or rectangular wave, from the Q output.

(h) High/low input frequency indication from the receiver (two lines).

(i) Mains/battery operation indication line.

(j) Self-tuning 1,750Hz notch filter (as per filter addition to the Mk1).

(k) One general input line, eg manually-operated mode switch.

(l) Four auxiliary input lines, eg digital signal strength, overdeviation, dtmf (touchtone) etc.

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Some basic properties of the CDP1802

A full description of the CDP1802 can be found in the RCA data sheet [3], but for those not too familiar with the workings of the "all-powerful silicon chip", a few words on its method of operation in this system might prove useful. Fig 1 shows a simple block diagram of the control unit, and it can be seen that attached directly to the micro are the eprom, address latch and input/output interfaces. The program to be obeyed, which is just a sequence of binary encoded instructions, is held in the eprom (and once programmed in, these cannot be erased except by exposure of the chip to ultra-violet light), which is interrogated by the micro via the address bus. The 2516 eprom is capable of holding 2,048, one-byte instructions, in sequential addresses 0000 to 2047, which is 0 to 11111111111 in binary, ie 11 address lines are required to uniquely select any one particular location. For convenience it is usual to refer to such a binary number in hexadecimal, where counting is performed to a base of 16 instead of the more familiar 10, the decimal values 10 to 15 being represented by the letters A to F. Thus an eight-bit byte can be described in two characters, eg 7A (hex) = 01111010 (binary) = 122 (decimal), and so the eprom addresses are 000 to 7FF. Since the address bus from the micro is only eight bits wide, an address "latch" must be used to store the "high" byte of a full two-byte address, the three least significant bits (lsbs) of this high byte being applied to the eprom as the three most significant bits (msbs) of its 11-bit address. It can be seen that a 16-bit (two-byte) address is generated in this manner, designated memory address lines MA0 to MA15, giving the capability of addressing 64k bytes of memory. However, the 2k eprom only requires MA0 to MA10, and so would respond if any of the higher MA lines (11 to 15) were set as well. This is of no consequence in the control unit, as no other memory is used, except that the input/output interfaces are addressed at 4000, so MA14 is used to enable the input/output and, at the same time, disable the eprom.

The 1802 has 16 internal registers, referred to as R(0) to R(F), each 16-bits long, which can be used for either general workspace/counters, the data register (X) or the program counter (P), which holds the address of the next instruction to be obeyed. All input/output data, including the program instructions, is passed to the micro via the eight-line bi-directional data bus, lines D0 to D7, the actual direction being indicated by a zero level on *MRD* for read, or *MWR* for write. Since many output ports could be connected in parallel on the bus, but only one can be active at any one time, tri-state devices (outputs capable of being set to an open circuit) must be used to "switch off" the others not selected, and the eprom and input interface (CD4502BE) are such devices.

Components list

R1	10MΩ	C1, 8, 11, 12, 18, 34, 35, 36	0·1μF 250V polyester
R2, 3, 4, 5, 12, 18 20, 22, 26, 27, 28, 30, 31, 35, 36, 40, 42	470kΩ	C2, 3	0·22μF 35V tantalum
		C4, 5	470μF 16V radial pc
		C6, 7, 14	0·01μF 250V polyester
R6, 7, 8, 9, 24, 38, 47, 48	10kΩ	C9, 10, 21	0·001μF 100V monolithic ceramic
R10, 21, 25, 29, 32, 33, 34, 37, 43, 44	4·7kΩ	C13, 19	4·7μF 35V tantalum
		C15	0·22μF 250 polyester
R11, 39, 41	150kΩ	C16, 27, 31, 32, 33	10μF 16V tantalum
R13	68Ω	C17, 20, 28	2·2μF 35V tantalum
R14, 15	6·8kΩ	C22, 23, 24	0·01μF 100V monolithic ceramic
R16, 51	47kΩ		
R17, 19	33kΩ	C25, 26	0·022μF monolithic ceramic
R23, 45, 49	2·2kΩ		
R46, 50	22kΩ		
All resistors, except R1 which is 0·5W, are 0·25W high stability carbon film, 5%			
RV1, 7, 8	220Ω	C29	0·0022μF monolithic ceramic
RV2, 9, 12	10kΩ		
RV3	22kΩ	C30	10μF 25V tube
RV4, 6	1kΩ		
RV5	4·7kΩ	IC1	CDP1802CD or CE
RV10, 11	100kΩ	IC2	TMS2516 JL (single rail 2716)
All min horizontal presets		IC3	CD4020BE
		IC4, 6	CD4042BE
D1-13	1N4148	IC5	CD4502BE
		IC7, 10, 14	CD4011BE
ZD1	1N5339B (5V6, 5W)	IC8	NE567V
		IC9	CD4001BE
		IC11	CD4016BE
RG1	7805	IC12, 13	348 (Quad 741)
RG2	78L05		TL064, 074, 084 CN
		IC15	CD4013BE
TR1, 2, 3	BC184L		
TR4	2N3819	SK1,2	10-way pc connector (RS 488-359)
X1	1,792kHz (HC33/u)		

The whole sequence of events within the micro is controlled by the clock, which can be either applied from an external source, or internally generated using the on-board crystal oscillator circuitry. Each machine cycle, except initialization, takes eight clock cycles, and instructions take two or three machine cycles depending on their type. Thus it is possible to derive

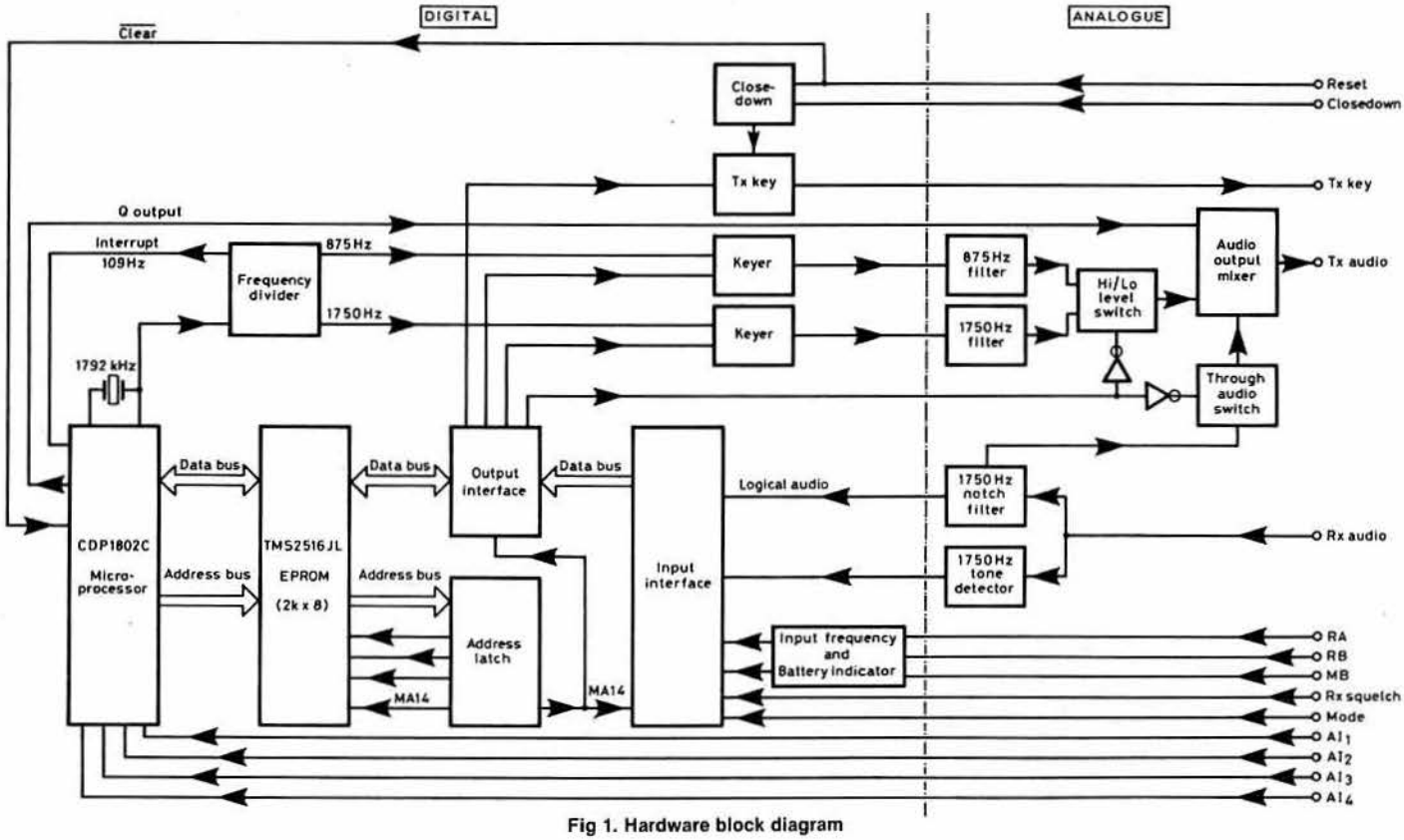


Fig 1. Hardware block diagram

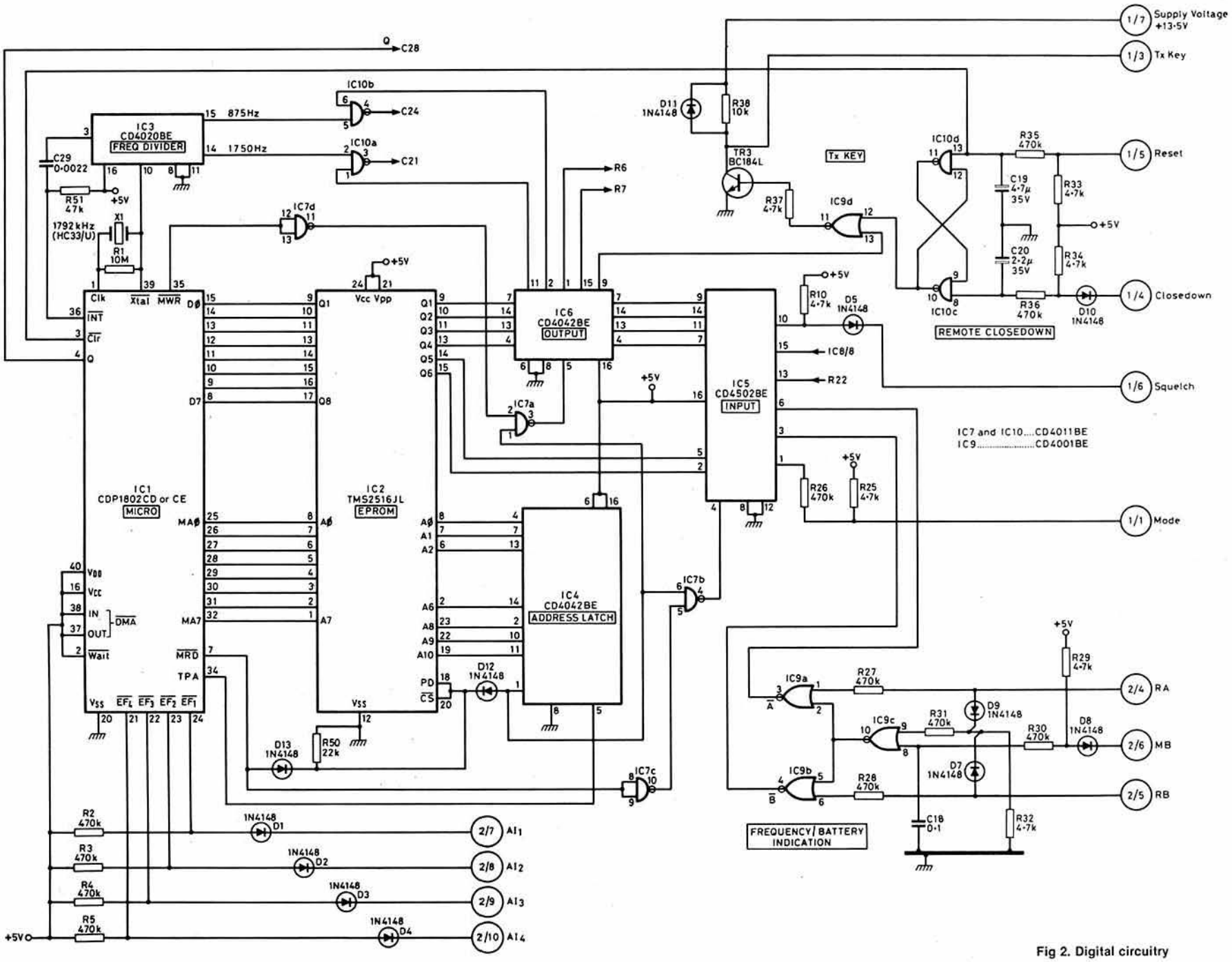


Fig 2. Digital circuitry

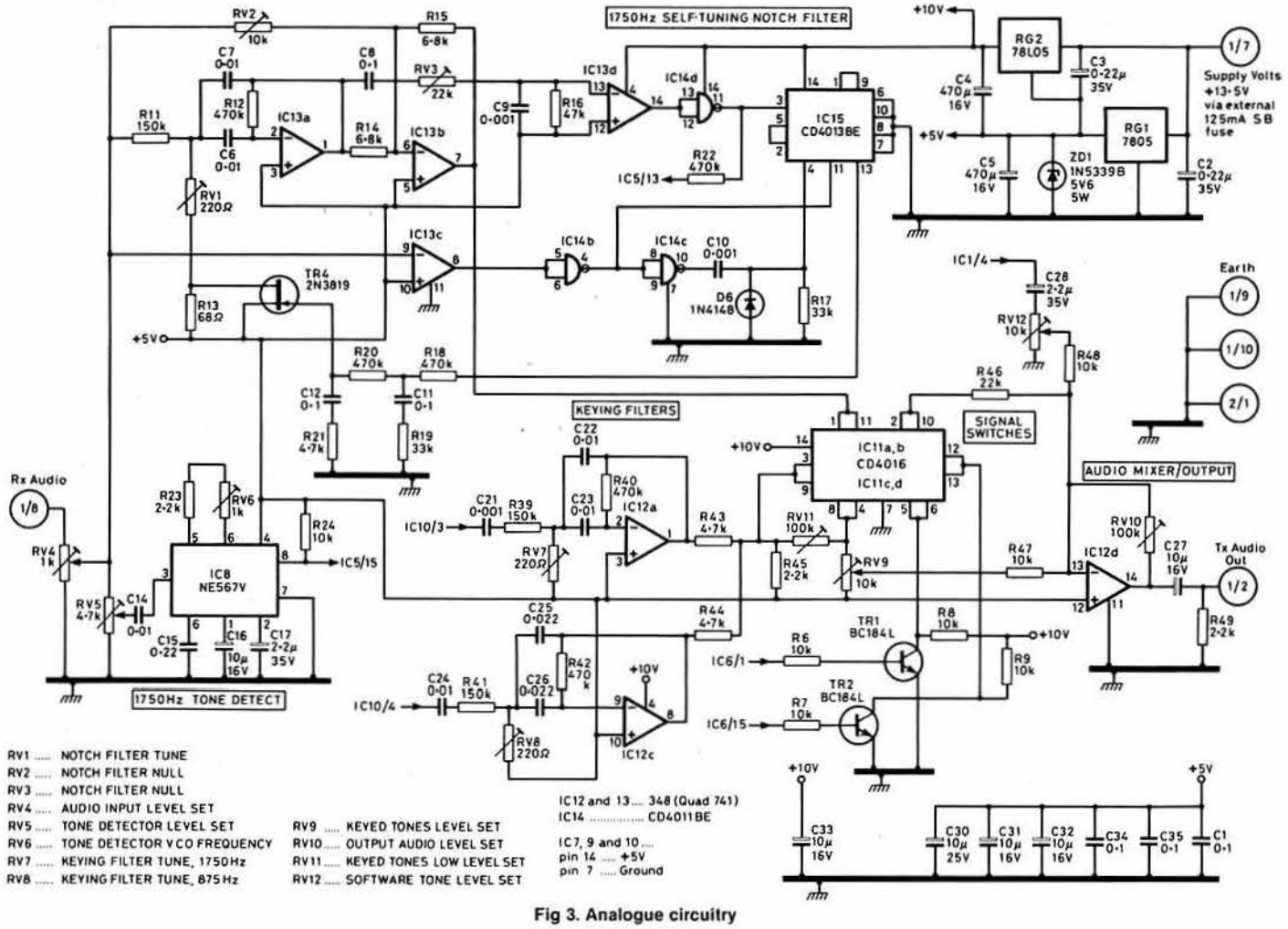


Fig 3. Analogue circuitry

accurate timings by counting instructions obeyed, although in this unit most timing operations are achieved using the interrupt, which functions as follows. When enabled, a zero level on the interrupt line (pin 36) will force the micro to adopt R(1) as its program counter. Thus, by setting R(1) to the address of the interrupt service routine (the piece of program that should be obeyed on interrupt) before the interrupt occurs, when it does, the micro will jump to that predetermined location and continue from there.

Digital circuitry

Fig 2 shows the circuit schematic for the digital side of the system. As mentioned previously, only high address lines MA8, MA9, MA10 and MA14 need to be latched, and these are held in IC4. MA14 is applied to the eprom's select and power-down inputs, OR'd with *MRD* via D12 and D13, to inhibit it during input/output. The six input lines are connected to the data bus (D0 to D5) via IC5, a hex tri-state buffer, enabled by MA14 AND'd with *MRD*, while the four output lines (D0 to D3) are latched into IC6 by the trailing edge of *MWR*, AND'd with MA14. The four auxiliary inputs are connected directly to the E Flags via pull-up circuitry, and the Q bit goes via the level setting control, RV12, to the audio output mixer IC12c.

The 1,792kHz clock is generated by the on-chip oscillator, which also drives the 14 stage binary divider IC3. The Q10 and Q11 outputs are 1,750 and 875Hz square waves respectively, which are keyed by gates IC10a and b, while the Q14 output (109Hz) generates a short negative pulse through C29, R51, which is applied to the micro interrupt line. The transmitter is keyed by TR3, via IC9d, which is controlled by the remote close-down flip-flop IC10c, d. The reset input of this flip-flop (pin 13) is also connected to the *CLEAR* line of the micro (pin 3), such that when power is applied, the time constant of C19, R33, R35, exceeds that of C20, R34, R36, ensuring that the program starts at memory location 000 with the close-down reset.

For the receiver input frequency and battery operation indications, IC9a, b, c combine the three inputs RA, RB and MB according to the truth table shown in Table 1. With no input at SK2, MB, RA and RB default to 1, 0 and 0 respectively, giving a permanent "OK with mains power" indication. The squelch and general inputs go directly to IC5 via pull-up components, the squelch sense being determined in software rather than by a link as in the Mk1.

Table 1

Input			Output		Indication	
MB	RA	RB	$\overline{A}$	$\overline{B}$	Frequency	Power
1	0	0	1	1	OK	Mains
X	1	0	0	1	Low	Either
X	0	1	1	0	High	Either
0	0	0	0	0	OK	Battery

Analogue circuitry

Fig 3 shows the analogue circuitry, much of which is similar to the Mk1 and filter/timeout addition. Receiver audio passes through the self-tuning 1,750Hz notch, ICs 13, 14 and 15, through the on/off switch IC11a, b, and finally into the output mixer IC12c. The notch circuit also provides logical audio on micro input line 3, which can be used, for example, by an audio detect routine. A conventional 567 phase lock loop, IC8, detects the presence of a 1,750Hz tone, giving a logical signal on input line 2. The two keyed square wave tones, at 1,750 and 875Hz, pass through high Q active filters IC12a, b, which not only convert them to sine waves, but also "ring" slightly to give an excellent keying envelope. These outputs are mixed in R43, R44 and R45, pass through the high/low level switch IC11c, d, and into the output mixer IC12c. The control of the analogue switches (IC11) requires a level shift, which is accomplished by TR1 and TR2.

The stabilized +5V supply is provided by RG1, a 1A regulator deliberately under-run for reliability, with a 5·6V power zener diode, Z1, for circuit protection should it fail. A 100mA regulator, RG2, gives an additional +5V stabilized line (+10V with respect to earth), mainly for the operational amplifiers, where the +5V line acts as the ac ground.

(To be concluded)

VHF DIRECTION FINDING

WITH A MINIATURIZED BEAM ANTENNA

by C. J. SEYMOUR, BSc, G4NNA*

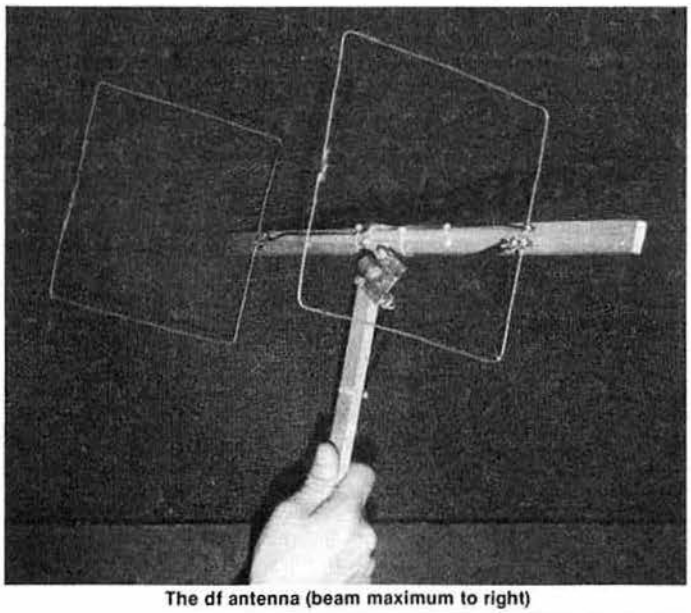
After an initial year of industrial training G4NNA read electronic engineering at the University of Hull, graduating from a four-year course in 1982 with BSc (Hons) and the Diploma in Electronic Engineering, under a thick sandwich sponsorship from EMI Training Department. He is currently in the graduate training part of the course at EMI Central Research Laboratories.

He took the RAE at the age of 14 and obtained amateur licence G8ITH in April 1974. His current amateur radio activities include automatic morse decoding and sending at ms speed for which he has written and tested programs on a Nascom 1 on 144MHz.

Introduction

VHF direction-finding enthusiasts on the 144MHz band often make use of a portable beam antenna which can be hand-held, typical examples being the HB9CV and the ZL-Special [1, 2, 3]. The basic principle is to hold up the antenna and rotate it until the direction of maximum signal strength, or the minimum off the back of the antenna, is determined with the aid of an S-meter.

To facilitate direction-finding where the size of an HB9CV type beam might be inconvenient, the df beam to be described has been developed, and works well in practice. It has a maximum dimension one third that of the HB9CV.



The df antenna (beam maximum to right)

124 Scotts Road, Southall, Middx UB2 5DG.

Theory

Of the many direction-finding techniques which exist, two methods are in general use. In the first, the antenna is rotated and the peaks or nulls in the signal strength are noted, while the second uses antennas spaced so that the phase differences of the received signals can be interpreted to give the direction of wave travel across the antenna system.

The second method is used by commercially-available antenna scanners with whips in a circle or square which give a bearing on an l.e.d. readout. This is also known as a doppler system because the electrical rotation of the antenna beam, by cyclic switching of the antennas, produces a phase shift which is equivalent to the modulation and doppler shift that would be the result of rotating the actual antenna array. These scanners are expensive and could be awkward to equip for use on foot, especially when the transmitter is sited on rough land.

In another method, two beam antennas have the beams angled apart so that the signal direction is off the side of each and in between the two beams, the signals from each beam then being of equal strength.

The method to be described is the simplest for home construction, but requires excellent screening of the receiver, and use of antenna attenuators to prevent the receiver being overloaded at close range. To get an unambiguous bearing, the antenna must have a unidirectional response pattern. Fig 1 shows two possible patterns. The cardioid is typical of hf loops with a vertical sense antenna, or of a two-element array spaced $\lambda/4$ apart. The antenna is rotated for minimum signal, and the null is sharpest with $\lambda/4$ spacing (maximum front to back ratio). Antenna nulls are usually sharper than the beams, so enabling accurate bearings to be read. A beam antenna can be used by adjusting for maximum strength on the beam,

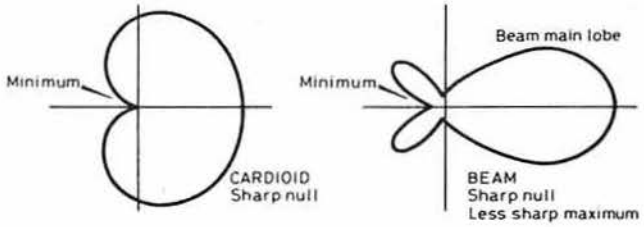
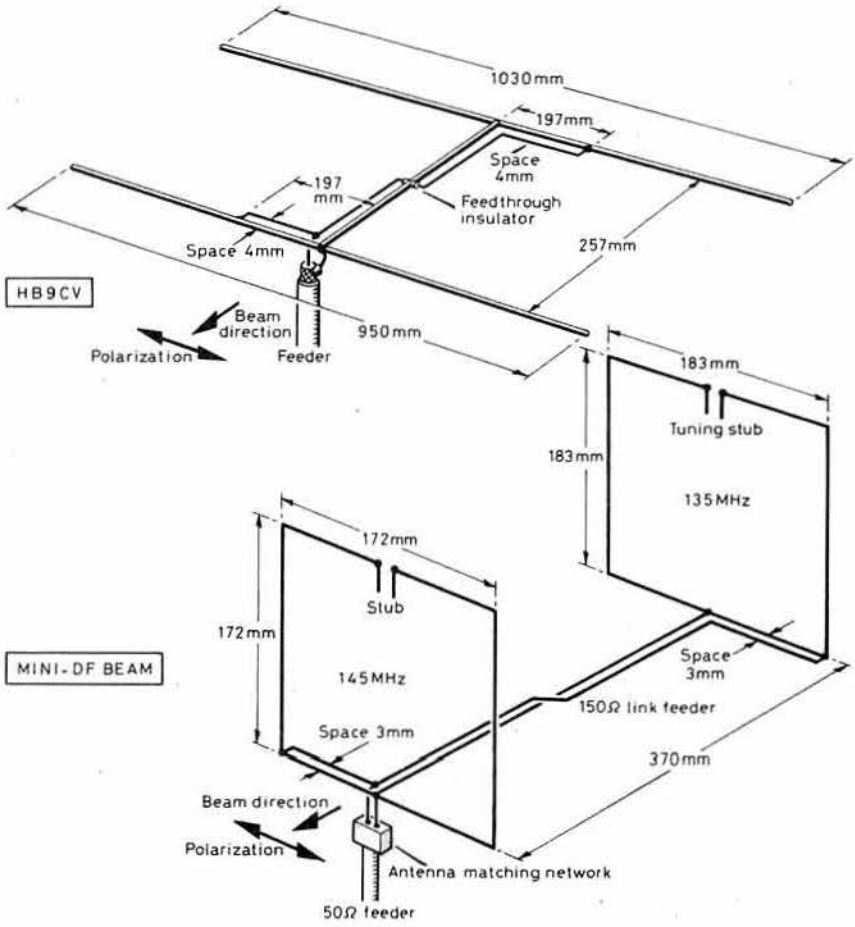
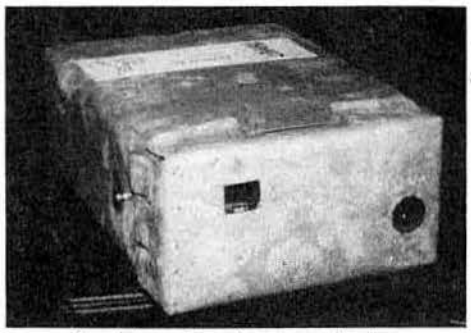


Fig 1. Antenna patterns for direction-finding





Front view of receiver screening box

Fig 2. Mini direction-finding antenna for vhf. A tuning capacitor (30pF trimmer) is normally connected in parallel at the feedpoint of the HB9CV (See *Radio Communication Handbook*, p14. 24)

or for a minimum on the null as for a cardioid. Beam antennas usually have less than λ/4 spacing, which worsens the front-to-back ratio and the sharpness of the null.

Construction of a mini df beam

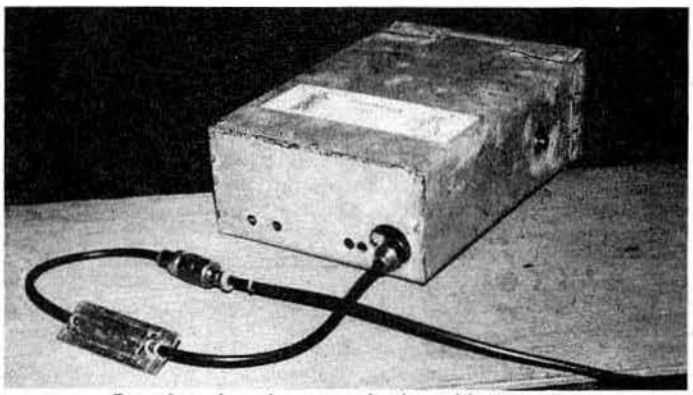
The configuration of a mini df beam for 144MHz is shown in Fig 2, and it can be seen to be somewhat similar to, but smaller than, the HB9CV, which is shown for comparison. This was the most successful arrangement found after much experimentation with small wire loops.

The antenna uses two small wire loops capacitance loaded and phased to get a unidirectional beam. The feed arrangement is the same type as that of the HB9CV, using gamma matching to each loop. The loops can be considered as the elements of an HB9CV shortened and bent into a 7 by 7in square, with the ends fixed to an insulator to which is attached a loading capacitor.

Dimensions for construction are given in Fig 2. The prototype was made from 16swg wire loops soldered to wood screws in the support. The loops are spaced at 70 per cent of λ/4 spacing, slightly more than the λ/8 of the HB9CV, as a compromise between narrow beam and maximum front-to-back ratio. The beam direction is parallel to the centres of the squares in the direction of the feeder-end loop, and there is a null in the opposite direction. The loading capacitors may be made from double-sided pcb, but these are difficult to adjust. A better way is to use an insulator made from glass-fibre pcb, with an insulating gap cut in the copper, and with a length of 75Ω twin feeder connected to it as a small capacitor. Initially, about 2in should be connected and trimmed by small amounts to tune the loops. If 75Ω twin is not available, 300Ω ribbon may be used, but a greater length will be needed.

The loops should first be tuned without any feeder connections at all. The radiator loop is tuned to 145MHz with a gdo,loosely coupled and away from objects. The reflector loop (fed by a reversed 150Ω link feeder) is tuned to within limits 135–137MHz. The link feeder and gamma match connections are then made. The gamma wires are 16swg spaced 3mm from the loop and tapped at the corner of the loop.

The link feeder is 150Ω characteristic impedance, made by paralleling two



Rear view of receiver screening box with attenuator

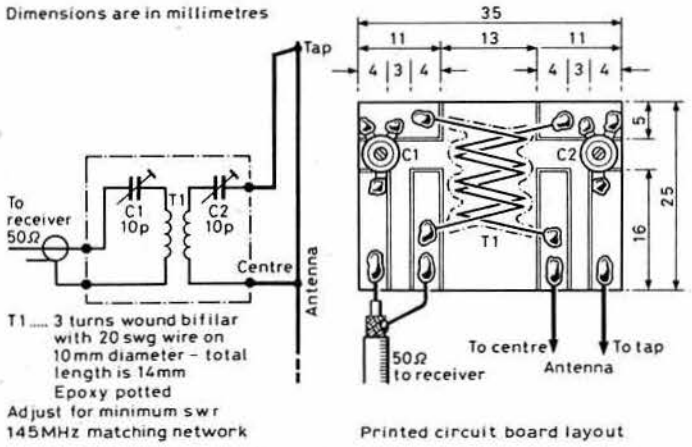


Fig 3. Antenna matching network

lengths of 300Ω ribbon and tying each conductor pair together by cutting holes in the insulation and putting nylon cable ties around them. The impedance is not critical, but better practical results with a well-defined beam pattern were obtained when an impedance between 75 and 300Ω was used, 150Ω giving the best results. This would affect the relative loop currents.

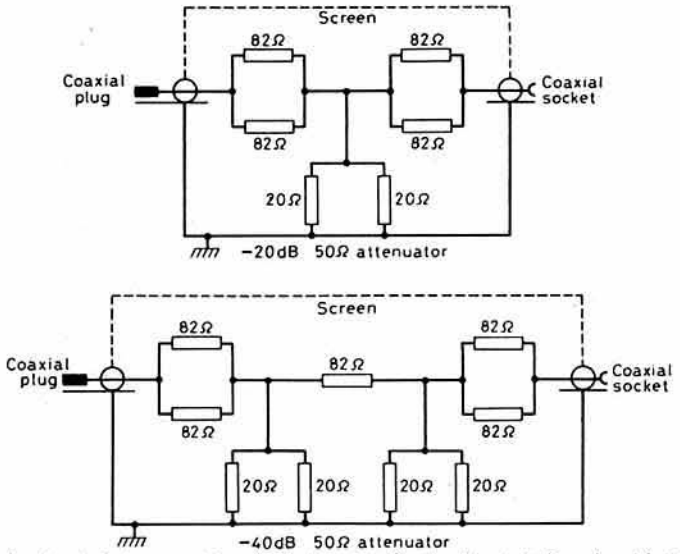
The feed loop is connected directly or, at most, through 5in of 75Ω twin, to a small antenna-matching network built on a piece of pcb. This network is necessary as the impedance of the folded loops is low, and a balun action provided by a bifilar transformer helps prevent the polar diagram being upset by rf picked up on the coaxial feeder. The matching network, which will also tune other homebrew antennas, is detailed in Fig 3.

In the prototype the 50Ω coaxial cable connected to the matching board was 182cm long, and, to further prevent rf on the coaxial outer affecting the antenna pattern or the receiver, two small ferrite rings were slipped over the coaxial cable at each end and secured. A mounting frame with a handle to support the loops was made from two pieces of 1 by 0·5in wood in a T-shape, varnished with polyurethane.

Having made the antenna, there are two more items necessary for the prospective df hunter. When the transmitter has been traced to within a few hundred yards or so, depending on its power, it will saturate the receiver and give a full-scale S-meter reading whatever the antenna direction. A null reading direction will reduce the input by several decibels, but to retain useful signal strength readings it is necessary to attenuate the rf before the receiver antenna socket. The circuits of 20dB and 40dB ladder attenuators are given in Fig 4. As the attenuators are only intended for receiving, small wattage standard resistors may be used. Commercial attenuators could be used of course, but will cost a lot more. The attenuators are constructed on a copper pcb sheet 3 by 1in as in-line units with PL259 line plugs and sockets. Short connecting lengths of coaxial cable from the plugs are secured to the pcb with cable ties. The attenuators must be well screened, and a tinplate screen can be soldered down over the resistors, leaving just enough space for the coaxial leads. Used singly or both in line, attenuation of 20, 40, or 60dB is possible and necessary.

Finally, even with a dummy load or no antenna the receiver is likely to be swamped within close range of an unseen transmitter, as the screening of most receivers is inadequate for this type of df work—the only solution is to screen the entire receiver. The author found that a local 250mW transmitter transmission could break through a metal biscuit tin with a closed lid, fully quieting the FT290 inside.

To get reasonable protection from breakthrough, a sheet metal box can be made from tinplated steel soldered along each seam. (Welded boxes would be suitable if continuous welds rather than spot welds were used). A lid with contact fingers all round completes the screen. Minimum-size holes are cut for the antenna lead, the S-meter viewing, and the strap lugs of the FT290, (which may be extended with washers). Small holes are cut to get at the back switches of the FT290 via a screwdriver. The prototype box reduced breakthrough from 25W at 15ft to S7-9, compared with S-meter full scale deflection without the box.



Use low inductance resistors (not wire-wound) and cut leads to 5mm for vhf use

Fig 4. In-line attenuators of constant impedance. Cascade both attenuators for −60dB

Using the df equipment and field trials

Tracking down a hidden transmitter consists of measuring the bearing of the signal, knowing the direction of the maximum and minimum response of the antenna. The bearing can be followed and used in conjunction with previous readings to get a map cross-reference. A map and compass are very useful items.

With some experience, the signal strength is another useful guide. At the start of the hunt, signals may be relatively weak, so that rotating the antenna for maximum signal strength is most useful, but the null direction will be more useful as the station gets nearer and the signal gets stronger. When very close to the hidden transmitter, the signals may be so strong that only the S-meter dip due to the null can be seen, and you may also need 60dB of attenuation.

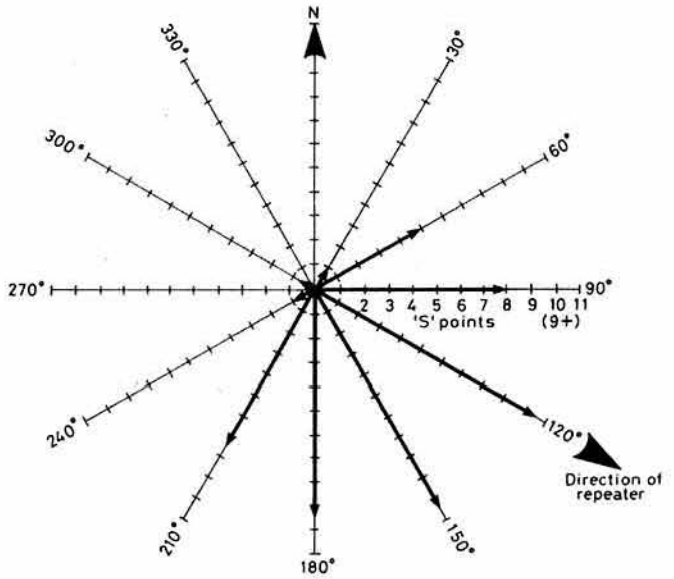


Fig 5. Dual mini df loop H-plane S-meter response (FT290R) measured indoors

This mini df beam antenna can easily be used vertically or horizontally polarized, and was constructed primarily as a vertical beam to correspond with the more frequently expected vertical hidden antenna. As you get nearer the transmitter, signals will begin to saturate the S-meter, so attenuators sufficient to stop the meter from overloading must be inserted.

With high attenuation in circuit, it is possible to lose the signal and not notice if the transmitter operates with a call every few minutes intermittently. Equipment such as the FT290 has its own antenna, which can be extended for monitoring, or an assistant with another receiver can monitor.

Conclusions

It is hoped that this description of a compact df beam antenna which is easier to handle than the HB9CV, will encourage df activity on the vhf bands for df hunts of all kinds.

Experience with the use of the mini df beam suggests that the H-plane polar response (antenna rotated horizontally while held vertically polarized) is "sharper" than the E-plane response, and is also better defined in the presence of nearby objects (eg indoors).

Fig 5 shows the S-meter readings to be expected when the beam is rotated while vertically polarized and receiving a transmission. The experiment was performed indoors using the author's FT290. Generally speaking, best polar responses occur in the open air with the polarization of the antenna matched to the transmission, and the construction of this antenna can make it easy to alter the polarization.

As a transmitting antenna, the df mini beam performs about as well as a dipole, and also makes a convenient pushbike mobile antenna.

References

[1] *Radio REF* March 1981, pp 155-71.

[2] "Technical Topics", *Rad Com* October 1981.

[3] *Radio Communication Handbook*, 5th edn, p14. 24.

Technical Topics

by Pat Hawker, G3VA

A TRADE MAGAZINE recently reported that a spot check carried out by health and safety inspectors in 207 Newcastle-upon-Tyne shops had revealed that in no less than 119 cases the electrical installations failed to satisfy safety criteria. In 82 cases the installations were sufficiently unsatisfactory as to lead the inspectors immediately to dismantle and disconnect plugs, circuits and/or cables. In general, the main complaints were of poorly jointed cables, badly connected or worn connections to plugs and sockets, dangerous circuitry or unmarked distribution boards.

Looking guiltily at my own jumble of adapters, "temporary" match-assisted connections, mixtures of two- and three-lead cables etc, I have been wondering how many of our amateur radio installations would satisfy those sharp-eyed inspectors. Still today, as for many years, the greatest potential hazard in a radio station remains the 240V mains supply with all its opportunities for electric shock, fire, soldering-irons left with the power connected etc.

THIS MONTH

Cable reels

In this connection, Eric Dowdeswell, G4AR, recently drew attention (*Electrical and Radio Trading* 7 July 1983) to a problem that may result only in a blown fuse but could in some circumstances be an unexpected hazard: the significant rise in temperature—sufficient sometimes to cause pvc insulation to melt—that can occur when a heavy current is passed through a long extension cable (as often used for power tools etc) while this is still wound on its cable reel. Jo-Jo Cable Reels Ltd, in a test with 10m of pvc-insulated cable nominally rated at 4A, have shown that the cable reached temperatures well above the maximum safe working temperature (70°C) when 5A was carried for more than about 20min, and reached the melting point of the reel and the cable insulation (about 170°C) after passing 8A for just under two hours.

The moral, G4AR suggests, is that unless reliable current or temperature cut-outs are fitted, the whole length of a cable should always be unwound from its reel whatever the distance between outlet and appliance. The inductance of wound cable and the poor thermal conductivity of the cable insulation can otherwise combine to produce these excessively high temperatures.

Jack Maling, G5JL, recently had the unpleasant experience of having his modern FT101Z transceiver ignite while he was using it, with only a momentary puff of smoke as warning and no sign of any fuses blowing. Fortunately, with what he terms a "superhuman" effort, he was able to blow out the fire before it really caught hold—but the experience set him thinking.

Modern commercial gear, he considers, is usually extremely well screened to minimize tvi etc, but with lots of ventilation holes and/or louvres on the sides, back, top and bottom of the enclosures. This can create dangers. It can provide a ready draught that will fan a fire; it also means that it is usually impossible to get at the seat of the fire without the time-consuming task of removing many screws.

So what should one do if a fire breaks out? In theory you exclude air: not easy with so many ventilation holes. Perhaps one might wrap the whole unit in a blanket—always provided there happens to be one handy.

G5JL feels he was lucky. His big puff might have fanned rather than extinguished the fire. Perhaps we should all work out just what we should do in similar circumstances, and make sure we have the means available.

Miniature antenna elements

The search for antenna elements significantly shorter than a resonant half-wavelength has occupied the attention of many people over many years. For 144MHz vhf hand-portables the short "normal-mode helix" provides a reasonably effective system, well suited for use with repeaters; the normal-mode helix can also be used at hf for portable operation (*ART7* p324, ZL1BDY). At hf, the single-turn or multi-turn transmitting loop has found increasing use for Defence and diplomatic communications (a low-profile loop can be seen edging above the roof of the American embassy in Grosvenor Square, London) but unfortunately such systems require the use of conductors of exceptionally low ohmic losses and sometimes large ground systems that make them less than ideal for portable operation.

In theory, even a miniature dipole element radiates all the rf power that is fed to it; in reality there is a rapid escalation of losses in the coupling network and great difficulty in feeding all the available transmitter power into such an element, basically due to its low radiation resistance. A further practical drawback that arises with any high-Q system is the narrow bandwidth over which the antenna radiates effectively unless retuned.

Any practical antenna structure has losses due to its finite ohmic resistance (remembering that rf resistance is likely to be much higher than dc resistance), imperfect insulation, moisture and physical environment. The special problem of short voltage-fed ship antennas used on the 500kHz calling and distress frequency has been highlighted in a number of articles in recent years in *Wireless World* (for example August 1983, pp29–31).

The ratio of radiated power to the total input power fed to an antenna structure is termed the "antenna efficiency" where: Efficiency (%) = Radiation resistance/(Radiation resistance + antenna loss resistance) × 100.

Clearly if the loss resistance of an antenna structure could be reduced to zero, antenna efficiency would be 100 per cent; however, since it would presumably need a superconductive element at or near absolute zero temperature to do this, the next best thing is usually to seek to increase the ratio of radiation resistance to loss resistance, for example by using large copper or even silver-plated tubes for small transmitting loops.

The toroidal helix antenna

Alec Clelland, DJ0FL/G3UUQ, who is an examiner in the European Patent Office, keeps an eye open for new ideas of potential use in amateur radio. Once a patent application has been published it passes into the public domain and it becomes possible for any amateur to use the information as the basis of further experimental work. It would, of course, be an infringement of a patent to use the disclosed information for commercial purposes. In other words, you can always build and try out a patented antenna or circuit device in your own station; but you cannot make such devices for sale without negotiating a licence with the patent holder or applicant.

Recently, DJ0FL/G3UUQ has drawn my attention to European Patent Application EP 0 043 591 A1, for which the applicant and inventor is James F. Corum (Route 9, Box 207-B, Morgantown, West Virginia 26505, USA). This patent application is for "an antenna for transmitting or receiving electromagnetic radiation, comprising a conductor configured to establish a closed standing-wave path, and to inhibit the velocity of propagation and support a standing-wave electromagnetic wave. One embodiment of the antenna (Fig 1) shows a toroidal helix antenna (61) which is adapted for

unbalanced feed from transmission line (62). A sliding tap (65) is moved to a point for proper impedance matching".

In effect, as Alec Clelland notes, the basic idea is extremely simple: the reduction of the dimensions of a full-wave circular (or square) loop by winding it helically. The inventor claims that various implementations of this basic principle "possess greater radiation resistance and radiation efficiency than loop antennas of similar size". He also claims that such elements "radiate controllable mixtures of vertically, horizontally and elliptically polarized electromagnetic waves, and possess radiation power patterns different from those produced by small loop antennas." He claims that these toroidal loop antennas can be used to form both driven and parasitic arrays. It should be appreciated that although such elements are similar in form to a toroidal inductor, they are essentially *not* perfect toroidal inductors which would have zero radiation efficiency.

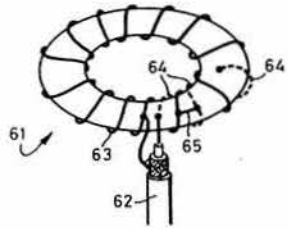


Fig 1. One simple form of the toroidal helix antenna as patented by James F. Corum. Isometric representation of the antenna (61) and transmission line (62). The main conductor (63) is continuous. In addition there is a shorter inductor (64) helically wound around the toroidal support between some of the turns of the main conductor (63). A sliding tap (65) connects the two conductors 63, 64. One side of the transmission line is connected to one end of the shorter conductor (64) and the other side attached to the main winding 63. The sliding tap (65) is moved to provide proper impedance matching. This point is found empirically at the operating frequency by moving the sliding tap to the optimum position

James Corum, who, from the examples given in his patent application, would appear to be an active radio amateur, sets out eight design examples, some, but not all, of which appear to have been built and tested. These cover frequencies as low as 200kHz and as high as 450MHz. The design examples are: (1) vhf toroidal loop; (2) vhf vertically-polarized toroidal loop; (3) omnidirectional vhf array; (4) hf toroidal loop; (5) mf vertically-polarized toroidal loop; (6) hf rectangular toroidal loop; (7) uhf parasitic array; and (8) contrawound vhf toroidal loop. Examples which appear to be most relevant to amateur radio are shown in Table 1.

I should perhaps emphasize that it is difficult to determine readily from the 70-page patent application just what degree of improvement in efficiency is obtained over more conventional short elements and transmitting loops by adopting helical toroidal winding. It appears entirely possible, however, to obtain the advantages of resistive feedpoints at resonance, and that, as with a full-sized quad loop, harmonic resonances are usable, as in example 4. The inventor admits that "one does not get something for nothing. The price one pays with the toroidal helix is that it is a narrowband (high-Q) structure and inherently not a broadband device". However, he adds: "These antennas by virtue of their construction possess a greater radiation resistance than known antennas of similar electrical size not having the slow-wave winding features . . . the helix permits the formation of a resonant antenna current standing wave in a region of electrically small dimensions, and it permits the controlled variation of antenna currents, resonant frequency, impedance, polarization and antenna pattern."

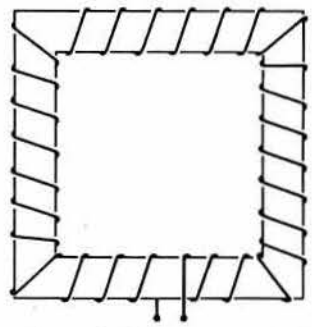


Fig 2. An hf rectangular toroidal loop antenna for 27MHz on 2·5in (63·5mm) od plastic pipe form 27in (68·58cm) by 27in. Measured feedpoint impedance about 2,600Ω resistive at resonant frequency with antenna comprising 115 equally-spaced turns of 18-gauge wire

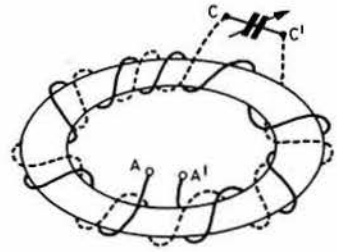


Fig 3. Use of a variable capacitor to vary the resonant frequency of a toroidal helix antenna without changing the number of turns. The antenna comprises two helices, one fed at points AA' and the other at CC'. The variable capacitor is connected across feedpoints CC'

The resonant frequency of the toroidal loop can be varied without changing the number of turns by using a variable capacitor, as shown in Fig 3. The antenna comprises two toroidal helices, one fed at points AA', the other at CC'. The capacitor is then connected across CC'.

21MHz on 32in

Short dipoles can be made from helical-wound elements without the toroid-loop configuration described above. In *Break-in* (March 1983, p16), Bill Evans, ZL4DP, describes making and using a 21MHz dipole antenna having an element length of only 2ft 8in (803mm) by winding two 22ft (6·7m) lengths of 24-gauge enamelled wire on to two 1·25in (32mm) diameter, 16in (406mm) long plastic tubes: Fig 4. ZL4DP describes construction and adjustment of this miniature dipole as follows:

"The wire is wound onto the plastic tubes evenly spaced, taking about 71 turns, and leaving enough at the ends for soldering the feeders and series capacitor into place. The two tubes are held end-to-end by joining them with a short length of smaller-diameter plastic tube; the top part of the mast should also be insulated from the metal support. The tuning capacitors can be mounted in any way that suits the particular circumstances, as the method of mounting should not make much difference to the tuning. The coaxial cable should be made long enough so that no trimming is needed when the antenna is finally mounted in position.

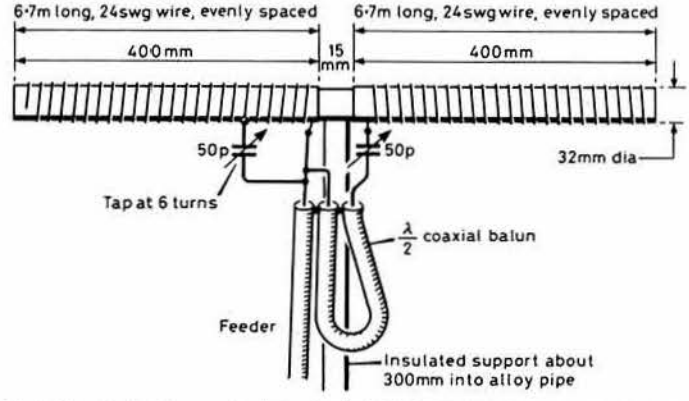


Fig 4. Short helical-wound 21MHz dipole built by ZL4DP with element length of 2ft 8in by winding two 22ft lengths of wire on two 1·25in diameter, 16in long plastic tubes

Table 1. Simple toroidal loop antennas, design examples from patent application

	Frequency	Turns	Wire	Velocity factor	a	b	s
1 Toroidal loop for domestic vhf/fm receiver	100MHz (n = 1)	70	16g	0·332	6·25in	0·5in	0·56in
4 HF toroidal loop fed through 4:1 balun and 50Ω coaxial feeder	3·6MHz (n = 1) 7·2MHz (n = 2)	1,000	18g	—	2·74ft	0·925in	0·2in
6 HF rectangular toroidal loop (Fig 2)	27·42MHz (n = 1)	116	18g	—	2·5in od plastic pipe form (27 × 27in)		

where a = radius of torus (to centre of torus), b = radius of torus (ie 2b = minor diameter of the antenna), s = uniform turn-to-turn spacing of turns. n = 1 represents fundamental resonance, n = 2 harmonic resonance.

"The tuning should be undertaken out in the open away from metal objects such as roofs, other antennas etc. The top of a stepladder is ideal and an insulated tuning tool is essential. I tuned my dipole at about 21,250kHz and found that the swr was also unity at 21,100kHz so it would seem that it would be better to tune slightly high. The swr is 1·1:1 at 21,000kHz and 1·5:1 at 21,450kHz so that it is reasonably flat over the whole 21MHz band."

Such an antenna system, ZL4DP points out, can be useful for portable work as it will all fit into the back boot of any car and still leave room for luggage etc. With low-power ssb, using this antenna, ZL4DP received Q5 from VK6PS (Perth) and N6NDA (Los Angeles), and Q3 from GI3OQR.

Broadband dipoles

The much more generous spectrum allocation at 3·5MHz (3,500 to 4,000kHz) to radio amateurs in IARU Region 2 (North and South America) presents an antenna design problem appreciably more challenging than any that arises in Europe. This is to achieve on a simple antenna a vswr of under 2:1 right across the band without having to retune an atu. I should perhaps stress that the need to achieve a low vswr arises less from questions of antenna efficiency than the fact that modern solidstate broadband power amplifiers have protection circuits that automatically reduce transmitter output if the vswr exceeds about 2:1. A centre-fed dipole cut for 3,750kHz will radiate effectively on 3,999kHz and 3,501kHz, although at these extremities the swr of a wire antenna is likely to be about 5:1. With a suitable atu there is no real problem except the requirement to retune when shifting right across the band. These days such a requirement is becoming unacceptable to those who feel that the only operational adjustment to a transmitter should be turning the bandswitch and vfo control knobs to the desired frequency.

For many years there has been a succession of dipole antenna designs claimed to provide low swr over a greater bandwidth than a simple resonant length of wire. These have included the folded dipole, the double-bazooka (using elements made from coaxial cable), "hairpin" stubs etc. Jerry Hall, K1TD, of the ARRL technical staff, has recently been investigating many of these systems using computer analysis: "The search for a simple, broadband 3·5MHz dipole", *QST* April 1983, pp22–7. Although few of us on this side of the Atlantic need to worry about a bandwidth of 500kHz on 3·5MHz, his article gives some useful insights into antenna impedance calculations—and may also serve to destroy long-held beliefs about some designs.

What emerges from his work (Table 2), admittedly theoretical and with several simplifications such as omission of ground effects, is that most of the techniques normally advocated on the grounds of increased bandwidth do indeed show some improvement over a thin single-wire dipole, but *none* of them seems capable of achieving the full 500kHz without exceeding 2:1 swr. The *only* approach fed into the computer by K1TD that does do this is a very old friend indeed, long discarded and forgotten by most of us. It is the cage-dipole, an antenna system that dates back to the earliest days and adapted from non-resonant low-frequency antennas where the requirement was to increase the capacitance of the system. In the 'thirties and 'forties, however, dipoles formed from two sausage-shaped or "bird-cage" multiple wires kept apart by wooden spreaders were popular for commercial receiving and transmitting applications. When used with open-wire feeders they could be used over frequency spans of at least two-to-one.

K1TD's computer shows that with a four-wire radiating element 121·5ft (37·03m) long (note the reduction in resonant length brought about by the increased diameter/length ratio) and 3ft (91·5cm) cage, such a system when fed with 75Ω coaxial cable should maintain a less than 2:1 swr over the full 500kHz. Unfortunately, as K1TD points out, it needs some 486ft (148·13m) of wire, a couple of dozen spreaders and antenna supports that will take the weight without undue sagging, so that the cage-dipole only barely comes within the category of a "simple wire antenna".

More thoughts on swr

It has often been pointed out that coaxial-fed hf antennas can radiate effectively even when a moderately high swr is measured at the transmitter end of the feeder. However, in *QST* technical correspondence (July 1983) Harry Hyder, W7IV, provides a useful word of warning in showing that this is not always the case when the feeder is very long and fairly lossy. Using a 3·6MHz inverted-V dipole on 10·1MHz, his feeder swr was about 5:1 and his antenna matching unit readily coped with this figure. Nevertheless signal reports proved disappointing. The reason? His mil-spec RG8A/U coaxial feeder is 350ft (106·7m) long and at 10MHz has an attenuation of 0·55dB per 100ft (30·48m) or almost 2dB. This means that *even without any radiating element* at the far end of the feeder to form a load, the swr at the transmitter end can never be much higher than 4·5:1. A lossy feeder, in effect, forms a transmitter load that can approach in value the nominal feedline impedance. It is because coaxial cable losses at vhf (and even more so at uhf) are significantly higher than at hf that achieving a genuinely low swr is much more important at vhf than at hf—and vitally important at uhf.

Again, although *TT* has often noted that an hf transmitting antenna can radiate effectively in spite of a poorly-matched feeder and consequent high swr, since reflected energy is re-reflected at the transmitter end, the effect of mismatching on *receiving* systems is often overlooked. It should be remembered that any incoming signal reflected back up the feeder to the antenna element (or alternatively not matched into the feeder from the element) is re-radiated and lost for ever. In the interests of optimum signal-to-noise ratios, good impedance matching from antenna element to receiver input circuit is thus *more* important than for transmission. This would be more obvious were it not for the fact that often receivers tend to be overloaded by a really efficient receiving antenna system, to the extent where rf attenuators are used at the front-end of receivers.

The quadplane

In *cq-DL* No6, 1983, pp264–6, Siegfried Hari, DK9FN, provides information on yet another variation of the quad-loop antenna, in this case to provide vertically-polarized signals from masts of modest height. In effect the quadplane is a half-quad loop element suitable for use with either a single support pole or alternatively with a compact horizontal λ/4 "top", with the λ/2 bent element working against resonant λ/4 radials elevated a little above ground on short poles. Fig 5 shows the basic principles, while Fig 6 shows how the system can be implemented in practice. While DK9FN considers that his antenna has a feedpoint impedance of 60Ω (ie half the 120Ω of a full-wave quad-loop element) the recent discussion in *TT* of the impedance of groundplane antennas with elevated, horizontal radials (18–19Ω and not 36Ω as usually suggested) makes one wonder whether the figure for the DK9FN configuration may not be nearer to 30Ω in a correctly adjusted system when the radials are appreciably above ground. However, DK9FN claims an swr of 1·2:1 for a 7MHz quadplane of the type shown in Fig 6(a) when the element is fed with 50Ω coaxial cable (RG213U) with radials 0·5m above ground. DK9FN stresses the critical importance of the radials in such antennas. For example, one suspects that (as in conventional groundplanes) it is important to ensure that each radial is exactly the same electrical length. DK9FN also describes a two-band version using two separate loops one inside the other.

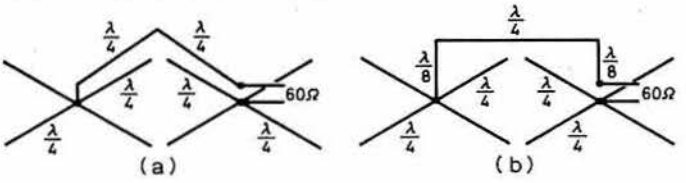


Fig 5. Basic principle of DK9FN's "quadplane" antenna

Table 2. Examples of K1TD's computer-study of 3·5MHz antennas

Antenna	Radiator diameter (in)	Radiator diameter (mm)	Feeder impedance (Ω)	Bandwidth* (kHz)
Single-wire dipole	0·08	2·0	50	152
Double bazooka	0·38	9·6	50	190
Single-wire dipole	0·08	2·0	75	208
Single-wired dipole with 52·5ft hairpin (300Ω)	0·08	2·0	75	211
Single-wire dipole	0·5	12·7	75	252
Folded dipole of 300Ω cable, short-circuit 100ft apart	0·5	12·7	300	261
Folded dipole of 300Ω cable, shorted at ends	0·5	12·7	300	265
Double bazooka, 75Ω feeder	0·5	12·7	75	268
Single wire with coil and capacitor at feedpoint	0·5	12·7	75	375
Cage dipole	36	914·4	75	500

* between 2:1 swr points

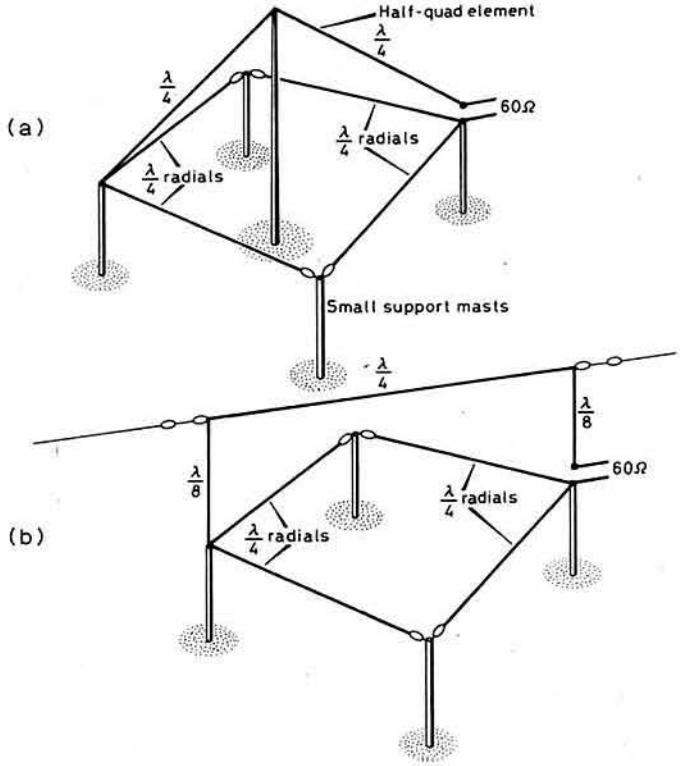


Fig 6. Two implementations of the quadplane. (a) Single pole support, with small masts supporting the radials a little above ground. (b) Implementation where two supports are available, though these can be shorter than for (a)

Half-delta loop

John S. Belrose, VE2CV (*Ham Radio* May 1983, pp37–9) has described what is, in effect, a variation of the quadplane: the half-delta loop: Fig 7. This has a mast radiator, height h, and a sloping wire, preferably 2h, and where h + 2h represents an electrical half-wave. An example would be a 25ft (7·62m) mast plus 52ft (15·85m) of sloping wire fed at ground-level from 50Ω coaxial cable. This antenna could be used on 7, 14, 21 and 28MHz since, unlike dipoles which resonate only at f, $3f$ and $5f$, the half-delta loop is resonant on all harmonics of the fundamental frequency (f, $2f$, $3f$, $4f$ etc).

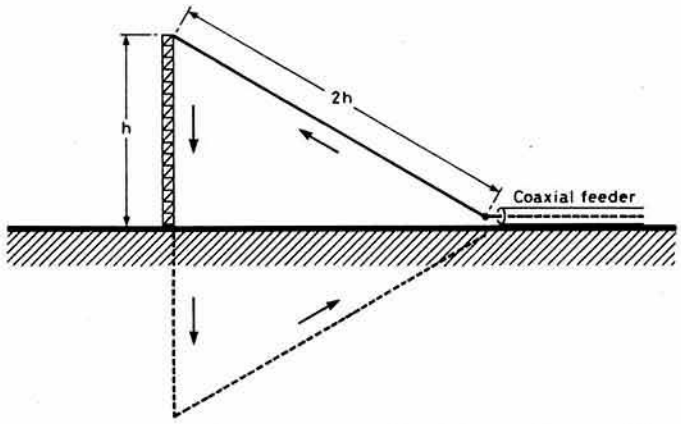


Fig 7. VE2CV's half-delta loop basically similar to the quadplane configuration but using the earth as a groundplane. Provides mainly vertically-polarized signals

Since this is an antenna with its image in the real ground, good earthing, preferably using a large earth mat, is needed to achieve good efficiency. At the very least a buried thick wire should connect the base of the mast to the shield of the coaxial feed cable, with two 6ft (1·82m) ground rods to earth the mast radiator and the outer screen of the feeder. The possibility exists, presumably, of using elevated, insulated λ/4 radials as for the quadplane, although this is not mentioned by VE2CV. Signals are similarly basically vertically polarized.

Effect of guy wires

It should always be recognized that the length/diameter ratio of an antenna element has a significant effect not only on the bandwidth but also on its resonant frequency. In other words, the overall physical length of a "fat" element is appreciably less than for a thin-wire element for any given band. This is one reason why the usual formulas for cutting an antenna do not always yield accurate results, and why it is always advisable to check for resonance with the antenna roughly *in situ*: an antenna only just above ground is affected by the additional capacitance.

For hf wire antennas it is usual to assume an l/d ratio of 1,000:1, for vhf antennas using tubular elements a ratio of 100:1 is more common. The thicker the conductor, the less will be the length for a given frequency. However, the element does not need to be solid to achieve this effect; two or more wires a few inches apart behave as a solid element, as in the cage-dipole or the simpler arrangement of two parallel wires joined at the feedpoint and possibly also at the extremities.

For amateur applications it is usually accepted that the impedance of an antenna, and often its exact electrical length, can be found only by trial and error. This is not the case, for example, with mf broadcast-type monopole antennas based on mast radiators, where the engineers seek to calculate accurately its impedance (resistance plus reactance) in order to reduce the cost of the coupling network by using fixed rather than variable components.

In practice, however, it is by no means unusual to find, once the antenna has been erected, that the input impedance often varies from that predicted. In view of the extensive use of such antennas for over 50 years, it may seem surprising that these problems still arise. In *IEEE Transactions on Broadcasting*, Vol BC-29, No 1, March 1983, Steven Wright and Paul Klock (of the University of Illinois) and Dane Juber (of Harris Corporation) show that one of the main reasons for the discrepancies between theory and practice appears to be the effect of non-resonant guy wires, normally disregarded in the calculations.

To investigate this they scaled down masts and insulators, using frequencies of 5,113kHz and 7,180kHz, so that their results are clearly indicative of effects to be expected on vertical antennas used on the amateur hf bands.

It was found that, compared with an unguyed structure, even a single set of metallic guy wires affected the λ/4 resonance, resistance and electrical length; the reactance at 90° increased significantly. These factors proved sufficiently pronounced to account for most of the discrepancies that have been recorded in past years between theory and practice. The effect of the guy wires is not just to shift the impedance curves, lengthening the effective height of the mast. Rather, both resistance and reactance curves become steeper with the addition of the guy wires, more than could be accounted for by simply increasing the height to radius (H/A) ratio of the mast radiator to the extent necessary to account for the increase in apparent electrical length. It would thus seem that with vertical antennas it is not sufficient just to duplicate an earlier design or erect a factory-supplied element without taking into account the whole structure, including guys and site conditions such as nearby trees, metallic gutterings etc. There is always likely to be a need for careful adjustments and checks once the antenna has been erected.

The sloping one-mast Yagi

In recent years there has been growing interest in various forms of "slopers"—mostly in the form of antennas in which a λ/4 sloping wire element is top-fed against a grounded tower, which acts as the groundplane. One of the attractions of such a system is that the tower can be used also

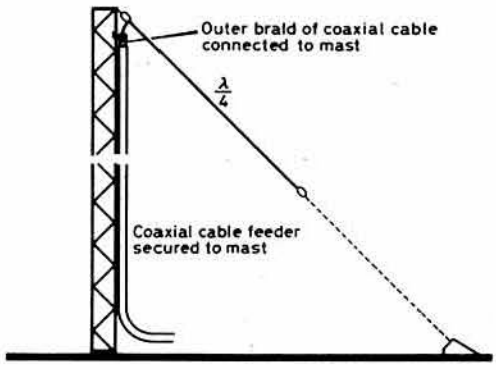


Fig 8. Usual form of λ/4 "sloper" with mast used as a groundplane

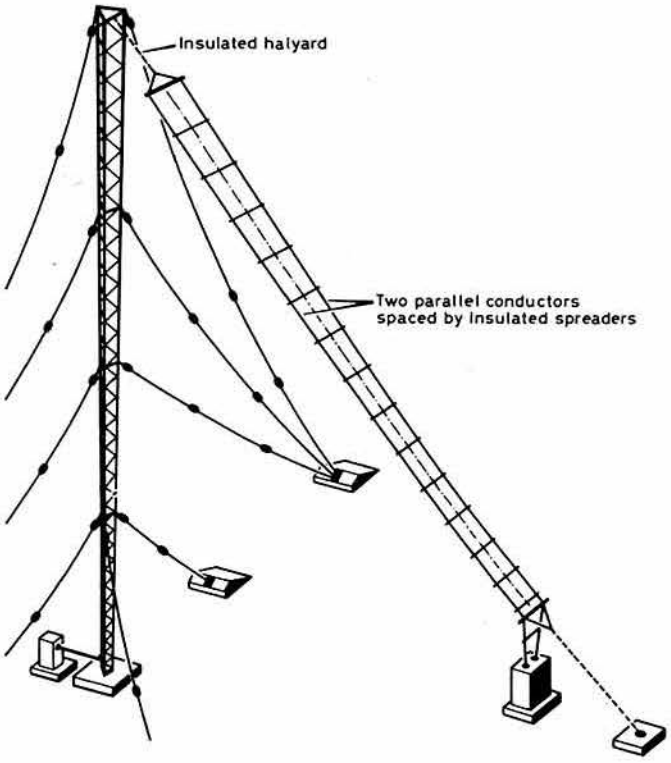


Fig 9. Directional mf two-element Yagi-type antenna with sloping reflector permitting the use of a single mast. Often used with electrically short mast primarily to obtain null, but can provide significant gain if the mast is λ/4 or λ/2 high

to support an independent Yagi antenna for the higher-frequency bands: Fig 8 shows a sloper antenna for 1·8, 3·5 or 7MHz bands as described in the *Radio Handbook* (22nd edn, pp27.18–19). Among the useful features of this arrangement is that (as for an inverted-V dipole) maximum current in the radiating element is at maximum height above ground. Polarization is mixed, with both vertical and horizontal components. There is only modest directivity, and such an antenna provides a virtually omni-directional pattern somewhat distorted by the presence of the grounded tower.

A different form of "sloper" has been used during recent years by the IBA for some of its mf local radio transmitting stations, either as the main antenna or a stand-by system for use while maintaining or repairing multimast directional antennas. In essence these antennas are basically a pair of phased-verticals with one element used as a Yagi-type (parasitic) reflector. However, only one tower is used with a wire-element (twin or triple wires) connected to the top of (but insulated from) the tower: Fig 9.

Such an array provides the cardioid pattern of phased-verticals, with a useful front-to-back ratio; the amount of forward gain that can be realized depends on the height of the tower; many antennas for local radio need to be of modest height, often providing a radiating element of only about 67° rather than the 90° of a true λ/4 monopole. The efficiency of electrically short antennas, as we have often noted in *TT*, depends primarily on the efficiency with which power can be fed into it. A shortened element, of course, decreases the effective bandwidth of the antenna unless arrangements are incorporated for retuning the whole system when changing frequency.

Results achieved with nine Yagi-type sloping-wire antennas designed for frequencies from 774 to 1,359kHz, using towers of electrical heights from 60° to 93°, were described at ICAP83 by E. T. Ford. All provide an f/b ratio in operation between 5–17dB (up to 22dB achieved under test conditions). Absolute forward gain compared with a monopole reference is usually modest with 60° height (in this application the main consideration is often the need for a null to minimize interference to other co-channel services) but the Coventry installation, with a λ/4 58m mast, has 2·2dB gain on 1,359kHz. Bedford on 792kHz with a 73m mast provides 2·4dB gain.

Such a system would appear to offer a practical degree of directivity with reasonable mast heights for 7 or 3·5MHz operation, and would also be useful at higher frequencies where it is required to use only a single mast for a vertically polarized array. At the higher frequencies λ/2 elements would also be possible, giving an easy means of changing direction of the null by swinging round the sloping wire element.

Reflected energy

Dave Gordon-Smith, G3UUR/W3, although an enthusiastic supporter of the efforts of Walter Maxwell, W2DU, to spread enlightenment on standing-wave ratios, baluns etc, is less than happy over the contention that "reflected power is real power" (*TT* May 1983). He points out that what travels up and down a transmission line is *energy*. No work is done until the energy is dissipated in the load. He adds: "Certainly a mismatch causes energy to be reflected; but the only *power* is that which is dissipated in whatever resistive element is attached to the end of the line (*or what is dissipated in the transmission line itself?—G3VA*).

"Apart from this 'technicality' I fully agree with all the *TT* comments on the subject of vswrs. I think it may be helpful to some readers to explain that the reflected wave is responsible for the impedance of the cable (ie with 52Ω coaxial cable the transmitter only 'sees' 52Ω when the vswr is 1:1). Hence the need for matching to get maximum power transfer."

Stable at 10GHz

Last year (*TT* September 1982, p772) I drew attention to the developing technique of using ceramic dielectric resonators to provide good frequency/temperature stabilization of self-excited microwave oscillators at frequencies above about 9GHz. But at the time this had been described primarily for professional applications, although there seemed no reason why it could not be used for the 10GHz amateur band if a suitable source of the resonators could be located.

In *Ham Radio* (June 1983, pp57–9) Dennis Mitchell, K8UR, describes a "10GHz ultra stable oscillator" that he claims can be built from scratch for "under $20", and so puts the 10GHz band well within the reach of an amateur constructor, particularly if he already has GaAs fets and/or chip capacitors. The 10·76GHz oscillator described was originally developed to form the local oscillator for a 12GHz receiver-converter for the reception of direct-broadcast satellites; it has a frequency stability of 3ppm, although like most microwave oscillators the spectral "purity" will look pretty grim to those more used to hf oscillators.

The K8UR design makes good use of the performance at microwaves of a GaAs mosfet in conjunction with ceramic dielectric resonators using barium tetratinate. This material (type D8512) is stated to be available from Trans-Tech Inc, Gaithersburg, Maryland, USA. The oscillator can provide a local oscillator for a 10GHz receiver or converter, or can also provide 50mW output of frequency-modulated speech to form a transmitter. The *Ham Radio* article provides circuit and constructional details, including the pcb artwork.

Tips and topics

Motorola is claiming to be the first USA manufacturer to market a high-volume line of GaAs devices (ie roughly similar to the Japanese 3SK96). This line includes the MRF966 (plastic) dual-gate fet which can provide up to 18dB gain with 1·2dB noise figure at 1,000MHz. In the USA this has a "100-up" price around $3, which suggests that single-unit retail price in the UK may be in the region of £4–£5.

Brian Castle, G4DYF, notes that when buying resistors nowadays they sometimes bear five or six colour-coded bands. As mentioned in the April 1983 *TT*, the sixth band represents temperature coefficient; the fifth band is tolerance. But that still leaves four bands for the value instead of the traditional three bands. He points out that: "In their catalogue Maplins recommend ignoring the third band and remembering to add '1' to the power-of-10 multiplier. I believe an easier way is to read the third band as a third figure (it will usually be black, ie zero) and treat the fourth band in the usual way as a power-of-10 multiplier. Thus a 270kΩ resistor would be red (2), violet (7), black (0), orange ($\times 10^3$ = × 1,000). The only new factors are that a gold fourth band means × 0·1 and a silver fourth band × 0·01. A 56Ω resistor would be green, blue, black, gold. The fifth and sixth bands are normally at the far end of the resistor: Fig 10.

Nigel Hewitt, G8JFT, is not convinced that the new quadrature generator

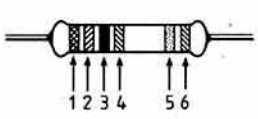


Fig 10. Some resistors now carry six colour coded bands. G4DYF explains what they all mean

arrangement shown in *TT* June 1983, p516, is likely to be any improvement, in practice, on the conventional circuit. He points out that to obtain an "equal mark/space ratio" for a clock frequency it is usually considered necessary to start at double the required frequency, thus putting the system back once again to a divide-by-four arrangement. □

4-2-70

*by Ken Willis, G8VR**

TIME FLIES, for I have been your "conductor" in this feature for over a year, during which time my postbag has grown enormously to proportions which cause the postman to eye me with disfavour as he tries to force your many letters through an impossibly small slit in my front door. My thanks are due to all contributors who make my task such an easy one, while my apologies must go to those whose information sometimes cannot be included through lack of space. All reports which provide any propagation information eventually find their way to the Propagation Studies Committee for evaluation, so please do not attempt to heal my relationship with the postman by curtailing your letters to *4-2-70*.

The period mid-July to the end of August provided some good tropo, a modest amount of Es and a major meteor shower. The encouraging thing to this old-timer is the way in which newcomers to vhf/uhf quickly learn to exploit all the available modes to improve their coverage. Despite the few "nutters" whom we all have to tolerate, plus those who believe that the way to operate a linear is to drive it to death, the hobby appears to be in excellent shape, with dx being worked which can only be described as "fantastic".

Meteor scatter

The Perseids meteor shower peaked sometime between 0100 and 0800gmt on 13 August, and was generally regarded not to be as good as in some recent years. However, activity was at an all-time high level as far as UK amateurs were concerned, and many stations only just licensed could be heard trying this mode. Listening on the 144·200MHz ms ssb random calling channel showed that most people had done their homework and knew what to do and to expect. However, many must have been discouraged by calling literally for hours (in 1min periods) only to have nothing to show for it by way of contacts. I have said in this feature before that ms is easy; I ought to qualify that and say that if you have a sked where the station at the other end knows you are going to be there on a specific frequency, then *that* is often very easy. Moral—get some skeds via the vhf net or by writing to the distant dx stations well in advance of the next shower, since this will improve your success rate enormously. There were times during the Perseids on the ssb channel when a long burst would disclose up to a dozen foreign-sounding gentlemen all on channel, some tantalizingly just off-tune, with a hint of some really exotic callsigns from YU, HG, I, and even YO. In the astonished silence which followed one particularly noisy burst, a lone (and hoarse) voice was heard to proclaim "Good grief", a sentiment shared by many.

Nevertheless some extremely good contacts were made. There will also be some who will be disappointed. G4NRV heard a YO calling in a long burst. He was answered by three stations, all of whom called him as a YU. The YO then sent a report, and all three sent rogers and claimed the contact. This is very much like an Es opening when few callsigns are exchanged. There is also a great tendency for callsigns to be mis-read in an ms burst due to poor English pronunciation by an overseas station, and doppler shift on the signal which produces distortion (neither of which bother the cw operator). This was evident to a listener who sometimes could hear several versions of the same call being sent simultaneously by different stations. But don't be discouraged. It is a valuable mode opening up very long-distance communication paths when other modes are totally useless for such a purpose. With practice one gets better, and the ultimate satisfaction is to complete a contact on a single burst by being aware and quick enough to appreciate that the opportunity exists. During one period in the Perseids at least three stations completed with a YU in a single long burst, great stuff for what used to be considered a very specialist mode requiring all sorts of fancy equipment and technical skills.

There were some good ones available for the cw fraternity during the shower in the way of portable stations visiting rare squares. A group from Berlin signing DL0I/VI7 operated from JZ, and G4IJE worked them very easily. YU7AJH/5 was in LB square, almost at the limit of expected ms range from the UK. They were worked also by G4IJE and several others. YU2JL was at his home QTH in HD, but YU2EZA/2 operated from IC and was worked by G3IMV, G3LTF and G8VR, and no doubt others in the UK. The reflections from this station were excellent though they used only 40W to a G2BCX 16-element antenna.

Other complete contacts by ms cw during the general Perseids period by G3LTF were with YU2JL (HD), YU4GJK/4 (JE), HG8ET (KG), YU3FM (HG), I1ANP (EE), EA3LL (AB), YU2DI (JF), TO6DMD (DD), I4MKN (GE), LA8N (?) and LA1K (FX).

GI4OMK found conditions disappointing and his eight skeds failed to produce a complete contact, though he did work DL8MCC on random. It is interesting to note, however, that the distance between his station and most of his sked partners was a little short for good ms working, and the times were by no means optimum for the paths, so hopefully he will keep trying since his square (XO) and country are much sought by European operators.

Chris, G8TZT, in West Yorks, has a very different tale to tell. In his first-ever attempt at ms (ssb) he completed with YU2JL (HD), YU3ES (GF), YU3TTL (HG), YU3EW (IG), YU2RGK (HF), YU2RSD (HF), SP6FUN (IL), HG4XT/P (JH), IW4ARD (GE), I4YNO (FE), OE3OBC (II), and twice with DL9MCC (GH). Four of these were by skeds, and the one with I4YNO by following G4KUX in one of his skeds and capitalizing on a long burst. HG and YU were new countries for Chris, and several new squares resulted, so he says "the hours of shouting into the mike were quite worthwhile".

In this matter of skeds versus random operation G8ECI (AN) made one of his trips home from Saudi Arabia in July, and by operating in skeds set up for him on the vhf net by G4IJE he worked IW5AVM, F9HS, F6DRO, EA3AIR, EA6FB (a 31s burst at S2), I4MKN, SM5CHK, SM7GEP, Y21PL and OE3XUA. All these were between 26 and 31 July when conditions were otherwise quite flat, and all on ssb of course.

YU3ES (GF) provided a new country, square and a thrill for two G stations making their first attempt at ms during the Perseids. G4ABB (Harlow) and G6DFT (Hoddesden) both had skeds with him and completed. Mark, G6ABB, showed considerable skill in noting a long burst towards the end of a period, so used break procedure to exchange all required information to tie-up the QSO in this one reflection. G4NQC (AL) also worked YU3ES on sked, but by cw, completing well under the hour.

For those bitten by the ms bug, the next showers of any note will be the Geminids (12 December) and Quadrantids (3/4 January), the latter being a good one for daytime operation. There are many minor showers throughout the next six months, and contacts are always possible via sporadic meteors if you can get someone at the other end in a sked, so there is really no need to wait for a major shower before trying again, especially if your QTH locator is a rare one.

(Note the item in "Expedition round-up" referring to a 432MHz ms contact made by G4PVM.)

Repeater news

Mike Dennison, G3XDV, manager of the RWG, has provided a most welcome statement relating to repeater licensing and similar administrative matters.

The following is a list of proposals which went to the licensing authority at the end of June 1983, with licences expected to be issued by the end of this year.

VHF Phase 6

GB3BB	Brecon	R4	GB3OC	Orkney	R2
GB3BI	Nr Inverness	R5	GB3PA	Paisley	R1
GB3LU	Lerwick	R3			

(Note: All the above are in Welsh or Scottish mountain regions, indicating that the vhf repeater programme is nearing its end)

UHF Phase 7

GB3AH	Swaffham	RB13	GB3KB	Biggin Hill	RB0
GB3BE	Bury St Edmunds	RB6	GB3KR	Kidderminster	RB4
GB3CA	Carlisle	RB13	GB3LA	Leeds	RB11
GB3CY	York	RB13	GB3OM	Omagh, NI	RB15
GB3DS	Worksop	RB13	GB3PP	Preston	RB15
GB3GD	Leicester (rtty/data)	RB12	GB3SZ	Bournemouth	RB15
GB3GU	Guernsey	RB13	GB3WI	Wisbech	RB15
GB3HK	Hawick (Rossburgh)	RB14	GB3YS	Yeovil	RB2

Some of the uhf channels indicated may need to be changed to avoid problems arising from the MoD Mould system.

*11 Old Downs, Hartley, Kent DA3 7AA.

Mike says that the DoT&I has agreed to accept mixed vhf/uhf repeater proposals in two batches, in January and July each year. The total is expected to be around a dozen proposals per year, and it is hoped that the new arrangement will make repeater licensing a less-prolonged process. He is optimistic enough to suggest that it may take less than a year, in future, for a group to obtain permission to operate a repeater!

New repeaters which recently came on the air include GB3HG (Bilsdale), operational from 2 July on R1, with the group experimenting with antennas to obtain optimum coverage of their service area. Reports please to G4ATZ, QTHR. GB3TD (Swindon) started up on 16 June on RB13, and reports to G4LDL, QTHR, would be appreciated.

GB3CK (Charing, Kent) is back on RB0 after a two-year absence; reports should go to G3TIS, QTHR. GB3SR has moved to its new site near Worthing (it was previously in Brighton); it operates on R3, and reports should go to G8TJQ, QTHR.

The West London repeater, GB3WL on R1, is reported to be working "better than ever" after some assistance from Mick Senior, G4EFO, of the RWG. In this context, the RWG would like it to be known that they have, among their members, a large pool of expertise available to give advice to repeater groups. They comment that there is no need for anyone to struggle.

Proposals have gone to DoT&I for a change of site for the Bedford uhf repeater GB3BD now on RB4. The proposed new site is south of the town and there is to be a channel change at the same time to RB6. Another change awaiting final approval is for GB3YJ (Leamington Spa) which plans to alter its call to GB3WK on moving to a new site at Edge Hill. Coverage, on R7, is expected to improve, and Banbury, which lies between the current service areas of GB3VA and GB3YJ should enjoy much better signals.

Despite the mixed emotions which are aroused when the topic of dx working through repeaters is reported, some contacts by G3IUE (Penzance) are worthy of mention, since he wonders if they are in any sense a record. In July, around 1600gmt, he worked 2m fm stations via repeaters on the islands of St Michael (Miguel) R6 and Terceira R4, both in the Azores. On R4 a contact with CT2AP was at S9, and shortly afterwards, CT2BV and CT2EA/Mobile were worked at S9 plus 20dB on R6. G3IUE used 100W to a Jaybeam 10XY antenna only 21ft above ground from a QTH some 300ft asl. He has, of course, a very fine sea-path to the Azores from Cornwall, but nevertheless the distance is little short of 2,000km. It proves that if our CT2 friends could set up a station on a good site and monitor 2m during the sporadic-E "season", many contacts with the Azores which would count for awards might result. Expeditioneers for 1984 please take note!

Expedition round-up

Each summer the vhf/uhf scene is enlivened by those who take the time and trouble to operate from rare and remote spots for the benefit of the many square and country chasers. We seldom hear about them after their return to the home QTH, so it is a pleasure to be able to report on some of this years' expeditions in some detail.

Chris Easton, G8TFI, went with Mike, G8TIC, and Tony, G4NBS, to Scotland where they operated on 2m, and 70 and 23cm from squares XO, XQ and YP. Three days were spent in each location, and a total of 1,200 contacts were made on the three bands combined. On 2m, signing GM8TIC, some 600 QSOs were made into all G squares from all three sites, while on 29/30 July when in YP square, contacts were made with OK, LA, SM, OZ, F, ON, PA, SP and D in a tropo opening, the best being to II square where seven OKs were worked.

GM8TFI was the call used on 70cm except during the 31 July contest. Some 400 contacts were made, again working all G squares from all sites, and just a single Continental contact with PA0EZ from XQ square. From YP square, however, during the opening of 29/30 July, contacts were made with stations in East and West Berlin, other squares worked being EN, EO, FO, FQ, GP, GO, FM, FK, GM and GN, with many contacts into Holland. Other countries worked were OZ, D, Y, PA, ON, F and SM. Priority was given, however, to 23cm, reported elsewhere.

The equipment they carried weighed one ton! They hope to go again next year and operate for a little longer, with a larger party, but from one or two sites only. Readers' suggestions as to the most-needed squares are requested —anywhere from the Scillies to Northern Scotland. At present the party is considering the island of Islay (WP) during the Perseids, with ms skeds by arrangement as part of the programme.

Another expedition, by the Albatross Contest Group to XJ square, provided some excitement and possibly a new record. Paul Tittensor, G4PVM, has written to say that on 12 August, during the Perseids, he used the group equipment for an ms cw schedule with DK1PZ (EL) on 432·180MHz, using 2min periods. The sked started at 2000gmt and was a real marathon affair, continuing until about 0300gmt. Using a speed of 800lpm, Paul copied a 3s weak burst from DK1PZ at 2200. He took some time decoding this, and started to send a "roger report" at 2306. At 2336 he copied both callsigns and a roger report from the German station, and sent full "rogers" until well after 0200 hours. At the far end, DK1PZ copied five bursts and 14 pings, maximum 3s at S5, prior to 0000gmt, and four bursts and five pings thereafter. He first received rogers at 0010gmt (QSO complete after 4h 10min) and in all received five bursts of rogers, the longest being of nine characters.

Possible 432MHz ms contacts have been reported in *4-2-70* previously. From bitter experience, and knowing the problems involved, G4DGU has queried whether any complete contacts have ever occurred, and none of the stations concerned have written to confirm or dispute any claims made so far. However, this contact by G4PVM, using 2×4CX250Bs and 4 × 21-element Tonnas elevated 3° above horizon, fed with heliax, has the stamp of authenticity, and Paul has promised to send the tapes to provide proof of what was copied. DK1PZ is an experienced ms operator who used 600W to 4 × 24-element Yagis elevated 7°, so the capability of stations at both ends of the link makes the contact quite feasible since it was also at the peak of the Perseids shower, give or take a few hours. The distance between stations is 1,050km.

The most ambitious expedition of 1983 was that mounted by the Hadrabs group, which returned to their mountain site some 8,000ft asl in Andorra. An undertaking such as theirs, with eight in the team, and equipment for the hf bands, 2m, 70cm and, by a stroke of administrative brilliance, 6m, took much planning and cost thousands rather than hundreds of pounds to mount. They had full eme capability on 2m, and the problems they encountered were not electronic but brought about by the weather. At that altitude the winds are always strong, but on this occasion they had to ride out 30 hours of storm during which scaffold poles were bent, and the eme array severely damaged, making it necessary to effect on-the-spot repairs and modifications which seriously affected their station capability, yet still they met their skeds and had hundreds of interesting contacts with some notable "firsts". Space will permit only the barest outline of their activities from this site; fortunately they made video recordings which, with tapes of their signals as received in the UK, will eventually be available from Robin, G8APZ, QTHR, for club lectures and the like. Ironically G8APZ has still to work Andorra on vhf though he and his colleagues have made it possible for so many others.

On eme, 10 stations were worked, namely K1WHS, K1MNS, WA1JXN, W4LYS, N4GJV, W5UN, VE7BQH, OZ1EME, SM2GGF and SM7BAE. Signals from K1WHS were so strong "off the moon" that as well as calls and report he sent "73 fb gd lk on dxpd" (no need to translate of course!). Firsts on eme are believed to be C31 to W, VE, SM and OZ.

On 50MHz their first contact with the UK, and as far as is known the first-ever 50MHz QSO between C31 and G, was with G4IJE (Essex) on ms ssb, completed in 20min and including a 16s burst received from Paul. Later both G4HUP and GW3LDH were worked by the same mode on a single long burst by some slick operating. The Hadrabs operators had much difficulty with some 50MHz operators, however, who were using a mixture of ms and tropo procedures, so there is a lesson to be learned here. On 22, 23 and 24 July the 50MHz signals from C31XV on ssb via Es propagation were very solid, while night-time Es was prominent on this band and put to good use both for direct contacts on 50MHz and crossband using both 14,340 and 28,885kHz. The group was very disappointed that so few stations were listening on 50MHz while conditions were so good, but they managed to work G5KW and GW3MHW (both several times), GI3ZSC and others two-way on the band. On crossband 28-50 they worked G4BPY, G4JCC, G3FDW, G5KW, GW3MHW, GW4HBZ and GW4HXO. The 50MHz rig produced 12·5W to a five-element.

On 2m the group had other interesting contacts. On 20, 21 and 23 July no fewer than 96 Yugoslavian stations were worked, plus some quite distant Italians. On these days propagation was, according to G8APZ, recognizably "field-aligned scatter" (as described in a lecture at this year's VHF Convention). The Yugoslavs call this "special propagation", while some Italians refer to it as "trans-Alpine" propagation. It is hoped that one of the group will prepare a short article on their experience with this form of propagation in due course.

To cap a very successful expedition, ms skeds were kept with many stations, and the group were to be heard regularly on the vhf net where their procedures and adherence to sked times were a model. Among other "firsts" recorded by C31XV are to SP, GM and Y22 on 2m ms, to G and GW on 50MHz ms, to GI and GW on 50MHz Es and several crossband firsts. It will take some time to analyse the results of this very successful venture. Meanwhile congratulations and thanks to all concerned on the making of a bit of vhf history by a group of UK amateurs.

Not all of us can aspire to mounting such an expedition, but this does not mean that successful operation is not possible on a more modest scale. Adrian Ball, G8PSF, who normally operates from Enfield, took a short holiday in Eire between 1 and 12 August and operated EI3VMS both mobile

and fixed location from County Wicklow in WM square. In the evenings from about 1900gmt he put in an hour or so of operation using an Icom 202 giving 3·5W into a five-element Yagi. He worked stations in WN, XO, WO, XP, YP and YN on 2m, and had 23cm contacts with home-brew gear (reported elsewhere) as well. As he described it "no great panic to work the globe, just. . .a gentle approach to amateur radio with a modest outlay on equipment".

Aurora

Things have been very quiet on the auroral front of late, and some of the reasons for this will be mentioned next month.

However, some late reports will help to fill in gaps in aurora coverage. On 24 May, G3IMW (London) heard G3UVR, G3UKV, GM3WOJ and G6WR all with auroral tone on 70MHz, so this band is always worth watching.

On 22 June, GI4OMK (XO) worked GM6UNJ (WR) via aurora, his next report of auroral signals being at 1730gmt on 24 July, quite a contrast from his usual list of Au contacts. In the 24 July event, GI6ATZ (XO) worked GM3XOQ in Shetland. Pete, GM3XOQ, now takes up the story: in early August he caught a breakfast-time aurora and worked SM3LGO (IX), SM0LRN (JT) and OH2WCA (MU) in what he describes as "an intense event in the north". He also noted weak auroras on 19 and 23 August.

Sporadic-E

As these notes are being written, the Es "season" is virtually over as far as 2m is concerned, though the possibility of some propagation of this type on the lower frequencies is still feasible.

Reports suggest that Es this year resembled the famous "curate's egg" —both good and bad in parts. Es is so selective that if you are not in the right spot when it occurs, there is little you can do to get among the dx. It can be frustrating to hear stations only a mile or two away giving S9 reports to exotic calls totally inaudible at your own QTH, but it happens all the time.

Some late reports have come in that serve to update previous information. It is not a bad idea to compile a list of the main openings this year, and the times when they occurred, since there is some evidence, however slender, that Es occurs at more or less the same time each year.

GM3VTB (Glasgow) found a path open to HG and OK on 21 June between 1700 and 1712gmt when he worked several stations in both countries. The best dx was HG8CE (KG), HG6NP (JI), HG6VV (JH) and OK2KZR. This event has not been reported by any other operator.

On 2 July, during VHF NFD, the Derbyshire Hills Contest Group operating as G6APZ/P worked HG8KAX/P (KG) and LZ2FA/P (ND). After working the HG, they were called by a YO, but he was completely flattened by the LZ who was at S9. On this day two Kent stations worked YO3AID/P in the very late evening as reported last month. Only 40 miles to their east, G6ECM had a very exciting time, working four 9H1s, two LZs, an IW9 and two USSR stations—RA3YCR (RN) and UC2ABT (NN), all on ssb. This was also the day when EA1TH worked several G-portables (see "Overseas news"), and he reports them as being tropo contacts. If so, 2 July was a most interesting day.

On 7 July Es was quite widespread, though the times it was reported differed widely across the UK. G6ECM worked CT1AMO and CT4PI, both in VZ, plus EA7PZ and EA7KU in WX. Unfortunately Mick did not give the times of his contacts, but on the same day, between 1808 and 1849, GI6ATZ (XO) worked F1JG and F6EPE in CD, EA4AW (WZ), EB7KU (WX) and I0SNY/P/EA9 (XV) in Ceuta for a new country and square—terrific dx this at a QRB of 2,076km and possibly a GI-EA9 "first".

Around 1730gmt on 4 August there was another short opening in the south to southern Spain. G4IJE heard EA1MO (XB) calling "CQ" in his own language, apparently unaware that there was any Es about. He soon found out, however, since after G4IJE called and worked him, a rock-pile descended on him as the G-stations, just home from work, created a pile-up. Spanish stations on the band at the time were EA7BVD (XX) and EA7ID (WX), both worked by several stations in the Greater London area and southeast. Further east, G6ECM again found the choice dx and worked CT1AYC (VY). It was all over in the south in about 20min, by which time it had moved north. At 1800gmt, GM4JJJ (YQ) was driving home from work when he heard his locals working into Spain, but by the time he reached his shack all was quiet. The time difference between north and south is quite interesting. Es propagation often "stretches" as the event progresses, in this case leaving the south and creeping north, leap-frogging the southern stations which were the first to hear the dx as it did so. This was very noticeable last year in some of the Mediterranean openings.

Many operators will have picked up some rare squares and new countries through Es this year. Up in Cumbria, G3BW found it a poor year, and only worked one EA through this mode, but at least it gave him a new square.

50MHz

There have been one or two comments on the amount of space devoted to reporting 50MHz activity in *4-2-70*. With only 40 operators able to transmit on this band, the comments are quite fair, though most will agree that it is necessary to publish major events on what is, for us, a new band. The experiment has been in progress long enough now for most of the permit holders to have worked a large number of their fellow operators. Much information has been obtained on sporadic-E and ms propagation on these frequencies, with a modest amount of auroral operation contributing to the pool of knowledge. Tropo propagation has probably received the least exposure, due to the need for operation to be confined to night-time or early morning hours, so it is debatable whether 50MHz behaves like 28MHz (as the Americans say) or 70MHz, or both. In future, 50MHz information will be confined to major events and administrative changes, since there is no case to record casual inter-G contacts any more than there would be on the other bands covered by *4-2-70*.

The main 50MHz news this month is in any case covered in the account of the C31XV expedition to Andorra. It showed that over paths of 1,000km or more, sustained Es propagation is possible. This is no surprise, since for years the American amateurs have enjoyed openings over far greater distances than this (see "Overseas news"), and when operating as G8VR/W1 from the east coast of the USA, it was often possible to work into states as far away as Oklahoma using only 10W into a simple Yagi. The Ws have been impressed by the transatlantic contacts made last June, however, and they were featured in "The World Above 50MHz" in *QST* August 1983. The distance is not much more than the Oregon-New York path mentioned by K7ZFG (see "Overseas news"), but the difference to students of Es is that one is a land-mass path, the other totally over water.

Meanwhile two operators have relinquished their 50MHz permits—G4BPY and G4GLT. They have been replaced by G3UGF and G3KEV. The official view is that if any permit holder feels that he no longer wishes to use the band, or is likely to be prevented from doing so for a lengthy period, he would be favouring those on a long waiting list if he relinquished his permit, even though he may ask to be retained on the list for the future.

There is still much pressure for Class B operators to be allowed to work crossband to 50MHz, and there seems to be no valid reason why they should not since it would increase the input of information which the experiment is expected to yield.

On 31 July, G4IJE worked OZ9QV (GP) via tropo crossband 6/2, and followed it up on 6 August by working him again via crossband ms 6/2.

Licensing authority officials have made routine visits to two of the Welsh stations operating on 50MHz. This, I am assured, is part of the experiment and not because of any complaints about operating procedures.

G4JCC has again been operating as F0FDB from DD square, and on 7 August worked GW3MHW for a first 6/14 crossband contact, following it up by working G2AOK.

GW4BCD (Porthcawl) is equipped for 50MHz reception and is available for crossband contacts 6/2m. Tel 065671 8963 and QTHR.

G3IMW sent a very detailed report, and in it said that on 6, 7 and 8 July, stations in the Bahamas were copying the beacon GB3SIX.

Please keep the reports of unusual events coming. They will all help to build up a picture of what 50MHz offers for the future.

Tropo

There have been several good tropo openings on both 144 and 432MHz since the previous *4-2-70* was compiled. Scandinavia was favoured on three or four occasions, notably on 30-31 July when 432MHz was wide open to SM, OZ, LA and some of the choicer German squares. LA6LCA/P (FT), working portable from his car on a small island off southern Norway, was much in demand, with station after station telling him he was their first LA on 432MHz. This was during the evening of 30 July and into the early hours of 31 July. Later that day, when the 432MHz QRP Contest started at 0900gmt, things had cooled off quite a bit and there was little dx about, though activity was high, especially among the portables.

On Saturday 6 August during the Spanish Contest the 144MHz band opened to such squares as BC, YC, ZC and ZD, with stations EA1CR, EA2LY, F1KBS and F1KNO being prominent. Propagation was good north-south, and one station in the southeast worked YQ and ZH squares using only 1W on 70cm.

GM3XOQ worked OY5NS on 2m via tropo on 10 August, and followed this up by contacts with four LAs on 23 August. Next day he worked 25 Dutch and 12 Belgian stations, but very few Gs were audible with him in this opening.

The August Bank Holiday weekend produced good dx to Scandinavia on both 144 and 432MHz from the south of England, but there were then signs that the good summer weather was ending with a consequent falling off in tropo conditions.

Microwaves

*by Charles Suckling, G3WDG**

New records on 10 and 1·3GHz

On 18 July I0SNY/EA9 in Ceuta (Spanish Morocco) worked IW0BCU/IT9 at Capo San Vito (near Trapani in western Sicily) over a distance of 1,621km across the Mediterranean. This path is 100 per cent over water. Weather conditions were unusually hot in July, and this no doubt helped with duct formation over the Mediterranean. Those who have been following the progress of the 10GHz world record will not be surprised to learn that yet again it has been furthered by Nicola Sanah, I0SNY. He has held the previous records at 757, 860, 1,101, 1,117 and 1,166km. Those familiar with Nicola's operation will also not be surprised to learn that later on the same day at 1900gmt he worked I0YLI/IT9 on the island of Ustica over an all-sea path, and extended the record to 1,663km. Ustica is a small island (3km across, 239ft (72·8m) asl) just to the north of Sicily. It is beginning to seem that every July Nicola goes out and breaks the 10GHz dx record, a remarkable achievement worthy of our congratulations.

Not content with the 10GHz record, on 5 July I0SNY/EA5 in Ceuta worked I8TUS in Calabria (at the southern tip of Italy) on 1·3GHz at a distance of 1,963km, for a new European record on 1·3GHz.

Looking at the map of the area it is interesting to speculate on what the ultimate trans-Mediterranean dx might be on 10GHz. Certainly it looks possible to work a 100 per cent over-water path from Ceuta to the Italian mainland which would extend the record by a few hundred kilometres. Perhaps next July we will find out!

There is no information at the time of writing about the equipment used for these contacts, but it is probable that on 10GHz it was the same as that used to set the previous records (1m dishes and 30mW Gunnplexers).

Many thanks to Bob Atkins, KA1GT, for the above information, which was extracted from his "New Frontier" column in the September issue of *QST*.

G8PSF operating on 1·3GHz from Eire as EI3VMS/P

* 46 Windsor Close, Towcester, Northants.

Expedition news

During late July and early August a number of expeditions were active on 1·3GHz. These provided a lot of interest for many stations, with the opportunity to work new countries, counties and squares at a time when conditions were quite good. Reports have been received so far from GM4NBS/P and EI3VMS/M.

The Scottish expedition was active from three sites: XO1OF (Dumfries and Galloway) on 24 and 25 July, XQ8OD (Central) on 26, 27 and 28 July, and YP2OJ (Central) on 29, 30 and 31 July. From the first site they made 21 QSOs, all with G stations except EI6AS. This contact may well be the first EI–GM QSO on 1·3GHz. The best dx was G3DAH (AL56b) at 530km, using cw. Eighteen contacts were made from XQ, all with G stations, and the best dx was G4NQC (ZL50C) at 573km, again using cw. From the final site in YP, conditions opened to the Continent. They worked 12 Dutch stations (best dx, PE1CHQ in DM at 675km), six German stations (best dx, DK6AS in FM at 918km) as well as 21 G stations (best dx, G3GIM and G4NQC at 505km). More stations could have been worked from this site, but generator problems forced the station off the air prematurely.

No doubt a lot of the success of this expedition was due to the rather powerful equipment used: 150W output from an eme 2 × 7289 pa feeding a 4 × 23el F9FT Yagi array. On receive, a masthead-mounted ssb MGF1400 preamplifier was used.

G4NBS notes that five stations managed to work the expedition at all three sites: G4KIY, G4KGC, G3JXN, G8AGU and G4NQC. He would appreciate any reception reports of the activities, and mentions that special QSL cards are being printed. QSLs can be sent direct (sae please), or via the bureau.

Adrian Ball, G8PSF, took his home station 1·3GHz equipment on holiday to Eire, and although his visit was a "domestic holiday and not an all-out 12h per day expedition" he did manage to make some interesting contacts. Operating as EI3VMS/M from WM10b in Co Wicklow he worked EI6AS (WM) and GB2XN (XN) on 1·3GHz. During a spell of 144MHz operating, Adrian learnt that there are several stations in GI on 1·3GHz, but only with low-power at the moment. Adrian's portable set-up is shown in the photograph, and consisted of a Jaybeam 15/15 Yagi fed with 1·25W of rf from a 2 × BFQ34 pa.

Beacon results

Dave Robinson, G4FRE, who is the keeper of the GB3MHX 10GHz beacon at Martlesham Heath, has compiled a map of reception reports of this beacon, up to May 1983. It can be seen from the map that the beacon has been very successful: it has proved to be a valuable pointer to good conditions across the North Sea.

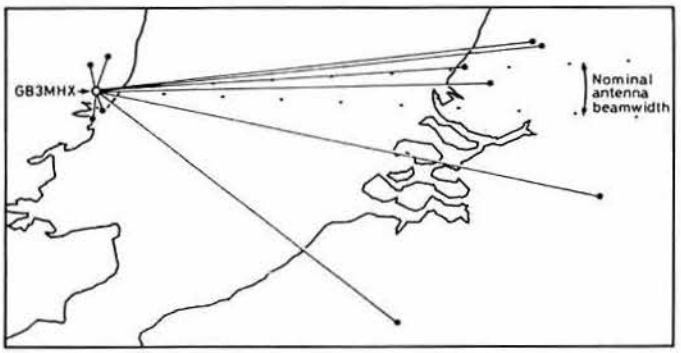


Fig 1. Reported reception of the GB3MHX beacon. NGR of beacon is 625·1E, 244·8N

New UOSAT 2·4GHz beacon schedule

Following power budget measurements, it was decided by the University of Surrey team to change the schedule for the 2,401MHz beacon on UOSAT. It will now be activated on alternate weekends. For reference, it should be operational on 1–2 October.

Forthcoming round table meeting

The annual Martlesham round table meeting will take place on 16 October. If you are thinking of attending, or would like further information, please contact Graham Murchie, G4FSG, Tel 03943 4199.

Erratum

In last month's item "A milliwattmeter for use up to 1·5GHz", the cable connecting the detector unit to the meter was incorrectly referred to in the text as RG214. This should have read "RG174". □

EPHEMERIS

Satellite news and views

*by R. O. Phillips, G4IQQ**

AMSAT Oscar 10

As reported last month, the first firing of the on-board kick motor took place at 2230utc on 11 July and resulted in a new orbit with apogee at 35,500km, perigee 3,924km and inclination of the satellite around 26°. The second burn was due to take place some 10 days later, but in the event no such manoeuvre took place. The issue of a joint ESA/AMSAT press release on 22 July shed a considerable amount of light onto the situation. The problems appear to have started quite soon after separation of the two satellite payloads from the third stage of the launch vehicle. At this point the attitude and spin rate of the satellite were nominal; however, after a short period both of these parameters exhibited anomalous characteristics. The launch agency indicated that the changes had probably been caused as a result of impact with the third stage of the Ariane L6 rocket. The press release continued "The most likely reason for this is a higher than expected residual thrust from third-stage lox (liquid oxygen) tank venting. The resulting problem can be avoided for future launches".

Initially it was thought that damage was limited to one of the elements of the 144MHz omni-antenna, but the inability to fire the kick motor indicates that an exposed pipe carrying the rocket propellant was probably fractured. Thus when the time came, after two weeks, to fire the motor for a second time the fuel had probably leaked out into space and no further orbital manoeuvres were possible. The result of these events is that the satellite will now maintain the major orbital characteristics achieved after the first burn of the motor. At first sight, with the lower orbital inclination, this looks to be attractive, particularly to the majority of us without some form of elevation control on the station antennas. There was, however, a very good reason to try to set the satellite orbital inclination to around 63°, in that this produces a very stable orbit with the latitude of the apogee remaining fixed for a long period of time. With any other value of inclination the orientation of the elliptical orbit of the satellite rotates so that the apogee would move down to the southern hemisphere. Nothing against amateurs in that part of the world, but there are rather more of us in the northerly latitudes. It has been estimated that the rate of change of the argument of the perigee is likely to be around 8° per month. The major orbital elements for Oscar 10 are given in Table 1.

Table 1. Major orbital elements for Oscar 10

Apogee	35,500km
Perigee	3,958km
Inclination	26·2°
Anomalistic Period	699·6min
Eccentricity	0·6041

So much for the orbit of Oscar 10. After the orbital manoeuvres and detailed check-out of the satellite sub-systems, the mode B (435–145MHz) transponder was switched on at 1400utc 6 August. During the following few days, even though only the omni-directional antennas on the satellite were in use, the greatly extended potential for worldwide communications became clear. After a few more days of spacecraft attitude corrections, the high-gain antennas were switched into operation and Oscar 10 entered its fully operational role.

Table 2. Oscar 10. U transponder frequency plan

Downlink frequency (MHz)	Service	Uplink frequency (MHz)
145·810	General beacon	—
145·825	L1 SSC	435·175
145·835	L2 SSC	435·165
145·838	CW	435·162
145·880	CW/SSB	435·120
145·920	SSB	435·080
145·962		435·038
145·965	H1 SSC	435·035
145·975	H2 SSC	435·025
145·987	Engineering beacon	—

Note. SSC = Special Service Channel. These may only be used by prior arrangement with AMSAT.

The frequency plan for the U transponder (also referred to as mode B) is indicated in Table 2. The special service channels will be used for news bulletin transmissions and co-ordinated scientific programmes and should be avoided by all other users. As for the earlier satellites, the communications transponder is divided into three sub-bands for cw, mixed cw/ssb, and ssb modes of operation. A new convention for ssb telephony has been adopted—ssb transmissions to the satellite should be lower sideband, resulting in upper sideband signals on the 145MHz downlink.

During the period when the spacecraft omni-directional antennas were in use, quite large values of up-link eirp were required to gain access. However, with the high gain antennas now in operation it should be possible to obtain a good downlink signal with an eirp of 100–200W. It is very important to use the lowest power consistent with maintaining communications, as this will allow the maximum number of users to operate through the satellite. As a rough guide, the peak level of a downlink speech signal should not exceed that of the general beacon on 145·810MHz.

Both the transmitting and receiving antennas should ideally be right-hand circularly polarized for maximum efficiency, and operation when the satellite is at high elevation will be limited unless some kind of elevation control is provided.

A great deal of information is now becoming available on the Oscar 10 spacecraft, much of which is included in a handbook available from AMSAT-UK. A self-addressed stamped envelope to AMSAT-UK, London E12 5EQ, will produce details of this and other services.

Satellite status reports

RS

Two of the Russian satellites, RS3 and RS4, appear to have been switched off, apparently due to difficulties with batteries. RS5–RS8, the ones with the communications transponders, continue to function well, and it has been stated that they should remain operational for at least another 18 months.

UOSAT

On 6 October Dr Martin Sweeting, G3YJO, and the team at the University of Surrey will be celebrating the second anniversary of UOSAT. After a rather traumatic period during its first year in orbit, the satellite is now in a relatively stable condition and is being used quite extensively to carry out a wide range of experiments. One of the great disappointments of the project has been the failure of the ccd camera to produce good earth images. However, the device does work and transmissions have continued in order to allow evaluation of image processing and display equipment. Tests using packet radio transmission techniques to pass data to the satellite on-board computer have proved very successful and are providing useful information for the planned PACSAT amateur satellites.

To date only the 21002kHz beacon has been heard even though telemetry indicates that the 7, 14 and 29MHz beacons are functioning. The lack of reception at 7MHz is due to the non-deployment of the stabilization boom which also comprises the 7MHz antenna, but spacecraft antenna problems are suspected for the 14 and 29MHz signals.

Oscar 8

As may be recalled, the satellite batteries failed earlier this year but it was thought that a very limited operational role could be maintained by running the active equipment directly from the output of the solar array. The satellite entered a period of continuous sunlight during July but no signals have been heard and it now seems unlikely that further operation will be possible. Now is probably a suitable time to look back on the five years of excellent performance of this satellite which undoubtedly introduced a great number of amateurs to the medium of satellite communication. One significant void left by the passing of Oscar 8 is the availability of a mode J transponder.

Other news

Several months ago I referred to the high cost of placing satellites into orbit so it was interesting to hear recently information on the "Get-Away Special" launches to be made available by NASA on future space-shuttle missions. The idea is that small payloads, up to 5ft³ and 200lb, would be carried on the shuttle and deployed into a 250km circular orbit. The service is intended for scientific, research and development purposes and could therefore be put to good use in amateur programmes for satellites carrying their own kick motors for placing the spacecraft into more suitable orbits. The current estimated cost is $3000 for a 60lb satellite rising to $10,000 for the maximum payload weight of 200lb.

An update on the proposed operation by W5LFL on 144MHz during the next scheduled space shuttle flight, STS-9, due to commence on 28 October, is given under "Amateur Radio News". □

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

SWL News

*by Bob Treacher, BRS 32525**

Belgian contests

John Goodrick, BRS44395, passed on details of the ON Contest. There will be three sections, all open to swls. The first will be on 3·5MHz phone on Sunday 2 October, followed by 144MHz phone and cw on Sunday 9 October, and then 3·5MHz cw on Sunday 16 October. All three events run from 0700–1100gmt. SWLs have to log only ON and DA2 stations. Each station logged counts three points with a multiplier of the number of different UBA sections (counties) logged. Total points are computed by multiplying together the QSO points and the multipliers. Logs should show the time, callsign of station heard, RS(T), serial No and UBA section sent, callsign of station being worked, together with the RS(T) at the swl's QTH.

Marc Domen, ONL6945, sent the halfway-mark scores for the ON All-Year-Round Contest. With the total number of entries standing at 156, the UBA must be congratulated on providing such an interesting competition for the swl. Best placed Society members as of the end of June were David Whitaker, BRS25429, in third place in the ssb section with a score of 143,850, and on cw, John Goodrick, BRS44395, who lay third with 88,403 points.

28MHz Counties Award

This is a new Society award aimed at encouraging more use of the band during the decline in the sunspot cycle. It may not be known that the award is available to listeners. The basic award requires confirmation from 40 UK counties/Scottish regions. Endorsements are available for 60 and all 77 counties/regions, and also for all-cw, all-ssb, all-fm, sstv or rtty, or mixed modes. The award is free to Society members. QSL cards, together with a list of heard contacts and counties should be sent to Peter Miles, G3KDB, who is QTHR.

News and views

Dave Vincent, BRS47324, wants BRS48453 to get in touch with him, as Dave has a QSL card for him from TI2CCC. An sae to Dave at 11 Richmond Terrace, Brighton, Sussex BN2 2SA, will see the QSL card into the right hands. Dave also mentioned several interesting QSLs that he had received on the lower frequency bands—7P8CM (both 7 and 3·5MHz), ZD7BW (3·5MHz), ZS4PB (3·5MHz), and ST2SA (7MHz).

Brad Bradbury, BRS1066, had little to report due to our surprisingly good summer giving him the opportunity to catch up on some outdoor activities. However, during August he managed to log two new countries, TZ8DC and 3B9FK, on 21MHz cw, together with T77C, YS1TG and PY0FE. CW had also been copied from Y31TF and SM0CCE/OY on 1·8MHz. Brad has no vhf equipment at present, but the recent reports of activity on 144MHz might just tempt him to purchase a converter for the band in readiness for next summer.

Harold Moss, BRS18529, reported KH6s on 21MHz during August, along with IT9HLO/IH9 and XE3ABC. 14MHz provided YK1AA and G4JMB/CT3, who is VS6CT in disguise. I had the pleasure of meeting VS6CT while he was in G-land, and learnt much about amateur radio in Hong Kong. It seems that swls can operate under supervision in VS6, so if any listener is visiting Hong Kong on holiday or on business, an approach to Phil before departure might prove worthwhile.

Martin Parry, BRS52543, found conditions hard work on hf during August, but bagged VP8AEN, 7P8CM and an OJ0 on 3·5MHz. 21MHz obliged with CE0ZAD and 3X4EX, while 14MHz also provided 3X4EX, plus a ZK1 and ZK2. 28MHz provided some useful short-skip openings and gave Martin eight new countries for the annual table. He also mentioned his efforts from YN square in VHF NFD and was reasonably sure he had put together a good score, but on the following Sunday his heart sank somewhat when the GB2RS News Bulletin reported all the sporadic-E activity during the event. As reported last month, here in London there was no Es audible either. As Martin put it—"Es? What Es"! The situation was remedied during the 7 July Es opening, when Martin heard EA4AAW (WZ49g), logged at 1847, and EA7AG (YW18b), logged at 1951. He also caught a short Es opening on 4 August, when at 1747 he copied EA5CPX and EB5CWM, both located in ZX square.

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

1983 HF COUNTRIES TABLE

(Starting score 150)

Station	28	21	14	7	3·5	1·8	Total	Mode
BRS8841	136	190	207	132	123	32	820	ssb,cw
BRS52543	114	184	184	122	125	27	756	ssb
BRS25429	132	165	154	115	122	39	727	ssb
BRS48909	120	176	186	113	99	29	723	ssb
BRS44703	102	113	134	90	110	34	579	ssb
BRS50134	88	128	137	95	97	26	571	ssb
BRS1066	70	121	120	99	69	40	519	cw
RS49327	97	137	160	66	47	12	519	ssb
BRS44395	78	122	131	85	57	29	502	cw
BRS46084/7Q7	103	161	147	62	20	0	493	ssb
ARS53844	76	136	129	69	64	12	486	ssb
RS49875	79	131	152	53	30	5	450	ssb
BRS25901	73	84	101	52	67	10	387	ssb
BRS42979	45	66	87	48	65	23	334	ssb,rtty, sstv
BRS18529	15	54	74	70	94	17	324	ssb
EI835	22	53	100	25	23	3	226	ssb
ORS45992/7Q7	25	77	112	8	0	0	222	ssb
BRS62088	11	24	45	45	48	8	181	ssb

1983 UHF/VHF SQUARES/COUNTRIES TABLE

Station	QTH loc	70MHz Squares	70MHz Countries	144MHz Squares	144MHz Countries	432MHz Squares	432MHz Countries	Total	Via*
BRS32525	AL	—	—	94	24	16	7	141	a,b,d
BRS52543	YN	17	6	64	17	13	5	122	a,b,c
BRS25429	ZN	—	—	98	24	—	—	122	a,b
BRS62088	AL	—	—	41	14	8	3	66	a,b
ARS53844	YN	—	—	28	10	11	4	53	a
RS49875	YN	—	—	9	5	23	8	45	a
RS49327	YN	—	—	9	5	19	8	41	a

*a = tropo, b = Es, c = Ar, d = ms

Dave Whitaker, BRS25429, wrote a brief note before heading for a holiday in the West Country. He found things rather poor on 144MHz, with only UC2ABT (NN18a) copied during the 2 July Es, and nothing else. With the Es season almost finished at the time of writing, we must all wait until June 1984 for a chance of some more. For myself this season was a poor one, as there were no really lengthy openings with all stations at 59 plus —rather quite a few shorter, more localized events with stations much weaker. There were of course exceptions—CT1AYC comes to mind, who was 59 + 20dB, but was such a poor operator that only half-a-dozen stations worked him during the opening. On the tropo scene David's best was propagation to GM on 3 August, when he logged GM3OUR/P (YQ07j) and several others in XO square. GI8TBV/P was also heard. On the QSL card front DB5UK (FK76j), F6GLH (ZI72j), and F6FET (DI77c) took David's square confirmations to 104.

Here in London, the band was remarkably quiet considering all the high pressure that we experienced. The evening of 28 July was quite lively, with LX1GR active, together with the EI2VNS/P expedition in WM square. Joan, BRS62088, logged EI4BMB/P in the same square. 30 July provided perhaps the best conditions of the period, with a useful opening to Scandinavia and northern Germany. DL6FAW/P (EK21g), DL1AC (EN64e), SM6OEF/6 (GS59b), SM7FJE (GQ57f), OZ5TG (EP09c), OZ1IOW (FP63d), OZ1IRM (FO20h) and SM6MNS (GR11f) were all good copy. The next good opening coincided with the French and Spanish portable contests on 6 August. BRS62088 added several new squares to her ever-growing total by logging EA2LY/P (ZD74d), F1KBF/P (ZC07h), F1DZB (ZJ78a), F6HWJ (AI41d) and F6HMQ/P (XI50c). Also putting good signals into London were F9YB (ZH46h), F6CJG/P (BF21j), EA1RCR/P (YC), EA2ALW/P (ZC25g), F1KNO/P (BC33f) and F6FHO/P (BF15d). During pre-Perseids activity GB2XN (XN59a), GW6APZ/P (XM80f) and GB4ULX (XJ05h) were heard doing brisk business during slightly above average tropo conditions.

The "Glorious 12th"

No, not the start of the grouse shooting season, but the peak of the Perseids meteor shower. Each year on 12 August this very popular shower peaks providing the opportunity for long distance dx to be heard on 144MHz. This year was no exception, but I personally thought the reflections were not so good this time around. Several times during the day some good reflections were copied over an hour-long period, but reflections were rather spasmodic. The best came, possibly, from OE3OBC (II), but 20 stations were identified and are listed in the order in which they were logged: 11 August: YU2JL (JF). 12 August: OE3OBC (II), OK1MBS (HK), F6CJG (BF), F1KPW (BK), EA7AJX (YX), F6FHP (AE), YU3EW (IG?), HG6KVB (JH), OK2KRT, IV3HWT, EA3ADW (BB?), HG4XT/P, I4BXN (FE). 13 August: YU1EU (KE), IW2BZY (EF), I0JDM (GB), DD0HZ, OK3KCM (JI) and OK1KPU (HK).

Finale

Let me have *your* news in readiness for the December issue by **Tuesday 18 October**, with late news no later than **Wednesday 27 October**. □

The Month on The Air

*by John Allaway, G3FKM**

G3ZAY's COMMENTS in August *MOTA* provoked some strong reactions —and perhaps a suggestion that they were a little out of place—so perhaps this is the time to re-iterate that the opinions expressed by those whose contributions appear together with their callsigns are not necessarily those of the Society, or indeed of G3FKM!

One who reacted strongly was Roger, G3SXW, and he has kindly set out some thoughts and counter-arguments to G3ZAY's points:

"Most dxpeditioners to rare locations want to make as many QSOs as possible. To do so they are brief, fast and flexible. This fact seems to have escaped G3ZAY—expeditioners do not intentionally frustrate callers, as that would be contrary to their prime objective, whether on cw or ssb.

"The less experienced dx'er needs to develop skills to compete effectively in the cw pile-up, and everyone needs to exercise self-discipline to reduce unnecessary QRM.

"First: LISTEN. Can you copy him well enough? What is his calling and QSOing 'rhythm'? Are his calls directional? What is his listening frequency? If he says 'up' he will probably be tuning for callers about 2kHz higher in the band. Net onto a station who is working him and constantly re-check with rit on subsequent QSOs. These preparations can be invaluable.

"CALL only when he finishes a QSO ('SK' or 'TU') or after 'CQ' or 'QRZ?'. Do not tune up on his frequency, do not call him when he is still in QSO or listening for a specific station ('KN'). Timing is of the essence —catch all his transmissions so as to call precisely at the right moment— QSK helps enormously. Send at your maximum speed or at his speed if that is slower.

"BE BRIEF—when calling, send only your own callsign (at most twice per call) each time he finishes a QSO. Keep repeating your call with 1s pauses until he is heard again. In QSO send just your callsign, RST, and 'SK'. Be flexible on length of call, sending speed, frequency etc—keep 'in tune' with the pile-up.

"He wants to work you too, so keep listening, re-netting, and be patient!"

Very good advice and, if followed, likely to improve the number of successful calls made to dxpeditions. Further points (from G3TXF) include the fact that there will always be lids, but it is the truly great cw dx pile-up operator who works them before they become lids on the frequency! He also lists some of the current top expedition operators (eg DJ6SI, K8CW and ZL1AMO) who seem to run tidy pile-ups whatever the conditions.

Members of the Malta Amateur Radio League. L to r: (standing) Desmond Xifo, swl; Mario Xuereb, 9H1GZ; Natalie, 9H1ES; Natalie 9H1IO; Joe Fenech, 9H1ER; Carmel Fenech, 9H1AQ, president; Dr Tonna Barthet, swl (kneeling), and Walter Gatt, 9H1DU, hon secretary

*10 Knightlow Road, Birmingham B17 8QB.

Nigel—in direct reply to Martin, G3ZAY, says—"No, dx cw pile-ups are not the ideal place for cw novices—and, indeed, why should they be? Those wishing to improve their morse skill are better advised to build up their technique away from pile-ups. 'L' drivers are advised to keep out of fast lanes on busy roads too!"

G4OWY requests publicity for the fact that his callsign is being pirated on 14 and 21MHz ssb by someone using the name Gus and claiming to be in Liverpool. A request of a different kind from G4PC who asks "Dan" of Gosport (who might possibly be a three-letter G4) to make sure that the stations he works copy his callsign correctly when he is operating on 7 and 14MHz cw. Charles already has difficulty persuading cw stations that he has no third suffix letter!

G4GLX also reports the receipt of QSLs for an operator calling himself Jon, John or Jack, and would like to warn others that a station using his callsign may not be genuine.

A note received via W3QPP gives the news that Wilbert Minola, W3WBA, inventor of the mini-beam and mini-quad antennas has become a silent key. His contribution to amateur radio will be long remembered.

The Liberian society reports that "EL7M" is a pirate and asks that no more QSLs for him be sent.

Overseas news

GW3JI has written to say that he had the pleasure of working from Fiji as 3D2CJ during May and June this year. He ran low power and used an FT7, loaned by GW3QN, which fed into wire antennas via 300Ω open-wire feeder. He made some 700 QSOs on bands from 3·5 to 28MHz (but not including 10, 18 or 24MHz), on cw and ssb. Schedules with home did not work, as his 10W responses could not be heard in the UK. A number of British stations were called during NFD, and QSOs with G3KLH/P and G3TVS/P resulted. G3PFZ was also worked. A surprising amount of South Pacific activity was noted, and about eight 3D2s are reasonably active at the present time. The antennas were left attached to the coconut trees ready for son GW4MPX to use (with more power) later in the year. A final remark from GW3JI—"please listen for the weak ones!".

Robert Finley, G3UAN, moved to the USA in December 1980 and was on the air as G3UAN/W1 until he passed the FCC examinations at Extra-class level and became KJ1Y in July 1982. He has completed WAC using a converted cb transceiver on 28MHz from his car, and also has an HW8 and indoor dipole. Robert is always looking for UK stations—particularly those near his home-town of Harrow—on 28MHz ssb, and on 14 and 21MHz cw.

VS6JD has written to point out that the frequency given for the Maritime Mobile Net mentioned in August *MOTA* should have been 14,320kHz. Nick says that the net is particularly valuable during the typhoon season.

Philip Weaver, G4JMB (perhaps better known as VS6CT), reports a most successful holiday in Madeira, where he made 3,250 QSOs during his six weeks as G4JMB/CT3. He worked 160 countries and all states. Philip is now back in Hong Kong, and asks for publicity for the fact that he has a new QSL manager—this is G5VS (who also deals with QSLs for A71AS, A71BH, A71BJ and C31YF). Please note that this is a re-issued callsign and not yet in the *Callbook*, but it will be found in "QTH Corner". VS6CT now has a new KLM KT 34A, and will be looking for friends in Europe every first Saturday in the month on 14,322kHz between 1600 and 1700.

G4BWP is active once again as second operator at 9K2BE following a month's leave in July. He will return to the UK in December for more leave before returning to Kuwait for a final six-month stay. He hoped to have an antenna for 1·8MHz by now.

Expeditions

Members of the Down Under DX'ers Contest Club intend to operate from Lord Howe Is during the CQ WW DX Phone contest this month. They will be on the island from 23 October to 2 November and will use the callsign VK2WU/LH. Equipment will probably consist of Yagi beams on 14, 21 and 28MHz, and wire antennas on 1·8, 3·5 and 7MHz. On the high bands they will be found on the "usual frequencies", and on 3·5MHz they will

transmit on 3,695kHz and listen around 3,805kHz (too bad for us in Region 1—but perhaps they will also listen below 3,800kHz). On 1·8MHz the "dx windows" will be used.

VK2BQQ is also due to visit Lord Howe Is—this time between 23 and 29 November. His callsign will be VK2BQQ/LH and he will operate mostly about 3,501, 7,001, 14,030, 21,030, 28,030 and 14,210kHz. QSLs go to his home address (see "QTH Corner").

The Malpelo Is expedition by LCRA should be on the air on 12 October. There will be no list operations, and confirmation requests should follow the rule: one QSL, one sae, and three ircs per QSO.

AD1S, H44SH, and probably a third expeditioner, will be visiting Jarvis and Kiritimati Is this autumn. They hope to be on the air for three or four days from each. Donations are solicited to AD2S, PO Box 32735, Oklahoma City, Okla, 73123, USA.

Jim Smith, VK9NS, is fairly confident of activating Kermadec Is around the second week in November.

OH2JL/T5 will be in Somalia until the end of this month and may be joined by OH2BH/T5.

ZL3AFH is due to move to Raoul Is in the Kermadec group, and should be on the air by now as ZL3AFH/K.

DX news

To celebrate World Communications Year there will be two special events in Nigeria—the first on 15 October and the second on 3 December. There will be stations active on those days using the callsigns 5N plus the WCY prefix with the space between filled with the appropriate district number—eg, the one in Lagos will be 5N0WCY. The December event will be centered on Kano, and it is hoped to show amateur radio to the public while it is taking place.

Also special for WCY is the permission which has been granted by the Cyprus licensing authority for 5B4 stations to use the 5B0 prefix from the last week of July until the end of 1983. For the same reason Syrian amateurs, who normally use the YK1 prefix, will be allowed to use the special prefix 6C1 between 0000 15 October and 2400 21 October, and FG and FO stations may use the TO7 and TO8 prefixes respectively.

Luis Teixeira, CT4NH, now has a QSL manager, W3HNK, whose QTH will be found in "QTH Corner".

The *DX Bulletin* reports that U0Y will once again be active from Tuva, in zone 23, during October and November. It seems that individual licences have been suspended in Thailand but that the club station HS0HS is being granted special permission to take part in some contests. One of the requirements for the Arabian Knights Award is a contact with a member of the Jordanian Royal Family, and The *Long Island DX Bulletin* says that JY3ZH is often on 14,250kHz from 0430 on Fridays. Latest information on YI1BGD is that operator Majid seems to be fairly active on 14 and 21MHz between 0400 and 0700, and that Saad is to be found mostly on 14MHz between 1700 and 2000. Their linear is in use again and some 3·5 and 7MHz work is planned. It is hoped that each individual operator of the station will be issued with his own callsign soon.

G3DME reports that Mike, FB8ZP, is frequently on 28,480kHz at 0800 looking for European QSOs, and that if the band is not open he moves to 21,289kHz. FB8WI often joins the VK9NS net on 14,220kHz at 0630 on Sundays. Stations on the air from the East Carolines include KC6JA, who operates after 0500 and joins the Inter-Island net on 14,315kHz at 0800, KC6VD—also one who favours nets—in the Open House Net on 14,332kHz from 1130, The West Carolines have KC6HA, who may be found near 14,310kHz from 0300. Tuvalu is currently being represented by T2GSH, who frequents the 14,190–14,195kHz area at 0200, 1000, 1400 and 2300, and T2ADE who operates in the same segment of the band from 0900. J87BD (formerly GM4JAM, ZD9BT and VP8CZ) is also in Funafuti, and may well be on the air by now. ZK2RS was only active on 14MHz at the time of writing, but Bob was hoping to have a six-element tri-band beam, a 7MHz quad, and 3·5MHz inverted-V very soon. Kure Is is another Pacific "rarity", and N2EDQ/KH7 is likely to be there for about a year and to be very active—particularly on cw.

Top band

A recent letter from VK6HD gives the news that Mike will be active again this year at sunrise times (in VK6). He did not list these, but last "season" times were as follows and should be very similar: 1 October, 2157; 11 October, 2144; 21 October, 2131; 1 November, 2120; 11 November, 2112; 21 November, 2106; 1 December, 2104; 11 December, 2104; 21 December, 2108; 1 January, 2115; 11 January, 2121; 21 January, 2131; 1 February, 2146; 11 February, 2151; and 21 February, 2200. Main transmitting frequencies will be 1,821 and 1,849kHz, listening up. Activity from Australia has increased, and Mike thinks that QSOs will be much less rare than they used to be. VK6HD contacts with the UK now exceed 200.

G3CYC received this hand-painted QSL card from W1BB when he gave Stew the first W-VP2V contact while operating as VP2AV

VK0GC, ZL4OY/C, VK9NS, P29PR, FK8CR, ZK1GC, ZK2RS and H44DX are all promising to come on the band.

HZ1AB is on 1,827kHz from 0230 on most Thursdays and Fridays, and also around 1,850kHz at 2200 on Thursdays.

ZK2RS is planning 1·8MHz activity using the local broadcasting station vertical antenna which is available after 0830 on weekdays but all day on Sunday. European schedules will have to be made on Sundays, and Bob seeks advice on the best time of day and year for these—he will be on the island until November 1984.

Ex-G Radio Club

Reg Cherrill, W3HQO (and also G3XNV), has finally handed over the office of general secretary/treasurer of the Ex-G Club to Don Rayner, W3CTR, after holding the position for 24 years since he founded the organization in 1959. Reg deserves our sincere congratulations for his devotion to the aims and purposes of the club, which include "promoting the welfare and interests of amateur radio, to establish contact with British-born amateurs domiciled abroad, to maintain and promote these contacts and assist each other where need be, and to cherish and perpetuate the love and respect we hold for Great Britain". A recent list shows nearly 300 members and more are welcome—being born in the British Isles and living abroad is required for full membership, and those having a parent or spouse born in Britain and who have lived abroad for at least six months may apply for associate membership. The regular worldwide net meets on Sundays at 1900 on 14,346kHz, the informal family net daily at 1230 on 21,410kHz, and the cw net on Saturdays at 1830 on 14,065kHz.

28MHz countries table

Scores notified by closing date were as follows:

G3VOF—173	G3XBY—101	G3XTJ—66 (cw)	G3KSH—28
G3XQU—159	G3SXW—96	G4EHQ—55	G3PSM—26 (cw)
G3GIQ—151	G3TXF—84	G4PKP—49	GM4RFE—26
G3KHZ—150 (138 cw)	G4MUW—83	G4RPX—37	G4PXT—25
G3JFH—135	G4GGY—82 (ssb)	G3XBM—35	G3JFF—23
G3KDB—108 (cw)	G4OBK—77	G4SDZ—34	G4FVK—17

Welcome

The following overseas amateurs became Society members during July: CX2AL, EI4DH, EI7DF, KD2Q, VE2BAM, VE2HAX, VE3HSA, VK2VZI, ZL3RW, 6Y5IC and 9H1HA. Listener members include W. Pickard (Z2), R. Hung Shu Ming (VS6), B. Borcard (F) and E. Valentini (I).

Contests

CQ WW DX Contest

0000 29 October to 2400 30 October (Phone)
0000 26 November to 2400 27 November (CW)

All bands 1·8 to 28MHz. Exchanges consist of RS/T plus *CQ* zone number (UK is 14). One point for contacts with own continent, three with other continents. Own country may be worked for multiplier credit only. The multiplier is the total number of DXCC countries and *CQ* zones contacted added together. There are three categories: (a) single-operator single- or multi-band, (b) multi-operator multi-band single-transmitter, and (c) multi-operator multi-band multi-transmitter. In category (c) only one signal may be radiated on a band at a time. There is also a QRP section for stations whose power output does not exceed 5W. Entrants must use separate log sheets for each band, all duplicate contacts must be clearly

marked and no points claimed for them. "Dupe" sheets are required for each band on which 200 or more QSOs have been made. Logs should have 80 QSOs per page and be 8·5 by 11in in size. Log and summary sheets may be obtained from the sponsors by sending a large sae and ircs to: CQ Contest Committee, 76 N Broadway, Hicksville, NY, 11801, USA. Entries should also be sent to this address postmarked no later than 1 December (for the phone section) and 15 January 1984 (for the cw).

Results of the **1983 PACC Contest** have been received, and UK scores are as follows: **G2HLU** (5,772 points), G3ESF (5,530), **GM3KLA** (4,983), G4IQM (4,100), G3AEZ (3,192), G4ANH/A (2,552), G4JFN (2,376), G4ISK (2,212), G5EPO (1,470), G4EDW (1,045) and GM8SQ (72). Listener entries were **RS44395** (4,366 points), RS46702 (190), and RS44984 (84). Certificate winners are in bold type. The 1984 event will take place on 11 and 12 February, and rules will appear later.

DARC FAX Contest
1400 29 October to 1400 30 October
HF, vhf and receiving sections. Exchange name, QTH, RST and QSO number on fax mode only. One point per confirmed QSO, a station may be worked once per band. Multipliers are DXCC and WAE list countries plus JA, PY, VE/VO, VK, W/K, ZL, ZS call areas and UA9 and UA0. Final score is total QSO points times sum of all band multipliers. Logs must reach Hans-Juergen Schalk, DJ8BT, Hammarskjoeldring 174, D-6000 Frankfurt 50, FR of Germany, by 1 December. FAX activity centres around 3,600, 7,040, 14,100, 21,150 and 28,200kHz (± 5kHz).

AGCW-DL Hand-key Party
1300 to 1600 1 October
CW only. 3,530-3,560kHz. Exchange RST, QSO number, and name. Each QSO counts one point, and each operator may "recommend one other operator to be a good cw-op" who will then count 10 more points. All entrants must sign a statement that they have complied with the rules and have used a manual key only. Post logs within two weeks to Karl-Heinz Pape, DJ5ZP, Eichenstrasse 40, D-2733 Westertimke, FR of Germany.

WA Y2 Contest
1500 15 October to 1500 16 October
3·5 to 28MHz, phone and cw. Note that the first 10 and last 25kHz of all bands are to be kept clear of contest operation. The same station may be worked once on each band and each mode for credits. There are single- and multi-operator, and listener classes. Exchange RS/T plus serial QSO number (from 001). Y2 stations will add two letters indicating their district. Each GDR station worked counts three points. Multiplier is number of different districts (maximum 15) worked on each band added together (*Note:* districts are identified by the last letter of the suffix). Listeners score one point for each Y station reported, including RS/T, district, and call of station being worked. Use separate log for each band, and include summary sheet showing scoring, list of districts worked, and the usual signed declaration plus name and address in block letters. Post within 30 days of the contest to Y2 Contest Bureau, RKDDR, Hosemannstr 14, DDR 1055 Berlin, German Democratic Republic.

Results of the **Concurso Radio Mundial-82** have been received via G3TXF. **G3VZT** is to be congratulated on being European continental winner with 43,537 points. Other British entrants were G4HBI (25,092), G3TXF (16,456), G4JXP (8,232), G3SNN (7,810), GW3MPB (5,985), GW3EJR (5,115), G4IJW (2,898) and G3ESF (2,184). RS32525 also entered with a score of 15,836 points.

Awards

The CQ DX Award
A further mention of this award, which has very simple rules and is suitable for those who do not wish to send their QSL cards to the USA to apply for DXCC. For the basic certificate the applicant must have QSLs from at least 100 countries (for QSOs since 15.11.45) from the current DXCC list (*NB:* deleted countries cannot be counted). Applications can only be made for all two-way cw or all two-way phone, and copies of the official form are available from G3FKM. This should be completed and sent with the QSLs and return sae and postage to G3FKM, who will check and return everything to the applicant. After this the certified form only, plus US $10 (or only US $4 if the person applying is a subscriber to *CQ Magazine*), must be sent to Billy Williams, N4UF, 911 Rio St Johns Drive, Jacksonville, Fla, 32211, USA. Country endorsements for 150, 200, 250, 275, 300, 310 and 320 are issued, and to promote multi-band usage special endorsements are also available as follows: (A) A 28MHz band for 100 or more countries on that band. (B) A 3·5/7MHz version for 100 countries on either or both bands mixed. (C) A 1·8MHz endorsement for 50 countries confirmed. (D) A QRP version for 50 countries worked using 5W input or less. (E) A mobile endorsement for 50 countries confirmed operating /M. (F) An sstv endorsement of the ssb award for 50 countries confirmed on two-way sstv. (G) An Oscar award for 50 countries via satellite. A CQ DX Honor Roll is published showing those with credit for 275 countries or more, and to remain on this it is necessary to update one's total at least once yearly. After the basic certificate is acquired only a list of confirmed QSOs is needed for special endorsements, and for these an sae and one irc should be forwarded.

Single-Mode Five-Band WAC
Issued by the N Kanagawa DX Association to those with proof of contact with six continents on a single mode on five bands. This is also available on a heard basis. There is no date limitation, and the certificate will be issued for six or more bands if supporting information is enclosed with the application. The award consists of a trophy with a medal, and log data (certified by two licensed amateurs) plus 25 ircs should be sent to: Award Chairman, N Kanagawa DX Association, JE1TTI, Michinori Jimbo, 2653, Suarashi, Sagamiko-Machi, Tsukui-Gun, Kanagawa-Ken, 199-01 Japan.

Knokke Award
In the autumn of 1944 Canadian troops fought a long and exhausting battle in the River Schelde and Belgian coast areas, and the town of Knokke was liberated on 1 November. The deeds of the Canadians are remembered every year when a "liberation march" takes place, and because 1983 is World Communications Year radio amateurs will contribute to the success of the event. A special station—ON4CLM (Canadian Liberation March)—will be on the air from Knokke town hall from 28 October to 2 November on the following frequencies: 3,595, 3,705, 7,005, 7,090, 14,025, 14,141, 21,025, 21,212, 28,025 and 28,282kHz (as well as on 144·025, 144·250 and 144·400MHz). A special award will be available for each contact or confirmed listener report. This is printed in six colours and costs BFr150, US$5, FFr30, or 10 ircs, and applicants should send QSLs to Radio ON4CLM, BP 140, 8300 Knokke 1, Belgium. The proceeds will be donated to a welfare fund. For additional information contact Victor Claeys, ON4UM, Koningslaan 116, 8300 Knokke-Heist, Belgium.

Prince Edward Is Abegweit Award
For contacts with at least two PEI stations made since 1 January 1960. QSLs must be in the possession of the applicant, but only log data, certified by two other licensed amateurs, need be sent (together with 10 ircs) to Award Manager, PO Box 1232, Charlottetown, PEI, Canada.

DARC WCY Diploma
Information on this was given in March and May *MOTA*, but readers are reminded that the requirement is to make confirmed contacts with at least 15 stations (on hf) or five (on vhf) using the WCY suffix by 31 December (the latest date for the receipt of applications). A certified list of QSLs plus 10 ircs, DM5 or US $3, should be sent to Hans-Peter Gunther, DL9XW, DARC WCY Award Manager, Am Strampel 22, D-4460 Nordhorn, FR of Germany.

QTH CORNER

CN9CL	DL0OI, c/o DK6VQ, W. Meiser, Trierer Str 1, D-6688 Illingen, FR of Germany.
CT4NH	via W3HNK, Box 73, Edgemont, Pa, 19028, USA.
FB8ZP	via F6KNO, Radio Club de L'Yonne Breviandes St Martin, 89700 Tonnerre, France.
DL7NS/HB0	DL7NS, Fesenfeld 57, D-2800 Bremen 1, FR of Germany.
JH1RNZ	PO Box 13, Isehara, Kanagawa, 259-11, Japan.
G3OLU/SV5	J. T. Saunders, 2 The Ruskins, Rayne, Braintree, Essex, CM7 8PA.
VK2BQQ/LH	PO Box 3209. Sydney 2001, NSW, Australia.
VK2WU/LH	(non-W/VE) L. Cullen, VK2WU, PO Box 31, Winmalee 2777, NSW, Australia.
VS6CT	via A. Allen, G5VS, PO Box 126, Harrow, London.
VS6KH	via G4ISK, 8 Crown Place, Victoria Rd, Owlsmoor, Camberley, Surrey.
XU1SS	via JA1HQG, Y. Arisaka, 1107 Zaimokuza, Kamakura, Kanagawa, Japan.
ZK1AR	via WB6HGH, 235 Payne Rd, San Juan Bautista, Cal, 95045, USA.
ZK2JS	PO Box 37, Niue.
ZK2RS	R. Sutton, PO Box 17, Niue.

Around the bands

Activity has been at a low level due to the fine weather, but the following managed to send in reports for this section: G2HKU, G5JL, G3s GIQ, GVV, GM3ITN, G3s KDB, KHZ, KSH, LOL, YRM, G4EHQ, GW4KGR, G4s LDS, OBK, GM4RFE and G5CFJ.

Callsigns listed in italics were of stations using A1A.

1·8MHz. 1200 PA0PN. **2200** *EZ9ADE, PY1RO, UK9CAA, W2MJ/MM.* **2300** *SM5AHK/OH0, PY1ZAE.*

3·5MHz. 0400 PY8ZWM. **0500** *CN9CL.* **2200** G4LJF/EA9, OJ0MA. **2300** 7P8CM.

7MHz. 0100 A4XJQ, LU8DQ. **0300** *VP2MM.* **0500** *FP0HOQ,* ZL (to 0700). **0600** C6ADV, *HT1JCC.* **0700** *FK0AQ.* **1800** *VP9LB, 4K1A.* **2000** *CN9CM, DJ6SI/OH0.* **2100** *CX5AO, JA0BCO, PY, 4K1GDW.* **2200** G4LJF/EA9, *PY0FE, UL7PBI, VS6DO, 6Y5MJ.*

10MHz. 0300 *W2GDV.* **0600** *TO6FHO, VK (to 0800), VP9BK, ZL* (to 0800). **1800** *FC8TT.* **2100** *VK2BMH, 4X4WF.*

14MHz. **0200** *TZ8DC*. **0400** *XE1X/XF3*. **0500** A71BH, FO8FW, KH6IJ, JYs, DF3NZ/ST2, VK, ZL (to 0900). **0600** FO8JL, KL7PJ/P, T32AF, VK0GC, YI1BGD, YJ8IND, *ZK1CY, ZL2BKM/C*. **0700** *AL7BK*, C21RK, FO8JA, TE32CCC (= TI), *TN8AA*, VK9WCY (= VK9NS), W6-W7, ZK2RS, 3D2DB, 3X4EX. **0800** CE0FQU, KL7RA, VK, W6-W7, ZK1CC. **0900** JA, KH6BOG. **1000** *EK10*, H44DX (SP), T2ADE. **1200** 3V8PS. **1500** *KX6QC, 4K1D*. **1700** EK0KA, *JW0A*, 9V1VP. **1800** *VK3BCY*. **2000** A71AD, C53EU, KH2AJ, UK1PGO, VK9WCY, 1Z9A, 3D2DM. **2100** HZ1AB, JA, VK, *VU2BX, 4K1QAV*. **2200** KL7AM, TR8DX, 3X4EX. **2300** CN9CO, *HH2VP, W3TB/TF*, 4X4MS/5N0, 9N1MM.

18MHz. **0700** *A35MS*. **0800** *TR8DX*.

21MHz. **0600** JA (to 1100). **0700** FO8JP, H5ADX, KH6WU, *TZ8DC*, XU1SS, YJ8TT, 5W1DZ. **0800** XU1KC, *XU1SS*. **0900** *TA1UA*. **1000** A92F, 3B8FK. **1100** AP2SQ, KD7P/KH2. **1200** KH0AC, 3X4EX. **1300** AH2AN, H44DX, *DK6NJ/ST2, TR8JLD, 3B9FK, 4K1B*. **1400** *FR0HPR*, HH2VP, *HS0HS, KC6RN*. **1500** *JA, JD1BAE*, 1Z9B. **1600** *A22BT*, TL8ER, *DF3GX/VP2V*, YC4FS, 9Y4RD/SU. **1700** *PY0FE*, W6-W7, *7P8CQ, 9V1VP*. **1800** G4JMB/CT3, G4LJF/EA9, S79WHW, VP8AOD, ZD9BV, ZF20GE, 9L1SL. **1900** *G4ABI/ST2, T77C*, ZD7CW, 5Z4RK. **2000** KH6WU, TJ1AF, ZD8TT. **2100** CE0ZAD, KL7K, V2AN, W6-W7, ZD7BW, ZL2ASX. **2200** *CE6EDZ*, VU2GI, W6-W7. **2300** HC8GI, W1-W0, 3X4EX.

28MHz. **0800** *3B9FK, 9U5AC*. **1100** *C30TC, PY0FE*. **1300** *LU*, 9Y4RD/SU, *ZS6BUF*. **1400** *OH0BA, KC7UU/5N6*. **1500** *PY*, ZP, *9X5SL*. **1600** 7P8CM. **1700** *PY* (to 2200). **1900** *CX*, HC1KN, *LU*. **2000** *JX5DW*, ZD8DX. **2200** *HH2VP*.

Thanks also to the editors of the following for news extracted: *DX News Sheet* (G3XTT/G3ZAY), the *Ex-G Radio Club Bulletin* (GI3OEN/W6), *Long Skip* (VE3GCO), *Lynx DX Group Bulletin* (EA2JG/EA3CBQ), *DX'press* (PA0GAM), *CQ Magazine* (W1WY), *DXNL* (DL3RK), the *DX Bulletin* (K1IM), and the *Long Island DX Bulletin* (W2IYX).

All items for **December** to reach G3FKM by **28 October** please.

HF propagation predictions for October 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 dagger (†) sign in the 28 and 3·5MHz columns respectively. The higher probability figures are printed in **BLACK**, lower probability in and lowest probability in

	28MHz				21MHz				14MHz				10MHz				7MHz				3·5MHz			
GMT	000	001	111	122	000	001	111	122	000	001	111	122	000	001	111	122	000	001	111	122	000	001	111	122
	024	680	246	802	024	680	246	802	024	680	246	802	024	680	246	802	024	680	246	802	024	680	246	802
EUROPE																								
Moscow	.	34	431	.	.	188	887	2	.	777	778	841	644	655	557	897	986	422	225	799	†53	.	.	2 4††
Malta	.	34	222	.	.	188	777	4	11	787	789	962	775	755	557	998	998	532	235	799	†††	2	.	2 5††
Gibraltar	.	2	111	.	.	57	656	4	.	288	788	961	563	776	557	897	998	743	234	799	†††	42	.	. 4††
Iceland	.	.	11	.	.	4	654	1	.	68	888	84	33	276	667	885	885	653	335	688	†††	42	.	2 45†
ASIA																								
Osaka	.	21	.	.	.	176	1	.	.	465	433	21	.	232	225	753	.	1	2	562	.	.	.	23
Hong Kong	.	55	4	.	.	388	841	.	.	155	556	621	1	22	225	885	.	.	2	685	.	.	.	352
Bangkok	.	166	62	.	.	478	873	.	1	125	557	641	3	2	225	886	2	.	2	687	.	.	.	354
Singapore	.	244	442	.	.	468	787	2	1	125	457	841	3	2	125	886	1	.	2	686	.	.	.	353
New Delhi	.	266	54	.	.	578	882	.	2	124	457	532	631	1	125	788	62	.	2	688	3	.	.	35†
Teheran	.	376	662	.	.	777	887	2	314	423	457	864	864	1	125	899	851	.	2	688	†2	.	.	35†
Colombo	.	376	662	.	.	567	887	1	111	113	457	854	62	.	125	899	5	.	2	688	2	.	.	35†
Bahrain	.	376	562	.	.	766	887	2	524	312	457	865	973	.	125	899	851	.	2	688	†2	.	.	35†
Cyprus	.	277	665	1	.	788	899	61	544	765	668	986	987	433	346	899	985	2	113	688	††2	.	.	4††
Aden	.	376	675	.	.	666	788	51	624	211	357	986	974	.	25	899	861	.	2	678	†3	.	.	35†
OCEANIA																								
Suva (S)	.	.	11	.	.	13	66	1	.	165	556	61	.	442	225	51	.	31	2	2	.	.	.	.
Suva (L)	.	.	.	1	1	253	1	251	112	764	332	741	2	532	124	51	.	31	1	2	.	.	.	.
Wellington (S)	.	2	2	.	.	46	641	.	.	465	556	61	.	442	225	52	.	21	2	3	.	.	.	.
Wellington (L)	.	.	.	.	1	1	.	2	123	552	.	552	2	432	113	52	.	21	1	2	.	.	.	.
Sydney (S)	.	144	32	.	.	588	773	1	.	565	557	72	.	232	225	841	.	1	2	62	.	.	.	3
Sydney (L)	.	.	.	.	.	31	.	21	111	164	21	263	.	242	112	641	.	1	1	41	.	.	.	2
Perth	.	355	41	.	.	688	764	1	2	245	457	852	2	12	125	885	.	.	2	673	.	.	.	34
Honolulu	.	.	.	.	.	.	1	3	.	32	216	62	22	342	224	3	3	41	2	1	.	2	.	.
AFRICA																								
Seychelles	.	344	541	.	.	555	786	41	633	111	357	987	962	.	125	899	83	.	2	678	†	.	.	34†
Mauritius	.	366	665	1	.	666	889	62	642	211	457	987	952	.	125	899	72	.	2	588	5	.	.	25†
Nairobi	.	266	675	2	.	665	688	731	753	311	157	998	984	.	24	899	872	.	2	588	†4	.	.	255
Harare	.	256	676	3	.	666	689	841	763	311	157	998	985	1	24	799	872	.	2	588	†4	.	.	25†
Capetown	.	45	677	51	1	566	679	952	873	521	136	999	996	2	4	799	884	.	1	588	†5	.	.	25†
Lagos	.	78	788	51	11	386	668	962	783	731	125	899	998	51	3	799	788	2	.	588	5†5	.	.	25†
Ascension Is	.	66	557	4	1	86	667	852	785	562	112	799	999	73	.	489	888	4	.	178	5†5	2	.	4†
Dakar	.	58	778	61	1	87	667	971	686	563	113	798	999	73	.	489	888	51	.	168	55†	2	.	3†
Las Palmas	.	47	656	5	.	89	889	95	564	686	667	897	999	864	334	799	899	631	11	489	†††	3	.	5†
S AMERICA																								
South Shetland	.	2	556	51	1	37	787	761	676	665	443	466	788	742	11	135	466	51	.	2	33	2	.	.
Falkland Is	.	5	767	62	.	48	876	761	616	565	422	367	8·9	742	1	36	6·8	51	.	3	4†	2	.	.
Rio de Janeiro	.	7	545	51	.	38	656	75	676	465	211	377	999	742	.	48	888	51	.	16	†††	2	.	3
Buenos Aires	.	5	756	62	.	38	766	761	576	365	311	257	999	742	1	26	888	51	.	3	5††	2	.	.
Lima	.	.	756	51	.	.	866	651	454	124	421	125	899	542	1	4	688	51	.	1	3††	2	.	.
Bogota	.	.	755	51	.	2	865	551	443	25	421	36	898	532	1	5	787	51	.	2	4†5	2	.	.
N AMERICA																								
Barbados	.	3	755	51	.	8	865	661	454	135	411	157	998	542	1	27	887	51	.	5	††	4	2	.	.	2
Jamaica	.	.	655	41	.	1	875	55	332	14	421	136	888	432	1	5	787	51	.	2	4†5	2	.	.
Bermuda	.	.	655	41	.	4	876	75	342	15	422	366	888	332	1	37	888	51	.	4	††5	2	.	.
New York	.	.	344	3	.	1	777	74	331	5	543	455	887	222	21	136	788	51	.	3	4††	2	.	.
Mexico	.	.	44	3	.	.	286	53	231	2	452	124	587	242	22	2	388	51	.	.	5†	2	.	.
Montreal	.	.	344	3	.	1	787	74	331	5	554	565	886	232	221	236	788	41	.	13	4††	2	.	.
Denver	.	.	2	1	.	.	46	52	22	.	255	333	575	22	222	2	378	41	.	.	4†	2	.	.
Los Angeles	.	.	2	1	.	.	17	52	22	1	55	322	365	231	122	1	158	41	.	.	25	2	.	.
Vancouver	.	.	.	.	.	.	2	41	11	.	36	542	454	221	124	212	257	41	1	.	25	2	.	.
Fairbanks	.	.	.	.	.	.	.	1	1	22	235	641	342	332	224	433	134	41	2	211	2	2	.	.

The provisional mean sunspot number for July 1983 issued by the Sunspot Index Data Centre, Brussels, was 82·1. The maximum daily sunspot number was 114 on 22 July, and the minimum was 40 on 28 July. The predicted smoothed sunspot numbers for October, November, December 1983 and January 1984 are, respectively: (classical method) 75, 73, 71 and 69; (SIDC adjusted values) 74, 72, 70 and 68.

QRP

*by Rev George Dobbs, G3RJV**

ARRL QRP forum

During the first weekend in October three members of the G QRP Club will form part of the QRP forum at the ARRL National Convention in Houston, Texas. George Burt, GM3OXX, and Chris Page, G4BUE, will join me as part of the team of speakers at the first QRP forum to be held during an ARRL National Convention. Other speakers will include Ade Weiss, W0RSP, QRP editor of *CQ Magazine*, and Wes Hayward, W7ZOI, joint author of *Solid State Design for the Radio Amateur*. GM3OXX will be demonstrating and discussing his excellent homemade QRP equipment, G4BUE will talk on his experiences of "milliwatting", working the hf bands with fractions of a watt of power, and I will be giving an Americanized version of my lecture "Amateur Radio on a Shoestring".

What the Texans will make of our approach to low power communication remains to be seen. In the UK the accent is upon low cost, appropriate technology, homebuilt equipment. In the USA most QRP stations appear to use commercial equipment. A typical letter from the USA enquiring about the G QRP Club might read, "I own a TenTec Argonaut 515, a TS120V and an HW8, what else ought I to buy". The American line-up for the QRP forum appears to feature people with academic excellence in electronics. The UK is sending a policeman, a vicar and a technician. Perhaps that tells us something about the world of amateur radio! I hope to report on the convention in future issues.

The QRP Winter CW Sports 1983

Each year the G QRP Club organizes a series of activity periods for QRP operation. These are not contests but an opportunity for QRP operators to come onto the bands and work as many fellow QRP stations as they can find. In 1983 there have been two activity weekends for cw operation and one for ssb operation. Perhaps the most successful event each year is the annual QRP Winter CW Sports. This runs from Boxing Day to New Year's Day, and QRP stations are invited to seek two-way QRP QSOs on or near the international QRP calling frequencies on the hf bands. Time periods are set for each band during the days of the event. In previous years some exceptional transcontinental two-way QRP contacts have been reported. Why not join-in this year. It is not a competitive event, just enjoyment, the power limitation is 5W.

The schedule from 26 December 1983 to 1 January 1984 is:

Periods (gmt)	Frequencies (kHz)	Periods (gmt)	Frequencies (kHz)
0900-1000	14,060	1500-1730	21,060/28,060
1000-1100	21,060/28,060	1730-2000	14,060
1100-1200	7,030	2000-2100	7,030/10,106
1200-1300	3,560	2100-2200	3,560
1300-1400	10,106	2200-2300	14,060
1400-1500	3,560		

KISS

Regular readers of *Technical Topics* will have noted references to KISS technology: KISS meaning "Keep It Simple—Stupid". I regret the movement in British engineering towards the transatlantic cheque book technology. What happened to the national spirit of genius that, it is said, won the second world war with elastic bands and bits of string? I am grateful to G3CWX for reminding me of the quotation: "The engineer is the man who can build for five bob what the fool can build for a pound". Much of the delight for many people who operate QRP is making contacts with simple, very inexpensive, equipment. A lot of satisfaction can be had from operating with simple rather than commercial equipment.

In *QRP* August, I referred to "fun rigs"; simple pieces of equipment that can be built by the inexperienced constructor at low cost and yet are capable of useful results on the hf bands. Many amateurs experiment with these fun rigs as an addition to their main station equipment, and derive added pleasure from their hobby. A considerable number of people only have such equipment available in the station and feel no desire to spend additional money on commercial equipment. There have been several circuits for transmitters and transceivers which have become almost classics in this field. Perhaps the most widely built and used fun rig has been the GM3OXX OXO transmitter. Originally designed for a competition in which a low component count was the chief criterium, this little transmitter has become a favourite among QRP operators in Europe.

The GM3OXX OXO transmitter

The circuit for the basic OXO transmitter board is shown in Fig 1. It is a simple variable crystal oscillator, TR1, feeding a power amplifier stage, TR2. A third transistor, TR3, provides dc switching to allow keying with respect to ground, although if a handkey is used TR3 and its associated circuitry may be omitted.

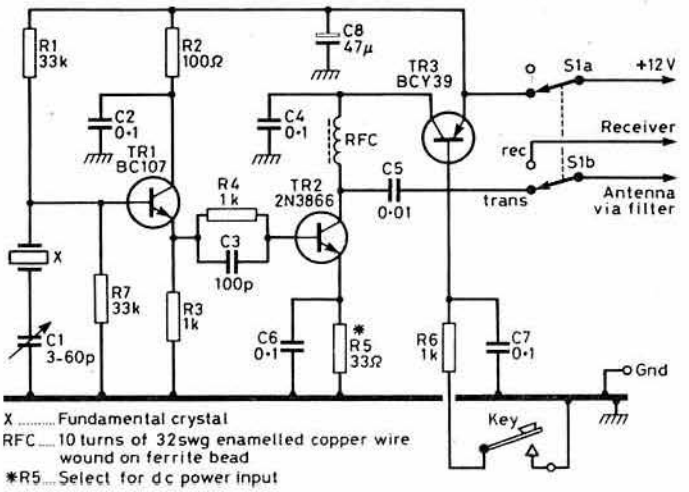
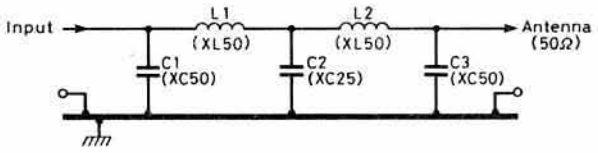


Fig 1. The OXO minitransmitter circuit

The basic circuit may be used on any band in the hf range provided that a fundamental crystal is used and the output is terminated with a suitable harmonic suppression filter. A suitable Chebychev filter, with values for some hf bands, is offered with the basic circuit. The toroid cores for the inductors can be obtained from Ambit International or TMP Electronics. Full design information for such filters may be had from *Solid State Design for the Radio Amateur* obtainable from RSGB Publications (Sales). The transmitter can be built as a single bander or with switching to bring in a suitable filter for the band in use. One common dodge is to build the basic board into a case and have a selection of filters built into tobacco tins to plug into the back of the case, changing band then simply involves plugging in another crystal and another filter.



FILTER VALUES

Band (MHz)	C1 (pF)	C2 (pF)	C3 (pF)	L1 (turns)	L2 (turns)	Wire (swg)	Former
3·5	750	750	750	21	21	22	T-50-2
7	470	470	470	14	14	22	T-50-2
14	210	210	210	12	12	22	T-50-6
21	105	105	105	9	9	22	T-50-6

Fig 2. Lowpass filter circuit

As TR1 is both dc and rf coupled to TR2 it will not oscillate withoutTR2 in circuit and R5 and C6 in place. The power amplifier emitter resistor, R5, is adjusted to suit individual pa transistors. Insert a milliammeter between the collector of TR3 and RFC to check the dc input to the pa. TR2 can be made to draw too much current if R5 is too small. A dc input of about 1-2W is ideal (about 100-160mA). A whole range of transistors (2N3553, 2N4427, 2N3053, BLY33, BSX61 etc) could be used for TR2, some of which will probably not run 2W dc input, but experimentation is what it is all about. The rf choke in the collector of the pa is homewound from some 10 to 15 turns of 32swg enamelled wire on a small ferrite bead. C1 can give a useful degree of frequency shift, the actual amount depending upon the band and crystal in use. Where does one get fundamental hf band crystals? P. R. Gollidge Electronics, Merriott, Somerset, supply fundamental crystals for 3,560, 7,030, 14,060 and 21,060kHz (the international QRP frequencies) in HC25U mounting for £3.75 inclusive, with a 75p reduction for G QRP Club members. Give it a try, it's inexpensive, simple to build and fun.

* 17 Aspen Drive, Chelmsley Wood, Birmingham B37 7QX.

RSGB SLOW MORSE PRACTICE TRANSMISSIONS

Alterations and additions to this list should be sent to the organizer Mr M. A. C. MacBrayne, G3KGU, 25 Purlieu Way, Theydon Bois, Essex

Time	Callsign	MHz	Mode	Town	Notes
Sundays					
1015	G3CGD	1·875	A1A/A3E	Cheltenham, Glos	
1100	G2FXA	1·910	A1A/A3E/J3E	Stockton-on-Tees	
1100	G3BLS	145·250	F2A	Osney, Oxford	[1]
1130	G4BFJ / G4DKK	144·625	F2A/F3E	Banstead, Surrey Tooting, SW London	
1200	G3PER	145·575	F2A/F3E	Heysham, Lancs	[1]
1200	G3HVI	145·250	F2A/F3E	Stoke-on-Trent, Staffs	[1]
1200	G3GNS	1·910 / 3·550 / 144·250	A1A	Locking, Avon	[13]
1830	G4GOC	145·250	F2A/F3E	Stoke-on-Trent, Staffs	[1]
1830	G3RLO	144·525	F2A/F3E	West Bridgford, Notts.	[1]
1900	G4OBK	3·565	A1A/J3E	Chorley, Lancs	
1930	GW4OXB	145·275	F2A/F3E	Swansea, West Glam	[1]
1930	G3LDW	144·160	A1A/J3E	Halesowen	[1]
2000	G4OJD	145·250	F2A/F3E	Brixham, Devon	[1]
2000	G4TKM	145·425	F2A/F3E	Birmingham	[1]
2005	G3OLU	145·375	F2A/F3E	Braintree, Essex	
2030	G4NRO	144·525	F2A/F3E	Atherton, G Manchester	[1]
2100	G4EWK	144·850	F2A	Burton-on-Trent, Staffs	[7]
2100	GW4LLE	145·525	F2A/F3E	Haverfordwest, Dyfed	
2130	G3ORP	144·250	A1A/J3E	Maidstone, Kent	[6]
Mondays					
1100	G4IRI	3·550	A1A/J3E	Bolton, Lancs	
1830	G3GNS	1·910 / 3·550 / 144·250	A1A	Locking, Avon	[13]
1900	G8QR	145·250	F2A/F3E	Norwich, Norfolk	[1]
1900	G3GC	3·562	A1A/J3E	Yeovil, Som	
1900	G3TPY	145·275	F2A/F3E	Chester, Cheshire	[1]
1900	G4ILD / G3ZQS	145·400	F2A/F3E	Rishton, Lancs. Darwen, Lancs	[1]
1900	G3RLO	144·525	F2A/F3E	West Bridgford, Notts.	[1]
1930	G4BFJ / G4DKK	144·625	F2A/F3E	Banstead, Surrey Tooting, SW London	
1930	GI3SXG	144·100	A1A/J3E	Newtownards, Co Down	
1930	G4LLU / G4JSQ	144·160	A1A/J3E	Wolverhampton, W Midlands	[1]
1930	G4SXU	145·250	F2A/F3E	Harrogate, N Yorks	[1]
1930	GW4OXB	145·275	F2A/F3E	Swansea, West Glam	[1]
2000	G2FXA	145·525	F2A/F3E	Stockton-on-Tees	[1]
2000	G4IRI	3·550	A1A/J3E	Bolton, Lancs	
2000	G4JDL	145·250	F2A/F3E	Solihull, W Midlands	[2]
2000	G4INM	145·250	F2A/F3E	Chelmsford, Essex	[1]
2030	G4NRO	144·525	F2A/F3E	Atherton, G Manchester	[1]
2030	G3ASR	1·875 / 144·175	A1A/J3E A1A/J3E (lsb)	Harrow, Middx	[1] [12]
2030	G2FKO	145·525	F2A	Bideford, Devon	
2030	G4ICC	3·535	A1A/J3E	New Duston, Northants	
2100	G3AVJ	145·250	F2A/F3E	Huyton, Merseyside	[1]
2100	G3WOR	144·250	A1A/J3E	Lancing, Sussex	[14]
2200	G3GMS	3·583 / 145·250	A1A F2A/F3E	Whitley Bay, T & W	[1]
Tuesdays					
1100	G4IAV	145·275	F2A/F3E	Atherton, G Manchester	
1200	G3GNS	1·910 / 3·550 / 144·250	A1A	Locking, Avon	[13]
1830	G4CWN	144·100	A1A/J3E	Stoke-on-Trent, Staffs	
1900	G3RLO	144·525	F2A/F3E	West Bridgford, Notts.	[1]
1900	G3WQK	144·775	F2A	Eastbourne, E Sussex.	[1]
1900	G4RS	3·565 / 145·525	A1A/J3E F2A/F3E	Catterick, N Yorks	[1]
1930	G4BFJ	1·950 / 144·625	A1A/J3E F2A/F3E	Banstead, Surrey	
	G4DKK	144·625	F2A/F3E	Tooting, SW London	
1930	GW4OXB	145·275	F2A/F3E	Swansea, West Glam	[1]
1930	G4IAV	145·275	F2A/F3E	Atherton, G Manchester	
1930	G4DAL	145·575	F2A/F3E	Lancaster, Lancs	[1]
2000	G3VHE	145·350	F2A	Swindon, Wilts	[1]
2000	GM4ELV	144·250	A1A	Arrochar, Strathclyde	
2000	G4FEX	145·250	F2A/F3E	Horsley Woodhouse, Derbyshire	[1]
2000	G4INM	145·250	F2A/F3E	Chelmsford, Essex	[1]
2000	G4OJD	145·250	F2A/F3E	Brixham, Devon	[1]
2030	G4NRO	144·525	F2A/F3E	Atherton, G Manchester	[1]
2030	G4PDP	144·250	A1A/J3E	Biggleswade, Beds	[1]
2030	G3IRM	1·975	A1A/A3E	Bury St Edmunds, Suffolk	
2030	G3OHM/A	144·180	A1A/J3E	Birmingham	
2030	G3KGU	1·910	A1A/A3E	Theydon Bois, Essex	
2030	G2FKO	145·525	F2A	Bideford, Devon	
2100	G4EWK	144·850	F2A	Burton-on-Trent, Staffs	[7]
2100	G3AVJ	145·250	F2A/F3E	Huyton, Merseyside	[1]
2200	G3AWL	144·110	A1A/J3E	Easington, Co Durham	[8]
2300	G4PEF	145·250	F2A/F3E	Willesden, London NW	[1]
Wednesdays					
1100	G4IAV	145·275	F2A/F3E	Atherton, G Manchester	
2300	G4PEF	145·250	F2A/F3E	Willesden, London NW	[1]
1830	G3GNS	1·910 / 3·550 / 144·250	A1A	Locking, Avon	[13]
1900	G3TPY	145·275	F2A/F3E	Chester, Cheshire	[1]
1900	G4ILD / G3ZQS	145·400	F2A/F3E	Rishton, Lancs. Darwen, Lancs	[1]
1900	G3RLO	144·525	F2A/F3E	West Bridgford, Notts.	[1]
1900	G2ABC	145·250	F2A/F3E	Truro, Cornwall	
1900	G3ULY / G4EXD	3·583 / 145·475	A1A F2A	Culgaith, Cumbria	[1]
1930	G4NNS / G4BFJ / G4DKK	144·625	F2A/F3E	Sunbury-on-Thames, Middx Banstead, Surrey Tooting, SW London	
1930	G4IAV	145·275	F2A/F3E	Atherton, G Manchester	
1930	G4FKH	3·550	A1A	Chelmsford, Essex	[1]
1930	GW4OXB	145·275	F2A/F3E	Swansea, West Glam	[1]
1930	G4SXU	145·250	F2A/F3E	Harrogate, N Yorks	[1]
1930	G4LHI	145·250	F2A/F3E	Huntingdon, Cambs	[1]
2000	G4INM	145·250	F2A/F3E	Chelmsford, Essex	[1]
2000	G2FXA	144·250	A1A/J3E	Stockton-on-Tees.	[1]
2000	GW4KDP	145·550	F2A/F3E	Barmouth, Gwynedd	[1]
2000	G3SWP	145·250	F2A/F3E	Doncaster, S Yorks	[1]
2000	G4BP/A	145·475	F2A/F3E	Scarborough, N Yorks.	[3]
2000	G4PYR	144·550	F2A/F3E	Solihull, W Midlands	[4]
2030	G2FKO	145·525	F2A	Bideford, Devon	
2100	GW4LLE	145·525	F2A/F3E	Haverfordwest, Dyfed	
2130	GM4HYF	28·350 / 145·375	A1A F2A	SE Glasgow	[1]
Thursdays					
1100	G4IRI	3·550	A1A/J3E	Bolton, Lancs	
1830	G4GOC	145·250	F2A/F3E	Stoke-on-Trent, Staffs.	[1]
1830	G4ILD / G3ZQS	145·400	F2A/F3E	Rishton, Lancs. Darwen, Lancs	[1] [1]
1830	G3GNS	1·910 / 3·550 / 144·250	A1A	Locking, Avon	[13]
1900	G3TPY	145·275	F2A/F3E	Chester, Cheshire	[1]
1900	G3RLO	144·525	F2A/F3E	West Bridgford, Notts.	[1]
1900	G3BLS	145·250	F2A	Osney, Oxford	[1]
1900	G3ZRZ	1·975	A1A/A3E	Blackpool, Lancs	
1900	G4RS	3·565 / 145·525	A1A/J3E F2A/F3E	Catterick, N Yorks	[1]
1930	GW4OXB	145·275	F2A/F3E	Swansea, West Glam	[1]
1930	G4BFJ / G4DKK	1·950 / 144·625 / 144·625	A1A/J3E F2A/F3E F2A/F3E	Banstead, Surrey Tooting, SW London	[15]
1930	G3ASR	1·875 / 144·175	A1A/J3E A1A/J3E (lsb)	Harrow, Middx	[1] [11] [12]
2000	G2ACZ	1·819	A1A	Mablethorpe, Lincs	
2000	G3IRI	3·550	A1A/J3E	Bolton, Lancs	
2000	GM4ELV	144·250	A1A	Arrochar, Strathclyde	
2000	G4OJD	145·250	F2A/F3E	Brixham, Devon	[1]
2000	G4INM	145·250	F2A/F3E	Chelmsford, Essex	[1]
2030	G2FKO	145·525	F2A	Bideford, Devon	
2030	G4NRO	144·525	F2A/F3E	Atherton, G Manchester	[1]
2100	G3WOR	144·250	A1A/J3E	Lancing, Sussex	[14]
2100	G4EWK	144·850	F2A	Burton-on-Trent, Staffs	[7]
2100	G3AVJ	145·250	F2A/F3E	Huyton, Merseyside	[1]
2200	G3GMS	3·583 / 145·250	A1A F2A/F3E	Whitley Bay, T&W	[1]
2200	GM4HYF	28·350 / 145·375	A1A F2A	SE Glasgow	[1]
Fridays					
1100	G4IAV	145·275	F2A/F3E	Atherton, G Manchester	
1830	G4ILD / G3ZQS	145·400	F2A/F3E	Rishton, Lancs. Darwen, Lancs	[1] [1]
1830	G3GNS	1·910 / 3·550 / 144·250	A1A	Locking, Avon	[13]
1900	G3TPY	145·275	F2A/F3E	Chester, Cheshire	[1]
1900	G3RLO	144·525	F2A/F3E	West Bridgford, Notts.	[1]
1900	G4FIM	145·550	F2A/F3E	Leeds, Yorks	
1930	G4ILW	145·550	F2A/F3E	Gateshead, T & W	[1] [10]
1930	GW4OXB	145·275	F2A/F3E	Swansea, West Glam	[1]
1930	G4IAV	145·275	F2A/F3E	Atherton, G Manchester	
1930	G3HVI	145·250	F2A/F3E	Stoke-on-Trent, Staffs.	[1]
1930	G4BFJ / G4DKK	144·625	F2A/F3E	Banstead, Surrey Tooting, SW London	
2000	G3RR	145·550	F2A/F3E	Barnoldswick, Lancs	
2000	G4INM	145·250	F2A/F3E	Chelmsford, Essex	[1]
2030	G4NRO	144·525	F2A/F3E	Atherton, G Manchester	[1]
2030	G3CAR/A	144·625	F2A/F3E	High Wycombe, Bucks	[1]
2030	G2FKO	145·525	F2A	Bideford, Devon	
2100	G3AVJ	145·250	F2A/F3E	Huyton, Merseyside	[1]
2200	G3AWL	144·110	A1A/J3E	Easington, Co Durham	[8]
Saturdays					
1200	G3GNS	1·910 / 3·550 / 144·250	A1A	Locking, Avon	[13]
1900	G3RLO	144·525	F2A/F3E	West Bridgford, Notts.	[1]
1930	GW4OXB	145·275	F2A/F3E	Swansea, West Glam	[1]
1930	G4TDO	144·160	A1A/J3E	Wolverhampton, W Mids	[1]
2000	G4FEX	145·250	F2A/F3E	Horsley Woodhouse, Derbyshire	[1]
2000	G4TKM	145·425	F2A/F3E	Birmingham	[1]
2030	G2FKO	145·525	F2A	Bideford, Devon	
2030	G4NRO	144·525	F2A/F3E	Atherton, G Manchester	[1]
2100	GW4LLE	145·525	F2A/F3E	Haverfordwest, Dyfed	

Notes

All times are clock time

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

QRV contest

by STAN CRABTREE, GM3OXC*

HAVING DEVELOPED an increasing thirst for contests during recent years, it was disappointing to realize my results appeared somewhat "hamstrung". My position in the tables had remained remarkably stable —at some point nearer to the bottom than the top. Why was this? What feature needed attention? What was preventing me from rising above my rather insignificant performance to date? I have now evaluated the whole business!

Operating techniques must make a substantial contribution. It has been stated that you make more QSOs by calling "CQ" than by replying to other calls. I don't dispute this, but ask simply—"What if *everyone* called CQ?". There must be some responders. Maybe they are only there in a servile capacity. They are undoubtedly introverts feeding the insatiable appetite of the more aggressive.

A known problem is one of endurance. How many actually last out a typical 24h session without a nap. Quite a few I believe. I checked with the nursing sister at the office. After I explained the problem she gave me a strange look. She couldn't quite see the intelligence in spending the weekend in this manner, but volunteered a few hints: try and arrange an open window; coffee is the best beverage—anything sweet is recommended; by keeping to light snacks the pangs of hunger will make you more alert(?).

Possibly my biggest failure is in concentration. I accept that dedication to the task in hand is paramount, but I am easily diverted. After the opening period I find myself monitoring the numbers of other contestants. This can be a decided hindrance to morale, as finding 3MXJ issuing a serial number 30 ahead of me within the first hour is hardly encouraging. As the hours progress I punish myself more by intercepting other reports—the bigger the difference, the greater the agony.

One feature is unfortunately impossible to rectify—the geographical location. My latitude is such that I am at a permanent disadvantage to all "southerners". I have no knowledge of propagation, but it cannot be disputed that my area suffers from excessive QRN on the lower frequencies and is *always* just out of the required skip on hf. I mention this during occasional meetings with fellow GMs, and can only assume their silence represents agreement.

Studying the above aspects, I felt quite confident of an increased position in this year's 7MHz CW Contest. For 21h I would follow the rules even if it meant entirely changing my nature. I gave myself plenty of time on the Saturday morning to prepare. First a check on the antennas. If I slung a halyard over a convenient municipality lamp post I could achieve an inverted-V from my present dejected-L. I considered this action for the period of the contest, reasoning that the probability of a cruising electricity board van on a Saturday afternoon was surely remote. I went to the xyl for reassurance but was advised to forget it. By 1130 my logs and duplicate sheets were neatly arranged. A quick listen to the speaking clock and I corrected my digital clock by the 7min it was slow.

A quick look over the band produced a few QSOs in progress. I always think of this as subtle "upmanship" of the highest degree. If you can start a QSO half an hour before the commencement of the test (and the other chap remembers he answered *your* call) you are left conveniently with your own frequency. Failing this the feeble-minded are left in some dilemma —there is just no space available. You have to pray that everyone else has at least a 600Hz filter and push in between.

Here we go! I call "CQ" and get no reply. But instead of reverting to my previous practice and answering calls, I persevere and call again. A DL responds. We're away and it works! After the first hour I am up to 048. A little disconcerted to find two duplicates when filling in the check list, I continue with optimism. Calling "CQ" is decidedly the best technique. My rate continues favourably for the following hour but during a lull I hear 3YOR and am tempted to wait for his serial number: 28 ahead of me! Back to the fray.

Around 1600 I am temporarily distracted by the cat which leaps up on to the operating position. This particular animal is reputed to be very intelligent. When I am on the air he spends much of his time sleeping on top of my rotator control unit. He obviously thinks it is warm because of the dial lamp? However, today the unit is switched off and apparently not so inviting. The animal gives me a look of disdain, walks across all my logs and then leaves the shack.

Following the nursing sister's advice I purposely missed lunch. I am now very hungry. I waste a few precious minutes shouting down for food. Shortly afterwards the xyl appears with half a pork pie and a piece of cheese. For some reason I am treated to a glare. I press on regardless.

Around 1900 I note 3SJJ is 28 ahead of me and 3YOR 40! I must not be distracted.

The calls of nature make me leave the shack, and I seize the opportunity of going outside for some gulps of fresh air. I reflect I *should* have risked the line over the lamp post.

Back at the key the going is getting harder. Bursts of QRN are making smooth QSOs more difficult. Fatigue is taking over. By 0030 the band is all QRN—only three Ws have been worked. What was the point of continuing—why call "CQ" on a dead band? A catnap is indicated and taken.

Being a light sleeper I awake at 0200 to find the band much the same —a few more Ws. At 0345 3TXF is 88 ahead; at 0400 3SJJ and 3PDL are 170 ahead. What did I say about our latitude!

We slog on regardless. Around 0500 a non-contestant UB5 responds to a "CQ" from 3YOR with a cheery GM and 599. Probably to reassure him as there is nothing on the band. All I can hear is 3YOR, but I control an urge to wait on his frequency to copy his next serial number. I begin to question my reason for participating at all, but then feel better when I remember the HH I worked at 2300—an all-time new country.

At 0600 3UFY is 200 ahead and 3YOR a staggering 243. Perhaps there is some foundation in the rumour that a two-mile stretch of disused telephone lines are used as an antenna?

As daylight appears the time is really dragging, with the contact rate a depressing 10 per hour. The final hour produces only five QSOs.

Upon comparing logs the total number of QSOs were almost identical to the previous year's. The increased rate of contacts in the opening hours had apparently been at the expense of QSOs in the evening hours.

So it's back to the drawing board to extract that elusive feature which separates the exclusive hierarchy from the rest of us. Perhaps 3FXB would consider running one-day seminars? But of course we in the Northern Hemisphere are permanently restricted by our latitude. □

*50 Victoria Street, Aberdeen AB1 1XA.

Contest News

Low Power Contest 1983 results

With the rules changed this year to include 7MHz, the HF Contests Committee was hopeful of a bumper turn-out, but once again the event attracted comparatively little support. Perhaps the rules need complete revision to encourage greater activity, a view expressed quite strongly by one group. The committee will reconsider some of the other suggestions forwarded after the 1982 3·5MHz event, and endeavour to come up with something different for 1984.

Let us now consider the 1983 event. The main problem seemed to be the thundery weather, which affected a number of entrants, and perhaps deterred some other stations from setting up portable stations. Conditions on 7MHz did not favour inter-G working; the introduction of that band in this sort of contest at this time of year was perhaps not the success it could have been. The SM QRO contest taking place at the same time also did little to lessen the QRM. Static noise was the main problem on 3·5MHz, often approaching S9.

None of the logs received was faultless. The winner of Section A was G4ELZ/P, operating from Newton Abbot in Devon who, using 15W to an inverted-V dipole at 35ft, made 58 QSOs in scoring 625 points. In Section B G4DDX/P came home first, operating from his usual portable site near Stevenage in Hertfordshire. 36 QSOs were made using a TenTec Argonaut and a trap dipole. Congratulations to the top three in each section, who will receive certificates, and in particular to G4ELZ/P who, subject to Council approval, will be awarded the Houston-Fergus Trophy. *BRS32525.*

SECTION A
(15W maximum)

Posn	Callsign	Points 7MHz	3·5MHz	Total score
1	G4ELZ/P	305	320	625
2	G3SFG/P	195	320	515
	G3VER/P	140	375	515
4	G4KGG/P	115	390	505
5	G4JKS/P	115	380	495
6	G4CXT/P	130	350	480
7	G4ODR/P	165	295	460
8	G4HFT/P	155	300	455
9	G3SHY/P	100	325	425
10	G4OTV/P	210	175	385
11	G3SZS/P	35	270	305
12	G3CNX/P	25	260	285

SECTION B
(5W maximum)

Posn	Callsign	Points 7MHz	3·5MHz	Total score
1	G4DDX/P	100	305	405
2	G3BBC/P	75	260	335
3	G3WKS/P	30	295	325
4	G3NOM/P	—	285	285
5	G4ATH/P	100	140	240
6	G3YRC/P	50	110	160

Check logs were gratefully received from G4BCY/P and G6OI/P

144MHz Low Power Contest results

There were about the same number of entries for this popular contest as last year, but with a greater emphasis on portable operation. A number of stations found themselves operating in close proximity, but this generally did not seem to result in difficulties. Thunderstorms and static rain made the going difficult for many stations, with some near-miss lightning strikes reported. Conditions were best on a north-south axis, with many French stations appearing in the best dx column. The contact between GM4DMA/P (YR40a) and F1KBF/P (AK39d) was the best reported dx, at 825km.

The standard of logs was rather variable this year. A club associated with a well-known computer firm sent a computerized listing of over 200 contacts on a long scroll of paper, but with all the scoring performed manually, and other computer logs also failed to stick to the same format as RSGB LSVHF log sheets. The algorithm used by some programs to translate from distance to points was found to be wrong – contacts on radial ring boundaries should score low eg 50km contacts score one point, not three. One station was penalized for not recording any signal reports. Several entries did not have the correct cover sheets (Form 427), but were accepted if sufficient information was given, 4422 summary sheets are only needed for multi-band events.

Publication of these results has been delayed due to investigation of a serious bad signal report against one station. This complaint was not confirmed by independent evidence from any other entrant however. Under these circumstances the committee has allowed the entry to stand, but has issued a warning to the station concerned. Instances of this type of problem could be resolved more easily if all entrants noted any poor signals encountered, told the offending station, and noted this on the cover sheet. Some comments were received that a few stations seemed to be running high power, but no specific callsigns were mentioned.

The equipment used by the leading stations was:

G6LIP/P	TS700G + MM linear	2 x 16-el at 45ft agl
G6ECM	FT221R + Tono linear	11-el at 35ft agl

Comments from the cover sheets indicated that the contest met the approval of most entrants. The omission of QTH from the contest exchange was generally favoured. Co-ordination with Continental contest timing was criticized, and some complaints received about the lack of the late May 144MHz contest. The 144MHz Low Power Contest will certainly continue in its present form, but it may move to a different date next year.

Congratulations and certificates go to the winners and runners-up in sections O and F, G6LIP/P, GW8SJP/P, G6ECM, G6SRY, and to BRS32525 for the swl section. Thanks also to all those who sent in check logs. *G3XDY*

SECTION O

Posn	Callsign	Points	QSOs	QRA	Best dx	Km
1	G6LIP/P	3,280	298	AN61	DK0OX	756
2	GW8SJP/P	2,965	399	YM44	PE1DNA/P	598
3	GW6GW/P	2,456	338	YL15	DK0HW/P	654
4	GW3OXD/P	2,148	320	YM54	ON1BPY	582
5	G6EKR/P	2,094	248	AL56	DL0CN/P	646
6	G4RLF/P	1,915	287	YK10	GM4JJJ	577
7	G4APA/P	1,781	188	ZO48	DL2KAL/A	623
8	G4CDA/P	1,630	261	ZN31	F6BQX	723
9	G6EZI/P	1,528	245	YK10	PE0WRO/P	609
10	G6CHL/P	1,513	314	ZN61	F1DLJ	476
	G8COI/P	1,513	265	ZL01	DK0LT/P	607
12	G3SRT/A	1,482	306	YM48	DK0EK/P	643
13	GW4KKC/P	1,422	235	YL03	DF0VK/P	803
14	G8LNC/P	1,413	249	ZK35	GM4JJJ	631
15	G4DEZ/A	1,352	229	AL34	DL6YCE/P	538
16	G6GS/P	1,334	293	ZL69	GM4DMA/P	718
17	G4FKA/P	1,325	275	ZL09	DL4MK	660
18	G3ZXZ/P	1,300	177	ZO46	GU8NIS	561
19	G3VRE/P	1,250	220	YL60	DK8JF	611
20	G3YMD/P	1,228	207	AL67	DC6NY	714
21	GW3VER/P	1,219	201	YM55	ON1RN/A	562
22	G4RUW/P	1,164	242	ZL53	DF0CQ	590
23	GW4MHC/P	1,096	198	YL25	PA3CEJ/A	628
24	G6HIE/P	1,082	224	AK11	GM4CXM	644
25	G4LIN/P	1,062	178	ZM70	GM4DMA/P	616
26	G4KTP/P	1,061	147	YO20	F1CDX	694
27	GW4IGF/P	1,050	228	YN75	PE1HVD	572
28	GW8VHI/P	1,046	162	YL32	DF0OK/P	699
29	G6NOL/P	1,016	224	YM35	F1TNB/P	414
30	G6HH/P	979	189	AK14	DG7AT	713
31	G4DAR/P	967	245	YM40	GM4ILS	569
32	G8SFM/P	962	186	ZL32	GM6LNM	524
33	G3LRS/P	958	198	ZM26	GM6LNM	440
34	G8ZWJ/P	950	173	AK22	DB7XO	510
35	G8KYR/P	938	206	ZL01	GM4CXM	470
36	G8KAX/P	927	109	AL17	DK0OX	612
	G4SGK/A	927	240	ZL29	F1KNO	527
38	G3SFG/P	895	233	ZL76	G8PNN	475
39	G4DND/P	893	137	XK27	PA3BPC	705
40	G6ETA/P	864	191	AL55	GD4IOM	493
41	G6DRT/P	841	185	AK02	DD0EM/P	438
42	G4SSS/P	834	154	YL72	F1GTR	576
43	G8TLC/P	806	180	ZM27	DF0OK/P	525
44	G8REQ/P	802	180	YN37	F6BQX	721
45	G4PSU/P	793	152	ZL15	DF0OK/P	525
46	G4NRG/P	789	214	AL33	F1KNO	488
47	G4LWG/P	781	164	YO79	F1TNB/P	528
48	G4OTV/P	773	161	AK12	DF0CQ	482
49	G8WSX/P	768	168	ZK07	G6LTL/P	433
50	G4BLX/P	744	171	ZL03	F6HPP/P	463
51	G8KGI/P	743	153	ZK05	DK1VC/P	679
52	G4SKG/P	711	110	AN61	DF0OK/P	511
53	G4CRA/P	706	152	AL14	F6EKG	569
54	G4NVC/P	629	116	YK21	PA0LGJ/P	626
55	G4MEM/P	628	145	ZL01	F6GRV/P	555
56	GM4DMA/P	612	48	YR40	F1KBF/P	825
57	GW4RWR/P	598	140	YN64	F1KBF/P	459
58	G6CRC/P	570	156	ZL30	GM4CXM	544
59	G6SRS/P	561	172	YM49	ON1BPU	438
60	GW4JTG/P	524	77	XM08	ON1BPU	592
61	G6KZS/A	516	86	ZN53	DL2KAL/A	613
62	G3TCR/P	509	127	ZL65	GM8YJU	447
63	G4ARE/P	508	116	YK13	G4OOP	485
64	G6JAW/P	498	111	YK30	F1GTR	495
65	GU6NAE/P	414	48	YJ47	EI5AVB	460
66	G8HSG/P	129	140	ZN08	F1KBF/P	405

SECTION F

Posn	Callsign	Points	QSOs	QRA	Best dx	Km
1	G6ECM	1,395	219	AL56	GI4TAP	594
2	G6SRY	1,186	188	ZL34	DL2NE	574
3	GD4IOM	1,005	100	XO67	F1DPU/P	706
4	GM8YJU	945	91	YO05	F1TNB/P	643
5	G6DOD	886	194	ZL09	GM6LNM	527
6	G8ZHP	856	131	ZM29	DB7XO	504
7	G8MJD	753	165	ZN12	F6KAW/P	459
8	G8DTQ	664	133	ZL60	GM8YJU	457
9	G3YLE	644	137	ZL08	GM4CXM	515
10	G4HLX	630	129	ZL23	DK0DN/P	556
11	G6CAQ	618	221	ZL39	GI4NKF/P	490
12	GM6LNM	617	45	XP07	F1KBF/P	736
13	G4SHC	600	114	YN40	F6KAW/P	439
14	G4APL	585	149	ZL60	GM8YJU	453
15	G6LJO	582	106	YN79	ON4AVV	506
16	G4MVR	573	156	AL41	GM6LNM	585
17	G8IEM	565	91	ZK05	DK0DN/P	523
18	G6DNT	564	114	ZM05	GI8HXY	420
19	G3BZU	535	131	ZK05	DK0DN/P	522
20	G8ETB	518	150	ZL37	ON4XG/A	374
21	GU8NIS	515	53	YJ48	PA3BPC	623
22	G8LIR	453	98	YN30	F6KAW/P	447
23	G3ZME	434	119	YM28	F1KBF/P	378
24	G4SNF	428	102	YN59	GM4ILS	481
25	G8XWA	401	51	YO57	F1KBF/P	521
26	G6ISM	392	81	ZM35	F6HPP/P	490
27	G6WEV	376	60	AM44	DK0OX	674

Posn	Callsign	Points	QSOs	QRA	Best dx	Km
28	G6SMU	361	97	AL21	G3ZXZ/P	325
29	G4THY	345	66	YM20	F1KBF/P	369
30	GM4SGB	290	36	YQ62	F6KAW/P	737
31	G8IGQ	272	78	ZM04	G4DND/P	345
32	G6BDV	261	91	ZL19	ON5UG	294
33	GW6PIL	247	85	YN75	G6LIP/P	218
34	G8VRO	243	65	ZL28	G6LCL/P	356
35	G4BCY	198	63	ZL77	F1DPU/P	296
36	G4ASL	154	60	ZL60	ON1BPU	257
37	G8TZJ	146	26	YN07	F1KBF/P	485
38	G8HGN	134	48	AL31	G8WXA/P	289
39	G8UYD	88	24	ZN64	G4BWG	217
40	G6OKU	39	13	ZN54	G4FKA/P	159
41	GM6SXF	34	16	YQ73	G4APA/P	262

LISTENER SECTION

Posn	Station	Points	QSOs	QRA	Best dx	Km
1	BRS32525	468	130	AL41	F1KNO	480
2	BRS62088	125	47	AL41	F1CDX/P	303

Check Logs gratefully received from G8XTV, G2DHV, G6AXO and G4SFY
Late entries received from G6LCL, G3WOR/P and G6LSQ/P

70MHz and SWL Contest results

This contest continues to be very popular judging by the enthusiastic comments on the cover sheets—"Very enjoyable"—*G4IGY;* "Most enjoyable first contest for the group"—*G4JSD;* "Very enjoyable event"—*G4HLX.*

In general conditions seemed average, except for the "lucky few" who worked ZB2BL during a short sporadic-E opening around midday. GD3YEO at GD4IOM even commented "Had to alter the computer program to accept a QRA outside our own system".

There were also reports of signals being received via meteor scatter by G3XBY and G4FRE.

The weather seemed to be good, comments varied from "a lovely day" at G4SIV to "It's amazing what effect a ton of car travelling at speed has on mud and water!" at GW4ERP/P.

Congratulations to the winner of the portable section, and the winner and runner-up of the fixed section, who will all receive certificates.

G4HWA

PORTABLE SECTION

Posn	Callsign	Points	QSOs	QTH	Best dx	Km
1	GW4ERP/P	743	87	YN75f	ZB2BL	1,811
2	G4BWW/P	574	57	YO65e	ZB2BL	1,985
3	G3UAX/P	446	66	ZL53b	ZB2BL	1,720
4	G3JEQ/P	421	81	ZL77h	G3BW	423
5	G4DZO/P	411	59	AK11a	GD4IOM	486
6	G4CWH/P	349	65	AL51f	GD4IOM	448
7	G3PIA/P	345	61	ZL33h	G3BW	354
8	GI4MFT/P	252	22	WO27j	G3PWK	521
9	G3LTY/P	190	30	AL56b	GD2HDZ	494

FIXED SECTION

Posn	Callsign	Points	QSOs	QTH	Best dx	Km
1	GD4IOM	680	53	XO67d	ZB2BL	1,913
2	G4ANT	657	75	AM27c	EI6DT	513
3	G3XBY	352	64	ZM52j	GD4IOM	282
4	G4RCD	350	40	YO38j	G4DZO/P	444
5	G4FOH	336	58	ZM60b	GI4MFT/P	550
6	G4SIV	319	50	ZM29h	GI4MFT/P	469
7	G4ENB	309	57	ZL08d	GI4MFT/P	519
8	GD2HDZ	307	29	XO68b	G4DZO/P	480
9	G4EKT	250	30	ZN10f	G4DZO/P	339
10	G3VIP	246	34	ZN40j	GD4IOM	305
11	G4FRE	227	31	AL07a	GD4IOM	463
12	G4TSJ	224	30	AM27e	GD4IOM	427
13	G2FNK	167	21	YK28j	G4ANT	347
14	G3PJX	136	34	ZL69j	GD4IOM	440
15	G4SHP	106	24	AL41j	G4BWW/P	370
16	G4ASL	40	14	ZL60g	GW4ERP/P	277

Summer 1·8MHz Contest 1983 results

The 1983 event was again held under conditions of high QRN, and most entrants commented on the difficulty in copying the weaker signals. Despite this, both the overseas and the UK entries exceeded last year's levels. Best dx was PY1ARS, who appeared in the logs of a number of leading stations.

Al Slater, G3FXB, with 128 QSOs and 51 bonuses, won the UK section this year, using a T4XC/R4C into an inverted-V at 65ft. In second place was Keith Spicer, G3RPB, operating G6KQ, with 124 QSOs and 52 bonuses. He used a TR7 and λ/4 Marconi. Don Field, G3XTT, was in third place, using an FT101ZD and inverted-V at 55ft.

The Overseas section was won by Pavel Váchal, OK1DXS, with 15W into a 23m vertical. His log included 58 G QSOs.

The first-timer league was headed by Dale Harvey, G3XBY, in 13th position overall. The senior citizen's award goes to Harry Fox, G8RZ, in 11th place overall.

Logs were generally of a high standard. Unmarked duplicates are now very much less of a problem, but many stations lost points through incorrect copying of reports—presumably the result of the high QRN level.

A final comment—pity the entrant who had S9 plus noise level—from the beer pumps in the pub next door!

G3OZF

UK SECTION

Posn	Callsign	Points	Posn	Callsign	Points
1+	G3FXB	636	9	G3IGW	563
2+	G6KQ (G3RPB)	629	10	G3RVM	553
3+	G3XTT	624	11+	G8RZ	537
4	G3SJJ	600	12	G3SYM/A	531
5	G3TXF	594	13F+	G3XBY	527
6	G3PDL	583	14	G4GIR	524
7	G4BUO	579	15	G4OBK	520
8*	G3XEP	569	16	G3IGQ (G4CWH)	517
17	G4CNY	512	29*	G3FYQ	376
18	G3HVX	493	30F	G3SWH	374
19	G4KGG	488	31F	G3VKM	341
20	GM4SID	446	32	G3NKS	340
21*	G4MEM/P	439	33F	G3VYI	332
22	G2VJ	422	34F*	G4NJR	302
23	G3PJX	411	35F	G4OOS	269
24	G3BPM	396	36	G3YMC	264
25	G3CCZ	394	37*	G4PRS	251
26	G4ELZ/P	386	38	G3WRQ	247
27F	G3VDF	384	39	G3OLB	225
28F	G4ARI	382	40	G3GMM	129

OVERSEAS SECTION

Posn	Callsign	Points	Posn	Callsign	Points
1+	OK1DXS	311	13	UA3PFN	140
2+	OZ1W	296	14+	UR2RND	107
3+	EI8ED	289		UK5ZBW	107
4+	DJ3XD	288	16	UA1WAP	102
5	DF9SF/P	247	17	UK3DBV	98
6+	UQ2GKM	235	18*	UK2CAZ	83
7+	F9YZ	226	19	OL6BID	67
8+	OE5JDL	217		UA6HOF	67
9+	LA5SAA	178	21	UA3QRZ	62
10+	UC2WAZ	172	22+	EA7DMF	53
11+	UK6LAZ	161	23	UB5VK	24
12	UA3DUF	153	24+	UL7IBQ	16

Check logs are gratefully acknowledged from G3ZRZ and G3WYK.
\+ Certificate winners
F First-time entrant
* Multi-operator

Second 1·8MHz Contest 1983 rules

1. The general rules for RSGB hf contests, published in the January 1983 issue of *Radio Communication*, will apply.

2. Eligible entrants. Single-operator stations only. British Isles entrants must also be members of the RSGB.

3. Period. 2100gmt Saturday 12 November to 0100gmt Sunday 13 November.

4. Sections.
(a) British Isles stations.
(b) Overseas stations including EI.

5. Frequencies/Mode. 1·81–2·0MHz cw only. British Isles stations should note that overseas stations may be allocated different parts of the band, eg France, Luxemburg, Netherlands, and Denmark, 1·830–1·850MHz; Yugoslavia, Switzerland and Austria, 1·810–1·850MHz; FR of Germany, 1·815–1·835MHz; 1·850–1·890MHz; Norway 1·820–1·850MHz; and Sweden, 1·830–1·845MHz.

6. Exchange. RST and serial number commencing at 001. British Isles stations must also send their county/region codes as published in the January issue of *Radio Communication.*

7. Scoring
(a) British Isles section. Three points for each completed contact, with a bonus of five points for the first contact with each British Isles county/region, and for the first contact with each country outside the British Isles.
(b) Overseas section. Three points for each completed contact with a British Isles station, with a bonus of five points for the first contact with each country/region.

8. Logs. RSGB hf contest log sheets, written on one side only, or A4 sheets with seven columns headed: date/gmt; callsign; RST/number sent; RST/number received; county code received; bonus; points.

9. Declaration. Each entry must be accompanied by the following declaration, signed and dated: "I declare that this station was operated strictly in accordance with the rules and spirit of the contest, and agree that the decision of the Council of the RSGB shall be final in all cases of dispute."

10. Address for logs. RSGB HF Contests Committee, c/o A. K. Gray, G4DJX, 44 Sherwood Avenue, St Albans, Herts AL4 9PQ.

11. Closing date for logs. Logs must be postmarked no later than Monday 28 November 1983.

12. Awards.
(a) The Victor Desmond Trophy will be awarded to the winning station in the British Isles section, and certificates of merit will go to the second and third placed entrants in this section.
(b) The Maitland Trophy will be awarded to the Scottish station scoring the highest aggregate number of points in this contest with the First 1·8MHz Contest 1984.
(c) Certificates of merit will be sent to the first three stations in the Overseas section and to the leading station in each overseas country.
(d) A certificate of merit will be awarded to the highest placed entry from a station which has not entered a Second 1·8MHz contest before. Candidates for this award should mark their cover sheet "First time award".
(e) A certificate of merit will be awarded to the highest placed British Isles entrant who has achieved pensionable age on or before 12 November 1983. Candidates for this award should mark their cover sheet "Senior citizen's award".

28MHz Activity Contests rules

Following the introduction of 28MHz sessions into the last series of cumulative contests, the HF Contests Committee has received many requests for separate 28MHz mini-activity contests to be organized on similar lines to the multi-band cumulative contests held in January of each year.

There is a need to keep the bottom end of the band occupied, as with so many cb stations using illegal vfo and synthesized driven wide-band transceivers for ssb and fm operation, the temptation to move into the wide open spaces of 28MHz for QRM-free cb contacts is always present. Reports from entrants in recent cw events have emphasized the extent of the problem, particularly near the large towns. Many regular 28MHz operators are working for the new 28MHz British Counties Award, so these series of mini-contests should provide good opportunities for extended ground-wave contacts with counties that are not usually active during weekday evenings. The committee hopes that the sessions will be well supported by both newly-licensed and by

experienced operators. Results will be tabulated with the scores from the best three sessions shown separately. SWL logs will be welcomed and the scores will be tabulated.

When. Between 2000 and 2200gmt, Monday 14 November, Tuesday 22 November, Wednesday 30 November, Thursday 8 December, and Friday 16 December 1983.
Frequency. 28·0-28·1MHz, cw (A1A) only.
Operators. Single- or multi-operator (no restrictions).
Exchange. RST and number (commencing with 001).
Points. Each completed contact with a UK or foreign station is worth three points. SWL logs should be scored on a similar basis.
Awards. At the discretion of the committee, certificates will be awarded both to a newly-licensed amateur and an old-timer operator whose performance is considered to be of particular merit. Provided five or more entries are received from RS or A members a separate certificate of merit will be awarded to the swl with the best log.
Logs. In addition to recording incoming and outgoing RST and number, logs should show the call of the operator and whether the entry is single- or multi-operator. If the entry is on behalf of a club, this should be stated. For single-operator entries, the date that the operator was first licensed should be given, together with any other information that the entrant considers to be relevant. No cover sheets are required, but entries should be on the standard RSGB contest log sheets (obtainable free of charge from HQ on receipt of a **large sae.** Logs are to be sent to: HF Contests Committee, c/o G6LX, 279 Addiscombe Road, Croydon CR0 7HY, to arrive not later than Monday 2 January 1984.

144MHz Fixed Contest rules

0900-1700 gmt, 4 December 1983
The following general rules, published in the January 1983 issue of *Radio Communication*, will apply: 1, 2, 3, 4b & 4d, 5a, 6a, 7a, 9, 10a, 11a, 12a, 13-26.
All entries and check logs to VHF Contests Committee, c/o R.W. Marshall, G4ERP, 44 Malleson Road, Gotherington, Cheltenham, Glos GL52 4ET.

Swale ARC (G4SRC) 144 and 432MHz Contests rules

1. Dates
144MHz, 22 January 1984, 1000 to 1800gmt
432MHz, 29 January 1984, 1400 to 1800gmt
2. Sections. There will be an open contest, plus a low power section. Low power is defined as 25W and below for 144MHz, and as 10W and below for 432MHz.
3. Contest exchange. This shall consist of callsign, RS(T) report, serial number starting from 001, postal county. Duplicate contacts must be marked.
4. Scoring. One point per contact, and 10 points for working club station G4SRC. Final score is number of points multiplied by number of postal counties.
Countries other than the UK will count as extra counties.
5. Logs. These must be sent to B. Hancock, G4NPM, Leahurst, Augustine Road, Minster, Sheerness ME12 2NB. These must include a declaration that the entrant is an RSGB member, has operated in accordance with licence conditions, and state the power used.
6. Awards. Awards will be based upon entries postmarked on or before *15 days* from the date of the contest.
The overall winner of *each* contest will *receive a cup to keep*. Certificates will be given to the winners of the low power sections and to runners-up.
Winners will be notified by post and the results will be published as soon as practicable.
The decision of the Swale Amateur Radio Club will be final in all matters relating to these contests.

Marconi Memorial 144MHz CW Contest November 1983 rules

The 10th Marconi Memorial Contest will be held on 5 and 6 November 1983 from 1400gmt on the Saturday to 1400gmt on the Sunday. The rules are published with those of the RSGB contest in *Radio Communication*, August 1983, page 725. It is hoped that there will be a larger UK entry than in 1982. *G3FZL*

Contests Calendar

October/ November	432MHz Cumulative *(Rules in July issue)*
1-2 October	432-24GHz & SWL (IARU) *(Rules in June and July issues)*
1-2 October	VK/ZL/Oceania (Phone) *(Rules in September* MOTA*)*
2 October	ON (Phone) *(Rules in September* MOTA*)*
8-9 October	VK/ZL Oceania (CW) *(Rules in September* MOTA*)*
9 October	21-28MHz Phone *(Rules in May issue)*
15-16 October	WA-Y2 Contest *(Rules in October* MOTA *)*
16 October	ON (CW) *(Rules in September* MOTA*)*
16 October	21MHz CW *(Rules in May issue)*
October/ December	1,296MHz Cumulative *(Rules in July issue)*
29-30 October	CQ WW DX Phone *(Rules in October* MOTA*)*
November/ December	28MHz Activity Contests *(Rules in October issue)*
5-6 November	144MHz CW *(Rules in August issue)*
5-6 November	Marconi Memorial 144MHz CW *(Rules in October issue)*
6 November	LF CW *(Rules in April issue)*
12-13 November	Second 1·8MHz *(Rules in October issue)*
12-13 November	WAE RTTY Contest *(Rules in November* MOTA*)*
13 November	OK DX Contest *(Rules in November* MOTA*)*
19 November	Verulam ARC Contest (1·8MHz)
19-20 November	All Austria Contest *(Rules in November* MOTA*)*
26-27 November	CQ WW DX CW *(Rules in October* MOTA*)*
27 November	Verulam ARC Contest (144MHz)
4 December 1984	144MHz Fixed *(Rules in October issue)*
22 January	Swale ARC 144MHz *(Rules in October issue)*
29 January	Swale ARC 432MHz *(Rules in October issue)*
4-5, 25-6 February	7MHz *(Rules in September issue)*

IARU Region 1 - Marconi Memorial 144MHz CW Contest November 1982 results

The results of the above contest have now been received from Franco Armenghi, I4LCK, the Marconi Memorial Contest manager. An extract from the results tables showing the first three in each section and the placing of the disappointingly small UK entry is as follows.

SINGLE OPERATOR

Posn	Callsign	QSOs	QTH	Points
1	SM7FJE	177	GQ56	84,845
2	YU3ES/3	240	GF40	73,935
3	DK3UZ	193	EN20	69,371
19	G4IYA	173	AL43	43,506
71	G4DEZ	68	AL35	20,689
120	GW4ALG	59	YL37	10,874
151	G4NBS	71	ZL48	7,902
154	G4AGQ	55	ZL66	7,654

Total entries 236

MULTI-OPERATOR

Posn	Callsign	QSOs	QTH	Points
1	OK1KRG/P	342	GK45	114,316
2	I4VOS/4	223	FE67	96,418
3	I4KLY/4	227	GD11	94,886
61	G4NUT/A	156	ZM77	34,705
104	G4ODA/A	87	ZM29	19,500
122	G4JKG	46	AL33	7,106

Total entries 129

Copies of the full results may be obtained by sending an sae (9 by 4in minimum) to G.M.C. Stone, G3FZL, 11 Liphook Crescent, Forest Hill, London SE23 3BN.

Members of Shirehampton ARC at VHF Field Day 1983, on Dundry Hill, near Bristol. *Photo* G3YHV

1983 VHF National Field Day results

	OPEN SECTION	RESTRICTED SECTION
Winner	HADRABS & Addiscombe CG	Cotswold & Big M CG
Runner-up	Sheppey Combined CG	Cat & Custard Pot CG
Band leaders		
70MHz	South of Scotland CG	Cotswold & Big M CG
144MHz	HADRABS & Addiscombe CG	Costwold & Big M CG
432MHz	Sheppey Combined CG	Cat & Custard Pot CG
1,296MHz	HADRABS & Addiscombe CG	Cotswold & Big M CG
Leading GD	Southampton University CG	No entry
Leading GM	South of Scotland CG	Cochno CG
Leading GW	Albright & Wilson ARS	Cotswold & Big M CG
Leading GI	Sperrin CG	South Belfast CG
Leading GU	No entry	Guernsey ARS

1983 will long be remembered for its hot summer weather, which had taken hold by Field Day weekend. Apart from those in the northwest, most groups had to contend with nothing more than high ambient temperatures and light breezes—a welcome change.

The popularity of VHF NFD as the largest event in the contests calendar was again apparent, with 135 contest groups and clubs taking part. Over the 24h period, in excess of 70,000 contacts were made, illustrating the maturity of vhf operating techniques. This was achieved despite propagation being only a little above average. However, some tropo-dx was worked and the appearance of sporadic-E livened things up for a period. Record scores were amassed for both sections on each of the four bands, due to increased activity and improvements in equipment, the latter being most dramatic at the higher frequencies.

During the event the VHFCC inspectorate visited 21 sites, ranging from a location on the Kent coast to one on Kinder Scout in the Pennines, and it is pleasing to report adherence to the rules by all concerned. The inspectors found a higher-than-usual rate of failure for generators, relays, masthead amplifiers and solidstate power amplifiers this year, perhaps in part due to the high temperatures prevailing, and it was obvious that many groups did not bring along spares. In contrast the leading stations took immense care to ensure that all their equipment was reliable and had been "contest proven".

There were several isolated wide-signal reports, which seemed to indicate that some operators were overdriving their transmitters from time to time. Receiver deficiencies were also in evidence. It is worth noting that the standard "black-box" transceiver cannot produce satisfactory performance on either transmit or receive when two stations are closely sited, and one or both uses high power. However, on the whole, the event was remarkably trouble-free.

Congratulations to the HADRABS & Addiscombe Contest Group in making it to the top of the Open Section after only four years participation in the event. They will receive the Surrey Trophy. Commiserations to the Sheppey Combined CG, which was the runner-up after a close battle right to the end. Congratulations also to the Cotswold & Big M CG, who opted for the Restricted section this year and, in winning three bands, outclassed the opposition. They will be awarded the Arthur Watts Trophy. The Tartan Trophy, awarded to the leading Scottish group, is again carried off by the South of Scotland CG. Certificates go to all the winners and runners-up.

G3VPK

70MHz

The 70MHz section was again well supported and enjoyed by most stations. The weather was described as "best for years" (G2ASF) and "nice for a suntan" (G4BJM), but some of the coastal stations suffered from "sea mist . . . chilly and unpleasant" (G3YYF).

Conditions on the whole were found to be average, but on the Saturday "strong fm broadcast made it very hard going on cw" (G4HNS). G4SCY also commented on the sporadic-E: "not the useful kind" and GW4EFP "never worked the Rock".

The two sections, with cw first and ssb second, seem to be well liked: G4EIA found "the arrangement to have the cw section during the evening worked much better". This was seconded by G3SWC: "The mix between cw and phone is excellent"; "the old 'uns" at G4BOX enjoyed the "heads down" during the night.

The cw section is definitely the harder of the two. G4TAW found that stations did not always slow down readily. From the adjudicator's standpoint a lot more points were lost here, showing the requirement for good and accurate cw operators in the first section. Some stations did not read the rules and gave only one QTH in both sections. Also, some of the logs were scruffy, illegible and even written in pencil and with real field-day coffee stains on them! But most were very adequate and neat.

Congratulations to the winners and runners-up in both sections, and thank you to G4FOH, G2FNK and G2DHV for their help with the adjudication.

G4KGC

144MHz

The 144MHz band provided good dx this year for many stations, thanks to the sporadic-E openings which occurred on both Saturday evening and on Sunday morning. Tropo conditions were also quite good, contrary to comments from some entrants. The sporadic-E events fell into a number of well defined openings lasting up to 2h each, during which 109 completed Es contacts were made by 27 entrants. The first opening began at 1640gmt with G4BUO/P in AL65 working LZ and UC2. The conditions then spread to allow stations in the south and east to contact UC2, LZ, UB5, and OH. As conditions faded in the east, G4BAR/P on Dartmoor benefitted from contacts to UC2, UP2, and UQ2. This first opening finished around 1900gmt. At 1935gmt GM4GRC/P worked into central Europe and Finland, but no other stations reported QSOs at this time. The second major opening began at 2030gmt, and again spread from SE England, this time the emphasis being on Rumanian stations. This event continued until 2125gmt, which is later than most sporadic-E openings last. On Sunday morning the band opened to Yugoslavia for several stations starting at 0945gmt, with a return to normal at 1140gmt.

The best dx reported was the contact between G4BAR/P and UB5JMR in RE01f at 2,865km, which occurred at 2105gmt. G4BAR/P and G4BWG/P realised the importance of cw for working the less well-equipped eastern European stations, and made most of their Es contacts on that mode. It would seem that many more stations would have been worked if other operators had made widespread use of cw. Unfortunately stations in the north west did not benefit from these openings, which boosted the open section leader's score by 1,253 points.

Equipment used by leading stations

OPEN SECTION

	TX	RX	Ant	AGL(ft)	ASL(ft)
G4BAR/P	FT225RD + 8877	FT225RD	2 × 11-el	30	1,700
G4BWG/P	FT221R + 2x4CX250R	FT221R	2 × 19-el	70	—
G4MRS/P	FT221R + YL1440	FT221R	4 × 14-el	80	200

RESTRICTED SECTION

	TX	RX	Ant	AGL(ft)	ASL(ft)
GW4ERP/P	FT221	FT221	12-el	35	1,860
GI4TAP/P	IC251E/MML144/25	IC251E	16-el	16	944
GW6GW/P	FT480R	FT480R	13-el	20	1,400

Turning to tropospheric propagation, conditions seemed to favour stations along the south coast with good contacts to France and Spain. Many entrants further north worked into Switzerland, and a few into Austria and Czechoslovakia. Stations on top of the mountains in the north found the going rather difficult and were hampered by poor weather conditions, whereas most of the rest of the country took the opportunity to sunbathe while working the dx.

A few bad-signal complaints were made, but no independent substantiation of the complaints was received. The stations involved have been notified and warned. Unusually most of the complaints came from the far corners of the country, rather than the heavily-populated areas.

Some logs had comments about the "east coast effect", but this year the best results in both open and restricted sections were achieved in the west of the country. Many logs mentioned the sporadic-E (or lack of it) and the excellent weather. A selection sums up the usual VHF NFD problems encountered:

"VHF NFD gets better every year—wish we could—*G3FDW/P;* "Many alligator operators about: all mouth and no ears"—*G3PIA/P;* "Learnt a lot (again)—will be back next year",—*G8YYB/P;* "Moving to the east coast next time"—*G3TAD/P;* "Called by LZ1XS, old ex-surplus key jammed and no second key—tent filled with blue air"—*G4FUR/P;* "One op sleeping in a small tent woke up at 2am lying in an inch of water"—*GM4SGB/P;* "Appalling weather—occasional sleet during night"—*GM3SHK/P;* "The main problem was keeping the beer supply cool"—*G3OVT/P;* "Broke one mast section during erection, sporadic-E made up for that"—*G4EFY/P;* "Bedlam"—*G3UER/P.*

G3XDY

432MHz

Conditions on 432MHz varied widely from "superb" on the south-east coast, through "average" over most of the country to "poor" in the north. G8TFI/P, G4PUB/P and others reported good lifts during the contest. As a result, the number of contacts made by leading stations in the south-east was considerably up on last year's event, when band conditions were generally poor. Syledis caused problems to many groups—G4LOJ/P suggested that groups should use diesel generators in the hope that the accelerated use of oil will cause Syledis to become obsolete sooner!

Many groups reported equipment problems—some unspecified—however, deaf receivers seem to have been the most common complaint this year. GM4TMS/P appeared to have had problems of a more serious nature as "the only interesting event was when the antenna fell down". It seems the

Equipment used by leading stations

OPEN SECTION

	Receiver	Transmitter	Antenna
G8TFI/P	Belcom LS707 MGF1402 preamp	Belcom LS707 2 × 4CX250B	4 × 16-el Yagis at 32ft.
G4IRC/P	FT901ZD + transverter D432 mh preamp	FT901ZD + transverter K2RIW amp	4 × 4 · 2λ Yagis at 75ft
G4PUB/P	FT620B GaAsfet first rf	FT620B 8877 amp	2 × 21-el Yagis at 30ft

RESTRICTED SECTION

G3YMD/P	IC451 GaAsfet first rf	IC451 Tono amp	21-el Yagi at 30ft
G4FAM/P	FT780R	FT780R	21-el Yagi at 33ft
GW4PDS/P	TS130 + transverter 3SK97 mh preamp	TS130 + transverter 2C39	5·6λ Yagi at 35ft

level of activity was such that they felt compelled to produce a cartoon depicting one of their operators asleep at the microphone. G3ZKI/P, on the other hand, used a 5m dish, which the group successfully managed to support at 20ft above ground.

Reports of poor quality signals were few and far between. These were either unsubstantiated, or the offenders took immediate remedial action, so no penalties were applied. The nature of one complaint was such as to suggest that the receiver in question was not beyond reproach—a case for careful checking of receiver parameters before the event.

Congratulations to the winners and runners-up in both sections, particularly G3YMD/P for their impressive lead in the restricted section.

G4ERP

1,296MHz

The entry was up on 1982, with 45 against 40 in the Open section, but in the Restricted section there were only 24 entrants against 26 last year. Conditions were average or just above for most entrants. To the extreme northwest weather was poor, but it was sunny over most of the country. GD4KMI/P experienced cloud, wind and rain and although he took advantage of some ducting he had difficulty with some of his contacts. For example, a QSO with G8GP, SE London, took 47 minutes to complete! The competition for leading positions proved to be a close thing between west and east. G4JAR/P in Devon secured a well-deserved win in the Open section against the "big guns" of the east coast, G4NXO/P, Isle of Sheppey, and G3XDY/P in Suffolk. The scores of all leading stations were well up on 1982. In the Restricted section the west also triumphed, with GW3WDG/P as leading station. Second place went to the east with G4ICM/P of Herne Bay putting in a good score.

Equipment used by leading stations

OPEN SECTION

	Transmitter	Receiver	Antenna
G4JAR/P	FT225RD + transverter + linear. 6 × 3CX100A5 300W p.e.p. output	MGF 1412 rf amp	8 × F9FT 23-el Yagi at 30ft
G4NXO/P	FT221R + MM transverter + linear. 2 × 7289 130W p.e.p. output	GaAsfet rf amp (masthead)	8 × F9FT 23-el Yagi at 24ft
G3XDY/P	FT221R + transverter + linear. 4 × 7289 300W p.e.p output	MGF1400 rf amp (masthead)	4 × 25-el loops at 80ft
G4HWA/P	MM transverter + amp + linear. 6 × 2C39A 300W p.e.p. output	2 × NEC 64535 rf amp (masthead)	4 × 25-el Yagi at 50ft 12ft dia dish at 30ft

RESTRICTED SECTION

	Transmitter	Receiver	Antenna
GW3WDG/P	Transverter + linear 3CX × 100A5 20W p.e.p. output	MGF1400 rf amp Balanced mixer	5ft dia. dish at 28ft
G4ICM/P	IC251 + MM transverter + linear 2 × 3CX100A5 25W p.e.p. output	NEC 57835 rf amp	23-el Yagi 6ft dia dish at 25ft (switchable)
G3OHM/P	Transverter + linear 2 × 7289 20W p.e.p. output	MGF1402 rf amp HP2835 balanced mixer	30-el quad loop Yagi at 35ft
G3NNG/P	Homebrew + linear 2C39A 20W p.e.p. output	NE720 rf amp	23-el F9FT Yagi

Last year the contest was marred by some poor quality signals, and some suggestions to improve matters were made in the report in December 1982 *Radio Communication*. Happily there was very little to comment on this year. The only problem appears to have been the occasional overdriving of transmitters by operators unfamiliar with the equipment in use. One entrant was told of his excessive spread and took immediate corrective action only to spread again a short time later. However the condition did not last for long and no points were lost. Log-keeping was to a very high standard, and there was only one untidy pencil-written entry that gave the adjudicator some trouble in reading.

Equipment used by entrants tended to be very similar. Almost everyone used one or more 2C39s or variants. Most used Microwave Modules transverters, although some had homebuilt equipment. Many used masthead pre-amplifiers, usually with GaAsfet rf devices.

Overall, entrants were well satisfied with the rules. The increased activity (some stations did not put in an entry) was appreciated and above all the excellent weather contributed to a highly successful event.

G3FZL

South Manchester RC erecting their 144MHz antenna, which consisted of two 14-element parabeams. *Photo:* G4ROM

OPEN SECTION OVERALL RESULTS

Posn	Reg No	Group/club	Total points	Band position 70MHz	144MHz	432MHz	1,296MHz
1	058	HADRABS & Addiscombe CG	3,353	2	1	4	1
2	102	Sheppey Combined CG	3,299	12	2	1	2
3	002	Martlesham RS & Ipswich RC	2,974	20	3	2	3
4	086	Norfolk VHF/UHF CG	2,852	5	6	3	5
5	020	Parallel Lines CG	2,781	7	4	5	4
6	012	S Scotland VHF/UHF CG	2,285	1	7	19	11
7	003	Quantock CG	1,766	10	24	6	7
8	032	Scunthorpe VHFG	1,678	29	15	18	6
9	055	Albright & Wilson ARS	1,560	9	21	9	18
10	143	Martlet CG	1,550	17	19	7	10
11	041	S Manchester RC	1,538	13	29	22	9
12	112	South Coast VHFG	1,534	6	23	13	14
13	047	Hastings E&RC	1,469	23	5	10	-
14	068	Leicestershire	1,465	24	17	20	8
15	017	Flight Refuelling ARS	1,432	21	14	12	20
16	016	Dunstable Downs RC	1,316	35	12	21	17
17	049	G4THB 'B' Team	1,290	22	8	36	36
18	118	Clifton ARS	1,246	33	32	14	12
19	026	Reading ARC	1,244	19	18	39	15
20	029	Horsham ARC	1,225	32	11	24	23
21	061	PACT	1,146	16	20	28	26
22	121	Crawley ARC	1,123	27	38	34	13
23	074	Victory CG	1,091	34	9	47	32
24	164	Worthing & DARC	1,085	14	25	36	30
25	103	Southdown ARS	1,054	51	10	8	-
26	075	Vale of White Horse ARS	993	45	67	11	22
27	010	North Bucks CG	990	40	30	16	34
28	082	Preston ARS	978	4	52	31	-
29	109	Warrington RC	921	38	22	17	-
30	084	White Rose ARS	906	11	55	41	37
31	050	Farnborough & DRS	861	39	42	36	24
32	040	Southampton Univ CG	851	-	19	45	13
33	060	Telford & DARS	850	15	44	27	44
34	138	Sutton & Cheam RS	821	25	58	15	-
35	153	Colchester Radio Amateurs	815	41	16	39	-
36	094	Cheltenham ARA	803	30	37	25	-
37	036	Mid-Cornwall CG	800	3	51	-	-
38	038	Basingstoke ARC	786	36	31	29	-
39	108	Newbury & DARS	772	28	48	60	31
40	053	Havering RC	767	47	56	44	21
41	154	Hornsea ARC	757	8	-	57	39
42	097	725 CG	707	-	62	23	15
43	073	Newark & DARC	705	18	57	50	-
44	072	Exmoor RC CG	700	42	39	30	-
45	151	Southgate ARC	691	50	28	59	34
46	163	Hull & DARS	662	46	33	69	27
47	034	Torbay ARS	630	31	59	61	41
48	090	MTL CG	621	26	69	54	-
49	098	Ayr ARG	619	37	27	72	-
50	136	Lincoln Short Wave Club	552	54	65	56	25
51	155	Grafton RS	551	52	70	55	27
52	145	Edinburgh VHF	549	56	34	42	43
53	133	West Kent ARS	548	-	38	33	33
54	062	Port Talbot ARS	544	48	49	34	-
55	007	Bury St Edmunds RS	526	49	45	-	29
56	115	Northern Heights ARS	525	53	47	53	38
57	028	Kidderminster & DARS	490	43	61	66	-
58	076	Wirral & DARC	467	55	41	49	-
59	067	Sperrin CG	466	44	64	65	45
60	156	G3XVA	450	-	26	47	-
61	129	Rochdale Cowboys CG	397	-	36	43	-
62	106	Butser Milliwatts	357	-	66	26	-
63	120	Stevenage & DARS	349	-	60	32	-
64	069	Rhyl & DARC	318	-	52	46	-
65	117	Harlow & DARS	313	-	46	51	-
66	009	South Wirral CG	307	57	40	-	-
67	019	Anglesey Radio Club	298	-	43	58	-
68	070	Thornton Cleveleys ARS	266	-	72	52	42
69	096	Conway Valley RC	265	-	54	70	40
70	081	Yeovil ARC	228	-	62	62	-
71	093	North Bristol ARC	200	-	71	64	-
72	160	North Down CG	193	-	68	68	-
73	125	Itchen Valley & Waterside	187	-	74	63	-
74	046	Edenbridge ARS	166	-	73	67	-
75	157	Mexborough & DARS	128	-	75	71	-
76	043	Notts & Derby ARC	100	-	76	72	-

RESTRICTED SECTION OVERALL RESULTS

Posn	Reg No	Group/club	Total points	Band position 70MHz	144MHz	432MHz	1,296MHz
1	025	Cotswold & Big M CG	3,448	1	1	3	1
2	116	Cat & Custard Pot CG	2,869	12	5	1	2
3	006	Cray Valley RS	2,315	2	4	2	8
4	137	Harwell ARS	2,108	15	7	4	4
5	048	Bracknell ARC	1,982	14	14	5	5
6	044	South Birmingham RS	1,957	7	21	8	3
7	092	Blackwood ARS	1,868	4	3	12	17
8	021	Surrey RCC	1,782	16	6	7	10
9	091	British Telecom TC ARC	1,686	5	8	16	6
10	162	Westmorland VHFG	1,664	3	11	21	14
11	142	U of Surrey EARS	1,652	10	13	6	13
12	042	Maidenhead & DARC	1,496	11	19	34	7
13	024	RS of Harrow	1,489	25	9	18	9
14	149	Plymouth RC	1,328	6	16	9	-
15	005	Five Bells	1,311	22	12	11	19
16	127	Shirehampton ARC	1,203	8	10	26	-
17	015	Bristol ARC	1,182	17	41	20	18
18	104	Vange ARS	1,171	27	17	35	15
19	158	South Belfast CG	1,156	34	2	17	-
20	139	Swindon & DARC	1,106	32	24	14	16
21	001	Guildford & DARC	1,097	14	23	13	-
22	077	Rossendale & Bury CG	1,039	9	27	24	-
23	065	North Kent RS	1,031	20	22	15	-
24	122	Chiltern ARC	1,014	28	47	27	11
25	134	Coulsdon CG	1,005	29	18	30	20
26	038	Edgware & DRS	990	19	30	41	21
27	100	Mid-Cheshire ARS	932	24	25	19	-

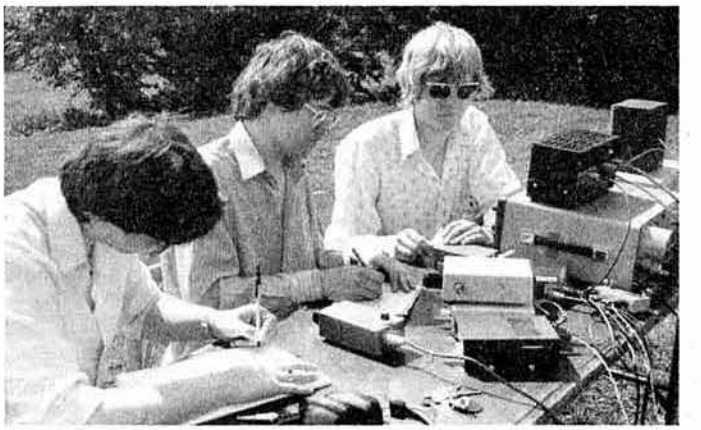
Posn	Reg No	Group/club	Total points	Band position 70MHz	144MHz	432MHz	1,296MHz
28	152	Saffron Walden & DRS	751	26	31	39	-
29	018	Turks Head	742	-*	15	-	12
30	051	Cochno CG	741	18	52	36	-
31	119	SE London Raynet	703	30	26	38	-
32	057	Salisbury R&ES	695	23	51	43	-
33	039	Tamworth ARS	678	-	36	10	22
34	054	Bishops Stortford ARS	647	21	35	-	-
35	064	Sutton Coldfield RS	626	31	33	44	-
36	037	Abingdon CC	592	-	28	22	24
37	033	Guernsey ARS	541	33	50	47	23
38	045	Derby & DARS	507	-	29	24	-
39	148	Exeter ARS	491	-	32	23	-
40	110	Mount St Mary's RC	469	-	20	50	-
41	159	Queens University RC	438	38	49	45	-
42	059	HI Conspiracy	426	-	34	31	-
43	161	East Lancs ARC	415	-	39	28	-
44	135	Mid-Warwickshire ARS	401	-	38	33	-
45	031	Goole R&ES	399	-	40	32	-
46	124	Doncaster SU ARS	393	37	56	29	-
47	080	Glenrothes & DARC	386	36	45	51	-
48	013	Greater Peterborough ARC	369	-	44	40	-
49	022	Coulsdon ATS	361	-	48	37	-
50	071	Copeland ARC	354	-	42	46	-
51	095	Tansy Green QRP	347	35	54	48	-
52	111	G6LJO/G6NWF	296	-	46	49	-
53	150	Saltash & DARC	244	39	37	-	-
54	052	NW of Ireland ARS	219	40	43	-	-
55	027	GM3TAL & G3SHK	171	-	57	42	-
56	128	Stirling & DARS	145	-	53	52	-

70MHz BAND RESULTS
OPEN SECTION

Posn	Callsign	Points	QSOs	QRA	Best dx	Km
1	GM3WOJ	3,047	216	XO26	GU4IUW/P	604
2	G4ALE	2,009	195	YK31	GI4OMA/P	493
3	G4ADV	1,947	159	XK57	G3RSI/P	533
4	G3SYA	1,850	205	YO78	GU4IUW/P	510
5	G3MPN	1,805	187	AM07	GI4OMA/P	565
6	G4CVI	1,731	206	YK30	GM3WOJ/P	505
7	G4HNS	1,708	212	AN61	G4PEM/P	486
8	G4IGY	1,704	181	ZN10	G4ADV/P	485
9	GW3UEY	1,602	203	YM55	GM3ULG/P	440
10	G2ASF	1,503	186	YL75	GM4PPT/P	424
11	G3PSM	1,456	162	ZO71	GU4IUW/P	516
12	G4BVY	1,404	177	AL45	GI4OMA/P	622
13	G4HON	1,356	182	ZN61	GU4EON/P	422
14	G3YHM	1,355	192	ZK09	GM3WOJ/P	516
15	G3UKV	1,326	194	YM28	GU4IUW/P	359
16	G4BOH	1,293	178	ZN53	G4ADV/P	395
17	G4AOL	1,273	171	AK11	GM3WOJ/P	539
18	G3TBK	1,259	182	ZN78	GI4OMA/P	430
19	G3WGV	1,234	198	ZL54	GM4PLI/P	549
20	G4FAW	1,233	161	AM67	GM3WOJ/P	492
21	G4LFM	1,202	166	YK30	GM3WOJ/P	482
22	G3RSI	1,177	113	ZO48	G4PEM/P	563
23	G3YYF	1,149	160	AK14	GM3WOJ/P	551
24	G8LM	1,147	178	ZM27	GI4OMA/P	449
25	G4BOX	1,144	166	ZN71	GU4EON/P	412
26	G3ZMD	1,137	187	ZM80	GI4OMA/P	532
27	G4MEL	1,103	174	ZL76	GM3WOJ/P	478
28	G3UAX	1,085	174	ZL53	GM4PLI/P	542
29	G4ERG	1,084	136	ZN49	GU4IUW/P	471
30	G4INL	1,070	178	YL20	GI4OMA/P	439
31	G3LHJ	1,068	115	YK32	G3MPN/P	434
32	G3SWC	1,045	170	ZK08	G4KOT/P	446
33	G3JKY	1,041	166	AL52	GM3WOJ/P	508
34	G3ZAM	1,029	137	ZK35	GM4PPT/P	517
35	G4ARD	1,016	173	ZL18	GM3ULG/P	512
36	G4OXK	952	155	ZL65	GM4PLI/P	563
37	GM4PPT	936	78	XO19	G4AOL/P	533
38	G3NFB	921	147	ZN61	GI4OMA/P	354
39	G4DKN	884	155	ZL66	GM3WOJ/P	467
40	G4BJM	883	167	ZM77	GM3WOJ/P	396
41	G4CRA	864	142	AL14	GM3WOJ/P	
42	G4RGW	850	106	YL72	GI4OMA/P	444
43	G4CTU	846	132	YM48	GM4HAM/P	324
44	GI4OMA	779	57	WO27	G4BVY/P	623
45	G5RP	687	127	ZL34	GM3WOJ/P	418
46	G3RDM	675	106	ZN18	G3ULN/P	413
47	G4HRC	584	120	AL32	GM4PPT/P	473
48	GW4HNT	549	75	YL32	G3MPN/P	371
49	G4MID	541	81	AM64	GM3WOJ/P	457
50	G4KBL	531	96	AL01	G4ADV/P	
51	G3WQK	528	90	AK12	G4ADV/P	356
52	G3ZKE	442	96	ZL26	G4ADV/P	305
53	G4GAK	421	67	ZN11	G4PEM/P	455
54	G3PVU	379	57	ZN58	G4ALE/P	375
55	GW4EFP	371	66	YN65	GM4PLI/P	314
56	GM4HAM	362	44	LYP57	G4BVY/P	492
57	GW3TXH	307	33	YN64	GM4PLI/P	347

RESTRICTED SECTION

Posn	Callsign	Points	QSOs	QRA	Best dx	Km
1	GW3SNN	1,837	227	YN75	GU4EON/P	402
2	G3TAA	1,355	174	AL65	GI4SIP/P	588
3	G3JYP	1,233	121	YO29	G4ADV/P	513
4	GW4EAI	1,191	175	YL06	GM4PLI/P	459
5	G4SCY	1,087	176	YM10	GU4EON/P	390
6	G3ULN	1,013	110	YK21	GI4OMA/P	481
7	G4EYD	968	164	YM50	GI4OMA/P	390
8	G4EQP	960	148	YL47	GM3WOJ/P	391
9	G3BRS	950	128	YN30	G4ADV/P	415
10	G4CWH	946	163	AL51	GM3WOJ/P	500
11	G3TWG	938	180	ZL17	GM3WOJ/P	421
12	G3LTY	938	121	AL56	G3JYP/P	441
13	G4DSE	926	133	YK18	GM3WOJ/P	457
14	G3PJX	886	156	ZL69	GM3WOJ/P	486
15	G4HLX	882	164	ZL33	GM4HAM/P	418
16	G4FUU	863	170	AL51	GM4PLI/P	590
17	G4EIA	828	151	YL49	GM4PPT/P	401
18	GM4PLI	778	61	XP09	G4FUU	590



The Shirehampton ARC 70MHz station: l to r: G4KKU, G3YHV and G4EQP.
Photo: **G3YHV**

Posn	Callsign	Points	QSOs	QRA	Best dx	Km
19	G3PSP	769	156	ZL29	GM3WOJ/P	449
20	G3WMR	753	145	AL51	GM3WOJ/P	480
21	G3TVW	745	139	AL02	GM3WOJ/P	445
22	G4EMK	705	125	ZM29	GU4IUW/P	392
23	G4RLF	701	118	YL80		
24	G4CAX	673	116	YN67	G4ADV/P	350
25	G3MLS	629	136	ZL06	GM3WOJ/P	408
26	G4KF	599	113	AM72	GM3WOJ/P	452
27	G4NRG	580	136	AL33	GM3WOJ/P	461
28	G3NCL	530	124	ZL27	GM3WOJ/P	435
29	G4BFJ	487	82	AL56	GM3WOJ/P	543
30	G4TAW	449	93	AL52	GM3WOJ/P	508
31	G3LNN	441	91	ZM31	GI4SIP/P	326
32	G3FEC	430	99	ZL32	G3SYA/P	282
33	GU4EON	289	34	YJ49	GM3WOJ/P	617
34	GI4SIP	285	30	XO51	G3TAA/P	
35	G4AQB	282	44	YN39	G4ADV/P	399
36	GM3ULG	272	26	YQ64	G3MPN/P	
37	G3PTV	240	49	ZN44	G4ALE/P	365
38	GI4SSF	215	23	XO61	G4HNS/P	410
39	G4GXK	27	11	XK39	GW4HXO/P	170
40	GI4OUN	2	2	WO25	GI4JIP	33

144MHz BAND RESULTS
OPEN SECTION

Posn	Callsign/P	Points	QSOs	QRA	Best dx	Km
1	G4BAR	13,031	831	YK31	UB5JMR	2,865
2	G4BWG	11,711	873	AL45	UB5EDO	2,477
3	G4MRS	10,179	826	AM67	UB5VEP	2,273
4	G4LIP	9,298	783	AN61	YO4AUL	2,302
5	G6HH	9,065	741	AK14	HG0KLX/6	1,415
6	G3ZIG	8,888	748	AM07	YU1OO/1	1,912
7	GM4CXM	8,382	703	XO26	F6GCP/P	849
8	G4APA	7,637	565	ZO48	LZ2FA	2,371
9	G8LNC	6,106	620	ZK35	UO5AP	2,219
10	G4MJC	6,041	519	AK12	RA3YCR	2,317
11	G4HRS	5,674	622	ZK08	EA1TH/P	976
12	G4DDC	5,449	662	ZL18	UB5VEP	2,123
13	GD3KMI	5,280	585	XO59	ON5UG	605
14	G4RFR	5,156	510	YK30	EA1TH/P	936
15	G4CDC	4,918	442	ZN49	UB5VEP	2,372
16	G4CRA	4,514	458	AL14	YO4AUL	2,218
17	G4JFW	4,452	486	ZM27	YO7CJI/P	1,922
18	G4CCC	4,418	590	ZL54	YO6CBN/6	1,946
19	G4DZO	4,375	444	AK11	EA1TH/P	992
20	G4NVA	4,320	560	ZN53	DL7VM/P	842
21	GW3OXD	4,142	518	YM55	F0HWH/P	887
22	G4CDA	4,113	561	ZN61	YU1EV	1,871
23	G8CKZ	4,077	431	YK30	EA1RCA	960
24	G4ETN	3,989	425	YL75	F6KCM	966
25	G3WOR	3,935	454	ZK09	F6GJO/P	1,004
26	GW4CZZ	3,929	534	YN64	F6CJG/P	914
27	GM3KJF	3,691	372	XO19	PA3BPC/P	690
28	G3SFG	3,666	405	AL01	YU1AFS/P	1,694
29	G3FVA	3,561	427	ZN61	HB9MDO/P	927
30	G4NUT	3,476	430	ZM77	HB9AC/P	783
31	G8JYN	3,332	470	ZL65	DL0SE/P	664
32	G8APV	3,139	436	AL52	UC2ABT	1,845
33	G8GBY	3,073	287	ZN18	LZ2FAG/M	2,359
34	GM4IPK	3,032	290	YP57	F6FMR/P	692
35	G3WSC	3,002	382	ZL76	F6CXF	832
36	G4SHC	2,925	423	YN29	F6CJG/P	938
37	G5BK	2,812	478	YL20	F0HWH/P	803
38	G3WKS	2,811	326	AL73	YO6AVU	1,897
39	G4SSS	2,684	300	YL72	EA1TH/P	992
40	GW4TDS	2,683	363	YN64	F1KNO	787
41	GW4MGR	2,609	390	YN65	F1FHI	1,010
42	G4EFY	2,476	402	ZL66	YU7BDO	1,750
43	GW6LAC	2,464	334	XN49	PA0GUS/P	636
44	G3ZME	2,441	410	YM28	PA0IJM/P	607
45	G6BSE	2,396	267	AM64	DK1PZ	627
46	G6UT	2,294	389	AL11	DF0OK	714
47	G2SU	2,228	340	ZN11	PA0IJM/P	573
48	G3WOI	2,211	280	ZL53	LZ1KDZ	2,303
49	G4EKT	2,146	287	ZN07	DJ4GC/P	700
50	GW4NZ	2,132	253	YL32	HB9MDO/P	913
51	G6ECC	2,103	200	XK57	F1GCA/P	948
52	G3KUE	2,094	331	YO78	DL0BI/P	757
	GW4ARC	2,094	325	YM04	F1FHI	648
54	GW6TM	2,072	295	YN61	GM8DPV	496
55	G3XEP	2,005	273	ZO71	F1FTB/P	753
56	G8HRC	1,992	320	AL32	UC2ABT	1,834

Posn	Callsign/P	Points	QSOs	QRA	Best dx	Km
57	G4HVC	1,961	262	ZN78	F1KNO	662
58	G4ADM	1,832	302	ZN71	DF0OK	627
59	G3NJA	1,829	209	YK32	F0HWH/P	770
60	G3OVT	1,826	312	ZL10	DF0VK/P	571
61	G4GXP	1,818	291	YM48	F6EKJ/P	763
62	G3CMH	1,789	236	YK05	EA1TH/P	968
	G4MJB	1,789	216	YP69	DF0VQ/P	812
64	GI4MFT	1,738	168	WO27	F0FF/P	739
65	G5FZ	1,723	262	ZN68	DF0OK	553
66	G8XCM	1,720	312	ZK06	EA2LY	885
67	G6VWH	1,704	304	ZL34	DL8PC/A	742
68	GI4SJB	1,672	140	XO32	F0FF/P	703
69	G8MTL	1,629	282	ZM80	GM4TXX/P	528
70	G3AFT	1,554	348	ZL26	DK0BN/P	915
71	G4GCT	1,539	228	YL48	GM8KRE/P	679
72	G4ATH	1,339	200	YN15	F6ASP/P	462
73	G6WFB	1,286	252	AL51	GM4TXX/P	565
74	G6IVR	1,266	202	ZK14	GI4TAP/P	500
75	G4BTS	1,181	184	ZN35	DF0OK	598
76	G4NID	912	135	ZN53	DF0OK	605

RESTRICTED SECTION

Posn	Callsign/P	Points	QSOs	QRA	Best dx	Km
1	GW4ERP	4,654	646	YN75	DB9EK	688
2	GI4TAP	3,344	325	XO51	ON1BPU	726
3	GW6GW	3,077	435	YL06	F1HGO	758
4	G4BUO	2,977	293	AL65	LZ2QA/P	2,218
5	G8YMD	2,950	316	AL56	F6CJG/P	634
6	G4DDY	2,746	364	AL51	LZ2KAD	2,193
7	G3PIA	2,621	399	ZL33	F6EKJ	645
8	G4HUP	2,383	373	YM10	F1KNO	712
9	G3EFX	2,220	375	ZL06	F1QSL/P	588
10	G4AHG	2,152	366	YL47	DF0OK	633
11	G3FDW	2,145	261	YO29	F0FF/P	582
12	G8NWM	2,104	210	ZM29	LZ2FA/M	2,310
13	G8AHK	2,086	328	AL51	DF0VK/P	556
14	G4BRA	2,023	243	YK18	EA1TH/P	960
15	G8YYB	1,993	275	ZL77	EA2LY/P	900
16	G3PRC	1,977	204	YK21	DL0BI/P	877
17	G3YCW	1,948	296	AL33	HB9MDO/P	594
18	G4KKC	1,859	228	AL56	EI7DJ	619
19	G3WKX	1,844	332	ZL17	GM4RGC/P	581
20	G4MSM	1,820	307	ZN51	YU1EU	1,852
21	G8OHM	1,728	305	YM50	DF0OK	606
22	G8TNK	1,510	236	AL51	HB9MDO/P	683
23	G6GS	1,446	277	ZL69	GM4TXX/P	592
24	G8SRC	1,437	263	ZL32	PA3BPC/P	477
25	G3ZTT	1,421	223	YN67	F1BDE/P	560
26	G4AVV	1,401	237	AL52	HB9MDO/P	673
27	G6RVC	1,397	236	YN30	DF0OK	668
28	G8PQG	1,340	232	ZL15	YO3AID/P	2,054
29	G2DJ	1,325	238	ZM03	DJ4GC/P	714
30	G3ASR	1,254	217	ZL29	HB9AC/P	730
31	G3TXC	1,243	183	AM72	F1KNO	529
32	G4ARE	1,234	174	YK13	DF0OK	689
33	G3RSC	1,142	218	ZM31	F6BRZ	489
34	G4OCR	1,127	213	ZM04	DF0OK	500
35	G5ZG	1,121	171	AL02	GI4MFT/P	540
36	G8TRS	1,105	206	ZM73	DF0OK	562
37	G8SAL	1,064	136	XK39	EA1TH/P	931
38	G6WAR	1,056	188	ZM73	DF0OK	558
39	G3NTJ	1,049	211	YN29	F0FF/P	473
40	G8HSG	1,040	162	ZN26	GM4TPF/P	492
41	G3TAD	1,033	171	YL49	F1KNO	608
42	G6HEF	1,032	161	YO54	F0FF/P	480
43	GI3CFH	1,014	84	WO25	F0FF/P	757
44	G4EHW	1,000	148	ZM38	DF0OK	509
45	GM4GRC	999	130	YQ64	OK3RLA/P	1,726
46	G6LJO	948	187	YN79	GM4TPF/P	520
47	G3CAR	936	189	ZL27	PA0FXA	509
48	G4FUR	920	151	ZL59	HB9AC/P	704
49	GI3LLQ	866	83	XO61	F0FF/P	657
50	GU3HFN	842	93	YJ49	DK0BN/P	973
51	G8PCB	777	106	YL80	F1KNO	565
52	GM6PZ	717	110	XP09	G4TAC/P	513
53	GM4SGB	583	107	YQ62	G4RFR/P	623
54	G4AGJ	458	86	YN39	PA0GUS/P	515
55	GM3VLB	437	72	YP28	G3EFX/P	435
56	G3UER	338	78	ZN44	EI6DD	355
57	GM3SHK	104	12	XP24	G3PIA/P	510

SWL SECTION

Posn	Station	Points	QSOs	QRA	Best dx	Km
1	BRS32525	1,157	209	AL41	F1FEN/P	778
2	BRS52543	1,013	127	YN15	F1BOF/P	586
3	BRS25429	879	121	ZN03	PA3AJF	500
4	BRS62088	142	24	AL41	F6EZV	335

Check logs gratefully acknowledged from G6HGE/P, G5ECD/P, G6EPN and G6PFR.

432MHz BAND RESULTS
OPEN SECTION

Posn	Callsign/P	Points	QSOs	QRA	Best dx	Km	Power
1	G8TFI	4,681	438	AL45	DL1ZC	673	400
2	G4IRC	4,038	384	AM67	DL2CI	674	400
3	G4LOJ	3,537	316	AM07	DG1NZ	787	400
4	G4PUB	3,251	270	YK31	HB9MIN/P	887	400
5	G4CLA	3,117	309	AN61	DG1FP/P	700	400
6	G4DSF	2,230	215	YL75	HB9MDO/P	862	400
7	G4GZO	1,995	230	AK11	F1BUT	853	150
8	G4MVN	1,954	201	AK12	DJ9BV	731	100
9	GW3TGL	1,941	221	YM55	F1KAW/P	869	80
10	G8BQX	1,853	204	AK14	HB9MIN/P	627	100
11	G3SEK	1,846	247	ZL34	F6CQU	712	300
12	G4RAM	1,735	183	YK30	DF9CY	735	200
13	G8HVY	1,529	192	YK30	F1BUT	850	400
14	G4RFC	1,511	199	AL52	HB9MDO/P	673	150
15	G3DCZ	1,428	227	ZN71	F1FHI	663	100
16	G4RMK	1,427	215	ZM77	DK1VD/P	596	400
17	G4RNL	1,417	242	ZN61	DK3OL	644	100
18	G4GZA	1,404	176	ZN49	DJ9DL	567	150
19	GM4DIJ	1,340	127	XO26	G3YMD/P	546	400
20	G3LRS	1,215	183	ZM27	DF7KB/P	610	250
21	G8DDC	1,202	220	ZL18	DK0AF	726	100
22	G3UHF	1,200	170	ZN61	DK1VD/P	703	150
23	G4PEC	1,193	113	YP69	GU6NBS/P	639	300
24	G3WZT	1,153	174	ZK08	HB9MIN/P	690	250
25	G4ILI	1,103	178	YL20	F1RTF/P	614	50
26	G8SVE	1,051	170	ZK06	HB9MIN/P	726	150
27	G4PUL	1,043	179	YM28	F6CTT/P	530	175
28	G4BVE	1,029	178	ZN53	F1GS/P	668	80
29	G3TCR	1,020	171	ZL65	DB1BP	619	50
30	G4HGU	1,006	116	YL72	F6CQU	751	100
31	G8RIP	984	148	YO78	F0FF/P	515	50
32	G3SAD	977	167	ZL10	GI4DBB/P	520	100
33	G4OTV	940	135	AL73	GM4DIJ/P	537	100
34	G3JKF	935	159	ZL76	F1BUU	686	400
	GW3EOP	935	124	YL32	DK1VD/P	769	50
36	G4CST	895	157	ZK09	F6KNO	465	50
	G4OKK	895	93	ZO48	PA0IJM/P	503	100
	G4MBZ	895	156	ZL66	PA0GUS/P	477	225
39	G3ULT	864	159	ZL54	PE1HQO	542	100
	G4CRA	864	118	AL14	DK1VD/P	496	15
41	G8LVQ	841	117	ZO71	F6CTT/P	677	100
42	GM8MJV	823	83	YP57	G4DDL/P	501	100
43	G4TWJ	808	125	YN29	F0FF/P	471	30
44	G6CNQ	792	133	AL32	DB2VY/A	522	100
45	GD8KMI	777	95	XO59	G8TFI/P	470	80
46	GW4NLD	735	115	YM04	F1GST/P	647	25
47	GW3YZD	693	115	YN64	F6CTT/P	589	150
	G8NEH	693	120	ZK35	PA0PLY/A	469	30
49	GW8WDC	677	123	YN65	G4GZO/P	339	65
50	G4CUO	666	115	ZN78	PE1HQO	445	10
51	G3WUX	640	127	AL11	—	—	7
52	G6GMW	613	94	YN15	G8TFI/P	377	35
53	G4ENR	607	102	ZN11	ON4YZ	585	40
54	G4MTL	578	116	ZM80	GM4DIJ/P	435	40
55	G4DWZ	575	132	ZL26	F6KNO	537	100
56	G6COL	563	95	ZN58	F6CTT/P	596	50
57	G4MWE	535	78	ZN07	G4PUB/P	427	10
58	GW6DOK	508	78	XN49	G8TFI/P	417	50
59	G3RWL	504	102	AL01	PA0GUS/P	383	100
60	G2CPM	503	103	ZL53	G4PEC/P	430	10
61	G8NJA	502	68	YK32	G4LOJ/P	434	10
62	G4OXR	425	74	YK05	PE0MAR/P	508	10
63	G8MZF	420	84	ZK14	F1GST/P	395	100
64	G6PNB	386	75	YL48	F1FHI	485	30
65	GI4DBB	343	37	WO27	G8TFI/P	623	100
66	G6KRC	337	73	YM48	F6CTT/P	498	26
67	G4GMS	314	71	AL51	G4PUB/P	287	10
68	GI4SOY	303	39	XO32	G4ILI/P	402	40
69	G3AMW	185	36	ZN18	G3IGQ/P	280	10
70	GW8WND	182	34	YN61	G6CGY	248	50
71	G4IHZ	175	44	ZN35	G3YMD/P	288	10
72	G6KZS	139	30	ZN53	G4OTV/P	277	50
	GM3THI	139	21	XO19	G3SEK/P	417	10

RESTRICTED SECTION

Posn	Callsign/P	Points	QSOs	QRA	Best dx	Km	Power
1	G3YMD	2,599	236	AL56	DJ9BV	644	25
2	G4FAM	1,338	160	AL65	DB1BP	502	19
3	GW4PDS	1,164	169	YN75	F1GST/P	651	25
4	G4CXJ	1,120	182	ZL33	DB2VY/A	605	25
5	G4DDL	1,106	145	YK18	DK1VD/P	672	25
6	G3IGQ	1,041	175	AL51	DK1VD/P	515	25
7	G3ZPB	982	155	AL51	GM4DIJ/P	498	25
8	G4OHM	950	165	YM50	F6CTT/P	494	20
9	G4PZI	916	108	YK21	HB9MIN/P	898	15
10	G4FWC	811	150	ZM73	DK1VD/P	658	20
11	G8JNV	800	119	ZM29	DB6BX	509	25
12	GW4JKV	799	123	YL06	F6GNR	564	10
13	G5RS	791	147	ZL69	GI4KSO/P	512	10
14	G4LDL	778	142	ZL32	GM8MJV/P	426	10
15	G4CW	772	126	AL51	HB9MDO/P	683	10
16	G4NJR	764	138	YM10	F0FF/P	397	25
17	GI4KSO	734	80	XO51	G8TFI/P	563	25
18	G4JWD	681	131	ZL06	GI4KSO/P	438	25
19	G8ZTT	678	124	YN67	GM6LNM/P	323	—
20	G3ZKI	677	118	YL49	F1CKM/P	672	10
21	G4RCD	657	76	YO29	F0FF/P	582	10
22	G4POL	653	131	ZL15	PA0VVH/P	471	15
23	G6ARE	587	79	YK13	PE0MAR/P	541	12
24	G6GZN	578	100	YN30	G4MUN/P	367	25
	G3ERD	578	120	ZM03	GU6NBS/P	429	10
26	G4DVV	567	101	YL47	G8RIP/P	327	10
27	G4LWA	506	104	ZL27	GM4DIJ/P	435	10
28	G4JMO	496	98	YN29	G4RCD/P	368	10
29	G8JJR	492	102	ZN44	G4PUB/P	365	8
30	G4FKK	480	71	AL56	DF7KB/P	466	12
31	G6HIC	477	98	ZM04	G4PUB/P	—	15
32	G8ERX	458	78	ZN26	G4PUB/P	395	6
33	G8UIO	453	91	ZM73	ON1BPV	368	15
34	G3LVW	435	98	ZL17	G4PEC/P	390	10
35	G4OJN	433	97	AL33	—	—	—
36	GM4AGG	425	51	XP09	G3SEK/P	551	25
37	G3ZMF	423	96	ZL59	DK1VD/P	527	20
38	G4JED	411	86	AL52	GM4DIJ/P	508	10
39	G4HPU	410	76	AM72	G4PUB/P	328	10
40	G4DXW	400	70	ZM38	G3ZQM/P	338	25
41	G3SHY	395	91	ZL29	PE0MAR/P	298	25
42	GM3TAL	386	45	XP24	G3SEK/P	523	12
43	G3FKF	379	77	YL80	G4GZA/P	—	10
44	G6LPB	367	79	ZM31	G4PUB/P	255	18
45	GI4LGP	352	36	XO61	G3SEK/P	422	10
46	G4PEW	344	54	YO54	G6WZT/P	340	10
47	GU4NYT	262	36	YJ49	GW3TGL/P	320	10
48	G8HXE	247	53	YN39	G4PUB/P	350	5
49	G6NWF	239	67	YN79	G4RAM/P	273	15
50	G6MCU	204	62	ZN51	G8TFI/P	281	25
51	GM4LYQ	60	12	YQ64	GW4PDS/P	—	25
52	GM4TMS	51	13	YQ62	G8BQO/P	299	1
53	GM4NLJ	6	4	YP28	G4PEC/P	58	15

LISTENER SECTION

Posn	Station	Points	QSOs	QRA	Best dx	Km
1	BRS52543	65	22	YN15	GW8KQW/P	159

1,296MHz BAND RESULTS
OPEN SECTION

Posn	Callsign/P	Points	QSOs	QRA	Best dx	Km
1	G4JAR	1,171	100	YK31	DL0HC/P	766
2	G4NXO	1,100	123	AL45	GM4BYF/P	526
3	G3XDY	1,083	126	AM67	DF9LN	633
4	G4HWA	984	115	AN61	DL0HC/P	551
5	G4ANT	963	101	AM07	DC9EO	491
6	G4CCH	755	96	ZN49	F6DZK	545
7	G4HRY	575	72	YL75	PA0FRE	562
8	G3ZUD	570	90	ZM27	DL0HC/P	586
9	G4ROM	559	84	ZN61	F6DZK	564
10	G3YKI	433	68	AK11	PE1CHQ	460
11	GM4BYF	417	33	XO26	G4NXO/P	526
12	G3GHN	398	72	AL52	PE1CHQ	436
13	G3GRO	388	70	ZL76	GM4BYF/P	478
14	G3OBD	382	58	YK30	PE0MAR	382
15	G4AXL	369	35	YP69	G4JAR/P	521
	G3AKF	369	75	ZL54	PA0PLY/A	449
17	G4CPE	361	88	ZL18	F6DZK	387
18	GW3NZS	352	48	YM55	F6DZK	512
19	GD4KMI	328	32	XO59	G3XDY/P	440
20	G3VMO	318	49	YK30	ON7WR/A	457
21	G8KAX	296	64	AL32	DL0HC/P	500
22	G4PMK	284	60	ZL34	DJ3ZU	535
23	G3NPF	235	52	ZK08	G4ROM/P	235
24	G4FRS	222	55	ZL66	F6DZK	339
25	G4STO	206	40	ZN58	G4JAR/P	375
26	G3WFW	199	45	ZN53	G4JAR/P	340
27	G3MCD	193	51	ZL26	G4JAR/P	230
	G4THI	193	27	ZN18	PA0PLY/A	407
29	G8SDK	192	38	AM64	G4JAR/P	357
30	G3LOI	172	40	ZK09	F6DZK	289
31	G4RUW	163	43	ZL53	G4CCH/P	244
32	G8BFV	162	34	ZK35	GW3WDG/P	302
33	G4RWT	153	29	AL73	PI4AZK/P	339
34	G3ZVW	150	37	AL01	PI4ALK/A	326
	G4MEJ	150	38	ZM77	G4JAR/P	273
36	G4THB	149	23	ZO48	PA3BPC/P	446
37	G8WRS	110	26	ZO71	G3XDY/P	295
38	G4EMW	101	25	ZN11	G3NNG/P	262
39	G4GDD	98	26	ZN07	G3OHM/P	193
40	GW8ACG	78	14	YM04	G4HWA/P	260
41	G4ELZ	38	10	YK32	G8BFV/P	179
42	G8MKQ	37	9	YN15	G3LHM/P	175
43	GM8MNG	25	5	YP57	G3OHM/P	327
44	G4IUT	6	4	YM28	G4ROM/P	76
45	GI8NBW	5	1	WO27	GM4BYF/P	116

RESTRICTED SECTION

Posn	Callsign/P	Points	QSOs	QRA	Best dx	Km
1	GW3WDG	742	93	YN75	F6DZK	593
2	G4ICM	537	71	AL56	PA0MX	402
3	G3OHM	514	88	YM50	GM8MNG/P	327
4	G3NNG	470	84	ZL33	PA0EZ	466
5	G4DDN	458	60	YK18	PA0EZ	549
6	G3WOH	438	75	YM10	G3RCV/P	288
7	G3VCT	313	70	ZL17	GM4BYF/P	421
8	G3RCV	311	45	AL65	PE1CHQ	397
9	G4AUF	297	64	ZL06	GM4BYF/P	408
10	G8TB	255	65	AL51	ON7WR/A	311
11	G3COJ	244	58	ZL27	GM4BYF/P	435
12	G6AWM	233	53	ZL77	F6DZK	314
13	G4HSD	214	56	AL51	G4JAR/P	280
14	G4RCE	207	27	YO29	G3DAH	439
15	G4ELM	201	58	AL33	G4JAR/P	307
16	G8SFM	196	47	ZL32	G4CCH/P	233
17	GW4FCV	186	34	YL06	G4ANT/P	305
18	G4REH	185	35	YL49	G4AXL/P	417
19	G4ODA	124	26	ZM29	G4JAR/P	335
20	G4FIT	116	24	AL56	G4JAR/P	349
21	G3SHY	111	37	ZL29	PE0MAR/P	298
22	G8AMD	96	26	ZM73	G3XDY/P	187
23	GU3KFT	74	12	YJ49	G4NPF	210
24	G4POL	39	18	ZL15	G4JAR/P	236

Golden Jubilee NFD results

NFD Trophy

Guernsey ARS ..... 3,620 points

Bristol Trophy

Great Western Contest Group ..... 3,072 points

Gravesend Trophy

Glenrothes ARS A ..... 3,527 points

Scottish NFD Trophy

Glenrothes ARS A ..... 3,527 points

Frank Hoosen (G3YF) Memorial Trophy

Hereford ARS ..... 2,038 points

Leading scores on individual bands

Open section

1·8MHz	Southgate ARC	654 points
3·5MHz	Maidenhead & D ARC 'A'	1,160 points
7MHz	Edgware & D ARS 'A'	1,242 points
14MHz	Hereford ARS	2,038 points
21MHz	Guernsey ARS	771 points
28MHz	West of Scotland ARS 'A'	560 points

Restricted section

1·8MHz	Leeds & D ARS	630 points
3·5MHz	Farnborough & D RS	802 points
7MHz	Eccles & D ARS	1,259 points
14MHz	West of Scotland ARS 'B'	748 points
21MHz	Liverpool & D ARS	481 points
28MHz	SRCC Croydon	402 points

Overseas stations giving most points to entrants

Europe: DA1WA/HB0 **Africa:** Z23JO **Asia:** 9K2BE
Australasia: VK6PG **North America:** VE3MGY

In late 1932, the RSGB announced that a new portable contest would be held in June 1933 and that each RSGB district could enter stations to compete for the new National Field Day Trophy. Eighteen districts took part and each fielded an A station to work on 1·8 and 3·5MHz and a B station for 7 and 14MHz. The contest ran from 1700gmt on Saturday to 2000gmt on Sunday and was won by the West London District operating from a site near Maidenhead.

The winners made 30 contacts from their A station, G6WN, and 34 from their B, G6YK, for a total score of 364, including dx contacts with ZL, ZD2, SU and W. Equipment was fairly simple, with crystal-controlled and SEO transmitters and straight receivers being standard. Antennas were mainly end- or centre-fed Zepps, Windoms or dipoles (not so different from today's Restricted section).

The report in the August 1933 issue of the *T & R Bulletin* makes interesting reading—"Motor-cars of all types, towed caravans, Scouts' trek-carts, delivery vans and even donkey carts and bicycles were pressed into service to carry gear, accumulators and operators to the chosen sites." Most stations were powered by accumulators for both lt and ht supply, although a few stations were using rotary converters to obtain the high tension voltages. The weight of the accumulators seems to have been a major problem. As is the "norm" for latter day NFDs, it rained and there were heavy storms in the south. G2NH and G5LA, the Southern District entry, were flooded and had to close down at 1200gmt.

In comparison, the 1983 Golden Jubilee NFD attracted nearly 100 entries and some record scores were made by groups in both sections of the contest. Many groups were able to make more contacts in a single hour than the 1933 entrants achieved in 27h of operation. As in 1933, the weather was hot and sunny at the start of the contest, but during the Saturday evening, a series of fronts moved across the Channel bringing all kinds of nasty weather to southern counties, but leaving the rest of the country in a heatwave.

The problems in the south started with a build-up of static, followed by heavy showers of electrically-charged rain. Early on Sunday, there were thunderstorms, more charged rain and hailstorms. Very few groups had taken precautions, and the electrical discharges took a heavy toll of transceiver front-ends, keyers, power meters, swr bridges and other solidstate equipment. At times the lightning was so bad that stations were forced to close down (some for quite long periods). Hastings lost a total of 8h, and the Channel group could not continue after 1400gmt. Another Sussex group found that their tent was on fire after a sustained static discharge from the open-wire feeder to a grounded tent pole, while yet another south-coast station was "bombarded by hailstones the size of tennis balls" (this was reported in the national press).

It was quite different in the areas to the north and west of London which were very hot and sunny during the whole weekend. Here the main hazard seems to have been sunstroke. Groups entering NFD are gluttons for punishment and, apart from Hastings (see "Comments"), all the others have intimated that they will be battling again in the 1984 NFD.

Members of the Great Western Contest Group with the British Trophy. L to r: G4BEZ, G3NKS, and G3MZV. *Photo* G3KNS

Open section

No less than seven groups topped 3,000 points on claimed scores, a clear indication of the good conditions on 14MHz. The previous all-time record score by last year's winners, Racal 'B', of 3,452 was exceeded by the two top contenders for the NFD Trophy. These were the Guernsey group, who last won in 1981, and Glenrothes A, who were joint winners in 1978. Both had claimed scores some 300 points ahead of the next four groups.

After checking, Guernsey, GU3HFD/P, took the top honours with 3,620 points made from 1,024 contacts, with Glenrothes, GM4GRC/P, winning the Gravesend Trophy, with 3,527 points from 925 QSOs. Gravesend, G3GRS/P were third with a score of 3,113. The two leaders used TS830S transceivers, and G3GRS used an Omni-D TenTec. Guernsey had a TH6DXX at 25ft for the high frequency bands and inverted-Vs for the lower frequencies. Glenrothes used separate hf Yagis and individual lf dipoles, while Gravesend used quads and a variety of wires.

All the leading stations in the section used 14 and 21MHz as their base for building large scores and spread their efforts over the remaining bands to take advantage of the prevailing conditions and the band loading. The band usage was very similar for the three leaders and they are to be congratulated for a fine effort.

Restricted section

In comparison with the Open section, leading stations in the Restricted concentrated their main efforts in building their scores on 7MHz. This is often the best tactic when hf conditions are good, as without the advantage of hf beams, QSO rates on the hf bands are slower than those obtainable on the lower frequencies and a better average points/QSO ratio can be obtained. To make a winning score, it is of course necessary to use all the bands and in particular take as many points as possible from the 1·8 and 28MHz bonus bands.

The leading stations in the section all used this operating pattern and although scores were slightly down on previous years, possibly due to the high levels of static on the lower frequency bands, some good scores were realised. the winner for the third year in succession is the Great Western group, G3NKS/P, with 3,072 points, followed by Red Dragon, GW8GT/P, who scored 2,924. There were three contenders for third place, Lichfield, Croydon/ SRCC, and Stockport A. After checking, the results were in that order and Lichfield, GW3WAS/P, took the third place certificate with 2,665 points. An excellent effort from all concerned.

Scottish NFD Trophy

As mentioned in previous NFD reports, Glenrothes A have made this trophy their own with consistent wins over a number of years. Once again, they are the leading NFD entry from Scotland. The second highest Scottish group is the West of Scotland A, GM4AGG/P.

1·8MHz (by G3KDB)

A total of 73 logs was received for this band with the first QSO being logged at 2024 and the last, unusually late, at 0119, but most of the traffic taking place before midnight. After checking, the Open section leaders were Southgate with 654 points, followed by Gravesend who made 616. Leeds led the Restricted section with a score of 630 and second were Great Western and East Barnet, who both scored 556.

The standard of log-keeping in a lot of entries was very poor and entrants will note a big decrease from their claimed scores. Entrants must realise that over 95 per cent of all contacts are checkable and great care must be taken when writing up the logs. It is obvious that this was the stage when a lot of silly mistakes were made. No non-European QSOs were made this year and the vast majority of traffic was between G portables.

3·5MHz (by G3KKQ)

A total of 87 logs was received for this band, including three overseas and four UK checklogs. High static levels were encountered, particularly in the south, but only one entrant reported equipment damage. Activity remained reasonably high throughout the contest, peaking around midnight and staying high throughout the night. No dx was worked, or indeed reported, indicating a high noise level.

The band leader in the Open section was Maidenhead A, G3WKX/P, who made 377 contacts. Runner-up was the Surrey Heath group, G3RRA/P. In the Restricted section, Farnborough, G4DKN/P took the honours with 268 contacts, with Edgware, G4IUZ/P, second with 217 contacts. Edgware made a bad start due to a fault in the antenna, but after mounting a midnight operation to clear the fault, their scoring rate doubled.

7MHz (by G4DJX)

As usual, 7MHz carried a great deal of traffic throughout the contest. High QRM levels on the hf bands forced many entrants on to the band, when they may have preferred to work dx on the hf bands. This resulted in well over 1,000 different stations being logged, with 290 from the British Isles, 240 from DL, 70 from ON, 45 from HB9 and three from PA. Logs show that 50 USA and VE stations were worked, together with VK6PG and ZL2UM. Many clubs found the static levels too high to be able to cope with easily and commented on this in their logs.

Results for this band are a repeat of last year. Edgware won the Open section with 1,242 from 370 contacts, and joint second were Verulam and Salisbury, both with 867 points. In the Restricted section, Eccles were the clear leaders with 1,257 points from 426 QSOs, and Guildford were the runners-up with 393 contacts and 1,181 points. It is interesting to note that despite the use of beams and other directional antennas for the band, the winning stations all used simple wires or groundplanes.

The accuracy of the logs varied tremendously from a faultless one (G4DAA/ P) to three who had five unmarked duplicates. A common fault, referred to elsewhere in the report, was transcription errors in writing up the logs. The use of a microcomputer for checking is on the increase and is recommended as none of the computer-derived logs contained unmarked duplicates. (Please see remarks from the committee).

14MHz (by RS20249)

This band appeared to be one of fluctuating fortunes, some thought it good, others mediocre. A lot depended on whether groups were able to get through the QRM and the QRN during the openings to the USA. Open section entrants clearly had the advantage, as the extra S points from their beams lifted them above the interference levels. Hereford, G3YDD/P, won the Frank Hoosen Trophy as a reward for their mammoth one-band effort. They made 660 contacts for a score of 2,038, using a TS520, a two-element quad and a G5RV. As mentioned earlier in the report, Guernsey used the band to their advantage and made 1,449 points from 476 contacts over a total period of 9h. In addition to their overall win and other band certificates, they will receive the certificate for being second on the band in the Open section. Glenrothes A, who also figure on the overall and the band leader boards, were third with 1,326 points.

The Restricted section was a much closer result with only 59 points separating the first three groups. West of Scotland B, GM8MJ/P, repeated their 1982 success with a leading score of 748, followed by Red Dragon, GW8GT/P, with 724 and Plymouth who had 693 points. Despite the criticisms some good dx was worked by Restricted entrants, including several VK and ZL stations, a few JAs and ZM3KR. Among the USA stations worked, were a considerable number of 6 and 7 call areas plus one or two from VE7.

Careless logging or faulty writing up of the logs caused almost every entrant to lose points. In particular, 599 and 559 were often confused, a point noted elsewhere in the report. The old bugbear of unmarked duplicates was nearly non-existent, although one group did manage to have three and another two. Clearly the problem was tackled efficiently by almost all the groups.

21MHz (by G6LX)

Apart from the Guernsey group who were able to work dx when the rest of the UK were listening to a dead band, most groups were not very enthralled with conditions. However, a lot of dx was worked. From past results, it does seem that the Channel Isles have a propagation advantage on 21MHz, and this, coupled with the GU prefix, was worth an extra 250 points this year.

The band leader was the NFD Trophy winner, the Guernsey group, GU3HFN/P, with a score of 771, and the runner-up was Glenrothes A, GM4GRC/P, the winner of the Gravesend Trophy with 524 points. Both stations operated in the Open section and had the advantage of directional antennas at a greater height than those available to Restricted entrants. In spite of this, Liverpool, G3AHD/P made a creditable 481 points for the highest placed Restricted group. There was a close fight for second place as several contenders had log inaccuracies and lost points. The South of Scotland B group, GM8MJ/P, leapfrogged into the runner-up slot with a score of 415, mainly due to having a more accurate log.

While most of the logs were neat and easy to read, a large number contained errors in recording callsigns, RST and No, or incorrect points claimed for a contact. Many groups claimed three points for a contact with Yugoslavia (4N7), and another two groups delved into the past and claimed six points for contacts with VE and VK. All the logs were computer checked for unmarked duplicates and the few which came to light were penalized accordingly. One entrant using a computer-derived log forgot to program in the page and overall totals (see comments from the committee, later in this report).

Most entrants commented about the difficulty in making inter-UK contacts with other portable stations. There was certainly a dearth of G/P QSOs in the logs, and fewer DL and HB portable contacts than is usual were recorded. There was plenty of dx to be worked during the openings and this should have compensated for the shortfall of Eu/P stations.

28MHz (by G6LX)

Although conditions were not as good for Europe as last year, there were a number of sporadic-E openings during the daylight hours, and additionally a few short openings for the longer haul dx. The logs showed that many groups

Harlow & DARS, G6UT, at this year's HF NFD. L to r: Terry Maton, G6GHU (contest manager), Keith Maton, G6NHU (QSL manager), David Wilkins, G6DMF, and Les Adams, G4KUI

in all parts of the UK had dx contacts, and while it may surprise some entrants, every continent was worked at some time during the contest. Countries appearing in the logs included: A92, CE, CX, LU, PY, VK, VU, VP8, VP9, ZC4, ZP, ZS, 5Z4, 7P8, 9J2, 9K2, 9L1, 9V1 and others.

The overall band leader was the South of Scotland A group, GM4AGG/P, in the Open section. The group had some good openings to Europe and made 84 contacts for a score of 564. Next, also in the Open section, was Guernsey, GU3HFD/P, who worked more dx than the leaders, but fewer Europeans. They finished with 526 points from 84 QSOs. In the Restricted section, SRCC/Croydon, G6LX/P, had 64 contacts on the band for a checked score of 402. In second place was Gt Western, G3NKS/P, who finished with 344 points from 52 contacts. One group had a higher claimed score, but unfortunately forgot to mark a duplicate contact and suffered a deduction of 80 points as a result. Several other groups were also penalized at the × 10 rate for the same reason.

As was mentioned in the 21MHz report, there were many instances of inaccurate logging, and many groups lost points for recording an incoming report as 599 when the other group sent something different. Perhaps the problem was during the writing of the separate band logs, but 599 was certainly not the norm for the band.

Surrey Heath Contest group, wishing HF NFD had been held in the summer —not June! L to r: G3SVL, G3VAA, G4FON, G3RPA and G3OQB. *Photo* G4GLP

Apart from complaints about conditions and the weather, many groups suffered problems from in-band QRM from illegal ssb and fm cb. This seems to have been very bad on sites near to large towns, and prompted one group to suggest that extra points should be awarded to compensate for lost contacts. Several other groups feel that the ×2 bonus is insufficient to encourage stations to work the band during the sunspot minima years. A contrary opinion was expressed by two groups. The first suggested that 28MHz should be deleted from future NFD contests, while another thought that it would be better to discontinue the bonus as this would be fairer to those stations who, because of location, were at a disadvantage. The committee will consider these suggestions when the rules for the next NFD are reviewed.

Inspections

As is shown on the tabulations, a total of 44 stations were inspected in all parts of the UK. The committee is very grateful to the many amateurs and helpers who gave their time to make the visits (some over quite long distances) on behalf of the Society.

Several groups asked why they were not inspected, when the XYZ group were, or vice-versa. The committee literally draws the names out of the hat, and apart from stations operated by members of the HFCC, which are always inspected, and last year's leading stations, who may be visited, all the others are chosen at random.

Check logs

Logs from non-competing fixed and portable stations are most useful to the adjudicators as they provide additional means for checking competitors entries. The Committee awards a certificate to the station in each continent that has the most contacts with UK entrants. This year, logs were received from G2FNK, G2MI, G3FAS, G3TZM, GCRS, AA6EE, DA1WA/HB0, HB9QA/P, ON4FD, OZ1HET, VE3MGY, VK2BQQ, VK6PG, W1OPJ, YU7SF, Z23JO and 9K2BE.

Certificate winners are DA1WA/HB0, Z23JO, 9K2BE, VK6PG and VE3MGY.

Equipment

Once again the FT101 series of transceivers was most popular and 39 groups used one or other of the various marks. Next most used was the TS820/830 (19), with the TS520/530 not far behind (17). After these main contenders, there was a wide variety of types in service, including the FT1, FT102, FT107, FT200, FT707, FT901/902, FT980, TS120, TS180, TS430, TS930, IC701, IC720, IC740, TR5, TR7, Signal-1, SRV-1, SS105S, 102BX, Omni-C, Omni-D, Argosy, Swan 500, FTDX401 and SB101. Only one group used the old faithful Drake twins, once the mainstay of NFD entries. In the Open section 21 groups mentioned that they had used separate monitoring receivers.

Antennas

Open section entrants generally favoured a combination of a multi-band quad or Yagi for the hf bands and separate dipoles for the lower frequencies. There were many more 7MHz beams in use this year, either interlaced with tri-band quads and Yagis, or as a separate antenna. One group had a monster seven-element rotary four-band quad, while another used a Xmas tree of four separate Yagis for 28-7MHz. A four-band Quagi was in use comprising a single multi-band driven element, a similar reflector and interlaced Yagi directors. One group erected a log periodic fixed beam that operated on all bands from 28 to 7MHz.

Delta loops (single or phased pairs) were quite popular for 7 and 3·5MHz, as were slopers, V-beams, long-wires, inverted-Vs and centre-fed wires. Several entrants used phased arrays for 7MHz, including one that could be steered electrically and another that had reversible reflector/director elements.

Once again there was a wide variation in the lengths of wire used by Restricted section entrants and this year they ranged from 66ft to over 500ft, with around 265ft (centre-fed) being the most popular. Others used end or windom-fed wires, standard or double-sized G5RVs, trapped dipoles, trapped verticals or multi-band single-element loops. Many groups used separate pre-tuned atus for each band for quick QSY and a number switched their cf wires from horizontal to vertical polarization by using a three-wire feeder or connecting the whole of the antenna and feeder as a T (yes, this is acceptable under the present rules).

Shacks, masts and towers

It is noticeable that there has been a switch from tents to caravans, car-campers and other specialized vehicles, and over half the entrants in this year's contest were not under canvas. One group had the luxury of a modified bus (normally used as a mobile exhibition), complete with beds, kitchen, a built-in diesel generator and plenty of tables for the gear. Another group borrowed a signals emergency truck, and yet another had a mobile workshop as a shack. We wonder if the days of the tent are numbered?

While many groups used the old reliable pipe mast, there were a substantial number of trailer-mounted towers and other specialized supports in use. The committee were curious as to how so many groups were able to obtain these expensive trailer mounted towers, but it seems that they can often be hired from plant contractors at special weekend rates. In recent years, one group has used a lighting service vehicle and another a mobile crane and they were again in service in this year's NFD.

COMMENTS FROM COMPETITORS

(Weather)

(The South)

"Severe thunderstorms and strong gale"—*Guernsey*.

"Sunburn on Saturday, frizzled by lightning and soaked to the skin on Sunday. Static so bad, it was discharging off the open-wire feeder to ground via the side of the tent. Our check-logger singed his hair on the feeder and was never the same again!"—*Gravesend*.

"Much problem with charged rain, are we the only group that used arc lighting in the tent?"—*Addiscombe*.

"Roasted on Saturday, sizzled by lightning overnight and drowned on Sunday. We found where our tent leaked—everywhere!"—*Crawley*.

"We had to close down at one stage as no one had the nerve to continue"—*G4GZQ NFD Group*.

"We lost nearly a third of our operating time due to storms. Lightning constantly zipped through our atu, very frightening"—*Hastings*.

"We had more than our fair share of 60mph winds and horizontal rain"—*Plymouth*.

"Storms on Sunday were terrible with lightning doing circuits and bumps all around our tent"—*Thames Valley*.

"Fitted earthed spark dischargers on both open-wire and coax feeders. A worthwhile effort as despite constant sizzle during the night and all day Sunday, we were able to keep going. We got drowned of course!—did someone say flaming June?"—*SRCC/Croydon*.

"Evacuated site completely because of lightning danger"—*West Kent*.

"Enormous QRN levels most of the weekend plus constant lightning sizzle. We were forced to give-up at 1400gmt and then had to borrow a farm tractor to tow our vehicles out of the quagmire"—*Channel*.

(Other parts of the UK)

"You did it this time, cannot remember better NFD WX"—*Wirral*.

"Weather not too bad"—*West of Scotland A*.

"Weather excellent"—*West of Scotland B*.

"A beautiful weekend"—*CG Group*.

"Warm and dry, no thunderstorms"—*Gt Western*.

"Very pleasant weather"—*Aberdeen, Lichfield, Scarborough, Stockport B and seven other groups*.

"Major problem this year was sunburn"—*Racal*.

"WX booked in advance by the club's witch doctor"—*Liverpool*.

(Conditions)

"Much better than expected"—*SRCC/Croydon and 16 other groups*.

"20 was outstanding"—*West of Scotland B*.

"Some good dx openings and short skip virtually throughout"—*Leyland Hundred*.

"Good old faithful 20m, it will always produce good results"—*Torbay*.

"A struggle all over the weekend"—*Reading*.

"Mediocre conditions"—*Chiltern*.

"/P activity low-very slow going"—*Bournemouth*.

"It was nice to work the dx as we only expected to work DLs"—*Aberdeen*.

"LF bands good except for heavy static"—*Gt Western*.

"Conditions generally very good"—*Guernsey*.

"Very high static levels but conditions excellent"—*Ilford*.

"Good on all bands"—*Addiscombe*.

"Conditions good for G contacts"—*G4BWP operating 9K2BE.*
"40m was hard going with G station well down on Europeans, the short-path on 20 was poor, but long path open for seven hours, on 15 only short path contacts and signals weak and watery while 10 did not open at all"—*VK6PG.*

(Equipment)
"Generator only broke down once this year"—*Stockport B.*
"Old faithful gene let us down, but we had a spare"—*Guernsey.*
"Choke retaining spring on gene went missing causing wide voltage swings and loss of an hour in total while trouble was sorted"—*SRCC/Croydon.*
"Static discharge caused the Drake to blow-up along with the keyer, even though the antenna was disconnected at the time!"—*Channel.*
"Equipment remained intact after a shower of 0·75in hailstones"—*G2BRS/P.*
"This was the year of the exploding rigs! Two modern and expensive solidstate transceivers failed us and a third developed spurious. We finished the contest using an old Swan 500 (valve unit) which had been put in the car as an afterthought"—*Addiscombe.*
"Static and weather disposed of two rigs and two keyers, but we somehow kept going"—*Crawley.*
"ATU, swr bridge and keyer all failed due to static and lightning sizzle"—*XG Contest Group.*
"Front-end of 740, atu, switching unit and table lamp all burnt out following near strike which set tent alight"—*A Sussex Group, anon by request.*
"Antenna tuned on all bands but so much rf in tent that keyer u/s. Who forgot the earth rod?"—*West of Scotland B.*
"Beam looked more like an aerial and less like a grotesque giant insect than last year's lash-up"—*Clifton.*
"Disaster struck when erecting our five-element interlaced beam as back guys not strong enough and it came down complete with 52ft mast leaving a lot of aluminium scrap. A team led by G3EGX had the lot repaired and up within four hours"—*Wirral.*

(Rules)
(Most entrants answered the request for comments about the starting time for NFD. Lack of space prohibits publication of all the comments, but the results of the survey are given later in this report. *G6LX)*
"Excellent rules, no changes please"—*Ainsdale and 10 other groups.*
"Field day should be completely restructured with homebrew, dipoles and max 50W with possibly straight keys only!"—*Scarborough.*
"Seems wrong to get more points for working locals than dx. Now that we are approaching the sunspot minima, is it not time that the 10m bonus was discontinued"—*Lichfield.*

The West Kent ARS entry for the RSGB HF NFD. The station G3WKS, is being operated by Peter Johnson, G4EMV, assisted by Mark Bennett, G4DIX (right). ***Photo:*** **Steve Ireland, G3ZZD**

"A double points premium is not enough to encourage restricted entrants to use 10m. This should be increased or a multiplier introduced for the band to make the effort worthwhile"—*West of Scotland B.*
"Rules just about right, no changes necessary, but what about a section for the ever growing QRP fraternity?"—*Gt Western.*
"Scoring system does not reward effort of building high gain aerials—seems daft that we get more points for working G5LO/P (line of sight), than VK6RV"—*Racal A.*
"Would like more points for ZL fixed than European /P"—*Bournemouth.*

(General)
"Being a club entering NFD for the first time with many new operators, we were disgusted at the way other stations refused to slow down when it was quite obvious that some of our operators were novices. . . .We did not mind if we came last as long as the operators enjoyed it and gained experience. In the event, they did not enjoy it and if anything it has put them off cw contest operating. It is sad that having had the courage to have a go, they were smacked in the face by these cw bullies. . .in conclusion we have no intention of entering any such future contest that shows so little passion for newcomers and is just a platform for so-called cw operators to wind up their keyers and send 5NN, for us it was a wasted effort" *(part of a long letter from G4NVQ Contests Manager Hastings E&RC).* (We were indeed sorry to read these comments, although not all groups thought the same.)
"Being a new group who had never entered NFD before and with members who had not previously entered a cw contest, they were literally thrown-in at the deep-end. We were impressed with the courtesy and the general opinion was that we had a grand time and thoroughly enjoyed ourselves, a smashing weekend, when is the next one so we can have another go?"—*Dynamics Hatfield.*
"Good to note that our requests for QRS were answered allowing many new operators to be introduced to NFD, for us it was a very enjoyable contest"—*Plymouth.*
"We are new to the NFD game and were pleased that stations slowed down when asked. It certainly helped us novices!"—*CGRS.*
"Thanks for a most enjoyable contest and for all the hard work you do to make it so"—*Aberdeen.*
"In the hope that height might help our score we expeditioned into Wales to our 1,700ft asl vhf site. Result: it didn't seem to make much difference either way"—*Lichfield.*
"The highlight was as usual the cooked breakfast provided by G4BEZ (menu available on receipt of sae and 10ircs). Seriously though, many thanks for organizing another fine NFD and thanks again for your efforts in checking and writing up the results, it's all very much appreciated"—*Gt Western.*
"What about the introduction of a Q signal to indicate 'worked before' eg 'QWB'. Thanks again for a smashing event"—*Wirral.*
"First class, thanks"—*ASMT/RCT.*
"A good event as ever, see you next year"—*Addiscombe.*
"In spite of the weather and all our problems, nobody was heard to groan 'never again', so we will be back in '84"—*Crawley.*
"An excellent contest much enjoyed by all"—*West of Scotland B.*

COMMENTS FROM THE HF CONTESTS COMMITTEE

As it is likely that the DL Society will change its start time for NFD, entrants were asked for their views, and 67 voted; 20 for no change, 23 for a 1600gmt start, one for a 1500gmt start and the rest willing to leave it to the committee. If the DLs and others decide on 1600gmt, then it might be best for us to follow, as otherwise the last hour of NFD will be without any Eu/P stations to work. The Swiss society already start at 1500gmt, and although a few HB/P stations remained on to give points to other portables, they may not do this in the future!

To ensure that all entrants had a supply of log and cover sheets, an amended entry procedure was adopted for this year's NFD. As there were no complaints it must have been successful. The committee thanks all those at RSGB headquarters for the help given in duplicating and distributing the contest stationery and the inspection documents. Thanks are also due to Heather at HQ for the research on the first NFD Contest.

Several entrants submitted computer-derived logs, and while these are acceptable, they must follow the standard log format with 40 entries to a page split into groups of 10 lines and spaced to fill a standard A4 sheet. The same column spacing as on the ordinary log sheet must be used and such logs must be headed and totalled exactly as if they were written logs. In the future, computer-derived logs that do not meet these criteria may not be accepted. To those who used the RSGB stationery, thanks. To the club who used pencil and both sides of the log-sheets, a very big black mark! For the record a total of 10,111 points were lost by all contestants during the checking process.

Another point that merits attention is the need to include operators' callsigns in the log against the contacts that they made. This has been mentioned before and is a definite requirement specified in the rules. Several logs this year omitted this information and had to be returned to the groups for correction. This causes extra work, and any such logs received in future NFD contests will be disallowed.

Organizing and checking the 1983 NFD has taken over 600 man-hours, and almost every member of the HF Contests Committee has contributed in some way or another. In addition to the work done by the adjudicators, special mention must be made of the efforts by RS20249 in co-ordinating the entries and producing the various tabulations that form part of this report, and the other background tasks performed on behalf of the committee. Thanks are also due to G3XTJ, who organized the inspections.

In conclusion, the next NFD contest will be during the weekend of 2-3 June 1984. We hope to see you all again. *G6LX*

The first six on the bands

Restricted section

Band	1st	2nd	3rd	4th	5th	6th
1·8	G4LAD/P	G3NKS/P	G6KQ/P	G6UQ/P	G3XEP/P	G3TVS/P
3·5	G4DKN/P	G4IUZ/P	G6KQ/P	G4DAA/P	G3NKS/P	GW3WAS/P
7	G3GXI/P	G5RS/P	GW8GT/P	G3NKS/P	G6KQ/P	G4GZQ/P
14	GM8MJ/P	GW8GT/P	G3PRC/P	G6LX/P	G4BP/P	GM3BSQ/P
21	G3AHD/P	GM8MJ/P	G3NKS/P	GM3BSQ/P	G6LX/P	G4BP/P
28	G6LX/P	G3NKS/P	GW3WAS/P	GW8GT/P	G3PRC/P	GM4EAF/P

Note: On 1·8 G3NKS/P and G6KQ/P have the same score

Open section

Band	1st	2nd	3rd	4th	5th	6th
1·8	G3SFG/P	G3GRS/P	G3VER/P	G4FUH/P	G4ALE/P	G3WSC/P
3·5	G3WKX/P	G3RRA/P	G3XRT/P	G3VER/P	G3UES/P	G3WSC/P
7	G3ASR/P	G3FKF/P	G3VER/P	G4GGD/P	G3RAL/P	G4ARN/P
14	G3YDD/P	GU3HFN/P	GM4GRC/P	G3KLH/P	G3WKS/P	G3RAC/P
21	GU3HFN/P	GM4GRC/P	G4FUH/P	GM4AGG/P	G3KLH/P	G4GGD/P
28	GM4AGG/P	GU3HFN/P	GM4GRC/P	G3NJA/P	GM4MCB/P	G5BK/P

Note: On 7 G3FKF/P and G3VER/P have the same score

OPEN SECTION

Posn	Name of society or group	Callsign	Band (MHz) 1·8	3·5	7	14	21	28	Total points	No of contacts made*
1	Guernsey ARS†	GU3HFN/P	376	102	396	1,449	771	526	3,620	1,024
2	Glenrothes ARC A†	GM4GRC/P	432	200	564	1,326	524	481	3,527	925
3	Gravesend RS†	G3GRS/P	616	474	716	673	376	258	3,113	813
4	Racal AR Group B†	G3KLH/P	308	327	650	1,144	418	256	3,103	915
5	Racal AR Group A†	G3RAC/P	522	320	705	948	377	226	3,098	812
6	West of Scotland ARS A†	GM4AGG/P	404	96	759	831	440	560	3,090	798
7	Verulam ARC†	G3VER/P	600	536	867	441	340	186	2,970	753
8	Torbay ARS†	G3NJA/P	418	464	541	717	315	334	2,789	721
9	Leicester Polytechnic ARS†	G3SDC/P	474	274	705	791	360	162	2,766	701
10	Scunthorpe ARC†	G4FUH/P	556	390	577	643	451	132	2,749	737
11	Cheltenham ARA	G5BK/P	412	337	490	802	336	288	2,665	711
12	ASMT/RCT ARS	G4GGD/P	404	499	776	429	399	42	2,549	708
13	Addiscombe ARC†	G4ALE/P	540	70	619	647	326	208	2,410	627
14	East Notts Contest Group†	G3TBK/P	390	432	738	372	185	190	2,307	571
15	Crawley ARC†	G3WSC/P	526	502	412	617	107	126	2,209	590
16	Norfolk ARC	G4ARN/P	384	370	760	529	74	124	2,241	581
17	Southgate ARC†	G3SFG/P	654	234	408	521	167	190	2,174	535
18	Leicester RS†	G3LRS/P	388	450	506	385	255	68	2,052	552
19	Hereford ARS	G3YDD/P	0	0	0	2,038	0	0	2,038	660
20	Kilmarnock & Loudoun ARC	GM3ZRT/P	310	237	441	600	374	16	1,978	547
21	Gloucester ARS	G4AYM/P	416	264	656	305	168	162	1,971	498
22	Chiltern ARC†	G3CAR/P	380	404	701	206	98	178	1,967	474
23	Ainsdale ARC	G4NWG/P	210	198	547	403	377	202	1,937	487
24	Hornsea ARC	G4EKT/P	474	358	407	479	175	30	1,923	586
25	Reading ARC†	G3ULT/P	484	308	369	433	100	186	1,880	503
26	Wirral ARS	G3NWR/P	436	336	459	493	76	38	1,838	566
27	Shefford & D RS†	G3FJE/P	12	112	654	540	152	272	1,742	528
28	Medway Radio Contest Group†	G3ZYV/P	296	482	383	355	66	156	1,738	436
29	Shirehampton ARC	G4AHG/P	344	365	479	237	178	100	1,703	446
30	Loughborough Falcon ARC	G3RAL/P	464	263	769	131	74	0	1,701	437
31	Chelmsford ARS	G4DAN/P	316	324	430	192	312	22	1,596	403
32	Stirlingshire ARC†	GM4MCB/P	202	0	364	321	265	302	1,454	354
33	Grimsby ARS	G3CNX/P	314	278	517	116	132	72	1,429	355
34	Clifton ARS	G3GHN/P	142	327	528	199	51	0	1,247	329
35	Edgware & D RS A	G3ASR/P	0	0	1,242	0	0	0	1,242	370
36	Maidenhead & D ARC A†	G3WKX/P	0	1,160	0	0	0	0	1,160	365
37	Ilford RSGB Group†	G3XRT/P	48	544	458	54	0	0	1,104	383
38	Greenock & D ARC	GM3ZRC/P	134	12	90	634	154	8	1,032	332
39	Pitsford Pirates	G3MFE/P	66	278	411	118	120	28	1,021	296
40	North Wakefield RC†	G4NOK/P	352	78	135	159	201	56	981	253
41	Surrey Heath†	G3RRA/P	0	975	0	0	0	0	975	303
42	West Kent ARS	G3WKS/P	0	0	0	955	0	0	955	307
43	Bromsgrove & D ARC	G3VGG/P	132	88	329	262	89	0	900	267
44	Salisbury R & E Society	G3FKF/P	0	0	867	0	0	0	867	287
45	Bournemouth RS	G2BRS/P	0	330	285	127	0	0	742	228
46	Bangor & D ARS	GI3XRQ/P	0	12	12	423	250	0	697	209
47	Hastings Electronics & RC	G6HH/P	82	53	358	34	17	72	616	177
48	Echelford ARS	G3UES/P	0	518	0	0	0	0	518	236
49	Maidenhead & D ARC B†	G3LVW/P	0	0	0	442	0	0	442	143
50	Dynamics Hatfield Club ARS	G4LWV/P	16	41	112	58	0	0	227	70

*Contacts made are claimed figures only
†Inspected stations

RESTRICTED SECTION

Posn	Name of society or group	Callsign	Band (MHz) 1·8	3·5	7	14	21	28	Total points	No of contacts made*
1	Great Western Contest Group†	G3NKS/P	556	532	820	439	385	340	3,072	766
2	Red Dragon Contest Group†	GW8GT/P	456	283	847	724	288	326	2,924	755
3	Lichfield ARS	GW3WAS/P	420	526	634	495	256	334	2,665	661
4	SRCC Croydon†	G6LX/P	412	248	578	610	358	402	2,608	653
5	Stockport RS A†	G6UO/P	500	474	728	465	224	180	2,571	650
6	East Barnet Radio Contest Club†	G6KO/P	556	609	800	455	52	32	2,504	654
7	Channel Contest Group†	G4DAA/P	468	538	694	502	110	162	2,474	613
8	Worthing & D ARC†	G3WOR/P	414	466	584	475	181	190	2,310	660
9	Leyland Hundred ARG	G3GGS/P	446	318	454	521	324	124	2,187	557
10	Liverpool & D ARS	G3AHD/P	300	358	460	453	481	104	2,156	539
11	West of Scotland ARS B†	GM8MJ/P	458	148	402	748	394	0	2,150	593
12	Aberdeen ARS A	GM3BSQ/P	370	292	491	555	372	68	2,148	584
13	Scarborough ARS	G4BP/P	366	393	441	560	335	24	2,119	552
14	Oxford & D ARS†	G5LO/P	374	220	694	481	150	184	2,103	540
15	Leeds & D ARS†	G4LAD/P	630	278	345	542	94	118	2,007	498
16	G4GZO NFD Group†	G4GZO/P	288	428	790	280	95	76	1,957	524
17	White Rose CW Contest Group†	G3XEP/P	498	196	576	427	173	54	1,924	492
18	Stockport RS B†	G4MCC/P	478	186	529	400	189	128	1,910	476
19	Thames Valley ARTS†	G3TVS/P	482	254	474	321	182	166	1,879	476
20	Plymouth RC	G3PRC/P	96	12	500	693	182	264	1,747	491
21	Glenrothes ARS B†	GM3ULG/P	442	274	270	443	290	0	1,719	452
22	Sedgemoor & D ARS	G4SRR/P	250	320	516	399	181	0	1,666	505
23	Preston ARS	G3KUE/P	340	513	266	306	163	72	1,660	414
24	Cornish ARC	G4CRC/P	0	142	370	432	220	220	1,384	359
25	Perth & D AR Group	GM4EAF/P	0	223	128	531	192	240	1,314	337
26	Easington & Hartlepool ARSs	G4APN/P	228	387	244	278	155	20	1,312	384
27	Aberdeen ARS B	GM3VEY/P	152	109	510	419	110	6	1,306	402
28	Blackpool & Fylde ARS	G5ND/P	0	310	353	312	221	68	1,264	369
29	Eccles & D ARS†	G3GXI/P	0	0	1,259	0	0	0	1,259	426
30	Ivybridge RC†	G4NDL/P	286	151	247	154	150	210	1,198	290
31	Guildford & D RS†	G5RS/P	0	0	1,181	0	0	0	1,181	393
32	Reigate ATS	G5LK/P	108	314	482	181	86	8	1,179	332
33	South Essex ARS	G4RSE/P	8	219	375	305	73	78	1,058	542
34	Farnborough & D RS†	G4DKN/P	0	802	0	0	0	0	802	268
35	Thornton Cleveleys ARS	G4ATH/P	112	108	262	219	70	0	771	225
36	Colchester Radio Amateurs	G4CRA/P	0	251	330	89	47	0	717	217
37	Edgware & D ARS B	G4IUZ/P	0	649	0	0	0	0	649	217
38	Burton upon Trent RS	G3NFC/P	0	286	294	10	0	0	590	188
39	Bury St Edmunds ARS	G2TO/P	0	0	0	387	0	0	387	128

*Contacts made are claimed figures only.
†Inspected station

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 January 1984 issue.

RSGB affiliated organizations are requested to report all programmes and news items to their regional representatives regularly. Information for inclusion in the **December** issue should reach them by **15 October** and for the **January** issue by **12 November**.

Club programmes are given in order of date, subjects, 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 (NW Repeater Group)—13 October, 8pm. Globe Bowling Club, Willows Lane, Accrington. Sec Howard Aspinall, G3RXH.

Ainsdale (AARC)—11, 25 October, 8pm. Ainsdale Scout HQ. Details from sec John Wollaston, G6JOE, tel 0704 27219.

Blackburn (East Lancs ARC)—4 October (To be announced), 1 November (Home construction night), 7.30pm. Shadsworth Leisure Centre, Blackburn. Pro Graham Pountain, G4MWY, tel 0254 678933.

Bury (BRS)—11 October (Constructional contest). Informal meetings 4, 18 and 25 October. Contact M. G. Pritchard, G3VNQ, tel Rochdale 355922.

Fylde (FARS)—4 October (Constructional projects, speaker/demonstrator Peter Mackrell, G3AEP), 18 October (Programme discussion—March 1984 onwards), 1 November ("Nucleonics", by John Bell, G4DPI), 7.45pm. Kite Club, Blackpool Airport. Sec Wally Poupard, 14 Beach Street, Lytham, tel 0253 734596.

Leyland (LHRG)—10 October, 7.30pm. Astley Park Sports Club, Hallgate, Astley Village, Chorley. Sec Arthur Jolly, G4JCO.

Liverpool (L&DARS)—4 October (AGM), 8.15pm. Wavertree Conservative Association, Church Road, Wavertree. Sec Gordon Purslow, G6MHG, tel 051-263 5837.

Manchester (SMRC)—7 October ("Introduction to ssb techniques", by Colin McKenzie, G8LQO), 14 October ("A thermionic revival", by David Holland, G3WFT), 21 October ("Transmission media on telecommunications", by Ron Smith, G3SVW), 28 October (2m fox hunt), 18 November (Annual Dinner, Bowden Hotel, Altrincham), 8pm. Sale Moor Community Centre, Norris Road, Sale. Informal meetings Mondays in club shack. Sec David Holland, G3WFT, tel 061-973 1837.

Ormskirk (O&DARC)—10, 24 October. Contact sec Mike Coverdale, G4LTI, tel 0695 78326, for further details.

G4EMA, of York ARS, shown with the G4INY trophy won with his homebrew hf transceiver

Preston (PARS)—13 October ("Earthing", by Ray Jones, G3NKL), 27 October (To be announced). Lonsdale Club, Fulwood Hall Lane, Fulwood, Preston. Contact George Earnshaw, G3ZXC, tel 0772 718175.

Thornton Cleveleys (TCARS)—3 October (Judging of the construction competition), 10 October (Photographs and videos of club activities), 17 October (AGM, pie & pea supper), 24 October (Natter night), 7.30pm. Norbreck 1st Scout Hut, Carr Road, Bispham. New sec Janet Atkinson, 26 Lancaster Avenue, Thornton Cleveleys FY5 4NN, tel Blackpool 826451.

Warrington (UK FM Group Western)—6 October. Grappenhall Community Centre, Grappenhall, Warrington. Sec Gordon Adams, G3LEQ, tel 0565 4040.

Wirral (WARS)—5 October (Sale of surplus equipment), 19 October (AGM), 7.45pm. Note new meeting place, Guide Hut, Westbourne Road, West Kirby. Details from sec Cedric Cawthorne, G4KFY, tel 051-625 7311.

Wirral (W&DARC)—9 October (Sunday df hunt), 12 October ("Computers in amateur radio", by Paul, G4DLY), 26 October (Inter-club quiz night, return match with Chester ARC), 8pm. Irby Cricket Club, Irby Mill Road, Irby. D & Ws: 5 October (The Seven Stars, Thornton Hough), 19 October (The Victoria Lodge, Tranmere), 2 November (The Harp, Lower Neston). Sec Gerry Scott, G8TRY, tel 051-630 1393.

REGION 2—RR D. S. Smith, G4DAX, Red Roof, Goathland, Whitby, North Yorks YO22 5AN. Tel 094-786 333.

Barnsley (UK FM Group Northern)—2 October, 6 November, 7.30pm. The Royal Hotel, Church Street, Barnsley. Sec G4LUE.

Goole (G&DARS)—4 October (Natter night), 11 October ("First aid", by G4VBI), 18 October ("Operating abroad", by G4NJP), 25 October (Bring and tell night), 8pm. Junior Chamber Buildings, Boothferry Road, Goole. Sec Richard Sugden, G8IOH. Details from G8IOH or G8VHL.

Halifax (Northern Heights)—5 October (Visit to Peter Black's car museum at Keighley), 19 October ("Bits and bytes", by G3YEE), 2 November ("Home brew 23cm", by G4ENR), 7.30pm. Clairmount Liberal Club, Belgrave Avenue, off Clairmount Road, Halifax. New address for sec G6CJL, 6 Park Fields, Moor End Road, Halifax HX2 0RF, tel 54635.

Otley (OR&ES)—Tuesdays, 8pm. RAOB Club, Otley. Sec G6LQN, tel 0943 75183.

Pontefract (P&DARS)—Second Thursday in each month, 8pm. The Carleton Community Centre, Pontefract. CW classes each Monday, 8pm. Pro G4TGU, tel Leeds 871484.

Spen Valley (SVARS)—13 October (Committee/project night), 27 October (Computers in amateur radio), 10 November ("Equipment alignment", by G4EZV), 8pm. Old Bank Working Men's Club, Mirfield, W Yorks. Sec G4MLW.

Wakefield (W&DARS)—4 October ("Computers for beginners", by G4CPC), 18 October (Pie and pea supper), 1 November (On the air/natter night), 8pm. Holmfield House, Denby Dale Road, Wakefield. Sec G8BPE, tel Wakefield 378727.

York (YARS)—Fridays, 7.30pm. United Services Club, Micklegate, York. Following participation at both Tollerton Show and Great Yorkshire Show (for both of which the band conditions were poor), the club is settling down to its winter programme. The annual dinner will be held on Friday 21 October. Details from sec Keith Cass, G3WVO.

REGION 3—RR L. W. Craven, G4EQI, Grassmoor, Radford Road, Alvechurch, Birmingham. B48 7DT. Tel 021-445 1347.

Atherstone (AARC)—20 October (Informal evening), 7.30pm. Tudor Centre, Coleshill Road, Atherstone. Sec G6IQM, tel Fillongley (0676) 40946.

Birmingham (Midland ARS)—18 October, (AGM), 7.30pm. 294a Broad Street, Birmingham B1 2DS. Sec G8BHE, tel 021-422 9787.

Birmingham (South Birmingham RS)—5 October ("50 years in amateur radio", by Tom Douglas, G3BA), 7.45pm. Hampstead House, Fairfax Road, West Heath, Birmingham B31 3QY. Sec G8RGQ, tel 021-459 8312.

Bromsgrove (B&DARC)—14 October (Club surplus sale), 8pm. Avoncroft Art Centre, Bromsgrove. Asst sec G4NWQ, tel 021-476 6965.

Coventry (CTARS)—October activities to be announced on GB2RS. Meetings 7pm, Winfray Annexe, Coventry Technical College. Chairman Roger, G3ZFR, tel Coventry (0203) 365117.

Dudley (DARC)—11 October ("Computers in the production of the *Express & Star*", by Miss Wheeler), 7.45pm. 12 & 20 October (Visits to *Express & Star*, six persons only for each visit), 2.15pm. Central Library, Dudley. Sec John, G4NRA, tel Kingswinford (0384) 278300.

Halesowen (MEB Sports & Social Club—Radio Section)—11 October ("RSGB—services and activities", by zonal member Henry Pinchin, G3VPE), 25 October (General meeting), 8pm. MEBHQ Social Club, Mucklow Hill, Halesowen. Sec G4RWH, tel 021-747 8784.

Hereford (HARS)—7 October (Club meeting, subject to be announced on GB2RS), 21 October (Annual junk and equipment sale), 8pm. Lord Scudamore School, Friar Street, Hereford. Sec G4CNY, tel Hereford (0432) 273237.

Kidderminster (K&DARC)—11 and 25 October, (To be announced on GB2RS), 8pm. Aggborough Community Centre, Hoo Road, Kidderminster. Sec G8WOX, tel Kidderminster (0562) 751584.

Malvern Hills (MHRAC)—1, 2 October (UHF contest). Club meetings Red Lion Inn, St Anns Road, Malvern. Sec G4GFX, tel Malvern (06845) 62900.

Solihull (SARS)—18 October, (AGM), 7.30pm. Manor House, High Street, Solihull. Sec G4NRR, 76 Solihull Road, Shirley, Solihull B90 4HL.

Stourbridge (StARS)—3 October (Final arrangements for JOTA, 22/23 October), 17 October ("Meteor scatter propagation at vhf", by Dave Powis, G4HUP), 8pm. 22, 23 October (JOTA at Hagley Ramblers Scouts). The Garibaldi , Cross Street, Stourbridge. Sec G8JTL, tel Lye (593) 4019.

Sutton Coldfield (SCARS)—10 October, (Preparation for JOTA). 24 October ("Workshop techniques", by Harry Griffiths, G3BOQ), 7.30pm. Central Library, Sutton Coldfield. Sec G8TUR, tel 021-353 2061.

Walsall (WARC)—12 October (Junk sale), 8pm. Forest Community Centre, Hawbush Road, Leamore, Bloxwich. Sec G4FAJ, tel Brownhills (05433) 2169.

Warwick (Mid-Warwickshire ARS)—4 October (Natter night), 18 October ("Safety", by Norman Read, G8CXL) 8pm. 61 Emscote Road, Warwick. Sec Carol, G6LKP, tel Southam (092681) 4765.

REGION 4—RR M. Shardlow, G3SZJ, 19 Portreath Drive, Darley Abbey, Derby DE3 2BJ. Tel Derby (0332) 556875.

Buxton (BARS)—11 October (Visit by Lowe Electronics), 8pm. Egerton Hotel, 36 St Johns Road, Buxton. Sec Derek Carson, G4IHO, tel Buxton 5006.

Derby (D&DARS)—5 October (Junk sale), 12 October (Night on the air), 19 October (Visit by Lowe Electronics), 26 October (Natter night), 2 November (Junk sale), 7.30pm. 119 Green Lane, Derby. Sec Jenny Shardlow, G4EYM, tel Derby 556875.

Grantham (GRC)—18 October ("The RSGB and its services for members", by Martin Shardlow, G3SZJ), 8pm. Shirley Croft Hotel, Harrowby Road, Grantham. Sec John Kirton, G8WWJ, tel Grantham 5743.

Grimsby (GARS)—6 October (AGM), 20 October (Talk on railways), 3 November (Junk sale), 7.30pm. Cromwell Social Club, Cromwell Road, Grimsby. Sec Reg Scarlett, G4HZF.

Lincoln (LSWC)—1 October (Fox hunt/treasure hunt, G8HMZ), 12 October ("Slow scan tv", by J. Stace, G3CCH), 26 October ("European steam trains", by Alan Hoggett), 8pm. City Engineers Club, Waterside South, Lincoln. Sec Pam Rose, G4STO, tel Gainsborough 778356.

Newark (N&DARC)—6 October (Television, slow and fast scan), 7.30pm. Palace Theatre, Appleton Gate, Newark. Sec Roger Hiscock, G4MDV.

Nottingham (ARCON)—6 October (Forum/beginners' night) 13 October (Grand junk sale), 20

The Maidenhead & Chiltern ARC teams just before the second leg of an inter-club quiz, with quizmaster Reg, G6XO. Chiltern ARC won the first round, Maidenhead the second! Back row, l to r: Dave, G6LAU; John, G3TWG; Reg, G6XO; Bob, G3LVW, and Peter, G4UAH—the Maidenhead team. Front row, l to r: Colin, G6LLE; Chris, G4KVI; Alan, G4MKE; and Dave, G6IST—the Chiltern team

October (Activity night), 27 October (Computers in amateur radio), 7.30pm. Sherwood Community Centre, Mansfield Road, Nottingham. Sec Phil Barber, G4OSL.
Skegness (S&DARS)—First and third Tuesdays in each month, 21 October (Visit to the Spilsby junk sale, Corn Exchange, Market Place, Spilsby), 7.30pm. White Swan, Burgh Le Marsh, Skegness. Sec Clive Ironmonger, G6HYF.
Wigston (WARC)—Fridays, 7.30pm. United Reform Church, Wigston Magna. Sec Roy Tabberer, G6HAJ, tel Leicester 403105.

REGION 5—RR J. S. Allen, G3DOT, 77 Rosslyn Crescent, Luton LU3 2AT. Tel 0582 508515, or at work, 0582 21151.

Cambridge (CUWS)—Sundays, 4, 5 October (A stall at the Societies' Fair at Kelsey Kerridge Sports Hall, Cambridge, to which anyone is invited), 9 October (The first of informal meetings), St John's College Buttery Bar. Further details from the new sec Lawrence Barker, G8NJJ, of Selwyn College.
Dunstable Downs (DDRC)—7 October (Construction contest), 21 October (TEK talk), 8pm. Chews House, Dunstable High Street. Sec G8XTW.
Leighton Linslade (LLRC)—Mondays, 3 October ("VHF then and now", a talk by Jack Hum, G5UM), 17 October (Richard Limebear, G3RWL, of Amsat, on Oscar), 7-10pm. Vandyke Community College, Room A64, Vandyke Road, Leighton Buzzard. Sec Pete Brazier, G6JFN, tel Heath & Reach 270.
Luton (Kent Process Control ARS)—5 October (Final arrangements for JOTA). KPC Club House, Tenby Drive, Luton. Only open to employees of Brown Boveri or Brown Boveri Kent. Sec G3DOT.
Peterborough (GPARC)—20 October ("My homebrew transceiver", by a local Class A licence holder), 7.30pm. Southfields Junior School. Sec Frank Brisley, G4NRJ.
St Neots (SN&DARS)—3 October (A visit to the studios of Radio Cambridgeshire), 17 October (A visiting speaker from the Cambridge Repeater Group), 8pm. Horseshoe Inn, Offord D'Arcy, nr Huntingdon. Sec Steve Foote, G4FOH.
Shefford (S&DARS)—Thursdays, 13 October (Final arrangements for JOTA), 8pm. Church Hall, Shefford. Sec Alan, G4PSO.
Wellingborough (Nene Valley RC)—5 October (Natter night and hf transmitting), 12 October (Lecture "Aylesbury Vale Repeater Group", by G8MEH), 15-16 October (GB3WDS special event station for Boy Scouts "Jamboree on the Air" from the club room at the First St Mary's Scout Hall, Finedon), 19 October (RSGB lecture, to be confirmed, G3RPE), 26 October (Natter night and Garex Ltd parts stall), 8pm. Lectures and natter nights are held at the Dolben Arms, Finedon. All transmitting from the club room at the First St Mary's Scout Hall. Sec Lionel Parker, G4PLJ, tel Wellingborough 79539.

Congratulations to the Leighton Linsdale RC for raising £125 for charities as a result of their July picnic; well done the xyls, I enjoyed the cream teas! For clubs who have not sent me a programme for October, please make use of the RSGB news service. *RR5.*

REGION 6—RR F. S. G. Rose, G2DRT, 84 Cock Lane, High Wycombe, Bucks HA3 7EA. Tel Penn (049481) 4240.

Aylesbury (AVRG)—Details from David Roberts c/o Hunters Moon, Buckingham Road, Harwick Road, Aylesbury, Bucks.
Aylesbury (AVRS)—4 October ("A 160/80m transceiver", by Robin Hewes, G3TDR), 1 November ("Semi-conductors and transistors", by Robin Pritchard, G8AYM), 8pm. Stone Village Hall, Stone, nr Aylesbury. Details from Cathy Clark, tel 0844 61461.
Banbury (BARS)—Last Friday in each month, St Paul's Church Hall, Warwick Road, Banbury. Details from John Burrell, G8OZH, tel Brackley 702900.
Chesham (C&DARS)—Wednesdays, 7pm. Stable Loft, Bury Farm, Pednor Road, Chesham. Details from sec John Alldridge, G6LKS, tel Chesham 786935.
Harwell (HARS)—18 October (Quiz "So you think you know about amateur radio"), 7.30pm. Harlequin Room Social Club, AERE. Contact AR, Cliff Sharpe, G2HIF, tel Wantage 3497.
Maidenhead (M&DARS)—18 October ("Secret listeners", BBC film plus another), (Check venue with sec), 3 November (Grand junk sale). Details from sec, Roger Hemmings, G3VCT.
Milton Keynes (MK&DRS)—10 October (AGM, all members please attend), 8pm. Lavatt Hall. Sec Dave White, G3ZPR.
Newbury (N&DARS)—11 October ("The RSGB", by John Nelson), 8 November ("Long Yagi—facts and fallacy", by D. White, G3SEK), 7.30pm. Newbury Technical College. Details from Mike Fereday, G3VOW, tel Newbury 43048.
Oxford (OURS)—New students interested in amateur radio please contact Robert Henshaw, G4GCM, Trinity College.

REGION 7—RR to be elected

Crystal Palace (CP&DRC)—15 October (Junk sale), 8pm. All Saints Parish Rooms, Upper Norwood, SE19. Sec G.M.C. Stone, 11 Liphook Crescent, London SE23, tel 01-699 6940.
Dorking (D&DRS)—Second and fourth Tuesday in each month, 8pm. Star & Garter Hotel, Dorking Station. Club net Sundays, 0730gmt, 3·780MHz. Sec G3AEZ, tel 0306 77236.
Redhill (Reigate ATS)—18 October ("Satellite operation", by G2BUY), 8.15pm. Constitutional and Conservative Centre, Warwick Road, Redhill. Sec C. Barnes, G8FEE.

REGION 8—RR to be elected

Canterbury (EKRS)—First and third Thursday in each month, 6 October (AGM and election of officers), 8pm. The Cabin, Kings Road, Herne Bay. Details from Stuart Alexander, G6LZG, tel Canterbury 68913. The club has a very active contest group and has been fairly successful over the last few years as G3LTY and G6EKR, both portable. Two of the members, G8FEZ and G8ULU, are QRV on 1·3GHz in QTH locator AL, and would welcome QSOs from other amateurs with similar equipment.
Thanet (RCT)—11 October (AGM), 15, 16 October (JOTA station GB4TS), 25 October (Video film evening), 8pm. Birchington Village Hall. Details from I. B. Gane, G4NEF.

REGION 9—RR W. J. Colclough, G3XC, Highview, Indian Queens, St Columb, Cornwall TR9 6LL. Tel 0726 860485.

Camborne (CRAC)—6 October ("1,296MHz and all that shf", by G3NPB and John Pover, or G4EIK and G4STB (There would appear to be some confusion here—the club mag says the former and the pro the latter) whoever the lecturers are it should prove an interesting subject, want to borrow my 4ft dish?-*RR*). Computer section: 17 October ("Peripheral control", by Des Old, G3CZZ). 7.30pm. Details of venue until further notice from pro Simon Rodda, G4PEM, tel Penzance 3948.
Exeter (EARS)—10 October (AGM), 7.30pm. Community Centre, St David Hill, Exeter. First and third Mondays (Informal). Scout HQ, Emmanual Road. 2m net Tuesdays, 1930, on S22. Details from pro Andy Lake, G8YOA, tel Exeter 39597.
Plymouth (PRC)—2 October (Club 144 and 432MHz contest, details from contest secretary, G3ULN), 3 October (Talk on computers in amateur radio), 17 October (Air sea rescue talk by Roland Hewett, G3XLU), 31 October (Activity night, club rig on air, competition for homebrew equipment), 7.30pm. Tamar School, Paradise Road, Millbridge, Plymouth PL1 5QW. Contact Dave Whitbread, G6EQM, tel 0752 20224.
Tiverton (South West TRC)—Mondays, 7.30pm. The Queens Head, Castle Street, Tiverton. Club call G4TSW. Details from sec V. W. Baldry, G6IVU, PO Box 3, Tiverton, Devon EX16 6RS, tel Tiverton 253319.
Torbay (TARS)—Fridays, 7.30pm. Last Saturday in each month (Special meeting), 7.30pm. Bath Lane, rear of 94 Belgrave Road, Torquay. Contact sec Mrs Margaret Rider, 7 Kingston Close, Kingskerswell, South Devon TQ12 5EW, tel 08047 5130. The club magazine is to be revived, publication is to be bi-monthly, and it will be available to members free, copies can be obtained by non-members by contacting club sec.

REGION 10—RR E. J. Case, GW4HWR, 2 Abbey Close, Tyrhiw, Taffswell, Mid-Glamorgan CF4 7RS. Tel 0222 810368.

Cardiff (CRSGBG)—10 October (AGM and film show), 7.30pm. Pantmawr Hotel, Tyla Teg, Pantmawr Estate, Whitchurch, Cardiff. Sec Cyril Laws, tel Cowbridge 3212.
Rhondda (RARS) (GW2FOF)—Listen for their new callsign on meeting nights, alternate Thursdays from 13 October, 7.30pm. NUM Club, Tonypandy. Sec John, GW4BUZ, tel Tonypandy 432542.
Swansea (SARS)—First and third Thursdays in each month, 6 October ("Ham radio's favourite topic", by John Powell, the Gower meteorologist, followed by a buffet and social), 7.30pm. Lecture Room N, Applied Science Building, Swansea University. Details from Roger Williams, GW4HSH, tel Swansea 404422.

Quite a few amateurs in the Dumfries area might recognize these faces from their "school days". Bob Frost, GM6FT (left) was a supervisor of RAE and radio & television trade classes at Allen Glen's School, and since the second world war has been at Cardonald College, Glasgow. Douglas Halliday, GM2AHD (centre), has been an RAE teacher at the Dumfries Technical College for many years, and A. Frazer, GM3AXX, taught the RAE first at Allen Glen's School, and then from 1951-77 at the Glasgow College of Nautical Studies. They met at the Dumfries RC Open Day

Members of the South Dorset RS at the Royal Signals Museum, Blandford Camp, Dorset. *Photo:* G3VOO

I would like to thank all of those members who supported me in the recent election and to assure all members of the region that I will do my best to represent them. I shall be pleased to hear from club secretaries and will arrange a visit to their clubs on a mutually convenient date should this be required. I shall also be pleased to hear from non-club members and will always try to sort out any problems. *RR10.*

REGION 11—RR B. H. Green, GW2FLZ, 1 Clwyd Court, Tan-y-Bryn Road, Colwyn Bay, Clwyd LL28 4AH. Tel 0492 49288.

Colwyn Bay (Conwy Valley ARC) (GW6TM)—13 October (Talk by Lt Commander D. M. Richards, "The role of the Royal Observer Corps"), 7.45pm. Green Lawns Hotel, Bay View Road, Colwyn Bay. Sec Mr J. N. Wright, GW4KGI, 46 The Dale, Woodlands, Abergele, Clwyd LL28 7DS, tel 0745-823674.

REGION 13—RR A. B. Givens, GM3YOR, 41 Veronica Crescent, Kirkcaldy, Fife KY1 2LH. Tel Kirkcaldy (0592) 200335.

Edinburgh (Lothians RS) (GM3HAM)—Second and fourth Thursday in each month, 7.30pm. Harwell House Hotel, 13 Ettrick Road, Edinburgh EH10 5TJ. Details from GM4HWO, not QTHR, tel 031-332 5502.

REGION 14—RR to be elected

Stirling (S&DARS)—Second and fourth Wednesday in each month. Details from Gordon Hudson, GM4SVM, tel Stirling (0786) 5834.

REGION 16—RR T. D. Howe, G3PLF, 18 Vange Hill Drive, Basildon, Essex SS16 4DD. Tel 0268 24453.

The regional representative regrets that due to unforeseen circumstances he has been unable to compile the Region 16 section of "Club News" this month.

The editor has been advised of the following:

Braintree (B & DARS)—First and third Mondays in each month, 1 October ("Autumn Fayre", at Braintree Community Centre), 3 October (Setting up for JOTA), 17 October (Talk by Tony Howe, G3PLF, RSGB RR), 15-16 October (JOTA "GB2FBS", First Braintree Scouts HQ, John Ray Street), 7.30 for 8pm. Braintree Community Centre, Victoria Street (Next to bus station). Pub sec Jeff Roberts, G6OIX, tel Braintree 44857.

Chelmsford (CARS)—4 October (AGM), 1 November ("The 50MHz band", by L. V. G. Turner, G4CUT), 7.30pm. The Marconi College, Arbour Lane, Chelmsford. Details from A. C. Mead, G4KQE, tel Silver End 83094, or Witham 512316 (day), or L. V. G. Turner, G4CUT, tel Chelmsford 66993 or Chelmsford 67111 ext 2043 (day).

REGION 17—RR H. G. Cunningham, G8FG, 235 Station Road, West Moors, Wimborne, Dorset BH22 0HZ. Tel Ferndown (0202) 876018.

Andover (ARAC)—4 October (YL-XYL evening), 19 October (Natter night), 7.30pm. For venue contact sec, G4OZL.

Basingstoke (UK FM Group Southern)—5 October (Auction of surplus equipment), 2 November (AGM), 7.30pm. Chineham House, Shakespeare Road, off Popley Way, Basingstoke. Sec G3KWU, tel (0703) 812435.

Bournemouth (BRS)—7 October (AGM), 21 October ("QRP construction and operating", by G4LKI), 7.30pm. Kinson Community Centre, Kinson, Bournmouth. Sec G4EKE, tel Ferndown (0202) 877945.

Fareham (F&DRC)—5 October (Natter night), 12 October (S-meters and PL259s", by G4JCC and G6BBS), 19 October (Natter night), 26 October (Shack layouts—open forum), 7.30pm. Portchester Community Centre, Porchester. Sec G4ITG, tel Fareham (0329) 234904.

Farnborough (F&DRS)—12 October ("Film night", by G4MBZ), 26 October (Surplus equipment sale), 7.30pm. Railway Enthusiasts Club, Access Road, off Hawley Lane, Farnborough. Sec G4BJQ, tel Farnborough (0252) 543036.

Horndean (H&DARC)—13 October (AGM), 7.30pm. Merchiston Hall, Horndean. Sec G4RLE, tel Horndean (0705) 593429.

Portsmouth (Marconi E&ARS)—25 October ("The history of early radar", by Les Carden, G8HY), 7.30pm. Sports & Social Club Lounge, next to bar at Broadoak Works, Airport Service Road, opposite Hilsea Railway Station. Details from Barry Skipworth, G8XNW, tel 0705 674023 during office hours. Amateurs who are not Marconi employees also very welcome.

Weymouth (SDRS)—4 October (RSGB meeting), 8 October (DF hunt), 7.30pm. Army Bridging Camp, Wyke Regis, Weymouth. Sec G3ZGP, tel (0305) 812893.

Wimborne (FRARS)—2 October (HF transceiver development by G3VBL), 9 October ("50MHz band, pre-and post-war, by G6XM), 16 October (Nicks rambles", by G8MCQ), 7.30pm. Flight Refuelling Social Club, Meerly, Wimborne. Sec G8VFY, tel Wimborne (0202) 882271.

Winchester (WARC)—15 October (Auction of surplus equipment), 7.30pm. The Scout Log Cabin, Stockbridge Road, Winchester. Sec G3SHQ, tel Twyford (0962) 713003.

REGION 19—RR R. J. C. Broadbent, G3AAJ, 94 Herongate Road, Wanstead Park, London E12 5EQ. Tel 01-989 6741.

Cheshunt (C&DARC)—5 October (Natter night), 12 October ("Writing for amateur radio", by Tony, G4FAI), 19 October (Natter night), 26 October ("A satellite rx station", by D. Woollard, Rediffusion Eng), 8.15pm. The Church Room, Church Lane, Wormley, nr Cheshunt, Herts. Details from Roger Frisby, G4OAA, tel 09924 64795.

Chiswick (ABCARC)—18 October ("Further experience in dx countries"). Committee Room, Chiswick Town Hall, High Road, London W4. Sec W. G. Dyer, G3GEH, tel 01-992 3778.

Edgware (E&DRS)—2 October (Sunday afternoon df hunt, 160/2m) 2.30pm. Watling Centre Car Park. Details from sec. 13 October ("Simple transmitters", by G. Stancey, G3MCK, plus a discussion on a novice licence). The Watling Community Centre, 145 Orange Hill Road, Burnt Oak, Edgware. Sec Howard Drury, G4HMD, tel 01-952 6462.

Havering (H&DARC)—5 October (Quarterly business meeting), 12 October (Informal), 19 October (Constructors' Cup), 26 October (A film or video lecture, to be announced, listen on GB2RS), 8pm. Fairkytes Art Centre, Billet Lane, Hornchurch, Essex. Details from A. Negus, G8DQJ, tel Upminster 24059.

London (BBC Ariel RG)—Membership is restricted to members of the BBC Club and their families. For details of this club, membership and the monthly nets please contact K. H. J. Rainbow, G8LRE, sec ARG, tel 01-580 4468, ext 4891 (Room 110 HWH).

London (Civil Service ARS)—3 October ("Aurora part 1", by Charlie Newton, G2FKZ), 17 October (Informal chat session). Tuesday net frequency has been moved to 3·720MHz at 2000 local. CSARS holds meetings mainly during the lunch hour at The Civil Service Rec Centre, Monck Street, Millbank SW1. Details from G. Costin, G4GFU, tel 01-632 6444, daytime.

Southgate (SARC)—13 October ("EME", by G4ASR), 8pm. St Thomas's Church Hall, Prince George Avenue, London N14. Pro John Fitch, G8EWG.

Stevenage (S&DARS)—4 October ("Making a homebrew lattice tower", by G8EKU), 18 October ("Talk on battery maintenance by Ever Ready), 8pm. TS Andromeda, Fairlands Valley Park, Shephall View, Stevenage, Herts. Morse classes at 7.15pm. Pro Trevor Tugwell, G8KMV; sec G4BGP, tel Baldock 893736.

Wanstead (ELGRSGB)—Third Sunday in each month, 3pm. Wanstead House, The Green, Wanstead, London E11. The Group was forced to cancel its September meeting at Wanstead House due to problems with the venue and lack of availability of the members of committee. Because of this situation there will be an EGM on Sunday 16 October which it is vital that all past and present members of this group attend. The business meeting will be followed by a junk sale. Details from Julian Greenberg, G6DXW, tel 01-550 7013.

Your Regional Representative, G3AAJ, would like all past, present and future secs of clubs wishing to use this service to read the preamble at the beginning of "Club News". I cannot place your programme in this column unless you do the job that you have elected to do for your members. *Ron Broadbent, RR19.*

REGION 20—RR B. L. Goddard, G4FRG, 2 Greenfield Park, Portishead, Bristol BS20 8NQ. Tel 0272 848140.

Bath (B&D ARC)—Alternate Wednesdays, 7.45pm. Englishcombe Inn, Englishcombe Lane, Bath. Club now has the callsign G4TMH and operates on hf and vhf. Details of the October meetings can be obtained from Trevor Whitehead, tel Bath 319150, or sec Mike Mason, tel Bath 31104.

Bristol (BRSGBG)—Queens Building, Bristol University. Details of the October meeting will be given on GB2RS. Details from Chris Short, G8GLQ, tel 0272 621253.

Cheltenham (CARA)—7 October (A joint meeting with GC Amateur Radio Club and Smiths Instruments Radio Society). Stanton Room, Carlton Kings Library, Cheltenham. Details from sec Gill Harmsworth, G6COH, tel Cheltenham 25162, or chairman John Holt, G3GWW, tel Witcombe 3435.

Gloucester (GARS)—5 October (Informal), 12 October (Lecture by Tom Douglas, G3BA). Please note that there is no meeting on 26 October. 2 November (Talk by a retired ship's radio officer on his experiences in the days of "Spark"). St Barnabus Hall, Stroud Road, Gloucester. Details from sec Tony Martin, G4HBV.

Portishead (Gordano ARC)—26 October (Talk on wildlife), 8pm. Ship Inn, Down Road, Portishead. Details from Bob Coles, G8ROC, tel 0272 691685.

Thornbury (T&D ARC)—5 October (Talk on Raynet by Trevor Hipwood, G8GFZ (North Avon Raynet), 7.30pm. White Horse, Groves End (on A38). Details from Alan Jones, G8AZT, or sec Brian, G3RYC.

Yeovil (Y&DARC)—6 October ("Ionograms and the concept of virtual height", by G3MYM), 13 October ("The potential of amateur radio in the community", by G3MYM), 20 October ("Choosing a vhf site, and vhf propagation", by G3GC), 27 October (Natter night), 7.30pm. The Recreation Centre, Chilton Grove, Yeovil. The club regret losing the services of Adrian, G4JBH, due to change of work location (hope the Black Horse got you to Cheltenham OK?) and the new secretary is Eric Godfrey, G3GC, Dorset Reach, 69 Chilton Grove, Yeovil, tel 0935 75533, from whom details can be obtained.

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 **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

Drake MN7 atu, swr/power meter, rated 250W output, 160-10m, as new, hardly used, £95. G4OBK. Tel Chorley 74451.

Adonis mobile mic MM202S, as new, £12. TI59 programmable calculator, PC100C printer, manuals, etc, cost £280, no reasonable offer refused or swap radio gear. W.H.Y? 144-30MHz converter, £10. G4RKO NOT QTHR. Tel Chelmsford 469683.

TS830, DFC230, mic, new, £630. SEM Ezitune, £60. PM2000, £30. 4-el beam ant, rotator, 10m, £15. Shure 444 mic, £20. Tel Derby 557705.

Decca KW1000 linear amp, 10-80m, handbook, £200. Spare mobile mount for Trio TR9000, £5. G3VGW, QTHR. Tel Derby (0332) 810760.

Going QRT: Pair brand new 572B, £50. Datong D70 morse tutor, £35. Brand new matched triplet 6146B, £20. Tronix 13·8V 7A power pack, £12. TE17 gdo, £10. Pair nearly new 6146W valves, £7. G4CHP, QTHR. Tel Swainsthorpe 470365.

FT75 hf tx/rx, comp with FV50C vfo, matching power supply/spkr unit, mobile power supply, mounting brackets, leads, £115 ono. G6RMS, 40 Pegasus Road, Leighton Buzzard, Beds. Tel 0525 384419.

Trio TS530S hf tx, matching atu, external vfo, all in new cond, used very little, genuine reason for sale, £600 ono for the set. G4NVL, QTHR. Tel 382551.

Five-off 2C39BA valves, tested, in good cond, £15 each or all, £40. 25W linear for 2m Ambit built, preamp, £25. As above but no box or heatsink, £20. Nicad chargers, 12V-12V, £2. 240V-6V, £3. G8WXW, QTHR. Tel Winsford 52834.

HB KW107 swr pwr dl, genuine KW bridge loading cap, *Rad Coms*, most 1970, 1982, *SWMs*, various 1960, 1968, indices, collectors bound vols *SWM*, 1955/6, 1956/7, 1957/8, offers plus postage. *Wanted:* 3BPI scope tube. G2ANT, QTHR. In all day.

Yaesu FRG7700, hardly used, in orig box, £220. SP102, new, £30. Tel 01-370 1000, after 6pm.

HW101, matching psu, spkr, five bands, 160m can be easily added for transvert, recent valve change, exc cond, £160 plus carriage. IC202S ssb cw rig, 3W out, exc, £80 plus carriage. G3GZQ, QTHR. Tel 0364 43608, evenings, weekends.

FT200/FP200, fan, £200. ZX81, 16k, £55. Palm 2, £70. Liner 2, £70. IC255E, £170. 4-el quad, 18ft portable mast, £30. All wkg. All ono. GW4IFB. Tel Gary, 087-487 238.

Trio 2200GX, xtals for S20-22, R0-1, R3-9, 144·48, 145·00, rx nicads, £80. G3MHF, QTHR. Tel Eastbourne (0323) 762252, (office), 25887.

Collectors: pair ex-service ringing telephone sets type "F" Mk2, £18 pair. Joystick car-top harness and mounts, £3. Collect or postage extra by agreement. Tel 0954 50597.

MR1000A, 2m scanner, xtals, charger, antenna, £20 ovno. Tandy scanner antenna, bargain, £20. Four "D" cell nicads, unused, only £7.50 (incl p&p). For details of all offers tel Ian, 01-302 2243 (Sidcup), any evening.

Going QRT: vhf sale, Icom IC215 fm, £70. Icom 202S ssb, £100. Both comp with nicads, suitable portable, base. Internal nicad charger, IC215/202S, £20. Europa C transverter, £50. Mirage B108 10/80W linear, built-in preamp, £60. Wood & Douglas 1/10W linear, £25. Dentron 16A power supply, £50. FRG7 rx, digital readout, £110. G4KNJ, QTHR. Tel 01-554 4827 (Ilford, Essex), Monday, Thursday, after 7pm.

Yaesu FT7 tx/rx, vgc, hardly used, never used mobile, orig packing, manual, offers of around £260. G. Fuller, G4KYD, Flat 3, 147 Buxton Road, Davenport, Stockport, Manchester. Tel 0553 841399 with genuine offer.

FRG7, mint cond, no mods, instruction manual, plugs etc, as originally supplied, orig packing, £125. Simple home-built non-calibrated scope, in working order, circuit diagram, suit experimenter, £20. Prefer buyer collects. G8KRK, QTHR. Tel Freeland (Oxon) 882605.

KW77 hf amateur bands rx, £50 or exch for hf type rotator AR40 or similar in good cond. G6VYK. Tel Eric, Grantham (0476) 3596.

FT480R, MM100W linear, both new, £400. Yaesu FL2100B linear, as new, boxed, £285. Sommerkamp FRG7700 rx with memories, six months old, boxed, £325. Buyer collects or pays carriage. GW4TUL, QTHR. Tel 0495 791884.

FT101E, cw filter, speech processor, fan, £325. IC280E 2m fm tx/rx, three memory channels, comp with remote mounting kit, mint cond, £140. G4TAW, QTHR as G8EZM. Tel Orpington (0689) 30334.

Datong D70 morse tutor, morse key, various uhf conns/RG58, bimbox, £40. Halina Paulette Princess electric 35mm camera with case, £2.50. G8MEN, QTHR. Tel Peter, 01-733 8878.

Trio TL911 2kW linear, £250. Mustang conversion kit, £30. Hi-mound MK704 squeeze paddle, £8. Datong paf FL1, £30. Philips N2204/15 tape recorder, £10. *Wanted:* user instructions for LM13 freq meter to photostat. G4CJY, QTHR. Tel 0494 30018.

Hygain antennas TH3 Mk3, 3-el 10-15-20 beam, BN86 balun, no corrosion, £140. 18AVT/WB five-band, 10-80, £40. Buyer collects. G3VXZ, QTHR. Tel Maidenhead 27350.

Microwave Modules 2m converter, 4-6MHz i.f., £15. QM70 28MHz-2m transverter, 50W out, £60. Jaybeam PBM 14/2m, £25. Jaybeam MBM 48/70, £20. B40 gen cov rx, £20. Prefer buyer collects or arrange carriage. G6EGY, QTHR. Tel 0604 842309.

Yaesu FL50B, FR50B, together make tx/rx, £65 each. FV50C vfo for same, £30, or £150 the three. All in good order. No mods. G3FQX, QTHR. Tel Winchester 63906.

Swan 350, matching psu/spkr, the more durable 6LQ6s in power amplifier, marker oscillator, sidetone, transformer for low impedance mic, £200 plus delivery. Letters only. GM4DQD, QTHR.

Datong UC1 (0·1-30MHz on 2m rx), £90. UK101 8k memory, wemon, 300/600 baud cassette interface, case, fan, £100. Creed 7B, spare motor, £15. Buyer collects tty and preferably computer. G8EZE. QTHR. Tel Witney (0993) 4890.

Sharp MZ80K 48k computer, tapes, comp, £300. Yaesu FT707, FD707, FC707, comp, £600 ono. Tel 061-865 2955, 6.30 on, or 061-707 5323, 10-5pm.

Yaesu FL110 linear, £115. Azden PCS2800 tx/rx, unused, £145. Microwave Modules 432MHz to 28MHz converter, £25. Lowe FX1 wavemeter, £28. Various antennas, magazines, etc, all property of the late G4MKA. Tel Silchester (Hants) 701066, 7-9pm.

FT101E, vgc, manual, fan, spare pa, drive bottles, (matched and unused), G3LLL fm tx/rx boards for transverter driving, otherwise orig, boxed, £390. R1000 gen cov rx, vgc, no mods, £190. G4MPD, QTHR. Tel Northwich 47552, 6-8pm.

Microwave advanced morse trainer MMS2, new, £169, £110 ono. It helped me pass the morse test. G4RWQ NOT QTHR. Tel Penkridge 4963.

RTTY Catronics demodulator and program for TRS80, less than half price at £50. G4DTL, QTHR. Tel 0522 790450.

Collins 75S3, 32S3, psu, £675. G4RGI. Tel Worcester 421908.

Grundig Satellite, bfo mains units, case, £75. HRO mx, ten coils ex con, offers. Books, valves, sae. Buyer collects sets. National tape recorder stereo four track, valved, spkrs, offers. Other items. HRO power pack is stabilized. Tel Maidstone (0622) 61327.

TS180S, nine bands, 160-10m, 100W transistor output, Trio dfc for split freq working, five memories, 500Hz cw filter fitted, used daily, £400 ono. Matching PS30 psu, £50. GM4KGJ, QTHR. Tel Sid, 0224 872521, day, 24774, evening.

FR101DD, exc cond, rarely used, no mods, £275, plus carriage. *Wanted:* xtal for HRO. G3OMF, QTHR. Tel Tony, 05643 2190.

FT7 Yaesu cw/ssb tx/rx, comp, in orig box, as new, £165. G5VH, QTHR.

Telequipment type D31 oscilloscope, in full wkg order, photocopied handbook, fairly small, double beam, no marks on tube phosphor, £50. GW4TNF (GW8EQJ) QTHR. Tel 0244 671994.

Drae morse tutor, £35. Liner 2, built-in piptone, *PW* speech processor, £75. Sony ICF2001 rx, £100. G8ZAG, QTHR. Tel 062-982 3072, evenings.

Drake B line T4XB tx, R4B rx, AC4 power supply, MS4 spkr, built-in notch filter, passband tuning, recently completely realigned and tuned, perfect cond, will deliver up to 50 miles, £475. G3KWT, QTHR. Leeds (0532) 688821.

Trio TS510 hf tx/rx, PS510 psu/spkr, 80/10m VFO5D ssb/cw mic, not wkg (pa needs servicing), hence £150. G4IQN, QTHR Wembley. Tel 01-902 4732.

KW2000A hf tx/rx, ac psu, mic, fitted fan, £160. G4FAJ, QTHR. Tel Walsall (05433) 2169.

TenTec Omni eight-band tx/rx, broad band, 200W ssb/cw, QSK, mains psu, immac, £475. Trio TS510, PS510 five-band rig, 250Hz filter, exc, £175. BBC model B micro, cassette player, immac, £340. Delivery arranged. Tel Bob, Crewe (0270) 841168.

Morganite type 7101 80Ω dummy loads, £1 each. Bovey, 1 Chapel Lane, Dartmouth, Devon TQ6 9BL.

Electron, Oric, BBC programs: morse tutor, £4. Locator, gives distance, bearing, points, handles lat/long, QRA, QTHL, £4. BBC rtty, requires tu, £4. Texas TI99 locator, £5. Brookes MB6R rtty tu, £45. G8KMV, QTHR. Tel 0438 354689.

Icom 240, car bracket, handbook, mag mount, 5/8 whip, 23 channels, reverse repeat, £120. TR2300 handheld, nicads, charger, all leads, carry case, handbook, extra flexible antenna, orig boxes,

£110. G4FPF, QTHR. Tel Bournemouth (0202) 576346.

Mini-beam, G4MH, as new, £55. G4ROE. Tel Manchester (061) 654 8490.

Redifon rx, R145/ssb, lf adaptor, LFA10, handbook, buyer inspects, collects, £100. RS48152. Tel Swanley 63605.

Portable generator, Honda E1500, output 1,500W at 240V ac, 10A at 12V dc, exc cond, hardly used, £300. Two pairs 813s, one pair never used, made by RCA in 1951, offers. G4IDE, QTHR. Tel Wolverhampton 781760.

Scan rx Nichiya SR118, vhf-fm, 8ch, seven xtalled, £35 ono. G6FHE. Tel Nottingham (0602) 892046.

BBC model B microcomputer program to teach you morse code, letters, numbers, punctuation arranged in nine lesson groups, 12-speed settings from 6 to 32 wpm, many different exercises incl learn code, keyboard test, random groups, mixed letters and numbers, random words from 200 in store, colour or b&w screen, fully adjustable pitch and master menu driven, 80 frames of advice. Put your beeb to good use for £7.50. Briggs, 57 Charlton Drive, Sheffield S30 4PA.

P30 Versatower, £219. Lafayette HA600 rx, £36. FT208R tx/rx, extras, £199. TV pattern generators, £30 and £15. Acorn Atom, £119. VCR NE1501, heads ok, (for spares), £38. B/W studio camera, built-in monitor, £115. Tel Maldon (0621) 828135.

IC202S, nicads, charger, £120. TR3200, xtals for three simplex channels, eight repeater channels, nicads, charger, £100. G8ICZ, QTHR. Tel Bracknell (Berks) (0344) 22438, after 6pm.

Atlas 210X tx/rx, 10-80m, manufacturer's psu, good mobile or base station, £290 ono. G4RAU NOT QTHR. Tel Huddersfield 661992.

IC2E case, spkr/mic, spare battery pack, charger, £140 ono. G8WTM. Tel Chelmsford 466915.

Antenna tuner model AT180, £55 ono. Datong morse keyboard sender model MK, £95 ono. G4LHK, 78 Thorley Drive, Cheadle, Staffs ST10 1SA.

Tektronix 535A scope with type ca plug-in unit, £50. MM 23cm converter, £23. Wide angle lens, c/mount, £26. CCTV camera, £36. Conrac colour monitor, £16. *Wanted:* Sony colour camera or w.h.y. Tel Maldon (0621) 828135.

ZX81, Maplin keyboard, Scarab tu, exc rtty station, hf or vhf etc, offers. 21ft collapsible heavy duty mast, offers. Channel Master 9502, top bearing rotator, best offer secures. *Wanted:* Vic 20. G4OIN, QTHR. Tel 021-451 2571.

KW77 hf rx, amateur bands only, 1·8-28MHz, £75. G4TIL NOT QTHR. Tel Southam (092681) 4765.

Computer clearout: S100 bus 8k ram boards, £15. Hitech 320x290 colour graphics board/software, £170 ono. North Star format software, eg M/Basic, C Basic etc, very cheap. Apple software games, utilities. Please enquire soon. G6THT, QTHR. Tel 0293 515201.

FT101ZD fm, fan, mic, £410. FV101 vfo, £70. FL2100Z, hardly used, £370. Robot 800, £350. Galvanized telescopic mast, groundpost mounted, crank-up tilt-over, extends to 30ft, head for AR40 rotator, £150. G3WYJ, QTHR. Tel 07555 2613.

TR2300, comp with mobile bracket, £100 ono. Can deliver rig. Sentinel 2m converter, 2-4MHz i.f., £7. Eddystone B34 rx, good cond, 40kHz-32MHz by 10 plug-in coils, handbook, power supply, £40 ono. G8XEB. Tel Chris, 0204 27025, or 051-521 8020.

RTTY ZX81, Maplin keyboard, Scarab terminal unit, all ready to go, best offer secures. Rotator, Colour master 9502, offset type, top bearing, £45 ono. *Wanted:* Vic 20. G4OIN, QTHR. Tel 021-451 2571.

FT101 Mk2, 160-10m, spare pa and driver valves, external spkr, good cond, £240. Inspect and collect. Martin Tasker, RS44298, D2 New Court, St Johns College, Cambridge CB2 1TP, before 8 December.

FDK M700EX 2m fm tx/rx, 1/25W variable, used little, Hokushin GPV5 co-linear, 5λ/8 mag mount, all vgc, £170 ono. Could deliver 30 miles or carriage at cost. G3VSD, QTHR. Tel Rossendale (0706) 225007.

G3BXI 50ft mast, telescopic, tilt-over, groundpost, assembly manual, ready for collection, £250. Eric Dowdeswell, G4AR, QTHR. Tel Ashstead (Surrey) 72515, or 01-661 3604.

IC740 with IC242 fm, SP3 spkr, as new, £650. C58 fm/ssb tx/rx, CPB58 25W pa, slide-in mobile mount, £225, G4MJW, QTHR. Tel 0376 84144.

IC2E, ICBP5, ICBP3, BC30, all as new, boxed, buyer inspect and collect, £140 ono. BAY96 diodes, new, unused, £2.50 each including p&p. G3RNV, 105 Dunbarton Road, South Reddish, Stockport, Cheshire.

Icom 251E 2m multimode, comp all accessories, hand mic, SM5 desk mic, handbook, orig packing, mint cond, never used mobile, £395 ono. G6KND, 3 Colne Road, Earith, Cambs. Tel 0223 312448, business, Ramsey (0487) 842050, home.

KW2000A, vgc, ac power unit, Shure mic, manual, circuit diagram, no mods, G3HHR, QTHR.

RAF morse key type D, £10. Joystick vfa, £5. B2 tx only, £15. *Wanted:* AD370 antenna, lf converter or RA117E. W.H.Y? All ono. Sale/exchange. Can deliver/collect. Tel 0203 57303, after 6pm or weekends.

Oric 1 morse decoder and tutor program, send and receive up to 30wpm with full verification and checking, menu driven, six functions, random letters, numbers, groups, sentences, plot keyed waveforms, cassette and instructions, £4.50. G6IDQ, QTHR.

Yaesu FR50B rx, good performer, £60 ono. Palm 4 70cm handheld, four channels, all accessories incl leather case, used little, mint, £120 ono. GW6AYM, QTHR. Tel Swansea (0792) 204146.

Realistic DX200 1·5MHz-30MHz rx atu, £80. 10m fm tx/rx, £20. 3A and 5A power pack, £7.50 each. Morse oscillator, key, £5. *Ham Radio Today* morse course, £5. 14MHz QRP morse tx pcbs, £5. Tel 0249 817153 (Wiltshire).

FT75 hf mobile, swr meter, mobile mount, mic, G-whip antenna, comp mobile station, £120. Goldring G820E cartridge, new, boxed, £10. G4DRI NOT QTHR. Tel Ron Selby, Welwyn Garden 38425, home, or 01-800 5315, work.

Datong FL3, two months old, £95. Datong morse keyboard model MK, £90. Trio SM220 station monitor, fitted with pan adaptor, £90. Trio FX1 absorption wavemeter, all as new, no offers. G4LTM, QTHR. Tel 061-368 9547.

Pair IC2Es auto tone burst model, exc cond, £100 each. G3ZYN, QTHR.

Yaesu FT290R, 25W linear, psu, nicads, charger, case, helical, swr meter, wavemeter, dummy load, HB9CV, 5λ/8 gutter mount, various coaxial, package deal, £275. GW8YYZ, QTHR. Tel Conwy (049-263) 6474.

Comp Icom 2m station comprising IC2E, ICML1, HM9, Drae 12A psu, spare BP3, ICDC1, ICBP4, LC3 swr meter, T3170L, CP1 vertical antenna, used as base mobile and handheld, orig packing, instructions, new costs £370, £240. G4RSR. Tel Dave, Yateley 873792.

TS820, cw filter, SP820, recent Lowe service, £390. IC202E 2m ssb, 25W preamp/pa, £120. 16-el Tonna, £25. Spare dc power lead for TR7, £3. *Wanted:* base for 4CX1000A. Tel Mold 740101, evenings/weekends.

National Panasonic computer-controlled communications rx, continuous synthesized manual/autoscan tuning, lw/mw/sw/fm, programmable frequency/clock/timer/calendar function, one year old, immac, any demonstration by appt, cost £2,250, asking £1,200 ono for this extraordinary machine. C. Graham, G3XIG. Tel Crawley 547400.

88mH toroids, American open pattern, suit BARTG, ST5 DT600 etc, £2.25 each (incl). *Wanted:* SB220, L4B, TL922, or w.h.y.? Chris Pedder, G3VBL, Thorncliffe, 5 Royalty Lane, New Longton, Preston, Lancs PR4 4JD. Tel 0772 612289.

FT101 tx/rx, Shure desk mic, as new, £370. SEM Z-Match, new, £35. Prefer buyer collects but will deliver up to 25 miles. G4ITS, QTHR. Tel Gloucester 67725, evenings or weekends.

IC2E, many extras, worth £220, only £170. Alinco 2m linear, ideal for above (25W out), £35. G6ETA, QTHR. Tel Chestfield, Kent (022779) 3262.

Palm 2 2m fm handheld, cw nicads, charger, fitted R2, 3, 5, 7, S20, 22, £60 plus carriage. G3ZOG, QTHR. Tel 0783 280080, 6-8pm.

IC211, RM3, £350. FRG7700, memory, £250. Midland 2m 25W, £130. All vgc. G3CFV, QTHR.

Datong FL1 audio filter, £35. Datong automatic rf speech processor FT707, cables, will adapt any rig, £45. Pair TT100 valves, 400W out at 850V, linear data list, over £200, unused, £40. G3XKA, QTHR. Tel Woking 73620.

FT101Z/FM WARC, fan 101Z, cw filter, mic, handbook, mint, hardly used, selling due to homebrew project. Wanted in p/ex: Trio TR2300, a snip at £450, no offers! G4HWB NOT QTHR. Tel 061-653 7055, weekends and Fridays after 7pm only.

Newbrain model AD computer, demo tape etc, £200. Belcom Liner 2m ssb tx/rx, preamp, £60. Power supply, £12. Prefer buyer collects but will deliver up to 25 miles. G4ITS, QTHR. Tel Gloucester 67725, evenings or weekends.

88mH toroids, pre-tuned to 1,275/1,445Hz, £10 pair. Reace 30MHz digital frequency meter, brand new, £35. 6S6 auto sender, £10. 4CX250 base (NATO type 5935-99-911-6711), £4. STC74600 step attenuator, 0·1 to 99·9dB by 0·1dB steps, 75Ω in/out, £6. Trio JR599CS rx, matching SP599 spkr, 1·8-30MHz, 50MHz, 144MHz, all modes including fm, selectable bandwidths, variable attenuator, exc cond, no known faults, £120. VOX3 unit for TS700G, £5. Weller PU1D power unit, £5. 12V rotating blue flashing beacon by Marchal (ex-fire engine), £6. 50V dc bells (2·75in gong), £1. HP opto-electronics applications manual, £8. National Semiconductor and Siliconix data books: memory, memory applications, pressure transducers, data acquisition, special function products, analogue switches (sil), analogue switch applications (sil), £9 the lot. *Elektor* issues 1-100 except 65, 67, 79, 87, 88, 96 and 98, offers? *The Unexplained,* issues 1 to 136 in 11 volumes, offers? Mint 1972 Silver Wedding crowns, £2.50. Mint set of farthings, 1935-1956, offers? Metway 150W shack wall heater (new), £3. Quickfit chemical apparatus: C5-22 double jacket distillation condenser, RA1-02 90° spout, SH4-23 tee piece, two litre flask, £10 the lot. Too numerous to list—very large range of components to clear at extremely cheap prices. Send 25p for list. Phil Hodson, G8RBY, 43 Thorpe Road, Melton Mowbray, Leics LE13 1SE. Tel 0664 67118.

TS180S, PS30, AT180, £568 ono the lot. G4LHK, QTHR. Tel Cheadle (Staffs) 757225.

Yaesu FT707 hf tx/rx, FP707 psu, FC707 atu, MR7 rack, YM35 mic, still under warranty, £625 ono. Apple 2 Europlus 48k microcomputer, 12in monitor, two disk drives, large amount of software incl rtty/cw programs, still under warranty, £1,600. GW4PNV. Tel Menai Bridge (0248) 715466.

FT101ZD Mk1, fan, mic, FC902 antenna tuner, Hokushin HSHF5 five-band trap vertical antenna (without ground plane kit), FF501DX low pass filter, SMC150PL 50Ω dummy load, financially embarrassed, £450. G6MZI. Tel Bishops Waltham 2065, after 7pm.

Robot 800 rtty terminal, Tono 1200G vdu, as new, bargain, £595 the pair. GW3FKO, QTHR. Tel 0874-2772, daytime, evenings or weekends.

Silent key sale (G2FQC): few remaining items left for sale—KW202, mint cond, £160. Codar preselector, £15. Many small items incl books. SAE for list. G4NWN, QTHR. Tel 0827-4894.

Valves: Taylor T20, HF100, Eimac 35T (2), 829, 832 (2), 2V/400A (1), all £1 each. 715A, 715B (3), 5D21, TT11, 807 (7), 50p each, lot, £10. UX base, 2A3 (2), 42, 59 (2), 76, 77 (2), 78 (3), 80 (2), 50p each, lot, £4. Octal 6AC7, 6AG7 (2), 6J7 (2), 6K7 (2), 6SS7, 6V6 (2), 6L6, 6SQ7 (2), 6A8G (2), 6A7G, 6K7G (2), 6H6G (2), 6J7G, 6F6G, 6V6G (4), 6L6G, 6SA7G (2), 6X5G, VR105/30, VR65, EF36, 50p each, lot £10. B7G, 9002 (2), 6J6 (2), 6AK5 (2), 6C4 (2), 6BE6, EF91, lot, £2. British U8 (2), UU5, AW3 (2), 25p each, lot £1. Entire list, £20. Postage extra or collect. BC453, Q5er with some spare valves, £5. Post extra. G5KM, QTHR.

FT101ZD, FC901, SP901, cw filter, £535. FT101ZD fm board, new, £25. AVO 8 Mk5, nine months old, leather case, £85. Micronta signal-audio generator, £49.95 new, £30. Varmint valve, 100W base linear, ideal for 10m, new, £85. Shakespear super big stick, ideal 10m groundplane, doesn't have ground plane radials? 750W, 1500W p.e.p., £30. Vent-Axia extractor blower, 12in wall fan, trunking, new, £75. MFJ all band atu, wire facility, 100W, £38. Weltz SP15M swr power meter, £20. HK707 key, £8. Electronic timer, plug-in bases, all new by Omoron, 0-30m variable, auxiliary contacts, £15 each. Moving messages by l.e.d.s display machine, 1025 characters, programmable, new, £125. Dormer HSS drills in rack, 1/16 to 1/2, all new, £25. Nine-element crossed Tonna, £25. FT480R, five months old, mint, £275. Homebrew psu, six 2N3055s, 20A, needs rf suppression, £45. Luminition Optronic electronic ignition, any car, new, £35. FX1 wavemeter, with gdo modification, new, (hf only), £30. ILP torroidal transformer, 300VA at 15V, new, £10. Toolmakers cabinet, £30. Ford Capri Mk1 front spoiler, new, £12. 12V Hella roof mount waterproof halogen spot lamp, new, £15. Readers Digest complete do-it-yourself manual, folder never used, £10. G4RTC. Tel Jake, 01-803 6678, evenings.

Yaesu 7700M atu, SP820 spkr, boxed, new, £350 ono. BC221 psu, £5. *QST* 1953/4. *Electronic Engineering* 1940, 50 copies Grundig TK35 recorder, £10. Vintage radios, spkrs, etc. G8CQ, QTHR. Tel 01-720 8539, evenings.

Enough! FT290R, charger, nicads, case, reverse repeater, mint but dusty! PSU colinear, brackets, 11m 0·25in coaxial, PL259s, 6-el beam, the lot, ready to go at £250. Tel Ian, 051-653 7042 (Wirral) anytime.

CWR610E morse rtty reader, morse tutor, requires uhf tv, 12V, four months old, perfect, fascinating to watch, hardly used, all leads, press agency

frequency book, £150 the lot incl p&p. G4NVQ, QTHR. Tel Hastings (0424) 420608, evenings, weekends.

Icom 701 tx/rx, dual vfo, rit, etc, just serviced, psu, £490. Daiwa CN1001 auto atu, as new, £95. Yaesu YO301 monitorscope, mint, £95. All carriage extra. Tel Tisbury 870690.

Restoring old radio/tv? G3IMW and friend have acquired manufacturers' service data/circuits. All makes, 1960 back to 1930. Now being sorted. Photocopies will be available. We also have valves. SSAE with your needs. QTHR, or tel 01-340 0789.

Satellite 2000, good cond, comp ssb unit, £90, carr extra. New GPO type (hand set only), £1.50, add 50p postage. Pair new Eimac 465A with bases, £15. One without base, £4. Postage extra. G5CP, QTHR. Tel 0246 590253.

Collins KWM2, good cond, psu, mic, knocks spots off Jap rigs, will haggle around £650. G4AJJ, PO Box 813, Scarborough, N Yorks YO13 9EL. Tel 0723 85212.

TR2500, mint cond, incl leather case, spare nicad, £195 ono. Two 7-el Yagis, stacking combiner, very low wind loading, incl coaxial fittings, £45. Coaxial 50Ω heavy duty like heliax, unused, 100m, £75. G8TQO, QTHR. Tel Hastings 437513, evenings.

Yaesu FT902DM, £650. FC902 atu, £65. FV901DM vfo scanner, £100. FTV901R transverter, 2m 70cm, auto toneburst, £190. G6LFU, QTHR. Tel Dorking (0306) 885533.

Power supply, 13·8V, up to 30A continuous crowbar, overload protected, toroidal transformer, mains filter, £60. G8UZE, QTHR. Tel Andy, 01-654 2665.

100W 70cm linear Microwave Modules MML 432/100, nearly new, £190. 2m converter, 144/28, £15. 70cm converter, 432/28, £15. Wood & Douglas noise blanker SLF1, £3. G6VS, QTHR. Tel George, 0253 823541.

TRS80 computer, LNW expansion 48k, printer and disc interface, vdu, cassette plus £100s software, handbooks etc, homebrew rtty interface with software, exc cond, £350. Disc drive if required, £150. Epson RX80 printer, £290. Epson FX80 printer, £395. Both new. G4AAQ, QTHR. Tel 0977 791071.

Trio TR7010, vgc, piptone, £90. Clegg FM88 25W fm tx/rx, no toneburst, 143-149MHz, gc, £90. Trio R300 rx, fm board fitted, no squelch, £90 (prefer buyer collects this one). GW4MTE, QTHR. Tel Richard, Porthcawl 4832.

Weltz swr/power meter SP300, three sensor, £65. Kenwood R599S, matching T599S, mint, boxed, buyer collects, can be seen wkg, £385. KW Vespa Mk2, £40. FDK multi 700EX, mint, £95. Adonis AM503 mic and other bits. Station, £640. Tel 0702 618305, anytime.

HW7 cw tx/rx. TR2300 nicads, charger, case. Will sell both for £175 or preferably exchange for HW101 or similar hf ssb/cw tx/rx. W.H.Y? G4PAC (ex-G6PMC, QTHR). Tel Kingsclere (0635) 298537.

Yaesu FT101ZD fm Mk3, fitted fan, hand mic, Kenwood MC60 base mic, SP901 spkr, Daiwa CN1001 auto atu, head/phones, lpf, all purchased Feb 1983, boxed, absolutely mint cond, £700. Tel Bishops Stortford 722579, evenings/weekends.

Exchange Icom IC255E and mic, in perfect working order, for hf tx/rx with cash adjustment or repairs not objected to. G4JNG, QTHR. Tel Bewdley 401711.

TS830S tx/rx, £575. AT230, £100. SP230, £30. MC50 mic, £20. MMT 144/28 transverter, £70. LF30A filter, £10. All in mint cond, no mods. Data Dynamics ASR33 teleprinter in wkg order, £50. G4JXU NOT QTHR. Tel Reading 698276, evenings or daytime Ansaphone.

FT101Z Mk1, fan, mint cond, spare pas, Yaesu ext spkr, £400. G4JDN, QTHR. Tel Huddersfield (0484) 661708.

Trio TR9000, service manual, £275. PS20 matching ps, £40. SOTA 100W 2m linear, £75. 25A ps to run linear, £45. Going homebrew. *Wanted:* SK606 chimney, 24V 50Ω, B&R coaxial relay. G6DRT, QTHR. Tel Peter, Eastbourne (0323) 832473.

Microwave Modules MMA28, 10m preamp, as new, used for approx 10min, £10. G4OKT. Tel 051-355 0617.

FDK Quartz 16 2m fm mobile, vgc, boxed, S20-23, R1-2, mic, etc, £60 ono. 10m fm tx/rx, 10W rpt shift mic, £40 ono. Trio Kenwood TS700A, vgc, £275 ono. Part exchange TS120V, TS130V. Tel Weymouth 786930.

Hewlett Packard scope tube, type 5083-5894, 5in flat screen, pda, ok for 50MHz, as used hp scopes, xy displays, brand new, boxed, £100 ono. G3UEQ, QTHR. Tel Chichester (0243) 782672, day 784843, evenings.

Icom IC30A, 70cm tx/rx, colinear antenna, mag mount, £150 ono. Trio 2200GX, nicads, charger, helical antenna, boxed, £110 ono. G8CBM. Tel Maldon (Essex) 891784.

Trio 7800, 2m fm, boxed, as new, manual, mobile bracket, £200 ono. G4NDJ, QTHR. Tel Skelmersdale 21814.

Trio R2000, exc rx, £320. TS180S, new bands, all filters, plus AT180, VFO180, SP180, PS30, superb, £675. Yaesu FT790R, 70cm multimode portable, mobile mount, nicads, as new, QTH change forces sale, £300. G4GXE NOT QTHR. Tel Buxton (0298) 71410.

Datong audio filter type FL1, (list price is now £79), £38. Surplus to requirements so selling cheaply for quick disposal. J.D. Heys, G3BDQ, Whitefriars, Guestling, nr Hastings, East Sussex. Tel Pett 2262, evenings only please.

FT101ZD, cond as new, fitted fm board, cw filter, comp with fan, mic, £520. FC902 atu, £80. Both boxed as new cond, manuals. G4MAG, QTHR. Tel Crewe (0270) 664916.

New boxed valves, QQV03/10, QE05/40F (6146A), QQV02/6, 2x6BR7, 2x6BW6, 6CH6, 5763, 1x2B, the lot £15. Redifon handbooks, GR336 vhf, £1.25; R408 rx, £2.50. Collector's item. Dulci battery eliminator for 2V radios, £5. All items p&p extra. G3LTU, QTHR. Tel Cleethorpes 696412.

Creed 444 teleprinter, tape printer/reader, silencer cover, vgc, £25. Zenith E 35mm slr camera, Photax 200mm telephoto lens, electronic flashgun, light meter, darkroom lamp, £40 ono. G6JBN NOT QTHR. Tel Burntwood (Staffs) 72344.

Icom 215 fm tx/rx, fully xtalled, mint cond, comp with nicads, ideal for portable work, exc audio reports, never needed attention, almost new power supply available, mint rig, £110 ono. PSU, £12 ono. Together, £117 ono. GM4MOA, QTHR. Tel 0542 32093.

FT208R, comp with NC8 charger, VM24 spkr mic, in orig packing, £200, no offers. Peter Crosland, Red Lion Cottage, Holt Heath, Worcester WR6 6TA. Tel 021-454 8585, days, or 0905-620041, evenings after 9pm.

FT7B, 80-10m, a.m., ssb, cw, 50W, mobile tx/rx, mic/box, etc, good cond, £295. G4FQF, QTHR. Tel Romford 47998.

Yaesu 902 dm, save £285, used in transmitting mode one hour only, orig packing, genuine reason forces reluctant sale at bargain price of £600. D. C. Long, 15 Hill Road South, Penwortham, Preston, Lancs. Tel 0772 742922.

Standard C7800 70cm. 1/10W, pristine cond, orig packing, manual, £200. FRG7, no mods, as new, with M1 multi-tuner atu, £135. Going hf, passed morse. G6DGY, QTHR. Tel 0282 73120, anytime.

Yaesu FT102 narrow cw filter, £675. Yaesu FRG7700 with atu, £270. Icom 45E, 70cm, £235. DX302 rx, battery or mains, 10kHz-30MHz, £180. Trio 7800 25W fm mobile, £175. G6SSG. Tel 0733 222588.

FT221R 2m all mode, unmod, best offer over £225. Prefer buyer inspects or deliver 30 mile radius. G3RFP, QTHR. Tel Cottenham (0954) 50279, evenings/weekends.

TR2400 143-148MHz, touch tone system, plus and minus shift, ST1 base stand, MC30S mic, belt clip, spkr/mic, manual, orig packing, vgc, £170. Sota 30W linear, as new, £55. Genuine reason for sale. Postage extra. Tel 0509 504163, after 6pm.

RCA AR8516L rx, 80kHz-30MHz, good wkg order, spare valves, £175. Racal RA218, £25. Mk128 tx/rx, £15. All with manuals. The following manuals: B40, £5; STR18B, £5; CR100, two at £3; CR88, £2. Tel 0203 57303, after 6pm or at weekends.

Yeasu FT101ZD fm, hand mic, cw filter, moderate use, mint cond, orig box, £500. G3ZHE, QTHR. Tel Penketh 5735.

FR100B, FL200B, matched pair, £180. AR58 xtal calibrator, £10. Cowlgill motor with power pack, £25. TR44 rotator, £60. Eddystone 940, £150. LPF KW, £6. Extensive testgear, homebrew, 150W and 2k lin, cheap, many other items. *Wanted:* HRO cabinet. G3IPM, QTHR.

Trio JR599, TX599, hf separates, rx fitted all filters, 2m, 4m converters, tx recently overhauled, spare 6146B finals, £300. No19 set and rotary psu, offers. Tel Dursley 47564, after 6pm.

FT290R, nicads, charger, carrying strap, orig packing, 30ft RG58U, homebrew Slim-Jim, J-pole antennas, connectors, £225 the lot. G6MRD. Tel Nick, 01-866 9403.

IC2E, boxed, as new, comp with two battery packs, mains charger, mobile charging lead etc, £125. G4RWU, QTHR. Tel Maldon (Essex) 57227.

FT101E, virtually unused, mint cond, protective front cover, cw 600Hz filter, £350. G4DYM, QTHR. Tel Yatton (Nr Bristol) 833478.

Westower, 40ft lattice telescopic mast, framed base plate mount, just over 12 months old, mast is dismantled, £400 ono. Consider swap for Myford or Boxford lathe. M. Prescott, 44 Glamis Drive, Chorley, Lancs. Tel Mike, 02572 65748.

Collins 30L1 hf linear, four new 811As, manual, £300. Hammarlund SP600 gen cov rx, 0·54 to 54MHz, works but can be improved, manual, £80. *Wanted:* KW EZeeMatch. G4DXI, QTHR. Tel John, Sittingbourne 25364, after 6pm.

ZX81, 16k morse tutor and sender programs: (a) morse code tutor giving choice of speed, figures, letters, or mixed groups and a printout check at finish: (b) a keyboard sender program with adjustable speed and memory recall facility (any length) to enable the ZX81 to be used as a morse keyboard output via the mic socket. Both programs on one cassette, £3.75 plus post. Paul Martin, 3 Birch Close, Broadstairs, Thanet, Kent. Tel 0843 61448.

IC2E handheld 2m fm tx/rx, nicads, charger, λ/4 helical, case, mint cond, still boxed, £135 ono. G4NEF, QTHR. Tel Thanet 54154.

FRG7700, memories, matching atu, bought November 1982, £250. Buyer collects or pays carriage. G2DRW, QTHR. Tel Coventry (0203) 597135.

G4MH mini beam, AR40 rotator on 17ft pole, 20m UR67, £100. 2m Jaybeam, 8XY, AR40 rotator on 12ft pole, 15m UR67, £70. G4NUV, QTHR. Tel Nottingham 634842.

Datong PC1 up-converter, mint cond, £80. Drake SSR1 synthesized 500kHz to 30MHz rx. £110 ono. PF1 tx, rx RB15, nicads, mint, £20 the pair. Carriage on items extra. G4POL. Tel Bryan, Oxford 67452, after 6pm or weekends.

Xtals: HC25/U 10·245MHz i.f. converter xtals, £1.50 each or five for £5. G6HXB, 11 Salisbury Road, Southall, Middx.

R444 search rx, £45. Tuners, 36MHz-12GHz available, spectrum analyzer, £85. Plessey rx, £45. R361/GR, £35. SWM 300MHz-12GHz, £85. RTTY CY89/URA, £30. 13·8V 30A psu, £45. Valves: Eimac 7609, 2C39A, £3 ea. RS46829, 249 Sandy Lane, Hindley, Wigan. Tel Wigan 55948.

IC211E 2m multimode rig, fitted preamp and piptone, ICRM3 remote control, scanning mod, vgc, £375. ICSM2 desk mic, £20. GW3WSU, QTHR. Tel Bonvilston (04468) 261.

FT101Z, six bands, mic, fan, dc converter, immac, boxed, any trial, £370 ono. Would consider any working hf rig in part exchange if you are upgrading. Buying house so need the money! G4HIY, QTHR. Tel Crowmarsh (049169) 788.

Valves to suit Collins equip 7543: 6BF5s, 6U8s, 6AU6, 6CL6, 6AL5, 6AT6, 5U4s, 5R4GY, 75p each. G2DAF final conv, xtals, 75p each. Four 4X150, £6 lot. Snail blowers by Airflow Dev, £4.50 each. G3ESB, QTHR. Tel 0332 671536.

FT901DM, £550 or swap IC251E/Mutek, consider 221/225 plus cash or w.h.y. Norden TT68A microprocessor rtty system output for tv or monitor built-in psu, incl cased keyboard, ready to go, £200 ono or w.h.y. G4RWM (ex-G6GYW), QTHR. Tel 0323 846577 (Sussex).

Mizuho MX2 2m ssb handie talkie, nicad, £60. AR240A 2m fm handie talkie, all accessories, case, spkr mic, flexy-whip, £95. ZX Spectrum programs, please enquire. G4ILO. Tel Colchester 572685.

Yaesu 480R multimode, hardly used, unused on transmit, boxed, manual, accessories, bargain, £295. SWRM, £5. Jaybeam co-linear 2MT boxed, £19. Devco mobile mount, as new, £20. PH5000 power supply, 13V 5A 7A surge. RS46238. Tel 051-531 9304.

Yaesu Sommerkamp FLDX400/FRDX500 tx/rx, 10-80m plus 180m rx, good wkg order. Some spare valves, £225 ono. G4KTX, QTHR. Tel Chelmsford (0245) 33222, evenings/weekends.

Microwave Modules MMT 70/144 70MHz transverter, 2m i.f., 4-el Jaybeam Yagi, both six months old, any reasonable offers. IC2E, mic, spare nicad, £135. *Wanted:* TR2300 mobile mount and pa, VFO900 external vfo. G4RLF, 27 Bulbridge Road, Wilton, Salisbury. Tel Salisbury 743335.

Moscow Muffler AEA WB1, built-in rf, acting tx/rx relay, really works well, reason for sale, not required on new rig, boxed, mint, £75. ICSP3 matching spkr for 740 or R70, brand new, boxed, £20. G3RHM, QTHR. Tel 01-423 0306.

Yaesu FT707, 12 months old, used for swl only, £390 ovno. Tel East Horsley 3772, evenings and weekends only.

2m rx, Ambit 96640, pair R4 xtals, £20. CXY19A Gunn diode, unused, £30. Pair BLW78, suit legal limit, 2m pa, £80. 7116 dvm chip, lcd display, £10. Direct drive turntable motor, driver, £5. G4IOK, QTHR. Tel Witney 4867.

DX302 gen cov rx, comp with homebuilt atu,

boxed, as new, £170, no offers. Reason for sale, passed RAE. Tel 045-55 2006, after 4pm.

Small quantity K-tone boards, ideal for competition work, full fitting instructions incl, fit any type of rig, £5 each plus 50p postage/packing. G6XZM. Tel 01-949 6327, after 5.30pm.

KW2000A tx/rx, ac psu, all (old) hf bands, ssb rig, unused for two years, sell as seen, £150. Tel Chelmsford (0245) 441117, evenings.

FT107M nine-band digital memory, external psu, spkr, desk mic, trap vertical, £650. Spare SP107, £15. Q-meter set TF1245, TF1246, TF1247, £100. TF1313 lcr bridge, £30. CRT for 545A, £10. MBM48, £10. Mr Slemp. Tel Chelmsford 266776.

Sig gen Marconi TF937, CT320A, 35kHz-19MHz, continuous in eight bands, 1μV-1V, cw, a.m., fm, fully metered carrier, mod depth, deviation, illuminated horizontal film scale, precision attenuators, xtal calibrators, magnificent instrument in heavy steel case, full manual incl circuit, £55. Front panel plug-in doubler, extends top range to 35MHz at 10mV, £15. 1MHz oscilloscope TS34 1AP, collector's item, small, portable, 1944 orig manual, 110/250V transformer, £25. Field telephones type J, pair, £10. Digital multimeter, Sinclair PDM35, calculator size, l.e.d., new, in box, £10. All items buyer collects. G3OGK, 2 Sarum Close, Middle Wallop, Hants SO20 8JL. Tel Andover 781752.

Trio 2300, reverse repeater shift, nicads, charger, carrying case, helical antenna, box, perfect cond, £125 ono. Matching VB2300 10W power amp, £30. 2m colinear, £10. G4PEQ. Tel Rugby (0788) 813486.

Philips G7000 video game, 26 games, £150. Nigel Alford, BRS84493. Tel Culverstone (Kent), Fairseat 823598.

QTH: detached bungalow in Thornton Cleveleys, gas ch, double glazed, roof insulated, 20ft lounge, 2/3 bedrooms, fully tiled bathroom (pink) with Dimplex shower, dining kitchen, plumbed for washer, entrance hall, brick garage, planning permission for mast. G6VS, QTHR. Tel 0253 823541.

Yaesu FT200/FP200 hf tx/rx, mic, spare new pa valves, but sidetone not working, £160. Trio R300 gen cov rx, £100. G4KTI, QTHR. Tel 0206 42559.

FT290R, exc cond, 1·2AH nicads, HB9CV antenna, £180. Buyer collects. *Wanted:* Class D wavemeter. G3SSJ, QTHR. Tel Alresford (096273) 3816.

Trio 7010 2m ssb tx/rx, vgc, £115 ono. Azden PCS 2800 10m fm mobile, £140 ono. CWR670 telereader, used little, £190 ono. Acorn Atom computer, 12k ram, 12k rom, 6522 via, printer interface, fitted lots of software, £180 ono. G4MIU, QTHR. Tel 09924 60194 (Herts).

For sale or exchange: *Rad Coms* May 1981-June 1983, also US Army rx BC348R in wkg order, as used in Super Fortresses. Tel 0509 502830, or 061-483 6689.

Snips: 2m 6-el quad, £20. Ferrograph tape recorder series 5 (faulty), £25. Withers lcl tx/rx, 29MHz fm, new, £30. LLL speech clipper for 101B, £15. 2x813 fils transformer, £5. All collect. G3HHZ, QTHR Devon.

Scooper MR1000A 144MHz 10ch portable scanner, comp with nicads, charger, carrying case, xtals R0, R1-5, R7, S13-15, S20, S22-23, incl PL259 adapter, £45 ono. N. Knapton, 67 Long Street, Easingwold, Yorks. Tel 0347 21476.

Drake TR4C 300W p.e.p., AC4 power supply, RV4C ext vfo spkr, MN4 matching network box, spare valves, exc wkg cond, £340. Datong gen cov rx converter PC1, £70. Speech clipper, £20. Yaesu frequency counter YC355D, £20. G4EUU, QTHR. Tel Havant 483879.

FRG7 communications rx, mint cond, packing antenna, £155. KW Vespa Mk2, £75 ono. Army 31 set, wkg, R209 Mk2, offers. *Wanted:* KW2000. G4PNN (nr Oxford). Tel Mark, Kidlington 3420, after 6pm.

Icom 251E, 10 months, mint, £420. Hitachi portable tv, stereo, tape, radio, four bc bands, £80. B. Taylor, G6KPI. Tel Broadchalk 396.

Microwave Modules MML 144/30 ls linear, as new, in box, £55. RAK middy vn trap dipole, book, hardly used, £35. Shure CB43 quality dynamic mic, mint, in box, £12. Tel Torquay 38043.

IC720A, power supply, new, £800. Tono 9000E, new £525. TS430S, unused, £625. GW4ACO, QTHR. Tel 0492 515240.

MZ80K 48k, exc cond, 18 months old, over £100 worth software, incl Fourth language, many games, User Club newsletters, software secrets book, cost over £500, would accept £295 ono. G6MGI. Tel 0332 760773.

FT250 hf tx/rx, psu, mic, good cond, £200. G4TZN, QTHR (S Yorks). Tel 0909 567561.

Liner 2 with preamp, boxed, handbook, 30x20in circuit diagram, £70. G8AWK, QTHR. Tel Brimscombe 2570.

Standard C5800 25W/2m multimode, as new, four months old, not been used mobile, £295 ono. G6VDM. Tel Hastings (0424) 751960.

Techtronic dual-trace oscilloscope type 545A, probes, full manual, £90. Teletypewriter type 33, paper tape punch, reader, full manual, £50. Peter Marlow, G8BTV, 32 Charlton Lane, Cheltenham. Tel 0452 855871, day, 0242 581383, evenings.

Video, Philips N1700 long play, ok 4x2h tapes, scratched, sell £85. Swap radio gear. Suzuki GT250, 1974, unused two years, used daily before, seen running, all ok, £95. Swap radio gear. G6THS (nr Chelmsford). Tel 0621 828807.

Only £20 for monitorscope CT52, full set of valves, circuit diagram, Panda PR120V tx, 150W a.m., 80-10m, £60 ono. G3XJB, QTHR. Tel 0823 76436, evenings.

BS5 pan adaptor unit for use with TS520 and SM220 scope, as new, £30 ovno. G4EIB, QTHR. Tel Sedgley (West Midlands) 76131.

Sony CRF160 13-band rx, ssb, cw, rf gain, bfo pitch, calibrator reset knob, 22 transistors, ext antenna terminals: sw 1-10, fm, mw/lw, max sensitivity (sw) 0dB (1μV), showroom cond, offers. Tel Amersham (02403) 21787.

Trio TR2400 handheld 2m fm tx/rx, vgc, comp with charger, boxed, £125. GM3WCS, QTHR. Tel 0383 726456.

Kenpro model KP100 squeeze key, 230V/13·8V, four months old, £45. G3DAC, QTHR. Tel Crewe 582910.

Sharp MZ80K 48k ram computer with extra tapes, £295. Yaesu FT707, FP707, FC707, all in exc wkg order, £575. Tel 061-707 5323, day, 061-865 2955, night.

IC251E multimode, £340. FT290R, £210. P60 tower with rotator cables, £300. Transverter: 144-70cm, £140; 144-23cm, £110. 23cm linear, psu, 30W, £60. 10GHz wideband system, comp with tripods, £100. Daiwa swr bridge, CN620A, £30. 18-el 70cm Jaybeam, £24. 23cm Jaybeam, £15. PSU, 5A 0-15V, £12. G4OLO. Tel 0785 822306.

Trio 2400 handheld, fully synthesized, spare nicads, charger, helical, λ/4 whips, carrying case, 12V adapter, all hardly used, £125. G6LDK. Tel Wakefield 270770.

TRS80 model 1, lev 2, 32k exp/int, 5·25 disk, line printer 7, Scripsit, Zen, £800 ono. ASR33 ASCII 110 baud, 20mA, tty, manuals, £85 ono. Catronics rtty terminal, £80 ono. G4EOC, QTHR. Tel Worthing 501425.

Standard C78 with nicads, case, etc, £165. Adonis mobile mic, new, £30. Jaybeam 5XY2M, harness, £30. AR88, £55. 8XY/70cm, new, £35. John Rowlands, G4OJS, QTHR. Tel 021-445 3207, after 7pm.

Trio TR9000, marked due to mount, £240. TR2400, case, spkr/mic, £130. Mizuho SB2M 2m ssb, nicads, £80. Daiwa AF606 audio filter, £50. 29MHz fm dnt rigs, brand new, £50. G4LVK. Tel Alan Kelly, 021-445 2088, after 7pm.

KW 2000A ac ps, Codar Q-multiplier, hb and cd, £165. Pye Cambridge hb and cd spares, £15. Philips G2889 twin sig gen wobulator, 10-15MHz, 10-220MHz, £20. KW101 swm, £15. Offers considered. G3AFC, QTHR. Tel 04747 2691.

Trio R1000, mint cond, £190. Tel Folkestone (0303) 42263.

New 40ft Versatower electric winch and transformer, cost £680, save £205. £475. Comp with ropes, hand winches, type 13M20P40 tower, post mounting, TH3JNR, 3-el, £140. May separate. G4IJS, QTHR. Tel 0925 64075.

FT225RD, unmarked, unmodified, one owner, cw handbook, mic, dc lead, £425. Valves, new, one NEC 12BY7A, £2. Two 6CH6, £4, plus postage. Five SB445 nicads, 6V, 1·20AH, £7·50 plus postage. *Wanted:* Xtal, 38·666 HC6U. G3OXV, QTHR. Tel Daventry 2265.

Trio 3200 nicads, charger, leather case, mobile mount, all 12 channels xtalled, boxed, £110. G4OWH, QTHR. Tel Mells 812274, anytime.

Andrews secondhand 0·5in solid cable in approx 60ft lengths, fitted 'N' type connectors, £25. Pye fm tx/rx T30FM and R18FM on 2m, ideal repeater, 12·5kHz channel, £170. G3XVL. Tel Chesham 784883.

High performance 28/432MHz linear transverter, using Piper Communications modules, SRA-1H, used in receive converter, comp in case, input output sockets, 100W coaxial relays, cost £110 for modules alone, sell for £90. G4GZS, QTHR. Tel Rugby 815506.

Mizuho 2m ssb/cw tx/rx, handheld battery/mains, £65 ono. *Wanted:* low power hf tx/rx. Trio R600 or R2000, or similar. Tel Bedford 711538, weekends.

Sony TC651 semi professional open reel stereo tape deck, mint cond, auto reverse, three motors, four heads, mic/line mixing, sound dubbing and echo, comp with mics, remote control unit plus £100 worth of tape, £400. G4NNP, QTHR. Tel Ilfracombe 65522.

FT790, nicads, case, ant charger, one year old, £300 ono. G4THL. Tel 01-969 2488, ext 352.

Icom IC2E, used little, incl accessories, £120. G4IQL, QTHR. Tel 01-653 3456.

Icom 720A a.m., cw filters, orig packing, new, unused, £795. Trio R1000, vgc, dc ip, £195. Marconi TF1066B, 10-470MHz a.m./fm sig gen, fully wkg, £325. Data precision eight-digit 250MHz counter, battery pack charger, £65. ZX81 i/o port, memory expansion (R&EW), new, unused, £6. New Eimac 8560A 230W, 500MHz conduction cooled tetrode, £7. *WW* matrix H 4ch decoder boards, comp, £5. Various M6800 series chips, cpu, i/o etc, Tellabs touchtone decoder incoder, £10. G8NTH, QTHR. Tel Guildford (0483) 34954.

Converter 1,296/28, £15. bandpass filter, 1,296MHz, £6. SSM 70cm modules, 4W and 10W, £8 each. G3ZTR. Tel 0262 74337.

Mini Seavoice vhf marine rt, £70. Storno handheld vhf marine, £50. Eddystone 880/2, £150. 830/9, £150. BC342 plus mounting tray, £40. BC454, £10. UHF base station and handhelds. SAE details. G3DVF, QTHR. Tel Alnwick 602487.

Icom 730 hf tx/rx, Yaesu FRG7700(M) rx, cw matching tuner, vhf converter, model E, active antenna, as new, Trio MC50, Shure 444, 401A mics, offers or enquiries invited in writing please. G3MIN, QTHR Shoreham, Sussex.

G2DAF linear, as *RSGB Handbook*, 2·5kV psu, in metal cases, not junk, working, £100. Deliver 20 miles radius of Croydon or buyer collects. G3YRB, QTHR. Tel 01-684 3974.

Sharp MZ80K 48k computer software, Sharp Basic, xtal Basic, rtty, QRA + distance, morse, sat-track, contest, chess, house accounts, data base, mc-copy, many games, £325 ono. May part exch for 70cm/2m valve linear. G6KGO NOT QTHR. Tel Warrington 574652, after 6.30pm.

Practical Wireless, 112 copies, May 1974 to Sept 1983; *Rad Com,* 36 copies, Jan 1980 to Dec 1982 comp; *Everyday Electronics,* 34 copies, July 1976 to Feb 1982; *Short Wave Magazine,* 20 copies, Jan 1980 to Feb 1983, £10, buyer collects. G4MLS, QTHR.

NAG linear 144XL, built-in preamp and power supply, superb performance, as new, £325. G4IOF, QTHR. Tel 01-486 8286, daytime, 722 7040, evenings.

Yaesu FT290R, psu, swr meter, 7/8 whip plus base, 5/8 whip mag mount, 9-el crossed Tonna, rotator, coaxial, £320 incl carriage. Tonna 9-el 2m Yagi, new boxed, £12 incl carriage. G6CHB, QTHR. Tel John, 091 4162606.

FT101B, spare valves, Shure 444 mic, Osker SWR200, Technical Associates compressor and filter units, type D morse key, Thandor PFM200 dfm, Heath gdo, AVO 8, all exc cond, cables, comp station, £425 or will split. G3PVX, QTHR. Tel 01-866 6432, after 7pm.

G4MH triband minibeam, exc cond, £50. G5EFL NOT QTHR. L. Cohen, 17 Ashbury Drive, Hawley, Camberley, Surrey GU17 9HH. Tel Camberley 32235.

FT707, YM37 mic, MMB2 mobile bracket, battery lead, plug, as new, perfect, £390. G2KF, QTHR. Tel 072-681 2337.

Dentron tuner coaxial open wire output, fitted balun, £70. Daiwa CN620A cross pointer swr power meter, 1·8-150MHz, £30. G4BXR. Tel 0908 566266, evenings.

Heathkit 10-18U lab scope, £50. Hewlett Packard square wave generator, £40. MT240X trap dipole 10-80m, £20. Ex-computer vdu, £35. Strobe, £15. Scope tube, £20. Eumig super 8, S932 sound projector, £75. Unwanted gift. G6USX. Tel Bill, 01-790 5644.

Trio TR7010 ssb 48 channel, 144·100-144·315 8wt p.e.p., mic, mobile mount, operating manual, supply lead, perfect working order, orig packing, £90. G3GPB, QTHR. Tel 01-764 1380.

Icom IC451, absolutely mint cond, hardly used, orig packing, £500 ono. G6LMJ. Tel 07816 4965.

Variable transformer (Variac) by Claud Lyons 200/240V input, 0/275V 13·5A output, as new, current list price over £110, £70 ono. Two-off 0-1in outside micrometers, brand new, £10 each. *Wanted:* external vfo for Quartz 16. G8NNJ, QTHR.

Morse tuition program tapes for Commodore 64, VIC20, Spectrum, ZX81-1k, ZX81-16k (specify). No hardware required, comp with full operating and learning instructions, variable speed and run length, checks and scores your copy. Characters come in five stages for easy, fast learning. Sends character groups which accurately duplicate GPO

test conditions and will take you up to much higher speeds if you want. The best program to get you that A licence, £5. GW3RRI, QTHR. Tel 0286 881886.

FRDX400 rx, in good cond, 160-10m 2m, 6m, cw filters, nine spare valves, £160 ono. G4DHE, QTHR. Tel 02572 78630.

Extel Transtel matrix printer, five-level baudot code, three speeds, 45·5, 50, 75 bauds, can also be used as an ASCII printer up to 300 bauds, £95. G4MQW, QTHR. Tel 021-745 4068.

Practical Wireless bound volumes, 1946-68, unbound volumes 1969-79. Details from G8EYM, QTHR.

Murphy 12V dash mobile, hb/a.m. 12·5kH, vgc, £30. GU3HKV, QTHR. Tel 0481 47278, 6-7pm.

TR9130, new, unused, from Lowe, Matlock. New QTH precludes 2m work, £360. Buyer collecting can have new unused 2m 5λ/8 gutter mounting whip, also from Lowe. Unused hand-made db, shotgun-proofed, £190. G4PVV. Tel Lionel, Leamington Spa (0926) 881507.

Archer nicad, charger, ABCD cells, £4. Shure 444D mic, £25. Shack of junk bits, books, etc, sae details, offers, etc. G4RSA, QTHR. Tel 0253 405271, after 7pm.

Cossor SU750, boxed, rectifiers, (two), offers. Two GE boxed 6JS6C valves, £4 pair. KW2000 three-gang 261pF preselector, £4. Garex modulator type 2, 12V, OC35 outputs, suit QQV03-10, 3-20A pa, working on chassis, 15 public address, circuit, £4. G3MBL, QTHR. Tel 01-445 4321.

Kenwood TS830S, 8MC 500Hz cw filter, remote VFO120, £550, or trade for late Drake C-line with filters and extra band xtals. G5EBA, QTHR. Tel Eriswell 2705.

Yaesu FT901DE, FC901 matching atu, YP150Z dummy load/wattmeter, all in vgc, used little, £650. Trio TR2300, HL32V 30W linear amp, vgc, £125. G4KUR. Tel Stuart, 021-704 1236. (S Birmingham).

Kenwood TS830, as new, with DFC230, or swap for 130S with power supply. Tel Derby 557705.

Ex-G2DAF tx filter ME45510K, 898 dial, matching vfo, carrier, switching xtals, all associated inductors, incl 2MHz stage, £30. Will not split. G3OWY, QTHR. Tel Chester (0244) 381051, evenings.

FT202R 2m 1W 6ch handheld, 100 per cent reliable, S20-22, S14, 17, R0, £75. Spare xtals, R4, 8, R7, £5. NC1A charger, £10. YM24A spkr/mic, £10. Buy all, then £90 inc postage. G8YBF, QTHR. Tel Rochdale 58229, weekends.

FT480R 2m multimode tx/rx, 143·500-148·500MHz, hand mic, stand mic, YD148, up and down scanning buttons, used as base station but have all mobile brackets, £310. G8TUL, QTHR. Tel Nelson 68548.

RTTY decoder, Microwave Modules MM2000, perfect cond, buyer inspects and collects, £95. G6UZM. Tel Swindon (0793) 721313.

VFO120, suitable for TS130 or TS120 tx/rxs, only £55 ono. 12XY Jaybeam for 70cm, harness, only £38 ono. MMC435/600 atv converter, only £21 ono. G6CSY, QTHR. Tel Graem, Orpington 29230, evenings.

FT207R handheld, NC3A deluxe charger, dc power supply, spare nicad pack, VM24A spkr mic, £155 ono. G6MZW. Tel Dave, 0225 314865.

Manuals for the following: KW77 rx with review, £3; Viceroy tx Mk2, £3; maintenance manual for FT101 to EE/EX, £7; FT200/250, £3; FT101B, £3; BCC69 tx/rx, £3; Trio stereo KA2000A, £2; Wilcox-Gay oscillator mulitiplier, £2. G3MBL, QTHR. Tel 01-445 4321.

Kenwood TS830, five months old, mint, £525. Owner going overseas. G3UGL, QTHR. Tel 0234 750050.

Yaesu FT480R, 2m multimode tx/rx, only six months old, £300. G6TTG. Tel Steve, Dunstable (0582) 864839.

Kenwood Trio 9130, brand new psu for above, reason for sale going hf, five months old, quick sale, £410. Tel 0302 855676.

KW Atlanta 10/80m tx/rx, £220. MM dfm, £30. Daiwa CN1001A auto atu, £120. JWR 10m fm, £30. Daiwa rx, 110G preamp, £20. Trio 8400 70cm fm, £150. Pye F27AM 4m, £35. Enq junk etc. G4RSA. Tel Bill, 0253 405271, after 7pm.

FT101Z/FM WARC, a.m. board, 600Hz cw filter, £425. MM tv tx, four months old, £115. Ferguson Videostar colour camera, model 3V20A, 3V21 carrying case, tripod, £375. 48-el 70cm beam, £25. G4KUB, QTHR. Tel Steve, 061-427 5931.

3·5in reflector telescope, unused. *Wanted*: 2m beam rotator. Hi-fi Sony amp, Wharfdale speakers. *Wanted*: 2m gear. 400cc Hondamatic, as new, luggage cases, fairing, 2000 miles only. *Wanted*: hf tx/rx or sell. Tel 876 1108 (Surrey).

SX200N scanning rx, used little, boxed covers 26-514, some gaps, a.m., fm, £195 ono. DX-tv, Bush mono, converted to cover all bands/systems, £45. Hi-fi, amp, 20W channel, direct drive deck, rack, spkrs, £65. G4UGV NOT QTHR. Tel 0732 823662 (Kent), evenings.

Moseley trap dipole, 40m and 80m, £10. Old Army Class C wavemeter, offers. Collect or pay postage extra. G3DWS, QTHR. Tel 021-475 6267.

FT101E, late model, mint cond, no mods, spare tubes, two sets, £340 ono. G3AJX, QTHR. Tel Winchester 61605.

Yaesu FT480R 2m 10W multimode, exc cond, hardly used, mobile mount unused, handbook, box, the ultimate 2m rig, £290. Buyer collects or pays postage and insurance. GW4LVB, QTHR. Tel Bridgend 50887.

Yaesu FT707, mint cond, 10 months old, orig packing, £425 ono. Tel Cobham (09326) 4507.

Icom IC2E handheld, comp with BC30 base charger, remote spkr-mic, soft case, used little, as new cond, under warranty, £170. G4NVO. Tel 0642 483464.

Coaxial 75Ω 0·5in dia double screened approx 165ft, two Advance Voltstabs CV100A, output 24Ω, load 100W, leaflet, offers. MC50 Trio Kenwood desk mic, dual impedance, leaflet, boxed, £17. *Wanted*: Trio fist mic 50K for 520SE. G3MBL, QTHR. Tel 01-445 4321.

Standard C58 2m 1W multimode, case, charger, new, not yet arrived as I send advert, reason for sale, not required, moving QTH, £245, collect or plus postage. G8YBF, QTHR. Tel Rochdale 58229, weekends.

Akai stereo cassette deck, £15. Sharp radio alarm tv, £75. ST8 rtty scope, £15. ST5 tv, £48. Creed 444, £35. SSTV hb unit, £200. 625 line camera, £45. Icom 290H multi-mode, £295. Olivetti TF300 free for collection. G4RSA, QTHR.

Drake R4C rx, 1·5kHz filter, 160m xtal, manual, top ham band rx, £285 or consider exchange with cash for good tx/rx. G4ERU, QTHR. Tel Bournemouth 510400.

FV101DM digital vfo for FT101ZD, after serial number XX240001, mine isn't, brand new, in box still with orig plug, would prefer swop for FV901DM but will accept reasonable offer or part exchange for FV101Z. GM4MPU, QTHR. Tel 041-840 2487 (Paisley).

Yaesu FRG7700 rx, comp with atu, used little, now passed RAE hence sale, £225. RS52155. Tel John, 01-857 8096.

Yaesu FRG7000 gen cov rx, exc cond, features 250kHz-29·9MHz a.m./ssb digital frequency read-out, digital clock/timer, preselector,fine tuning, volume/tone control, £169. G6LPS. Tel Terry, Worcester (0905) 26171.

MSF clock, unfinished project, three out of four boards completed, just needs a few hours further work, £50. MBM48 70cm beam, brand new, unused, £28. GW4HAT, QTHR. Tel Swansea (0792) 290770, evenings.

Sell or exchange for hf gear: IC251E, MM 144/100S, perfect wkg order, unmarked, 35ft telescopic tiltover mast, 1·2kVA 230/110V portable generator by Kango, 1982 Honda Express moped. G4REZ, G6HSH, QTHR. Tel 0209 213820.

FT207R handheld, case, NC9C charger, PA2 adapter, MMB10 mount, nicads, manual, £140 ono. G4KVI, QTHR. Tel Beaconsfield (Bucks) 3372.

TS120V, manual, vgc, £250. Icom IC2E, comp, vgc, £100. Owner needs cash or part exchange for FT101ZD and Yaesu FT480R or 290R etc. G4NQH, QTHR. Tel 0832 651786.

Ten fm rigs, choice of three tx/rx, 29·310-29·700MHz, DNT M40FM or LCL 2740 FM or Icom 1050, modified, tested, warranted unused, perfect, talk to the world for £33 each ono. G4SNO. Tel 0562 884824, evenings.

Exchange or sell Vauxhall Viva four-door, MoT till May 1984, taxed Oct 1983, drive away, vgc, for hf rig or hf linear amplifier to suit my FT7 or vhf 2m rig. W.H.Y.? Royston, GW4PCX/GW8YJN, QTHR.

TS520, new valves, tested, mic, manual, coaxial switch, swr bridge, Zycomm Z5800 charger, rubber duck, Standard 828 vfo, psu, Yagi, 12AVQ, assembly instructions, small rotator control box, 60ft cable. G4HEY NOT QTHR. Tel Stone (Staffs) (0785) 816582, after 6pm.

Icom IC25E 25W 2m mobile, comp as new, still under guarantee, £200. Koyo 11-band rx, £40. Tel St Austell (Cornwall) (0726) 65340.

TET HB15M2SP 15m 2-el mini beam, brand new, unused, £50. Cushcraft Ringo Ranger ARX2B 2m colinear, good cond, £10. G4ORD. Tel Dudley 57798.

FR50 tx, FL50 rx, (ssb 80-10), both plus manuals, £90 pair or split. RTTY freq shift scope, crt plus six valves, £10. Murphy Rover 2m fm, circuit, £10. ultra Cub (4B7) fm 2m, xtals, nicad, £30. G3MDQ. Tel 021-354 9972.

TR7500, mic, mobile bracket, £120, 3A psu, homebrew, £10. PM2000 ssb power meter, 3·5-30MHz, £35. G2KF, QTHR. Tel 072-681 2337.

FT780R 10W 70cm multimode, boxed, exc cond, £300. MM4001KB rtty tx/rx, two months old, £220. G6MBS. Tel Alsager 3879, after 6.30pm.

Simprop Contest 8 8ch, tx tray, 27MHz plug-in modules fitted red and green xtals, four contest servos, Simprop multicharger, Ripmax 3ch trainer, Irvine 20, Maricardo 4ch mid-wing with OS40, Sullivan starter, 2V accumulator with charger, flight panel (needs pump), heat sealing iron, wire bender, fuel, would consider exchange for good hf rx, tx or 2m portable rig etc. Must collect. GM6SYP NOT QTHR. Tel Dunfermline (0383) 736401.

WANTED

Gen cov rx, not too big, not too old, not too expensive, advertiser wishes to build QRP txs and is looking for receive capability of all hf amateur bands, therefore rx must be quite stable. Tel 01-952 9548.

TS700, TS700G, TS700S, or any other secondhand 2m multimode, fm, or ssb equipment (such as FT290R, FT207R, FT208R, IC2E, etc). M. Farrimond, G6WNN, 9 Denmead Close, Eaton, Norwich NR4 6NB. Tel Norwich (0603) 55341.

Gen cov rx, age unimportant but must be good cond, handbook if possible. GM6RVE NOT QTHR. Tel 031-331 4439, evenings and weekends.

Collins rx model 75A4, 500Hz filter, your price paid, must be fb. CRT for Philips PM3200X scope or comp unit for parts. Peter, EI8AYB, QTHR. All replies answered.

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.

Components of Redifon GR479G, eg GRB45, ACU9. Need other Clansman components, vhf, hf, have GA481 linears, 1·5-30MHz for trade. AW/PRC74s. W.H.Y? Tony Grogan, WA4MRR, 5 Rollingwood Drive, Taylors SC 29687, USA. Call area code 803-244-0324.

QST back volumes for recent years; incomplete volumes also acceptable. Bob McHenry, G3NSM. Tel 0865 56321.

Short wave band selector knob for Sony CRF220 serial No 61217. Will pay good price. F. W. Allen, 23 Alfred Road, Greatstone, New Romney, Kent TN28 8SH. Tel New Romney 64107.

Suitcase or similar tx/rxs (British, American or Polish). Wartime and post-war; any spares, incomplete or damaged sets, orig manuals or associated literature welcomed. Any connector leads for WS(CDN) No 29. Taylor, G3UCT, 8 Government House Road, York. Tel York (0904) 29777.

£10 reward for information leading to purchase pedal generator, 1945 vintage, tripod, tubular frame, with rectangular back-frame and canvas deckchair seat. Generator in square tubular housing with 5-pin connector. G3EUR, QTHR. Tel South Ockendon 852371. Reverse charge accepted.

Circuit diagram and any info, rx APR9 with tuning unit TN128. G8TTU, QTHR.

TA33JR for club station. Contact treasurer, G4JUW. Tel Danbury (Essex) (024541) 5748, evenings or weekends only.

For the Wireless Museum: old radio books, magazines, catalogues, service manuals, QSL cards, morse keys, valves, components, any knobs! Shelving. Collection arranged. Details please to hon curator G3KPO, Arreton Manor, Newport, IoW. Tel 0983 62513.

Assembly and wiring diagram for Archer Tandy variable power supply 2779601, for loan, copy or purchase, zero to twenty dc, 2·5A. G6UGU, QTHR. Tel 0302 841530.

CW filter YG88C for TS820. G3BMO NOT QTHR. Tel York (0904) 54579.

Manual for R1132A or copy or loan of. One VS70 valve. G4SVR, QTHR. Tel 061-941 3930.

Burndept uhf 3ch hand portable tx/rx, xtalled for 70cm or not, with or without Varta nicads, must be in vgc, same model as Fire and Police Home Office issue. Top money paid for good tx/rx. G6MIW. Tel 0204 653230.

Hewlett Packard sampling head, 1816A or 1817A for cash or swap 1430A head. 140 and 160 plug-ins. *For sale*: HP430C power meter head, 477B, £20. 188A 4GHz dual channel plug-in, £100. G8BXH, QTHR. Tel 01-428 0974.

Datong gen cov converter type UC1, or gen cov rx.

ATU, 200W rating GW3ZNN, QTHR. Tel Wrexham (0978) 26855.

Wide-spaced variable cond 250 + 250pF, suitable for 200W Z-Match atu. G3CPM, QTHR. Tel 0386 852753.

Motorola HT220 handbook, willing to purchase or copy and return. G6VBJ. Tel 01-283 1880 or 01-310 5123, home.

HRO bandspread coils, 7MHz, 14MHz, 28MHz. G3IGN, 57 The Ridgeway, Acton W3 8LW. Tel 01-992 1602.

Circuits, Racal counters 815R, 835. Eddystone 670A rx. Tube LD924E. *For sale*: divider organ box, 60 valves, amp Jennings, transformers, tape rec, record players. D. Griggs, 5 Collingwood Avenue, Muswell Hill, London N10 3EH. Tel 01-883 3474.

Handbook/manual or any information on Cossor CC302 marine tx/rx, especially change of channels and circuit diagram. G3JAU, QTHR. Tel 0202 514078.

HW101, with or without power supply. PS23. HW8, with or without power supply. G3LP, QTHR. Tel Cheltenham 512481.

Circuits or manual for KP202 2m handheld tx/rx. Same for B40C rx. Will buy or borrow to copy. G6NSH. Tel Herne Bay (02273) 69028, evenings.

Ex-Post Office morse key. Type 610 with large knob. GW4JKR, QTHR. Tel 0248 715582.

Century 21 cw tx/rx. Any tx for cw. Can include a.m./ssb, eg DX100U, LG300, Minimitter, Panda Cub, 120 or homebrew, anything considered. Condition immaterial. G3YRQ. Tel 0942 679948.

FT225RD, manual, must be in mint cond, could collect reasonable distance. G4JQI, QTHR Lancs. Tel 025482 3366.

Manuals for Heathkit rc bridge. C3U and rf sig gen RF1U, happily pay costs, can photocopy your original. Holden, RS51644, 5 Bolton Lane, Ipswich, Suffolk IP4 2BX. Tel 222282.

Handbook or copy circuit diagram, scope type 400, solidstate, made by Microcell Electronics. Name your price. Digital multimeter DMM2 by Advance Ltd. GW3JEZ, QTHR. Tel 0633 211009.

Ex-Army SR A14 tx/rx (BCC30), comp with rf amp, atu, case, head/handsets, etc, nicads if possible. Good price paid for late model set in clean, comp, fully wkg cond. Taylor, G3UCT, 8 Government House Road, York YO3 6LU. Tel York (0904) 29777.

16-el F9FT 2m Yagi. Ham 2, Ham 4 or Ham-M rotator. All letters answered. GM3WOJ, 5 Stirling Place, Fort William PH33 6UW. Tel 0397 2527.

Heathkit OS1 or OS2 oscilloscope, will collect or pay carriage in London or Kent area. G3ZQF, QTHR. Tel Medway (Kent) 723694, evenings or weekends.

Atlas 180 manual and/or circuit diagram. Buy or borrow to copy. Any available technical information welcome. Bill Pechey, G4CUE, Jays Lodge, Crays Pond, Reading RG8 7QG. Tel 0491 680552.

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Heathkit HW12A, psu, accessories, must be in good cond. Good price paid and will collect or pay carriage. G3VGC. QTHR. Tel George, 01-659 0845.

Suitcase tx/rxs, any spares, incomplete or damaged sets. Any connecting cables or spares for Canadian No 29 set. Any commercial or military a.m. fone tx or tx/rx covering about 3-8MHz continuous. Taylor, G3UCT, 8 Government House Road, York YO3 6LU. Tel York (0904) 29777.

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PIN RF Switch	PSI 433	9.10	7.75
Converter (2M or 10M i.f.)	70RX2/2	27.10	20.10
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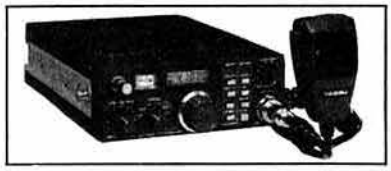

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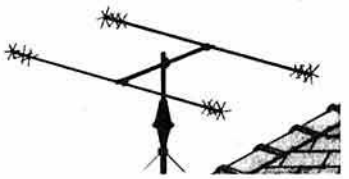

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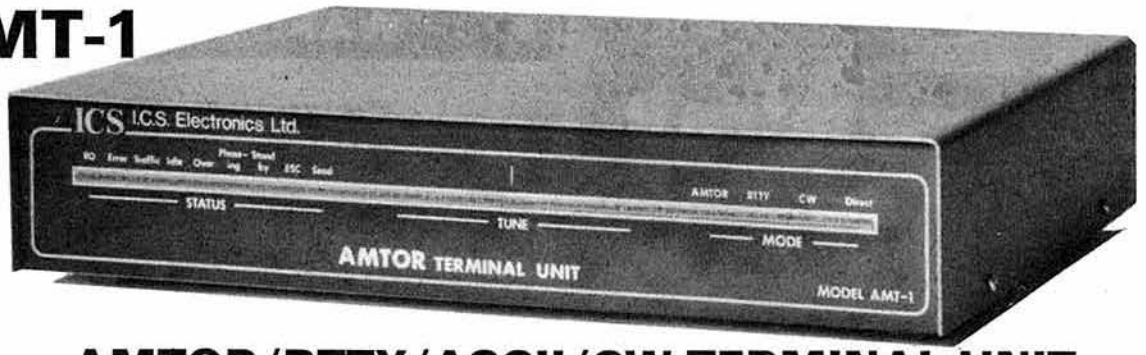

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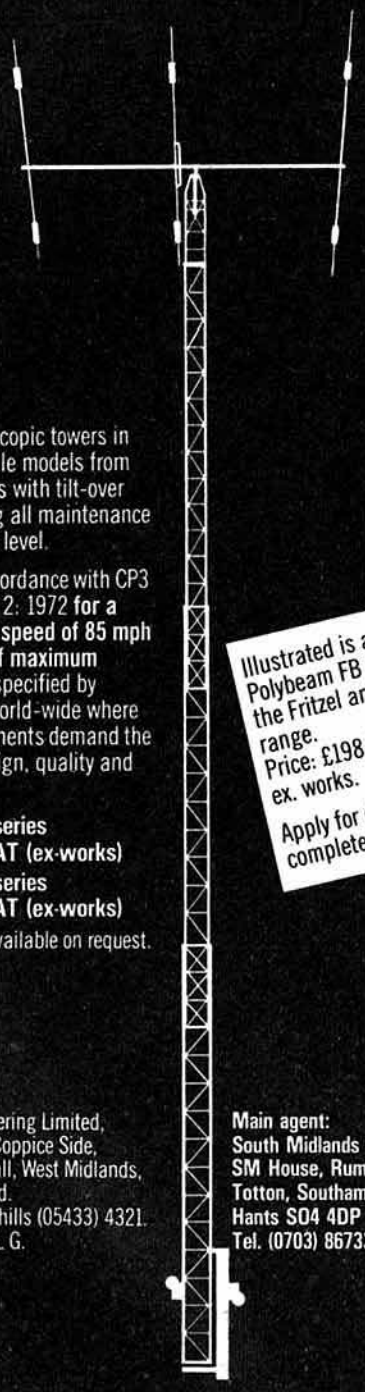

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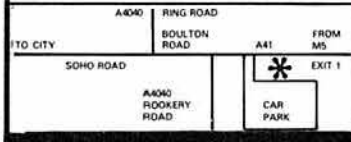

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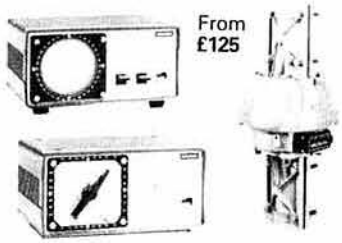

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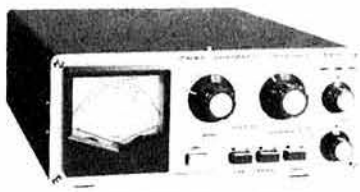

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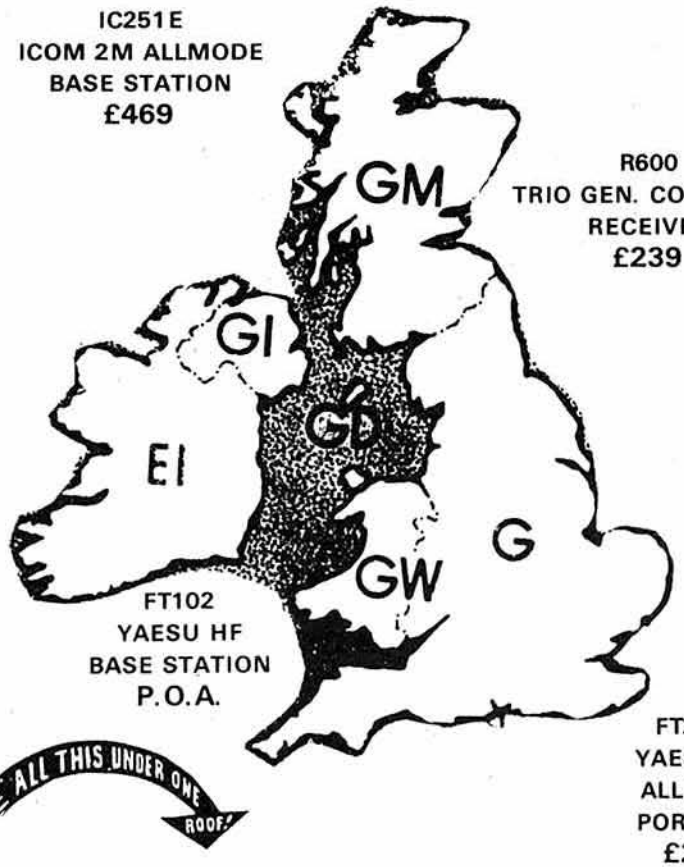

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