March 1980

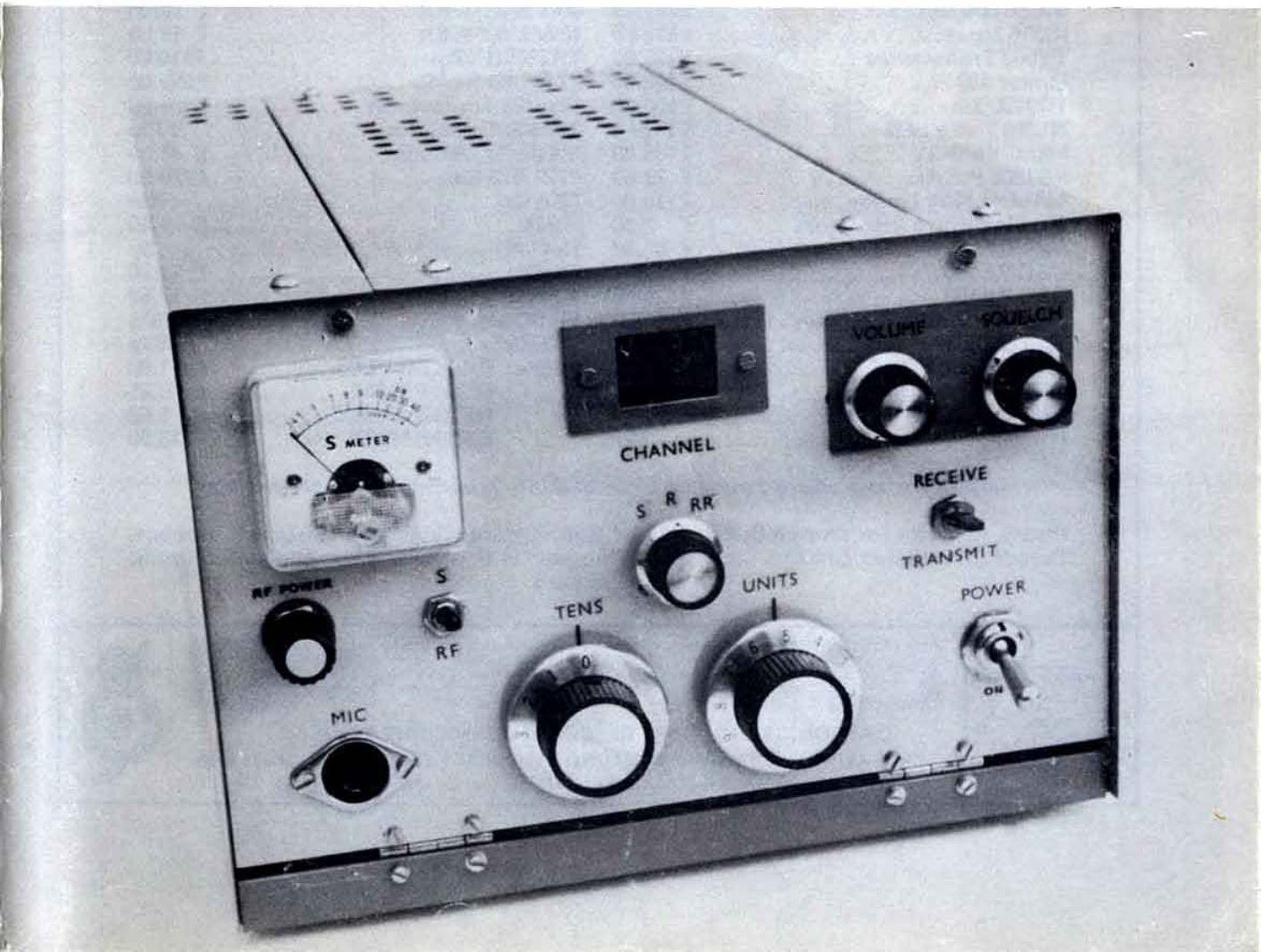
radio communication

journal of the Radio Society of Great Britain

Commencing in this issue

"A 144MHz synthesized fm transceiver"

by N. G. Hyde, G2AIH



SALE! SALE! SALE!

Catronics are holding a
GRAND SPRING SALE
March 10th–March 29th 1980

Bargains in Components, Bargains in Equipment, Bargains in FDK, Bargains in I.C.'s, Bargains in Jaybeam, Bargains in LED's, Bargains in Transistors, Bargains in Trio, Bargains in Yaesu.

Many, many price reductions including 15% off CSC Breadboarding Equipment, 10% off all Jaybeam Antennas, 10% off selected Trio Equipment (20% off some), 25% off Vero Boards etc, 50% off some discontinued items.

SOME EXAMPLES

Swan 500 Rx/Tx	£243.00	40W 2M PA Kit	£ 20.00
IC255 2m	£242.25	10W 2M PA Kit	£ 18.50
TV502 Transverter	£155.00	TR2200GX 2m	£110.00
Linear 430	£145.00	FT101ZD Rx/Tx	£550.00
TR7200 2m	£160.00	1296/28 Transverter	£166.50
DL304 7-seg LED	£4 for 4	2N4440 Transistor	75p
Multi-Palm IV	£135.00	Matrix H Decoder	£ 48.00
PS1200 P.S.U.	£ 28.50	FT227RB 2m	£220.00
144MHz 80W Linear	£110.00	TBA120	70p
Dipole Centre Insulators	£ 2.00	μL914	£ 1.40
SG402 R.F. Sig. Gen.	£ 61.50	1N4148	3p
CSC PB100	£ 10.03	2N6084	£ 11.20
CSC PB103	£ 29.30	74S262	£ 12.50
Snooper Radar Detector	£ 66.50	MLED500	10p
Trio R300 Receiver	£149.50	CFT455C	69p
6BA6/EF93, 6GK6	75p ea.	PCB's: PA0KSB PLL	£ 1.00
BF224	25p ea.	G3XGP DFM	£ 3.25
E430	£ 1.40	G3TDZ AMRX	£ 1.60
LM380	92p	G3TDZ FMTX/Rx	£ 13.90

All items are offered subject to availability and only while stocks last

Phone or write for complete list. Pay by Barclaycard, Trustcard, Visacard, Access, Eurocard, Master Charge etc; Cash; Cheque; H.P; or the new Catronics credit charge card.

APPROVED TRIO DEALER

BARCLAYCARD VISA

We are 300 yards from Wallington Railway Station (London Bridge or Victoria). Frequent buses from Croydon and Sutton. Three large car parks within 100 yards. **Hire purchase facilities available on all equipment. Credit cards accepted.** Mail orders – normally dealt with on day of receipt. Securicor delivery arranged. All prices include VAT.

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LOWE ELECTRONICS Ltd

THE TRIO 2 METRE TWINS

TR2300

APPROVED TRIO DEALER

TRIO PRICES DOWN! TAKE A GOOD LOOK AT THEM!

Trio have always been acknowledged leaders in the field of portable VHF equipment and this leadership is amply demonstrated by the TR2300. Following the long established TR2200 line, the TR2300 combines all the virtues of small size, ease of use and rugged go-anywhere construction but introduced for the first time, full band coverage in 25kHz steps from the same advanced synthesiser used in the TR7500. This provides all 80 FM channels from 144-146MHz together with 600kHz repeater shift (and reverse repeater if requested). Automatic tone burst is provided for repeater operation thus catering for all operational needs.

The high sensitivity receiver section uses a combination of effective RF filters providing optimum cross modulation rejection across the entire band. An extra low profile speaker uses a samarium cobalt magnet to reduce equipment size whilst improving speaker efficiency and clarity of reproduction.

The remarkable asset of the TR2300 has to be it's unexcelled versatility. Using the carrying case and shoulder strap, you can take the 2300 anywhere, powered by the rechargable ni-cad batteries, and this is certainly the way that most operators use the rig. Sit the 2300 on top of a 12V dc supply at home, however, using the power cord provided, and you have a terrific home station FM rig.

If you want mobile operation, slot the 2300 into an MB1 mounting bracket, possibly add the matching VB2300 amplifier and you have a really high performance mobile transceiver—and being so small, the TR2300 fits almost anywhere. The front panel layout was designed for ease of operation and the back illuminated dial is so easy to read that it's a delight to use.

TR2300—truly the transceiver for all seasons.

Now—if you insist on a hand held, and don't need the versatility of the 2300, take a look at the new TR2400.

TR2300	**£166.75 inc VAT**
VB2300	**£49.45 inc VAT**
Nicad pack	**£10.35 inc VAT**

TR2400

The TR2400 is a futuristic 2 metre FM handheld transceiver incorporating a large LCD frequency display, 400 channel operation from 144-146MHz, 10 memory channels and a host of frequency control systems (including scanning) all designed around a microcomputer. The sophisticated design makes the TR2400 the ideal handheld to meet all repeater or simplex operation for the 2 metre man.

1. **Large LCD digital frequency readout.** Clearly readable even in direct sunlight, with back illumination for night use. Virtually no current drain (unlike LED displays) so display stays on all the time. Shows RX and TX frequencies and memory channels. Also included in display are indicators for "on air", "memory recall", "battery status" and "lamp".
2. **Frequency control functions.** Keyboard entry of any frequency from 144-146MHz in 5kHz increments. Up/down manual scanning from 144-146MHz in single or fast continuous 5kHz steps.
3. **10 memories** (retained by battery backup), one of which can be used as a non-standard repeater shift. Automatic scanning of all 10 memory channels is provided, and scanning can be for a busy channel or the next free channel.
4. **Full repeater operation** and also instant reverse repeater operation at the touch of a switch. Proper auto tone burst provided.
5. **Fast 1½-hour base charger** and stand with full external microphone facilities available.
6. **Lock switches** are provided to prevent misoperation of the keyboard and also to disable the press to talk switch.
7. **Power output** of over 1·5W to a BNC aerial connector (flexible whip supplies as standard). Decent size batteries for long operating time.
8. **Superb mechanical design** in the Trio tradition of top engineering, based on a die cast frame for real drop proof performance.
9. **Supplied complete with Nicad pack,** charger, rubber helical aerial—ready to go.

The TR2400 is the best available; would you expect less than the best from Trio?

TR2400 (inc Nicads, charger, and helical aerial) £210.45
ST1 Base charger and stand £43.70

It's a little more expensive than it's competitors—but oh so far ahead in performance.

LOWE ELECTRONICS Ltd

THE GREAT HF LINE-UP BY TRIO

TS180S

TS180S **£679.65** (inc VAT)
PS30 **£85.10** (inc VAT)

Trio's TS180S with DFC is an all solid-state HF transceiver designed for the DXer, the contest operator, and all other Amateurs who enjoy the 160 through 10-metre bands. The following features prove, beyond doubt, that the TS180S is the finest rig available!

Digital Frequency Control (DFC) including four memories and manual scanning. Memories are usable in transmit and/or receive modes. Memory frequencies to be tuned in 20-Hz steps up or down, slow or fast, with recall of the original stored frequency. It's almost like having four remote VFOs!

All solid-state. . .including the final. No dipping or loading. Just dial up the frequency, peak the drive, and operate!

High power. . .200W p.e.p./160W dc input on 160-15 metres, and 160W p.e.p./140W dc on 10 metres. Also covers more than 50kHz above and below each band (28-30MHz,) WARC, etc. and receives WWV on 10MHz.

Improved dynamic range.

Single-conversion system with highly advanced PLL circuit, using only one crystal with improved stability and spurious characteristics.

Built-in microprocessor-controlled large digital display. Shows actual VFO frequency and difference between VFO and "M1" memory frequency. Blinking decimal points indicate "out of band." Monoscale dial, too.

IF shift . . . Trio's famous passband tuning that reduces QRM.

Selectable wide and narrow CW bandwidth on receive (500-Hz CW filter is optional).

Automatic selection of upper and lower sideband (SSB NORM/SSB REV switch).

Tunable noise blanker (adjustable noise-sampling frequency).

RF AGC ("RGC"), which activates automatically to prevent overload from strong local signals.

AGC (selectable fast/slow/off).

Dual RIT (VFO and memory/fix).

Three operating modes—SSB, CW, and FSK.

Improved RF speech processor.

Dual SSB filter (optional), with very steep shape factor to reduce out-of-passband noise on receive and to improve operation of RF speech processor on transmit.

13·8 VDC operation.

TS120V/S

THE SYSTEM APPROACH

What do we mean by the "System Approach"?

Well, take the TS120V and you have the finest 20W p.e.p. mobile HF transceiver you could buy. Many operators are even buying it as a second station because it's so good. Consider it's features, the single conversion PLL derived top performance; the accurate digital readout; the passband tuning; the noise blanker; the superb engineering; THEN maybe add the PS20 mains power supply and you have an equally great home station; OR maybe add the multi-function VFO120 second VFO unit; OR the SP120 external speaker; OR the 100W AT120 antenna tuner or maybe even a superb Microwave Modules 2 metre or 70 cm transverter to get you up on the VHF and UHF bands. It all adds up to a fine station tailored exactly to your own needs.

If you need more power, the TL120 200W p.e.p. linear is now available, but you will need a heftier 12V supply to run it. A suitable unit would be the PS30 which delivers up to 20 amps fully regulated and protected. Lots of people are buying the PS30 as a general purpose heavy duty supply for shack use.

Finally, should you really want high power all the time, consider the TS120S which incorporates all the features of the TS120V but has a built-in high power, fully protected 200W p.e.p. linear and it's still not too expensive to enjoy!

PRICES (all including VAT)

TS120V	**£347.30**	TS120S	**£432.40**
PS20 4 Amp	**£44.85**	PS30 20 Amp	**£85.10**
AT120	**£55.20**	MC355 mic	**£13.80**
SP120	**£25.30**	TL120 linear	**£128.80**
VFO120	**£89.70**		

TAKE A GOOD LOOK AT THE PRICES!!! **MANY ARE DOWN!**

LOWE ELECTRONICS Ltd

AND FOR SOMETHING COMPLETELY NEW

TR9000

2 metre MULTIMODE

If you sat down at some time and designed your ideal 2 metre multimode rig, you probably laid down the specification for the new Trio TR9000. I believe that this transceiver will satisfy the needs of every radio amateur, combining as it does small size, (same as the TR7600), light weight (same as the TR7600), and powerful performance.

As you can see, the TR9000 has a complete array of facilities including all mode operation, noise blanker, RIT, 5 memories, twin digital VFOs and digital frequency readout to 100Hz. Now for the smart parts.

The TR9000 is based on a 100Hz synthesiser controlled either by a photo microsensor on the main dial or by the remote up/down microphone. On FM, the operator has instant selection of either 25kHz steps (for convenient mobile use), 12·5kHz steps (for future use), or 100Hz steps (for continuous tuning). On SSB and CW, the synthesiser steps are automatically switched to 100Hz and the digital display is extended to match.

A special feature is the search facility on SSB which tunes the whole band, and the scan facility on FM which scans in 25kHz or 12·5kHz steps, stopping momentarily on any received signal. The scan may then be held by touching the HOLD button or depressing the PTT switch on the microphone.

The TR9000 has so much to offer, it's bound to be yet another leader from Trio. Contact us soon for further details.

TR-9000 about £365 inc VAT

TS770

2 metre and 70 cm MULTIMODE

The only dual band high performance transceiver available today. The TS770 is another successful result of Trio's advanced engineering capability and represents the peak of RF engineering for VHF and UHF.

Full coverage 144–146 and 430–440MHz using an advanced microprocessor controlled synthesiser generating 20Hz steps for that "VFO feel". Eight memory channels which can be scanned, cross band operation for satellite use, VOX, break in CW, 15–18W output at any frequency, terrific receiver performance, search and scan facilities, in fact everything one might expect from the best equipment designed by the best manufacturer in the business.

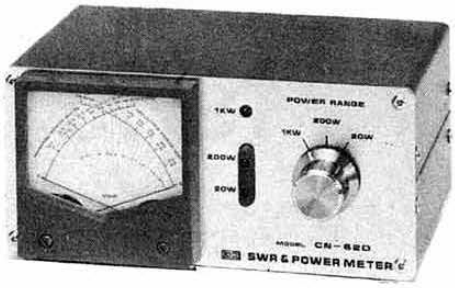
The TS770 gives you a single package to replace all those boxes you use right now. Performance and convenience on VHF and UHF are yours today with the TS770.

For complete information, contact us right now and we will send a detailed brochure.

TS770 £690 inc VAT

LOWE ELECTRONICS Ltd

DAIWA ACCESSORIES—THE BEST THERE ARE



CN-620 SWR & POWER METER

The CN-620 is a radical departure from the accepted norm for in-line power and SWR measurements and represents a considerable improvement over all existing power meters.

The system is based on a crossed needle twin meter, one needle indicating forward power, the other reflected power. The point at which the two needles cross indicates the SWR existing on the system. In one instrument, you combine power and SWR measurement with high accuracy and simplicity of operation.

The CN-620 is simply inserted into any 50 ohm coaxial line. No adjustments are necessary in order to use the instrument. The CN-620 covers the frequency range from 1·8-150MHz and can measure power as low as 400mW reflected and as high as 1kW forward using three easy to read ranges. With the CN-620, doubt in measurement is a thing of the past and once you have used the CN-620, all other power meters will seem old fashioned.

£52.81 inc VAT

CN-620 SPECIFICATION	
Frequency range	1·8-150MHz
Line impedance	50 ohms
Power ranges forward	20W, 200W, 1kW
Power ranges reflected	4W, 40W, 200W
Through power rating	1KW CW, 2KW P.E.P. 1·8-30MHz 250W CW, 500W P.E.P. 140-150MHz
Min. power for SWR measurement	5W
Connectors	SO239
Size	165 × 75 × 97mm

At last, a safe reliable rotator capable of continuous use without going up in smoke! For some time we have been trying out many rotators in the search for something better than usual and we believe we found it in the Daiwa DR7500 series. You can see from the photograph that the quality of construction in the rotator is very good indeed but the most interesting bit of the system is the DC7001 controller.

Basically, the whole system is a closed loop servo which is self aligning and self correcting. The resistance element in the rotator head is part of a bridge which, if unbalanced, drives a reversible motor in the controller, via a high gain amplifier to turn a balancing resistor (and the indicator pointer) until the system is rebalanced. In practice, what this means is that using the left/right switches on the controller drives the rotator in the usual fashion and the indicator follows the rotation smoothly, quietly and with spot-on accuracy all the time. Further point—the usual rotator system has its end stops at south and if like me you like to work DX from Africa, it's b- - - -y annoying to have to swing the beam all the way around from 5 degrees E of S through 350 degrees to point 5 degrees W of S. With the DC7001, you can have the end stops anywhere you like, just choose your least favoured direction.

Power to the rotator motor is split phase 24V ac so there's no dangerous voltage up the mast. Load carrying and turning torque of the DR7500 is more than adequate for a 3 element tribander and if you really need a big brute there is the DR7600 with even higher ratings. Really, we have found nothing to compare to the Daiwa DR7500 and we are sure that you will agree that it is a new step forward in rotator systems.

DR7500 **£108.10** including VAT. DR7600 **£154.10** including VAT.

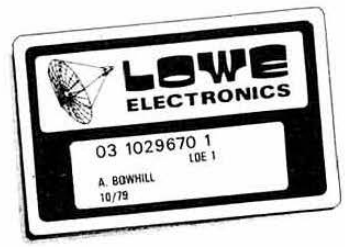
Note: The rotators are supplied complete with control box and both upper and lower mast clamps.

P.S. There's a new fully automatic ATU now from Daiwa. It's magic! Give it a few watts of RF and little motors whizz round and tune for best SWR. Has a CN620 built in too!

2m + 70cm

£71 inc VAT

ALSO THE CN630 FOR VHF/UHF



Everyone is talking about the new Lowe credit card scheme, following its introduction at Leicester. This is the new, easy way to have the rig you wanted right away and avoid any future price rises. How does it work? You simply agree to pay a fixed amount each month and you then get instant purchasing power of 24 times the payment. For example, a payment of £20 gives you £480 of credit, more than enough to buy that TSI20V, aerial and accessories. No fuss and no hefty deposits needed. A further advantage is that as the payments continue, your credit is automatically extended to allow further purchases. Why not send for full details right away and join the growing numbers who hold the Lowe blue card—the way to have tomorrow's equipment today. A major advance to your purchasing power.

THE WAY TO HAVE TOMORROW'S EQUIPMENT TODAY

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

LOWE ELECTRONICS Ltd

TRIO DON'T BE FOOLED! TRIO

Not all dealers sell Trio products . . . and not all dealers who sell Trio products are authorised Trio dealers.

By buying your Trio equipment from an authorised dealer, you can be confident that you have the support of the Trio service and backup organisation stretching all the way through your distributor right back to the factory.

Only an authorised dealer can give you the service, spares and advice that you may need, and only an authorised dealer can allow you to take advantage of the regular meetings between the distributor and Trio factory personnel at which there is a constant exchange of information and advice.

The official Trio organisation in the United Kingdom is as follows:

SOLE IMPORTER AND DISTRIBUTOR
Lowe Electronics Ltd, Chesterfield Road, Matlock, Derbyshire. Telephone No. Matlock (0629) 2817 or 2430

AUTHORISED DEALERS
Yorkshire: Leeds Amateur Radio, 27 Cookridge Street, LEEDS LE2 3AG. Telephone No. 0532 452657
Birmingham: Ward Electronics, Soho House, 362-364 Soho Road, BIRMINGHAM B21 9QL. Telephone No. 021 554 0708
South London: Communications House, 20 Wallington Square, WALLINGTON SM6 8RG. Telephone No. 01-669 6700
North London: Radio Shack Ltd, 188 Broadhurst Gardens, LONDON NW6 3AY. Telephone No. 01-624 7174
Lancashire: Stephens-James Ltd, 47 Warrington Road. LEIGH. Telephone No. 0942 676790
Wales: M.R.S. Communications Ltd, 74 Park Road, Whitchurch, CARDIFF. Telephone No. Cardiff 616936
Essex: Waters & Stanton Electronics Ltd, 18-20 Main Road, Hockley, ESSEX. Telephone No. 03704 6835
Sussex: Bredhurst Electronics, The High Street, Handcross, W. SUSSEX. Telephone No. 0444 400786

Other firms offering Trio products are not officially authorised Trio dealers and Trio equipment purchased from these companies is not backed by the Trio service and spares organisation in the U.K.

THE NEW EMPORIUM IS OPEN!

Yes, the builders have finally, well almost, gone away and we are installed in our new home at last. We believe that the new showroom and workshop facilities are the best in Europe and if you care to check on that, we hope you will come and see us.

As an incentive, any visitor to our new showrooms will be invited to complete a card which will go into the hat at the end of March and a draw will be made for a prize of a brand new TS180S. No obligation to buy anything, just come along and see us.

In addition to the complete range of Trio amateur radio gear, we stock the widest possible range of other equipment for the keen electronic hobbyist, including our new 16K microcomputer system, the EG3003 Genie. Ready to go and complete with 16K of RAM, Microsoft extended Basic, full format keyboard, built-in cassette and full compatibility with most TRS80 software, the Genie introduces a new low price into the small computer field—**£425** inc VAT.

Bargains? there are bound to be some because inevitably in the move we shall turn up all sorts of things lurking in the back of the warehouse which we shall be selling off. This is in addition to our normal range of low priced, top quality accessories for example—DL20 20W 50Ω dummy loads at **£6.04** inc VAT; an indispensible tool, the ME221 20K/V multimeter at **£16.49** inc; the FC5M 50MHz frequency counter at **£41.10** inc; a 3 to 5amp 12V regulated PSU for **£18.40** or a smaller one giving up to 0·7 amp for **£10.93**; a smashing set of chassis punches for **£8.63** and an equally useful small screwdriver set for **£1.50**; the SWR25 twin meter SWR bridge for **£12.78**, and the FU200 VHF aerial rotator for **£40.39**. We stock the full ranges from J. Beam and Microwave Modules, and monitor receivers for all sorts of frequencies right up to 500MHz at prices from about **£46**—in fact we stock everything you need.

Come to the new Emporium and have a good browse around. You will cetainly be welcome, and you could win a brand new TS180S.

You'll find us on the right hand side of Chesterfield Road leaving Matlock just before you leave the 40 mph limit.

A COMPLETE RANGE OF MOBILE AERIALS

From the makers of our popular HF5 vertical, we have a complete range of vehicle aerials for VHF and UHF use. All the whips terminate in a PL259 plug so that you have complete flexibility, and any aerial in the range will fit the RG4M base or the magnetic mount. The 2E, 2NE, and 430E have a quick foldover joint at the base so that you can drive in and out of your garage without dismantling the aerial.

2E	2M 5/8, 3·4dB gain foldover whip.	**£6.50** inc VAT
2NE	2M 7/8, 4·5dB gain foldover whip.	**£11.00** inc VAT
430E	70cm 5/8+5/8, 5·5dB gain.	**£10.00** inc VAT
HS-F1	2M rubber helical on PL259 plug	**£3.95** inc VAT
320	2M stainless quarter wave on PL259	**£1.50** inc VAT
RG4M	Base for all above units including 4 metres of cable ready terminated in PL259.	**£3.00** inc VAT
GSS	Heavy duty gutter/boot mount to take RG4M base	**£3.15** inc VAT
MB5	Magnetic mount complete with 5m of cable and PL259	**£7.95** inc VAT

Also two really great base station aerials

GPV5	High performance 2m base station colinear. Forget the S...MJ...M and R...OR...R	**£22.00** inc VAT
GDX2	3dB gain over the range 50-480MHz. The classic wideband aerial, 500W p.e.p.	**£36.80** inc VAT
HF5	Our original success. 5 band vertical 80-10m with great performance, great savings only	**£41.40** inc VAT

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For equally helpful attention in Scotland contact Sim, GM3SAN, 19 Ellismuir Road, Baillieston, Nr. Glasgow. 041-771 0364.

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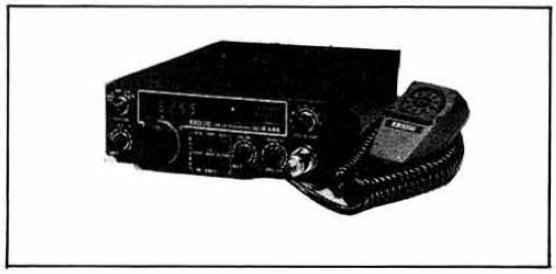
Tried — Tested and Popular . . .

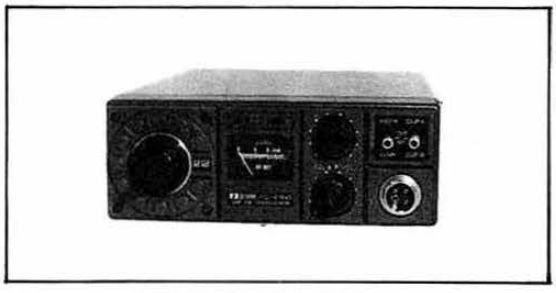
THE MOBILES

★ 25 watt output (1 watt low power).
★ 5 memories. ★ 2 VFOs.
★ Built-in scanner (with optional mic for scan control from the mic). Can scan the whole band, a selected portion, or just the memories.
★ Normal and reverse repeat—600kHz shift built-in plus another user programmable shift, from the front panel (for 70cm transverting?).
★ Size 64 × 185 × 223mm.

PRICE £255 INC VAT



IC-255E 25 WATT FM!



IC-240 NOW £169 inc.

The IC-240 is the ideal mobile rig for most people. Apart from the fact that it is quite a lot cheaper than most, it is, in fact, more suitable than many to use in the car while driving (and let's face it, it is under those conditions that most mobiles are used). It can be operated with ease without taking your eyes off the road and provides up to 22 channels (which is more than you are likely to need). Being synthesized, of course, there are no crystals to buy for extra channels. Full repeat, reverse repeat and automatic tone burst plus a low power facility are selectable from the front panel. By adding a 'Superscan' at a later date you can obtain full scanning facilities over the whole band at a VERY competitive price.

The IC-240 is a superbly built and very reliable piece of equipment as witnessed by the many thousands in use. All Icom equipment is built to a very high standard and the IC-240 is no exception. It has an excellently sensitive receiver and a very clean transmitter and will give you hours of headache-free pleasurable use—so why not get one now before the price goes up again!

240 Alone Less VAT = £167.91 **With VAT = £193.00**

IC-280E NOW £250 inc.

★ WITH SCANNER £260

As usual, ICOM have kept ahead with technology and have produced their revolutionary new IC-280E which uses a microprocessor to produce frequencies throughout the 2m band at the ideal 25kHz spacing required today. The IC-280 has the ideal advantage of being separable into two parts for easy mounting into today's cars which so often forget to leave space for a rig. The removable front panel, with all controls, is only 3" deep and will fit in any convenient spot—in the glove pocket, on the dash or even on the sun visor! The main part of the set can be mounted anywhere within 4 feet—or even further in many cases—under the passenger's seat is quite handy! Display is of frequency on an LED readout and there are three memories for your favourite channels. These are not cleared when the set is switched off as long as it is left connected to the car battery.

Less VAT = £217.39 **With VAT = £250**

AGENTS (PHONE FIRST—All evenings and weekends only, except Barnsley and Burnley)
Scotland—Jack GM8GEC (031-665 2420)
Wales—Tony GW3FKO (0222 702982) **Burnley**—(0282 38481) **Midlands**—Tony G8AVH (021-329 2305)
North West—Gordon G3LEQ (Knutsford (0565) 4040) **Yorkshire**—Peter G3TPX (022678 2517 Evenings) (0226 5031 Day)

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ICOM®

IT'S THE FASTEST MOVER YET, SO TRY TO CATCH ONE!

THE MOBILE OF CHOICE FROM THE WORLD FAMOUS

ICOM STABLE — THE IC-255E

25 Watts—5 Memories—Scanning—600kHz AND User Selectable Repeater Shift—Full Coverage in 5kHz or 25kHz Steps

We have had a poke around one of these little beauties and are certain that ICOM, yet again, have come up with a winner. As you can see it has the expected smart ICOM appearance. Features include:-

- ★ Crystal controlled Tone Burst
- ★ Full band coverage—extendable to 148MHz if required
- ★ Four digit LED display
- ★ 25 Watts output or TW low power
- ★ A superb receiver using grounded gate FET front end
- ★ Scanning over a user programmable range
- ★ Memory scan
- ★ Stop on empty or busy channels
- ★ Tuning in 25kHz or 5kHz steps
- ★ 5 Memories—retained while the power is connected to the rig
- ★ Built-in 600kHz Repeater Shift
- ★ Alternative programmable shift
- ★ Reverse Repeater facilities
- ★ RIT (±3kHz) for those off channel stations
- ★ Scan control from the microphone (an optional mic available shortly)
- ★ Good loud audio
- ★ Optically coupled tuning between control knob and CPU
- ★ Multiway 24 pin socket on back for touchpad, computer, or external control (note the current RM3 cannot be used but a new version is to be introduced).
- ★ Rugged modular PA (Guaranteed of course!)
- ★ Mobile mount which can be padlocked

At £255 including VAT these are such value for money that demand may exceed supply for a while—but they are worth waiting for! (Delivery is free of course by Registered First Class Letter Post.)

FROM THANET OF COURSE

WATERS & STANTON ELECTRONICS

HOLD IT!

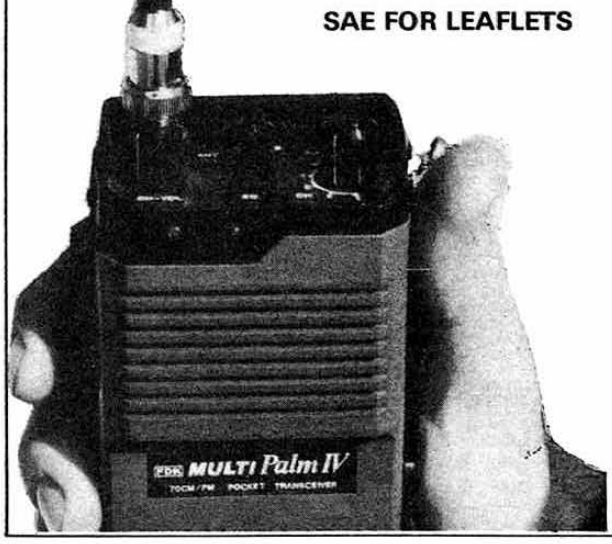
FDK 2m & 70cms
HAND-HELDS
1 WATT, 6 ch

PALM II (144MHz) **£99***
PALM IV (432MHz) **£159**

Prices include ni-cads, AC chargers, Xtal tone-burst and carrying strap.
S20/SU20 fitted.
Leather cases **£5.75.**
Extra channels **£3.00**

***without tone burst £89 inc. VAT**

SAE FOR LEAFLETS



IT'S NEW! . . .

AND LOOK AT THE PRICE!

FDK MULTI-700EX

144–146MHz
12½kHz & 25kHz STEPS
4 PRIORITY CHANNELS
CHANNEL SCANNING

ALL FOR
£225 INC VAT

TUNES IN 25kHz and 12½kHz CHANNELS. 1–25 WATTS OUTPUT VARIABLE. INSTANT REVERSE REPEATER OPERATION. INCLUDES MICROPHONE, MOBILE MOUNTING BRACKET AND DC LEADS.

DELIVERY MARCH/APRIL

STOP PRESS!

Mobile safety mics back in stock complete with boom and gear lever switching boxes. State transceiver model when ordering. **£20.95** inc. VAT.

WATERS & STANTON ELECTRONICS

TRIO

STOP PRESS! TRIO PRICES ARE DOWN!

APPROVED TRIO DEALER

PLEASE PHONE FOR THE NEW PRICES
(Revised prices shown below)

COMING SOON

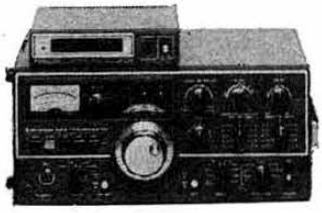
TR9000 2m all mode £365 approx.

ALL PRICES INCLUDE 15% VAT

TRIO TS120V £347
TS120S £432

SOLID STATE RIG RELIABLE AT LAST

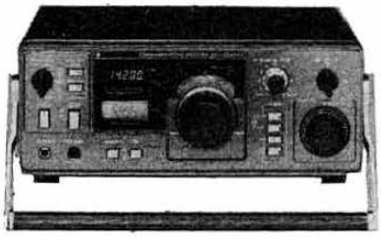
Up until now there has been a natural reluctance to accept solid state HF rigs as anything but a second rig or mobile unit with dubious reliability of the PA devices. Now at last the new TS120 series gives you 80-10 metre coverage at either 10 watts output or 100 watts output. Digital readout and variable selectivity are just two features that put them in a class above any other solid state rig we know of (apart from the TS180S)—even those costing nearly £1,000. The TS120 will put to shame many of the older valve PA designs and can confidently be regarded as a good reliable base or mobile station—and no tune-up means instant QSY from band to band at the flick of a switch.



TRIO TS520SE £437 inc VAT

NEW LOW PRICE UNBEATABLE

For the operator that wants an HF transceiver on a budget this surely must be the answer. 160-10 metres (full coverage) with built-in speech processor and the fine Trio engineering that now has become a legend amongst amateurs around the World. The price is really competitive and from tests we have carried out we must say that if you are looking for a 100 watts output base station the TS520SE should be top of your list for value for money. A pair of fan cooled 6146B's ensures high efficiency and good linearity. There's no longer a 12 volt facility but for mobile work it's a little big these days—for base station use it's unbeatable at this price.



NEW **TRIO R1000 £298 inc VAT**

At last the Trio R1000 has been announced—a real purpose-built receiver for the serious short wave listener. 200kHz to 30MHz in 30 bands. This receiver has many features that are not available on other models and, of course, has the technical backing of the world's largest manufacturers of amateur communications equipment. Features include: 1kHz digital readout and separate analogue dial, large high quality speaker, digital 12 hour clock—AM and PM, three separate filters for razor sharp selectivity, noise blanker (try finding this on any other receiver!), automatic preselector tuning via the 1MHz band switch, three-stage attenuator, dimmer control, tone control, timer circuit, and all this in a diminutive package measuring $12\frac{3}{4} \times 4\frac{1}{4} \times 8\frac{7}{8}$ in. Trio have now solved the problem of choosing a receiver—there is no choice—it's got to be Trio!

KING OF THE PORTABLES

TRIO TR2300 £166.75 inc VAT

The TR2300 is a remarkable package which combines all the advantages of a portable station with those of a mobile transceiver. In many ways it's the ideal "starter rig" in amateur radio. Full band coverage from 144-146MHz in 80 × 25kHz channels plus 600kHz repeater shift and 1750Hz automatic tone-burst complete its versatility.
The dial is directly calibrated in frequency and has illumination for night use. The transmitter is exceptionally clean with an output power in excess of 1 watt. Receiver sensitivity is every bit as good as the best mobile rigs and either internal batteries or an external DC source may be used. Fits easily into a suitcase or on the corner of a desk and makes a really compact mobile rig. Price includes carrying case, shoulder strap, battery charger, external DC cord and, of course, the Waters & Stanton 12 month warranty. An absolute bargain—we even sell them to our staff!

NEW

TRIO

TR2400 £210 inc VAT

The new TR2400 really does eclipse all other hand-helds in its sheer technology. There's no other model that can approach its performance. The large LCD readout has low current drain and the 1·5 watts output is a good compromise between effective communication and reasonable battery drain. 10 memories, automatic scanning, instant reverse repeater operation, 16 key touch-tone encoder, 144-148MHz etc etc . . . all adds up to the new leader in hand-helds . . . the Trio TR2400. Get your Barclaycard or Access cards ready for this one . . . half its fascination is operating it—the other half is owning it.

Waters & Stanton

TWO SUPER POWER HOUSES . . . IMPORTED DIRECT BY US

IN STOCK NOW!
DenTron
MLA 2500B
160–10m 2kW PEP
£695 inc. VAT
and delivery

Send 25p for complete DenTron HF Catalogue

NEW 'B' VERSION NOW IN STOCK
FITTED HIGH/LOW POWER SWITCHING

- 1kW DC continuous
- ALC circuit
- 3 speed cooling
- Military specifications
- 240v/117v AC
- 2 of EIMAC 8875 tubes
- R.F. Wattmeter (incl. p&p)
- Size 5½" × 14" × 14"
- Weight 47lb.
- Ideal for SSTV/RTTY
- 3rd order down 30dB +
- 40 watts drive for 1kW

160–10m ATU's also in stock

144 MHz!
NAGAI
2200 LINEAR
£429
inc. VAT
(Securicor £4.50)

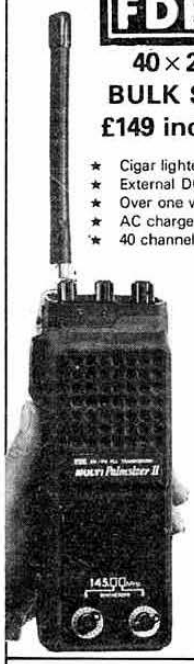
Sae for colour brochure

- 240v AC
- 4CX-350F tube
- Receiver pre-amp
- 10–13 watts drive
- SWR meter built-in
- 500W PEP input
- 400W FM/CW input
- Fan cooled
- 12v DC output—3 amps
- Covers 144–146MHz

FDK PALMSIZER

40 × 25kHz Channels 145–146MHz
BULK SHIPMENT AT SUPER PRICE!
£149 inc. VAT buys this.....

- Cigar lighter plug
- External DC cord
- Over one watt output
- AC charger included
- 40 channel capability
- Simplex or ±600kHz switch
- BNC aerial socket
- Flexible whip supplied
- Xtal controlled tone-burst
- Ni-cad battery pack supplied



OR PALM II & IV

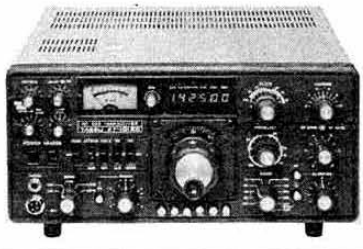
£99.95 inc. VAT £159.00 inc. VAT

The Palm II and IV offer truly amazing value for money in the field of hand-held transceivers. Certainly they are the most compact units currently available and fit easily into the pocket. Accessories such as ni-cads, AC chargers and helical whips are all included in the basic price and additional channels will cost you a mere £3. Repeater operation is fully catered for with the built-in crystal controlled tone-burst and both the 2 metre and 70cms models have plus and minus repeater shifts. Don't miss these amazing prices—just think, you can have both 2 metre and 70cms hand-helds for less than £260 inc. VAT—can't be bad!

DenTron GLA-1000

(IN STOCK NOW)
10–80m 1200W LINEAR
LOW COST, SMALL SIZE, BUT . . .
. . . BIG VOICE DELIVERY FREE IN UK **£295 inc VAT**

This beautiful HF linear covers 80 to 10 metres and has its own built-in 117/234V power supply. Its diminutive size means less table space needed but without sacrificing power capability. Weighing in at just 24 pounds it measures only H.5¼" × W.11" × D.11" with room to spare inside. An almost silent fan ensures cool running whilst the little power house generates 1200 watts input on SSB or 1kW DC for CW. RF drive required is approx. 80 watts and the amplifier can be instantly switched in or out of circuit. Comprehensive metering monitors HF volts, PA current and output RF voltage. Altogether a linear we can thoroughly recommend at a price you can afford—just £295 delivered.



YAESU

FT101Z £575
FT101ZD £659

PRICES INCLUDE FREE DELIVERY & INSURANCE

HUGE DISCOUNT! 2B2M
2m SSB/CW PORTABLE

Fitted 144·2–144·6MHz £135

WATERS & STANTON ELECTRONICS

SALES & SERVICE

We try to keep a very wide selection of all that's good in amateur radio. Occasionally new products are added and others deleted—usually when they become obsolete or technically unsatisfactory. As radio amateurs ourselves we're a pretty fussy bunch so you can buy with confidence from us. Our policy has always been to despatch goods the same day if possible. Our recent move of premises has caused a few delays but we are now back to normal and our new mail order warehouse is simply bulging with goods ready to be despatched anywhere in the UK. New stock control methods and full-time packing staff means a better deal for you the customer. And remember, as one of the largest amateur retailers in the UK, we have a reputation and after-sales back-up service second to none. Simply send us your cheque or quote your Barclaycard or Access number for immediate despatch.

TRIO

TS820S 160-10m transceiver 200w digital	£832.00 (3.75)
TS820 160-10m less digital	£710.00 (3.75)
SP820 External speaker	£39.00 (1.50)
TS520SE 160-10m transceiver 200w	£485.00 (3.75)
SP520 External speaker	£18.00 (1.25)
VFO520S External VFO	£103.00 (3.75)
TS120S 80-10m Solid state 200w	£495.00 (3.75)
TS120V 80-10m Solid state 10w	£408.00 (3.75)
PS20 AC PSU (TS120V)	£52.00 (3.75)
PS30 AC PSU (TS 120S & TS 180S	£98.00 (3.75)
MB100 Mobile mount	£17.00 (0.75)
AT200 1-8-30MHz ATU	£95.00 (1.50)
MC50 Desk microphone (Super!)	£27.50 (1.50)
MC30S Noise cancelling hand mic.	£13.30 (0.50)
TR9000 2m all mode transceiver	t.b.a.
TR7625 2m FM mobile 25w 80ch.	£273.00 (3.75)
TR2300 2m FM portable 80ch.	£199.00 (3.75)
MB2 Mobile mount (2300)	£18.90 (1.00)
TS180s 160-10m solid state transceiver	£825.00 (3.75)
TR3200 70cm portable 3 ch. fitted	£140.00 (3.75)

YAESU

FRG-7 General coverage receiver	£214.00 (N/C)
FRG-7000 Digital readout receiver	£375.00 (N/C)
FT101Z Transceiver	£575.00 (N/C)
FT101ZD Transceiver	£659.00 (N/C)

ICOM (special prices on some models)

IC215E 2mFM 3 watt 12 chs	£162.50 (N/C)
IC202S 2m SSB 3 watt portable	£199.00 (N/C)
IC240 2m 22 ch's 10 watts	£193.00 (N/C)
IC280E 2m FM 80 ch's 10 watts	£250.00 (N/C)
IC211E 2m All mode transceiver	£549.00 (N/C)

MICROWAVE MODULES (NEW PRICES)

MMT 432/28-S transverter	£136.75 (N/C)
MMT 432/144-R transverter	£173.50 (N/C)
MMT 144/28 transverter	£90.75 (N/C)
MMC 144/28-30 converter	£21.85 (N/C)
MMC 144/28 LO converter	£24.15 (N/C)
MMC 70/28 converter	£21.85 (N/C)
MMC 70/28 LO converter	£24.15 (N/C)
MMC 432/28 S converter	£29.90 (N/C)
MMC 432/144 S converter	£29.90 (N/C)
MMC 1296/144 or 28 converter	£32.00 (N/C)
MMC 28/144 10m up converter	£20.70 (N/C)
MMD 050/500mHz counter	£69.00 (N/C)
MMA 144 2m pre-amp	£14.90 (N/C)
MMD 500P 500mHz pre-scaler	£23.00 (N/C)
MMV 1296 varactor tripler	£34.50 (N/C)
MML 144/100w linear amplifier	£142.50 (N/C)
MML 432/100w linear amplifier	£228.00 (N/C)
MML 144/25w	£48.30 (N/C)
MML 432/50w	£113.75 (N/C)

SEM

2m converters	£23.00 (N/C)
70cms converters 144 IF	£23.00 (N/C)
2m pre-amp	£14.95 (N/C)
2m auto switching pre-amp	£19.50 (N/C)
70 cms auto switching pre-amp	£22.63 (N/C)
2m PA3 pre-amp	£8.00 (N/C)
70cm PA3 pre-amp	£10.00 (N/C)
2m 48 watt linear/pre-amp	£66.70 (0.95)

All pre-amps fitted SO239 sockets

HF auto pre-amp 2-40mHz	£16.68 (N/C)
HF pre-amp 2-40mHz	£11.73 (N/C)
HF Z-MATCH ATU 80-10m	£45.00 (1.00)

VHF MONITOR Rx's

TM56B 12v/240 AC auto scan 10 ch's	£106.00 (N/C)
TM56B Marine model	£115.00 (N/C)
SR9 12v DC Marine model	£48.00 (N/C)
Extra xtals	£2.45 (N/C)

FDK (New PII price!)

Multi 3000 2m All mode	£495.00 (N/C)
Multi 800D 2m 25 watts	£289.00 (N/C)
Multi 700E 2m 25 watts	£229.00 (N/C)
Multi Palm II 2m hand-held special package	£99.95 (N/C)
M-11/Q16 xtals	£5.00
Palm II xtals	£3.00
Multi-Palmsizer 2m synthesised 40 channel hand-held	£149.00 (N/C)
Palm IV 70cms	£159.00 (N/C)

DENTRON

MLA 2500 160-10m 2Kw linear	£699.00 (N/C)
MT3000A 3Kw 160-10m tuner	£280.00 (N/C)
MT2000A 3Kw 160-10m tuner	£180.00 (N/C)
160-10AT Supertuner 1Kw	£99.95 (N/C)
JR Monitor 160-10m tuner 300w	£59.95 (N/C)
W-2 160-10m PEP/SWR meter	£59.95 (N/C)
MT 200A Transceiver	£399.00 (N/C)
1Kw 80-10m linear 240v GLA 1000	£295.00 (N/C)

AR

AR240 Synthesised hand-portable	£168.00 (N/C)

MIZUHO (NEW LOW PRICE!)

2m SSB 1 watt portable	£135.00 (N/C)
Extra xtals	£3.00

NAIGAI (NEW LOW PRICE!)

2200 2m 500w PIP linear	£429.00 (N/C)

ADONIS MICROPHONES

AM802G Compressor - 3 outputs	£59.95 (N/C)
AM502G Compressor - 1 output	£39.95 (N/C)

ASP MOBILE ANTENNAS

201 - 2m ¼ wave	£3.50 (1.00)
2009 - 2m 5/8th wave	£9.25 (1.00)
677 - 2m 5/8th wave deluxe	£14.95 (1.00)
462-70cms colinear	£8.25 (1.00)
667 - 70cms colinear deluxe	£17.95 (1.00)
Magnetic base and cable	£8.50 (1.00)
"No-hole" boot mounts	£3.75 (0.50)

HF ANTENNAS

HQ-1 20-15-10m mini-quad	£96.50 (2.50)
C4 20-15-10m vertical	£48.50 (2.00)
Mosley 20-15-10m mini-beam 600w	£99.00 (2.00)
Mosley 2Kw version	£129.00 (2.00)
TA32 600 watts 20-15-10m	£81.00 (2.00)
TA33 600 watts 20-15-10m	£120.75 (2.50)

All prices include VAT at 15%

Mustang 2Kw 20-15-10m	£149.50 (2.50)
Hy-gain 12 AVQ 20-15-10m	£43.00 (2.00)
Hy-gain 14 AVQ 40-10m	£60.00 (2.00)
Hy-gain 18 AVT/WB 80-10m	£87.00 (2.25)
Mosley TD3JR 20-15-10m dipole	£31.00 (1.00)
Mosley RD5 SWL ham dipole	£36.30 (1.00)
EL-40X 80-40 Mini dipole	£39.50 (1.00)
HF5 5 band vertical	£41.50 (1.00)

VHF ANTENNAS (JAYBEAM)

4Y/4M 4el yagi	£17.20 (2.00)
C5/2M 5db colinear	£40.00 (2.00)
5Y/2M 5el yagi	£10.25 (1.50)
8Y/2M 8el yagi	£13.25 (1.50)
10Y/2M 10el yagi	£28.40 (2.00)
PBM10/2M 10el parabeam	£33.60 (2.00)
PBM14/2M 14el parabeam	£40.80 (2.50)
5XY/2M X'd 5 element	£20.70 (1.50)
8XY/2M X'd 8 element	£25.80 (2.00)
10XY/2M X'd 10 element	£34.30 (2.00)
Q4/2M 4el quad	£21.50 (1.50)
Q6/2M 6el quad	£28.50 (2.00)
D5/2M 5 over 5	£18.30 (1.50)
D8/2M 8 over 8	£24.85 (2.00)
SVMK vertical Kit	£6.60 (1.25)
UGP/2 Ground plane	£9.35 (1.25)
HO/2M 2m halo	£4.25 (0.75)
HM/2M Above with 24" mast	£5.05 (1.00)
C8/70cm 8db colinear	£45.40 (2.50)
D8/70cm 8 over 8	£20.45 (2.00)
PBM18/70 18 el parabeam	£24.75 (2.00)
MBM/48 70 el Multibeam	£28.20 (2.00)
MBM88/70 88 el Multibeam	£37.50 (2.00)
8XY/70 8 el X'd yagi	£31.05 (1.50)
12XY/70 12 el X'd yagi	£38.50 (2.00)
D15/1296 15 over 15	£30.95 (1.50)

ACCESSORIES

9502 rotator	£55.80 (1.75)
KR400 rotator	£105.80 (2.00)
AR40 rotator	£54.50 (1.50)
Stolle 2030 rotator	£55.00 (1.50)
Stolle 2010 rotator	£50.00 (1.50)
Stolle 2050	£39.95 (1.50)
SWL ATU	£16.50 (0.75)
Shure 444 microphone	£27.50 (0.75)
Shure 201 microphone	£11.75 (0.75)
Shure 526T microphone Type II	£36.35 (0.75)
Hand morse key	£9.70 (0.50)
MM202S Safety microphone	£20.95 (0.50)
50ohm balun	£11.25 (0.50)
UR67 per metre	£0.62 (0.05)
UR43 per metre	£0.22 (0.03)
5 core cable per metre	£0.30 (0.03)
HP3A high pass filter	£3.00 (0.20)
Drake low pass filter	£18.40 (0.75)
TV1 ferrite rings	£0.35 (0.05)
Plastic antenna insulators	£0.25 (0.05)
Twin SWR meters 3-150mHz	£13.50 (0.50)

JAYBEAM (HF)

TB 3 ele 2kW Beam	£155.00 (2.00)
VR3 Triband vertical	£39.00 (2.00)

HILOMAST LTD

PNAM-1 Telescopes to 9m	£271.00 (15.00)
PNAM-2 Telescopes to 14½m	£331.00 (16.00)

SAE for details.

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Electronics (UK) Ltd

MARCH MADNESS? — MAYBE — BUT....

We think you'll agree these prices cannot be resisted....

YAESU

FT-7B plus FP-12 P.S.U. ..... only **£439** (usually £484)
CPU-2500RK (25W. 2M. FM) ..... only **£319** (usually £335)
FTV-901R (including 70 CMS!) for '101Z or '901 ..... only **£389** (usually £422)
FT-225RD 2m. Multimode ..... only **£545** (usually £599)
FRG-7000 General coverage receiver ..... only **£345** (usually £355)

TRIO

TL-922 2kW input HF linear ..... only **£755** (usually £789)
TS-180S Solid-state HF transceiver (with DFM) ..... only **£795**

Full YAESU/TRIO/DENTRON/ICOM Price List on receipt of S.A.E.

PEAK READING (PEP) WATTMETERS NOW—BRITISH PATENT PROTECTED!
PM-2000 (HF) £51.75 PM-2001 (VHF) £51.75

ANTENNAS		
DX-103	3-el 10m beam	**£69.00**
DX-105	5-el 10m beam	**£89.00**
DX-31	Rotary dipole	**£46.00**
DX-32	2-el tribander	**£80.50**
DX-33	3-el tribander	**£121.90**
DX-34	4-el tribander	**£161.00**
DX-5V	5-band vertical	**£60.32**
ACCESSORIES		
SRK-1	Professional Morse Key	**£11.96**
Vibroplex	Original Standard Key	**£39.68**
Vibroplex	"Champion"	**£39.68**
Vibro Keyer	For el-bugs	**£39.68**
AT-40	40m traps for dipoles	**£9.55**
BA-1	Balun 1:1 1kw p.e.p	**£9.55**
BA-4	Balun 4:1 1kw p.e.p	**£9.55**

Plugs—sockets—insulators—cable etc. etc.

Western MANUFACTURE

WESTOWER Steel telescopic tilt-over towers —"THE STRONGER ONE"

ALUMAST An exclusive lattice aluminium mast

The **DX SERIES** of HF Antennas (see left)

*All the above are designed and manufactured by **Western** in GREAT BRITAIN. Details of these BRITISH PRODUCTS on request.

ALL ADVERTISED PRICES INCLUDE VAT AND CARRIAGE—ACCESS/VISA ACCEPTED

MOST EQUIPMENT CAN BE SEEN AT OUR AGENTS AT—

SOUTHAMPTON—SCOTLAND—N. IRELAND

Western Electronics (UK) Ltd

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Tel. Louth (0507) 604955.

Our Agents
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Scotland: Alan Cameron, GM3OGJ, Alloa (0259) 214653
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LOUTH: 9-12; 1-5pm Mon-Fri. By appointment Sat 9-12.
LEICESTER: May's Hi-Fi, Churchgate (Tel: 0533-58682). Mon-Sat 9-6pm; closed Thurs.

Lee Electronics Ltd

LEE ALL PRICES INCLUDE VAT 15%

PRICE LIST, MARCH 1980

MANAGER NORMAN G8THJ LEE

YAESU MUSEN EQUIPMENT & ACCESSORIES

Receivers:

FRG7000	Digital Receiver with clock covering all bands.	£376.05
FRG7	General coverage receiver 0.5-30 Mhz AC/12 VDC/ Batteries	£215.05
FRG7D	Digital as above but fitted with digital readout	£261.05
DIG	Digital Display for FRG7 with fitting instructions	£45.43

Transmitter:

FL101	10-160M 180W PEP, SSB/CW/AM	£520.95
Proc.	RF Processor for FL101	£47.73

Transceivers and Accessories

FT901DM	160-10M 180W Digital transceiver with FM unit memory unit DC to DC converter etc.	£920.00
FT901D	As above without DC to DC converter memory unit and Keyer	£848.13
FT901DE	As 901M without FM unit memory unit and DC to DC Converter.	£848.13
SP901	Matching speaker	£27.60
FV901DM	Synthesized Scanning external VFO	£248.40
FTV901	VHF/UHF Oscar Transverter	£266.80
YO901	Multi Scope with a pan adaptor	£319.13
FC901	Antenna Tuner	£132.25
SP901B	Loudspeaker with phone patch	£51.18
FT101Z	Transceiver 160-10M 180W	£575.00
FT101ZD	As above with digital display	£661.25
DC-DC	DC to DC Converter for FT101Z and ZD	£38.53
FAN	Electric fan for FT101Z and ZD	£13.80

Accessories are the same as for FT901 series FT101E and Accessories are available while stocks last.

FT301	Accessories while stocks last	
SP120	External loud speaker	£21.28
FT207	Synthesized 2m hand set	£199.00
FT7B	Mobile Transceiver 80-101M 100W PEP	£431.25
7DIG	Digital Display for FT7B	£70.15
FP12	Power supply for FT7B	£77.05
CPU2500RK	2M Synthesized scanning with key board Mic 25W	£354.20
FT227RB	As FT227R but with scanner in 4 memories	£263.35
FT225R	Multi mode 25W Transceiver	£511.75
FT225RD	Multi mode 25W Digital Transceiver	£557.75
FT202R	Hand held transceiver	£119.00
NC-1	Slot in charger for FT202	£18.98
YM-24	Speaker Microphone for FT202	£16.68
YC500S	As YC500J but 1 ppm resolution	£273.13
YP150	Power meter 6/30/150 Watt 1-8/200Mhz	£67.28
FF501DX	Low Pass filter	£21.28
QTR24	World Clock	£18.40
YD844	Desk microphone	£22.43
YD846	Hand microphone	£8.63
YH55	Low impedance head phones	£10.06

Free delivery within the UK.

ICOM EQUIPMENT

IC215E	With S20, 22, RO-9 inc.	£162.00
IC240	With low/high power and rev rpt	£193.00
IC280E	80ch mobile, 3 memories	£250.00
IC211E	Multi Mode with digital read out	£549.00
RM3	Keypad for IC211E/245E/701	£99.00
IC260E	CW/USB/FM digital mobile/fxd	£369.00
IC202S	SSB portable	£199.00
IC701	De luxe HF solid state synthesized transceiver complete with electret mic and matching mains PSU 13-6V or 240V.	£899.00
PSU	alone	£99.00
IC402	70cm SSB portable 3W PEP	£294.00
IC255E	25W 2m transceiver	£255.00

Full range of accessories available.
Free delivery within the UK.

STANDING EQUIPMENT & ACCESSORIES

C146G	144MHz 2W hand held transceiver fitted with S20 complete with tone burst and carry strap and belt loop.	£125.93
CN-10	Set of Ni-cad Rechargeable batteries	£9.75
C12-230	Low Cost Wall Type Ni-cad charger	£6.61
CSA	Base Master charger with antenna coupler etc.	£25.88
CAT08	Flexible helical antenna	£6.84
CMP30A	External PTT Speaker/ microphone	£18.69
	Spare tone burst (timed tone burst)	£7.48
C432	70cm 2W hand portable FM transceiver fitted 433-2/ 433-5 with tone burst.	£194.98
C830S	Marine hand held transceiver fitted with Ch 6 and 16 complete with carrying case	£160.00
C8800	2M Synthesized mobile 400 channel	£251.85
C7800	70cm Synthesized mobile 430-440MHz	£274.85

VHF MONITOR RECEIVERS AND SCANNERS

MRS/T1000	Pocket receiver 144MHz 12 Ch fitted with S0, S20, S22,S23, S24, R4, R5, R6, R7	£66.13

FDK EQUIPMENT

Multi 2700	FM/SSB/CW 10W Transceiver with VFO and VXO Digital	£489.00
700E	2M FM Synthesized digital transceiver	£234.09
Multi 800D	25W 2M FM Synthesized digital transceiver	£289.00
DD800	Digital Display	£19.95
TM56B	2M FM monitor 230V/12V 10 channels fitted. 4 auto scan channels plus	£104.63
TM56B	Marine FM monitor receiver 230V/12V DC 10 ch fitted	£113.60

MICROWAVE MODULES

MMT144/28	MHz Transverter 10W	£90.85
MMT432/28S	Transverter with Oscar shift xtal 10W output	£136.85
MMT432/144R	Transverter with repeater shift xtal	£173.65
MMT144/28	MHz Converter	£21.85
MMC144/28	MHz Converter with L/O output	£24.15
MMC136/28	MHz Satellite Converter	£21.85
MMC70/28	MHz Converter (any if)	£21.85
MMC432/144	MHz Converter	£27.60
MMC432/144S	Converter	£32.20
MMC432/28S	Converter	£32.20
MMC432/51	ATV converter	£32.20
1296/144	MHz converter	£32.20
MMC1296/28	MHz converter	£32.20
MMC28/144	Converter	£21.85
MMA144	2M – preamplifier	£14.95
MMV1296	MHz Varacter Tripler	£34.50
MMDO50/500	MHz Frequency counter	£69.00
MMD500P	500MHz Pre-sealer	£23.00
MML144/25	2M Linear 1-3W input	£48.30
MML144/80	2M Linear 10W input 80W output	£142.60
MML432/100	432MHz Linear power amplifier	£228.85
MML432/50	432MHz Linear power amplifier	£113.85

Free postage

HELICAL ANTENNA

	2M with BNC Plug	£4.43
	2M with PL259	£4.43
	2M Screw thread for IC215/202, Trio 2200GX	
	Standard C146	£4.03
	156MHZ Marine antenna available	£4.43

P&P 30p.

ANTENNA SPECIALISTS

ASP 201	1/4W 2M Mobile Antenna	£4.03
ASP 2009	5/8W 3dB 2M Mobile Antenna	£9.50
ASP 629	1/2W 3dB 2M Mobile Antenna	£8.75
ASP 677	5/8W 3dB 2M Mobile Antenna	£16.39
ASP 393	1/2W De Luxe 3dB 2M Mobile Antenna	£17.25
ASP 462	70cm 3dB Mobile Antenna	£8.74
ASP 667	5dB Colinear 425-440MHz with 0-375" snap-in mount	£21.39
ASP 659 UK	70cm 3dB Base Antenna	£23.00
ASP 655 UK	2M 3dB 130-174MHz Base Antenna	£25.88
ASP 220 A	Magnetic mount for ASP 201/2009	£10.29
ASP 220	Magnetic mount for ASP 629/677	£10.29
ASP	Bolt Mount	
ASP GM	Universal Cutter Mount	£5.18

Full range of Marine and Professional Antennas available on request.

JVL ANTENNAS

285 B	5/8 Wave ground plawe 144-148	£25.88
285 D	6dB Gain Colinear 144-148	£36.80
485 D	6dB Gain Colinear 430-435	£36.80
DPL C22	Dimond 6-5dB Mobile colinear 2M	£36.80
BM-1	Bumper mounts suitable for G-Whip and DPLC22	£9.14

Free carriage

JAYBEAM ANTENNAS

4 Metre Antennas

4Y/4M	4 element folded dipole yagi with 1¼" boom	£17.19
PMH2/4M	2-way phasing harness for two 4m yagis	£12.19

2 Metre Antennas

C5/2M	5dB glass fibre colinear, omnidirectional	£40.02
5Y/2M	5 element folded dipole yagi with 1" boom	£10.23

LEE ELECTRONICS LTD PRICE LIST MARCH 1980—continued

8Y2M	8 element folded dipole yagi with 1" boom	£13.22
10Y2M	10 element folded dipole 'long yagi' with 1¼" boom and trombone support	£28.40
PBM10/2M	10 element Parabeam with 1¼" boom and trombone support boom	£33.58
PBM14/2M	14 element Parabeam with 1¼" boom and 45° braces	£40.82
5XY/2M	Crossed 5 element yagi with 1¼" boom	£20.70
8XY/2M	Crossed 8 element yagi with 1¼" boom	£25.87
10XY/2M	Crossed 10 element yagi with 1¼" boom	£34.27
PMH/2C	2 way phasing harness for circular polarisation	£6.78
Q4/2M	4 element quad yagi	£21.50
Q6/2M	6 element quad yagi	£28.52
D5/2M	Double 5 slot-fed yagi with 1" booms	£18.28
D8/2M	Double 8 slot-fed yagi with 1" booms	£24.84
SVMK/2M	Mounting kit for vertical polarisation for 2 slot-fed yagis	£6.61
UGP/2M	Unipole and ground plane	£9.37
HO/2M	Mobile 'halo' head only	£4.25
HM/2M	Mobile 'halo' with 24" mast	£5.06
PMH2/2M	2 way phasing harness for two 2m aerials	£8.97
PMH4/2M	4 way phasing harness for four 2m aerials	£21.50

70cm Antennas

C8/70cm	8dB glass fibre colinear, omnidirectional	£45.42
D8/70cm	Double 8 slot-fed yagi with ¾" booms	£20.47
PBM18/70cm	18 element Parabeam yagi with 1¼" boom	£24.72
MBM48/70cm	48 element Multibeam yagi with trombone mounting	£28.17
MBM88/70cm	88 element Multibeam yagi with trombone mounting	£37.49
8XY/70cm	Crossed 8 element yagi complete with phasing harness and 'N' type connector	£31.05
12XY/70cm	Crossed 12 element yagi complete with phasing harness and 'N' type connector	£38.52
PMH2/70	2 way phasing harness for two 70cm yagis	£7.76
PMH4/70cm	4 way phasing harness for four 70cm yagis	£16.44

Carriage £3.00

23cm Antenna

D15/1296	Double 15 slot-fed yagi with 'N' plug	£33.23

HY GAIN BASE STATION ANTENNAS, VERTS. YAGIS AND QUADS

12AVQ	10-20cm Trapped vertical self supporting 14' H	£43.12
18AVT/WB	10-80m Trapped vertical self supporting 25' H	£87.40
14RMQ	Roof mounting kit for 12, 14 and 18 AV's	£22.42
18V	10-80m Loaded vertical self supporting 19' H	£31.97
18HT	10-80m Hy Tower self supporting 'stubbed' 50' H	£258.75
103BA	10m 3 element yagi 17' LE 8' B	£58.65
105BA	10m 5 element yagi 18·5' LE 24' B	£105.80
153BA	15m 3 element yagi 23' LE 12' B	£72.16
155BA	15m 5 element yagi 24·5' LE 26' B	£135.12
203BA	20m 3 element yagi 35' LE 16' B	£135.12
204BA	20m 4 element yagi 36·5' LE 26' B	£178.25
205BA	20m 5 element yagi 36·5' LE 34' B	£235.75
402BA	40m 2 element yagi 43' LE 16' B	£181.70
DB10-15A	10-15m 3 element yagi 23' LE 13' B	£132.25
TH3MK3	10-20m 2 element yagi 27·3' LE 6' B	£126.21
TH3JNR	10-20m 3 element 600W yagi 24·2' LE 12' B	£130.52
TH3MK3	10-20m 3 element yagi 27' LE 14' B	£180.55
TH6DXX	10-20m 6 element (total) 31·1' LE 24' B	£235.75
HY QUAD	10-20m 2 element quad 13·5' TR 8' B	£194.35
	Diamond KB105 10-80m Trapped vertical antenna	£77.50

Carriage £3.00

G WHIP MOBILE ANTENNAS—FULL RANGE AVAILABLE

ROTATORS

HAM111	Heavy Duty with solenoid brake	£159.85
AR22	For Medium VHF Antennas solenoid control	£49.45
AR40	As AR23 but solid state control	£54.63
CD44	Medium Duty continuous read out	£109.25
ART3000C	Medium Duty continuous read out	£91.94
TRI	Low cost light weight	£30.76
KR400	Medium Duty	£105.80

COAX CABLE

UR43	50 OHM Solid Centre—price per metre	£0.23
UR67	50 OHM Solid Centre—low loss price per metre	£0.56

SWR & POWER METERS ETC.

SWR 15	Single meter SWR/FS 3·5-150MHz	£9.78
SWR 25	Twin meter SWR/Power 3·5-150MHz	£12.08
UH 74	Single meter SWR/Power HF/2m/70cm	£15.39
T-432	Twin meter 144/432MHz SWR/Power SW/20W/120W	£34.44

OSCERBLOCK RANGE

SWR 200B	Twin meter SWR/Power 3·5-150MHz Power Range 200/2kW at 3·5-30MHz 2/20/200W at 144MHz	£40.19
SWR 300	Twin meter SWR/Power 3·5-30MHz, covers 2m and 70cm with SPC-2B and SPC-07A, 20/220/2kW	£45.94
SWRVVV	Meter body only for use with SPC-2B or SPC-07A	£22.94
SPC 2B	Add on adaptor for 144MHz 20/200 watts	£17.19
SPC 07A	Add on adaptor for 430MHz 2/20W	£21.79

LEADER RANGE

LPM 880	Dummy load power meter 1·8-500MHz 5/20/120W	£83.38
LPM 885	SWR/Power meter 1·8-54MHz 20/200/1kW	£58.65
LDM-815	Dip meter 1·5-250MHz	£51.75
LIM 870A	Antenna impedance meter 1·8-150MHz 0-1K Ohm	£51.75

ANTENNA TUNER

LAC 895	3·5-28MHz and SWR	£104.65
LAC 897	144-148MHz 5/20/100W and SWR	£57.44

DUMMY LOADS

DL20	30W DC-150MHz with PL259 connector	£6.33
T-80	80W DC-500MHz with SO239 connector	£22.94
T-150	150W DC-500MHz with SO239 connector	£32.78

MORSE KEYS

HK 707	Straight Up/Down keyer	£10.06
BK 100	Semi-automatic mechanical bug	£17.88
MK 702	Up/Down keyer on marble base	£22.43
MK 702	Manipulator	£22.43
MK 704	Squeeze paddle	£14.38
MK 705	Squeeze paddle on marble base	£22.43
EKM-1A	Morse code practice oscillator	£8.63
MK 1024	Automatic memory keyer	£135.13
EK-150	Semi/Automatic keyer	£74.75

LINEAR & PRE AMPLIFIERS (LUNAR ELECTRONICS)

2M10-80P	144MHz 10W input/80W output with 9dB preamp	£138.00
2M25-150P	144MHz 25W input/150W output with 9dB preamp	£184.00
2M10-150P	144MHz 10W input/150W output with 9dB preamp	£209.88
2M3-150P	144MHz 3W input/150W output with 9dB preamp	£209.88
HF-100L	3-30MHz 100W with 9dB preamp	£138.00
PA28	10m preamp 15dB gain (BNC)	£28.18
PA144	2m preamp 11dB gain (BNC)	£28.18
PAI 144	2m inline RF switched preamp	£35.94
PAI 28	10m inline RF switched preamp	£35.94
PAD 144	2m dual preamp 22dB gain	£34.44
PA432-2	420-450MHz preamp	£30.48

HF MOBILE LINEAR

TX 5300	80-10m 200W output 440W Max PEP with 10dB gain preamp fully protected 2-15W input	£253.80

POWER SUPPLIES ETC. (FULLY STABILIZED & PROTECTED)

PM103	12/9/7·5/6/4·5/3V 500 Ma	£14.38
PX402	13·8V 3 amps Nom 4 amps Max	£22.94
AT1500	Inverter 150W AC and 12V charger	£56.92
NC-10	NI-CAD charger charges 10 AA size batteries	£6.32
NC-4	NI-CAD charger charges 4 AA size batteries	£5.17

SHURE MICS

201	Hand ceramic omnidirectional high impedance	£14.49
202	Hand ceramic noise reducing high impedance	£15.18
401A	Hand controlled magnetic high impedance	£16.56
401B	Hand controlled mag. low impedance (200 ohms)	£16.56
444	Desk adjustable height controlled magnetic	£32.43
526T	Desk controlled response transistor preamp	£39.33

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£241.50 inc. VAT. Delivery by Securicor

FREQUENCY COVERAGE .....66 - 88 MHz FM; 118 - 136 MHz AM (Aircraft Band); 144 - 174 MHz FM; 420.45 - 512 MHz FM. This coverage includes the 70 cm; 2m; 4m FM AMATEUR BANDS. To programme this Receiver you simply punch in the frequencies you wish to monitor. To AUTOMATICALLY SEARCH MARINE FREQUENCIES YOU JUST PRESS ONE BUTTON. The Bearcat 220 FB will also AUTOMATICALLY SEARCH the entire AIRCRAFT BAND.
Power requirements: 240V AC/12v DC. Accessories included in the price are - Mounting bracket and hardware, DC cord and telescoping antenna.

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AMATEUR ELECTRONICS UK

source for YAESU MUSEN

YAESU FT-101ZD

FT-101ZD. When YAESU first introduced the original FT-101 this was the trend setter of the day and so it has been with each succeeding version of this world famous transceiver. Countless thousands have been purchased around the Globe and the reputation which these rugged rigs earned for performance and reliability operating under every form of adverse condition went a long way towards establishing the YAESU MUSEN name. When the latest model, the FT-101ZD, was launched last year we knew as soon as we saw the first delivery that once again YAESU had a winner and the sales that have followed have proved this beyond any shadow of doubt. There is simply nothing on the market that can match the FT-101Z and FT-101ZD for value for money and—as we keep saying—the performance outstrips many a rig with a fancier price tag.

THE ABOVE IS ONLY PART OF THE YAESU STORY—FOR FULL DETAILS OF ALL THE MODELS 36p IN STAMPS WILL BRING YOU THE LATEST GLOSSY CATALOGUE OF THE FULL PRODUCT RANGE TOGETHER WITH OUR CREDIT VOUCHER FOR £3.60—A 10-1 WINNING OFFER!

AND WHAT ELSE IS AT AMATEUR ELECTRONICS?

The short answer is 'PLENTY' but the full reply is a very lengthy one indeed these days. Quite apart from the host of accessories and ancillary units stocked we import the superb SWAN range as per our recent advertisements and carry ATLAS equipment and latterly the full ICOM range. Add to these the superb new STANDARD RADIO models and you'll soon see that a visit could be well worth while. If you can't make it of course then we shall be pleased to send you all the information you require by return post. Lest you forget!—we carry the full Jaybeam range plus a good choice of mobile aerials.

ATTENTION BARGAIN HUNTERS! A large SAE will bring you our latest used equipment list and our special offers on discontinued new gear and new demonstration models.

AGENCY APPOINTMENTS

We are pleased to announce that we have extended our service to out-of-town customers with the appointment of two new agents in areas which are, in our view, lacking in amateur sales facilities at the moment. As from the appearance of this issue AMATEUR ELECTRONICS UK will be fully represented by the following AGENTS and the personnel involved, named or otherwise, are fully licensed operators who have been selected for their interest in and knowledge of, the hobby not to mention their impeccable bona fides.

EAST ANGLIA—Dr T. THIRST (Tim) G4CTT, NORWICH. 06925 403
NORTH EAST—NORTH EAST AMATEUR RADIO, DARLINGTON. 0325 55969
We hope customers in the above areas will avail themselves of the service now offered and we are sure they will derive great benefit from expert local help.
Our existing representatives remain, of course, as below.

BRANCH: AMATEUR ELECTRONICS, UK—COASTAL, CLIFTONVILLE, KENT, KEN McINNES, G3FTE, THANET (0843) 291297. 9 a.m.-10.30 p.m.
BRANCH: AMATEUR ELECTRONICS UK-SCOTLAND, 287 MAIN STREET, WISHAW, LANARKSHIRE, GORDON McCALLUM, GM3UCI. TELEPHONE WISHAW 71382. (EVENINGS CARLUKE 70914)
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DATONG ELECTRONICS LIMITED

IMPROVE YOUR DX POTENTIAL!

Datong RF Speech Clippers add "punch" to your speech signal and help you get through where otherwise you wouldn't. Their low-distortion **R.F. clipping** technique helps in two ways.

Model A.S.P.

NEW

Firstly it allows your transmitter to radiate more useful average power and **secondly** it improves the intelligibility of your speech in difficult conditions.

The renowned fully automatic R.F. clipper **MODEL ASP** is now joined by a new manually operated R.F. clipper **MODEL D75.** This supersedes our original manually controlled unit, MODEL RFC, and offers the following additional features:

Model D75

- Input monitor LED – lights when clipping is betwen 0 and 20 dbs
- Power-on LED
- Low/High input impedance selector
- Stylish appearance to blend with any rig

Remember: all Datong R.F. clippers connect in series with your microphone. No internal connections are required. For R.F. clipping at minimal cost our MODEL RFC/M is still available. MODEL RFC/M is a fully assembled and tested R.F. clipper in PCB module form. You provide controls, case and power source.

Data sheets on all three R.F. clippers, including the new MODEL D75, are available on request. Price: Model D.75 £49.00 plus Vat (£56.35 total). Model A.S.P. £69.00 plus VAT (£79.35 total).

MORSE TUTOR

Morse Tutor has a calibrated speed control **plus**, and this is vital, a separately adjustable delay between letters.

Start at, for example, 12 words per minute but with a two second delay and just reduce the delay as you improve. It delivers five character groups of letters, numbers, or both together. The sequence is random so the supply is unlimited!

All this plus portability, built-in loudspeaker, personal earpiece and key jack. Only £43.00 plus VAT (15%), inclusive price £49.45. Full data sheet free on request.

MODEL UC/1 UP CONVERTER

If you already own a good quality ten-metre or two-metre receiver or transceiver you are only £118 away from a really high performance general coverage receiver. Just add the magic ingredient, MODEL UC/1 from DATONG!

You get full coverage in thirty synthesised 1 MHz segments from 60kHz (Rugby MSF) to 30MHz, at high sensitivity and with all the facilities and high performance of your existing rig!

For good measure UC/1 also adds two-metre coverage to ten-metre receivers. Price: £119.00 plus VAT (£136.85 total).

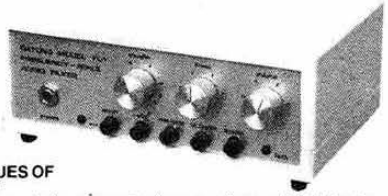
MODEL FL1

Frequency

Agile

Audio

Filter



AS REVIEWED IN AUGUST ISSUES OF "QST" and "73"

A versatile add-on unit for communications receivers which helps to extract wanted signals from background interference. It connects in series with the loudspeaker or headphones. The effect is similar to "I.F. pass-band tuning" for SBB/ or RTTY reception, and bandwidth down to 20Hz (with limited a.f.c.) gives an amazing capability for pulling weak CW stations out of the QRM. Model FL1 is unique in being able to tune itself when notching out unwanted whistles.

Price: £59.00 plus VAT (£67.85 total).

MODEL AD170 ACTIVE ANTENNA

For sensitive reception right through from MSF at 60 kHz to Band 1 TV DX around 50 MHz, without the need for an antennae farm, MODEL AD170 has no adjustments and needs no external tuning units.

Although only three metres long, MODEL AD170 has the same directional properties as a full size dipole, even at 60 kHz.

Price: £33.00 plus VAT (£37.95 total); Special price complete with mains power unit: £37.00 plus VAT (£42.55 total).

NEW SHORT FORM CATALOGUE AVAILABLE FREE ON REQUEST (QUOTE REF. RC12)

ALL PRICES QUOTED INCLUDE POST & PACKING

If you wonder how our products blend into a station, October's Rad. Com. gives some nice examples; out of the 7 photographs of members shacks, 4 show Datong equipment in use – (three FL1's, two RFC's and a UC1)

DATONG ELECTRONICS LIMITED

Spence Mills, Mill Lane, Bramley, Leeds LS13 3HE, England. Telephone: (0532) 552461

KYOKUTO

KYOKUTO DENSHI COMPANY LIMITED

NEW
2025
2m SYNTHESIZED TRANSCEIVER

★ **Custom design microprocessor control**
★ **25kHz *and* 12·5kHz synthesizer steps!!**
★ **'Instant QSY', 10 times rate button**
★ **25 Watts of reliable output**
★ **Band scan between any 'easy set' limits**
★ **10 write-in non-volatile memory channels**
★ **Memory scanning with hold facility**
★ **Standard ± 600kHz or any repeater split**

The KDK FM2025E is a 12V DC two-metre FM transceiver suitable for mobile or base station use. Although packed with more features than any previous model, operation has been made even easier, by the use of a 'custom built' microprocessor controller.

A digital frequency synthesizer provides full band coverage in 12·5kHz or 25kHz steps selectable by a slide switch. 'Single knob' frequency selection is provided by an optically coupled encoder (30 PPR) plus a dialling speed switch that increases the tuning steps tenfold to facilitate the selection of widely spaced frequencies.

An electronic memory, with on board Ni-Cd back up, provides 10 simplex (plus standard ±600kHz shift) and/or 5 semi duplex channels for the ten slot, two group store. This makes the 2025 as easy to use mobile as a crystal controlled transceiver. One memory slot is semi-dedicated to 'priority' use, and is programmable even when the 2025 transceiver is controlled by the dial.

The 2025 embodies the best non-lockout scanner available. It seeks occupied or empty channels and a flick switch hold facility enables immediate transmission on a desired frequency. The scanner functions on both memory channels and across any selected portion of the band, scan limits are defined by two of the memory channels.

Dual gate UHF MOSFETS are used in the RF and mixer to provide superior intermodulation characteristics with high sensitivity. This performance is maintained over the band by automatic varicap electronic tuning.

A monolythic crystal filter in the first IF and a commercial quality 15-pole ceramic filter in the second IF provides extremely sharp selectivity. The adoption of the latest one-chip multifunction IC for all the second conversion circuitry enhances receiver performance and reliability.

The single conversion transmitter uses a balanced mixer and a VCO on the signal frequency (directly modulated for superb FM) and a hybrid power module for 25W (or 3W) RF output. The PA is impervious to breakdowns under infinite VSWR and produces with the LPF a substantially spurious free signal.

All necessary control function instructions are programmed into the microprocessor itself. But by re-arranging a diode matrix, the lower frequency transceive limit, the high frequency receive limit and the high frequency transmit limit may be altered to allow for changes of band plan or location after purchase of the transceiver.

Switchable auto-tone-burst, RF attenuator, squelch, microphone, microphone clip, power lead, mounting bracket, handbook are, of course, part of the package.

Call your dealer today for further details or demonstration.

£250 inc. VAT at 15% (£217.39 + VAT) **SEE ONE TODAY!**

SOUTH MIDLANDS COMMUNICATIONS LTD

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HAMPSHIRE SO4 4DN

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TELEX: 477351 SMCOMM G

VERSATOWER

TELESCOPIC & TILTOVER RADIO TOWERS

Twelve years of continuous development has produced a range of over 50 models, all of which conform to the current B.S.S., requiring *minimum* designed wind speeds of 85mph and up to 117mph.

Before purchasing a Tower, we strongly recommend consulting one of our engineers for advice regarding the most suitable combination for an installation. *It would be incorrect to nominate a specific headload as this is dependent upon load distribution, geographical location and siting.*

25–120ft, post, base plate, wall, fixed base or mobile (on high-speed trailer) versions.

Price of towers are for the complete package – tower sections, mounts, telescopic and luffing gear, guys, head unit and winches.
AS APPROPRIATE FOR ANY PARTICULAR MODEL

The sample of prices exclude VAT and delivery

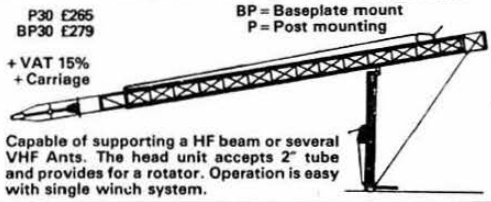
STANDARD 13M20 SERIES				*HEAVY DUTY 16M20 SERIES*			
Post Mounting 13M20				*Post Mounting* 16M20			
P25	25'	Tower	£236.20				
P40	40'	Tower	£323.60	P40	40'	Tower	£476.60
P60	60'	Tower	£392.70	P60	60'	Tower	£541.10
Fixed Base 13M20				*Fixed Base* 16M20			
FB25	25'	Tower	£175.60				
FB40	40'	Tower	£262.40	FB40	40'	Tower	£382.20
FB60	60'	Tower	£332.20	FB60	60'	Tower	£446.70
Socket Types 13M20				*Socket Types* 16M20			
SP25	25'	Tower	£274.60				
SP40	40'	Tower	£361.50	SP40	40'	Tower	£528.50
SP60	60'	Tower	£431.30	SP60	60'	Tower	£592.70
Base plate 13M20				*Base plate* 16M20			
BP25	25'	Tower	£276.00				
BP40	40'	Tower	£361.90	BP40	40'	Tower	£496.30
BP60	60'	Tower	£431.20	BP60	60'	Tower	£560.70
Wall Mounting 13M20				*Wall Mounting* 16M20			
W25	25'	Tower	£190.20				
W40	40'	Tower	£277.00	W40	40'	Tower	£390.30
W60	60'	Tower	£346.80	W60	60'	Tower	£449.50

80-85-100-120' and MOBILES PRICES ON APPLICATION

NEW '30ft': 10ft SECTIONS

P30 £265
BP30 £279
+ VAT 15%
+ Carriage

BP = Baseplate mount
P = Post mounting



Capable of supporting a HF beam or several VHF Ants. The head unit accepts 2" tube and provides for a rotator. Operation is easy with single winch system.

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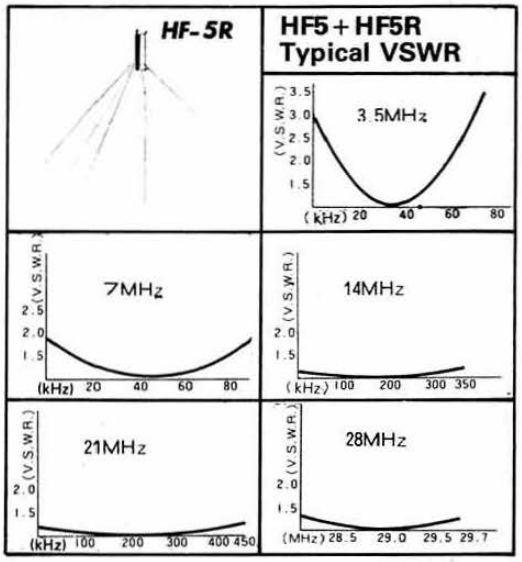
SMC-HS

FIVE BAND VERTICAL ANTENNA

Only 15' 9" high (4.8m) and around 1⅝" in diameter (4.2cm). This remarkable new antenna operates on 80, 40, 20, 15, and 10 metres. Power handling of 500W PEP on 10, 15 and 20m and 200W PEP on 40 and 80m, within its 1.5:1 V.S.W.R. bandwidth.

The SMCHF5 weighs only 6lb 6ozs (2.9kg) and is suitable for mounting at ground level on a good earth post (with or without radials) or in an elevated position with wire radials or better still the SMCHF5R.

THE SMCHF5R Radial kit, with power handling capabilities of 150W PEP weighs only 4lbs (1.8kg) and is the perfect answer to restricted locations, consisting as it does of five solid rods of similar length 6' 6"–7' 3" (2.05–2.2m) sloping at 45° to the antenna.



SMCHF5V and SMCHF5R are available from reputable amateur radio dealers throughout Britain

SMCHF5V £35.00 + 15% VAT, £40.25 Ex-works
SMCHF5R £25.65 + 15% VAT, £29.50 Ex-works

Carriage–Antenna or radial or both together
SECURICOR DELIVERY £3.30 + 15% VAT, £3.80
RAIL DELIVERY £1.50 + 15% VAT, £1.73

Check out our exciting new range of mobile and VHF colinear antennas today.

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ASCOT

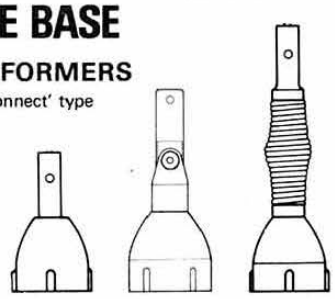
THE FIVE-EIGHTS ANTENNA A SIX POINT GUIDE!

1 PICK THE BASE

BASE TRANSFORMERS

Screw on 'quick disconnect' type

- ★ 130–175MHz
- ★ 3dB Gain
- ★ 5MHz Band
- ★ 1·5:1 max
- ★ 100W Rated
- ★ 50 ohm nom.
- ★ A100 nylon
- ★ Chrome plated
- ★ Stainless spring
- ★ Beryllium Cu.



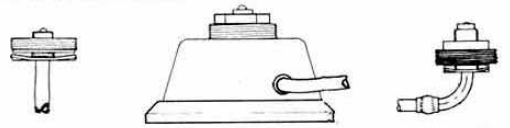
STANDARD (440) £3.50 | SWIVEL (330) £4.45 | SPRUNG (341) £6.65

2 CHOOSE THE MOUNT

all fit the above

BASE CONNECTORS

All c/w 4.5m coax



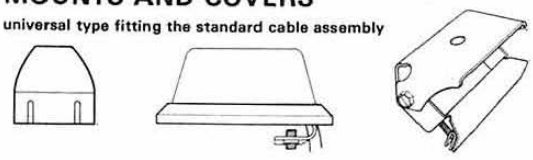
STANDARD (085) £2.80 or MAGNETIC (092) £8.95 or FIBRE-GLASS (085LR) £3.35

3 ADD AN ACCESSORY

(if required)

MOUNTS AND COVERS

universal type fitting the standard cable assembly



Blank-off (031) £0.80 and Boot-lip (093) £2.90 or Gutter clip (089) £4.75

4 SELECT THE WHIP

STAINLESS STEEL GROUND TAPERED

(057) 127cms long £1.95

5 ADD THE CARRIAGE

Mail order is offered direct from SMC HQ and the Branches.
Carriage **£1.00** complete antennas or **£0.50** for accessories any quantity.

6 ADD THE VAT+15%

An illustrated leaflet on the full range of ¼λ and ½λ antennas is available

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HANSEN

PEP & LEVEL RESPONSE IN-LINE WATTMETERS

The FS700 series are flat frequency response, peak envelope power and R.M.S. in-line wattmeters with many novel features. The most notable being the 'power independent' SWR scale—no forward power calibration knob, just a direct reading SWR scale.
Get into the Hansen habit today.

Specifications	FS700H	FS700V
Freq. Range	1·8–60MHz	50–150MHz
Power FSD	15,150, 1·5kW	15,150W
V.S.W.R.	1:1 to 4:1 and 1:1 to 20:1	
Accuracy	±7% of FSD	
Impedance	50-52 Ohms	
Connectors	SO239	
Power	240 Volts AC 50Hz	
Weight	3·3lbs (1·5Kgs)	
Size overall	8" × 4" × 5½" (205 × 100 × 140mm)	
Size Meter	2" × 3¾" (51 × 97mm)	
Time Const.	PEP follow 4 seconds PEP Hold 600 seconds	

FS700H or FS700V **£68.00**

FS500

PEAK READING WATTMETER
Power RMS and PEP ±7% FSD
SWR Measurement 1-5:1
Size 8" × 4" × 5½"

FS500H	1·8-60MHz	20, 200 & 2kW	**£59.00**
FS500V	50-150MHz	20 & 200W	**£59.00**

FS60*

PEAK READING WATTMETER
Power RMS & PEP ±10% FSD
SWR measurements 1-3:1 ±3%
SIZE 6½", 2½", 4½"

FS601MP	1·8-30MHz	20 & 200W	**£40.00**
FS601MO	1·8-30MHz	200 & 2kW	**£40.00**
FS602M	50-150MHz	20 & 200W	**£40.00**
FS603M	430-440MHz	5 & 20W	**£40.00**

Hansen Wattmeters are available from reputable amateur radio dealers throughout Britain.

Mail order service (£0.75 post and packing) is offered direct from SMC or any branch.

The range encompasses level response wattmeters and remote indicator types. Please contact your local stockist for further details.

NB. All prices exclude VAT at 15%

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South Midlands

SMC & YAESU FOR HF

FT107M

FT107M NEW SOLID STATE TRANSCEIVER

All solid state transceiver. 160-10M (+WWV Rx and 2 Aux). 12V DC. SSB, CW, FSK and AM. 240W PIP. The fan cooled (thermostatically controlled) no tune "broad band" power amplifier delivers 75% power output into 3:1 VSWR. Analogue and digital readout to 100Hz. Sensitive and with excellent dynamic range (hard driven schottky diode ring mixer). Continuous variable bandwidth 300Hz to 2·4kHz plus optional "basics" of 350/600Hz and 6kHz. Full equipment includes: audio peak/notch filter, full metering including SWR, RF speech processor, advanced noise blanker, semi break-in with side tone, VOX, clarifier on Tx, Rx, or both, 20dB attenuator etc. The optional memory system provides 12 stored channels (with fine tuning), and offers scanning from the microphone. The store employs DMS—digital memory shift--to allow tuning, via a photo interrupter of any of the memorised frequencies (equivalent to 13 VFOs!!).

FT107M Transceiver	£660.00	FV107 Ext. VFO	£80.00	FTV107 Transverter frame	£96.50	YM34 Mic. desk	T.B.A.
MEM/DMS Memory	£87.00	FC107 Antenna Tuner	£92.50	430-440 70cm module	£158.50	YM35 Mic. hand. scan	T.B.A.
FP107E AC PSU Extnl.	£92.50	SP107 External speaker	£24.00	144-148 2m module	£68.50	YM36 Mic. noise cancel	T.B.A.
FP107 int. AC PSU	T.B.A.	FTV107(2) Transverter	£181.50	50-54 6m module	£68.50	YM37 Mic. Hand	T.B.A.

FT901DM

FT901DM THE SUPERB PERFORMER

160-10m (+WWV Rx), 12 and 234V (PSU Built-in). SSB, AM, CW, FSK and FM (Tx & Rx), 180W. PIP, 80W FI. Analogue 1kHz and Digital to 100Hz. Sensitive, ¼µV with AGC controlled Mosfet RF, to push pull FET RF, Balance active mixer, push pull IF amp, to crystal filter then noise blanker. Continuously variable selectivity 300Hz to 2·4kHz and fixed 350/600Hz, 2·4kHz, 6kHz and 12kHz (at 6dB), 80dB cross mod rejection, 90dB desensitisation immunity (at 20kHz off at 14MHz). Audio Peak and separate notch tuning. Negative RF feedback on 6146B output stage (−31dB 3rd order). RF processor, VOX, Curtis electronic keyer, tune button (10sec on full power), PLL VFO with memory for any Tx, Rx or T/Rx frequency, Modular plug-in construction, permeability tuning (for new band allocations) 25kHz calibrator, 20dB switchable attenuator, sidetone, clarifier and an advanced noise blanker are all features of the FT901.

FT901DM Transceiver	£800.00	YVM-1 Video Monitor	£125.00	FTV901 Transverter	£245.00	FC901 Antenna Tuner	£115.00
FT901D Transceiver	£710.00	YO901 Monitorscope	£240.00	430-440 70cm module	£160.00	FL2100Z Linear Amp.	£355.00
FT901DE Transceiver	£700.00	YO901P YO901 with pan	£280.00	50-54 6m module	£60.00	FV901DM Synth. Ext. VFO	£215.00
YR901 Morse/TTY read	£395.00	PAN KIT Mod kit	£47.00	70-74 4m module	£75.00	SP901 External speaker	£24.00

FT101ZD

FT101ZD PERFORMANCE AND ECONOMY

A hybrid HF transceiver. 160-10M (+WWV Rx+Aux). 234V AC and 12V DC (inbuilt inverter option). SSB, CW and AM. 180W PIP from a pair of 6146B with negative feedback. Analogue and "mode sensitive" digital readout to 100Hz. Continuously variable IF bandwidth 300Hz-2·4kHz plus optional "basic fixed" of 350/600Hz. Full equipment includes:— adjustable level RF processor, advanced adjustable level noise blanker, front panel adjustable VOX, semi break-in with side tone, 0-10-20dB attenuator, switchable AGC, Slow/fast/off, clarifier (RIT) selectable on Tx, Rx or both etc., etc.
The FT101ZD is compatible with nearly all the FT901 accessories listed above—morse reader and video display, monitor scope with panadaptor, 3 band transverter, ATU, linears, speakers, and a choice of synthesized or conventional (NEW FV101Z) external VFOs.

FT101ZD Transceiver Digital £575.00 FT101Z Transceiver Analogue £500.00 Count Analogue/Dig. kit £80.00 FV101Z £110.00

FT7B & YC7B

FT7B MOBILE AND BASE TRANSCEIVER

A compact all solid state HF transceiver. 80-10M. (full 2MHz coverage of 10 with optional crystals). USB-LSB CW-AM. 100W PIP (A3j and A1), 25W (A3). VFO control with clear analogue scale to 1kHz, plus an optional digital readout unit that can be conveniently sited above the transceiver, on the dash or steering column. The front panel remains remarkably uncluttered for a transceiver boasting a; crystal calibrator, vox, clarifier, side tone, and an excellent audio peak filter for CW. A mosfet RF stage for sensitivity, and a schottky diode ring mixer for dynamic range provides a level of receivers performance that outclasses "competitive" (?) transceivers. Supplied complete with mobile bracket, microphones, leads, plugs, etc. The FT7B provides the economic answer to world wide communications from home or from the car.

FT7B Transceiver £375.00 . YC7B Digital Readout £60.00 FP12 12V 12A PSU £67.00 YD148 Desk Mic. £18.50

YC500J £168.50
500MHz 10p.p.m.

YC500S £237.00
500MHz 1p.p.m.

YC500E £306.50
500MHz 0.02p.p.m.

YH55 £8.75
Padded Phones

QTR25D £22.50
World Time Clock

FP12 £67.50
12Amp 12V PSU

FP4 £35.00
4Amp 12V PSU

YP150 £58.50
Wattmeter/Load

PRICES EXCLUDE VAT (15%) BUT INCLUDE DELIVERY—SECURICOR/POST IN THE UK

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SOUTHAMPTON, SO4 4DN
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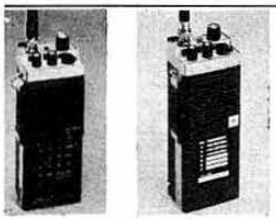
E	GM8GEC	Jack	Edinburgh	(031665) 2420
N	GI3WWY	Mervyn	Tandragee	(0752) 840656
T	GW3TMP	Howarth	Pontybodkin	(035287) 846/324
S	GW4GSW	Alan	Swansea	(0792) 24140

Communications Ltd

SMC & YAESU FOR VHF

YAESU



FT207R–FT202R: 2m HANDHELDS

The FT207R is a microprocessor controlled synthesized handheld that offers 12·5kHz channel steps!! 4 memory channels are provided and these may, as can the whole band, be scanned. Any one of the memories can be used as a priority channel. Simply operate as normal on any frequency, designate one of the memories as priority, and every few seconds, for a few milliseconds, the set will check occupancy of the channel. All frequency entry is by the keyboard (which includes touch tone). The readout displays frequencies (to 100Hz), memory channel number and 'P'. Switches are provided for keyboard lock (prevents accidental operation) and display 'time-out'. A 600kHz shift, and any programmable split, is available, both of course plus and minus. Memory back-up is provided but can be switched off for long-term storage. 2.5W + 200mW outputs and a whole host of accessories complete the brief specification of this exciting transceiver.
The FT202R is an economical 6 channel handheld physically similar to the FT207R.

FT207R Transceiver	£173.04	NC-9C Small charger	£6.50	YM24 Speaker/mic	£14.50	FT202R Transceiver	£103.50
NC-1A Slide-in charger	£16.50	NBP-9 Nicad pack spare	£14.50	FLC1 Heavy duty case	TBA	NC-1 AC charger '202	£16.50
NC-2 Charger eliminator	£34.50	FBA-1 Pack/charger adaptor	TBA	AA Nicads, each	£0.87	PA-1 12V PSU '202	£16.50

CPU2500 MICROPROCESSOR CONTROLLED

The CPU2500 family are 2 metre FM transceivers available in 25W or 10W output form with keyboard or standard push tune microphones. CPU stands for Central Processing Unit and it is this microprocessor that governs the synthesizer functions. Frequency control is possible either by rotating the main tuning knob (optically coupled), by using the up/down push buttons on the front panel, by using the up/down buttons on the microphone or by tapping in the data on the keyboard microphone. Plus and minus 600kHz repeater shift and any split (up to 4MHz) can be programmed in. Four memory channels with back-up are provided and these may be scanned, as can the whole band, the scanner stopping at the first vacant or occupied channel. The SMC stepper (St) provides 25kHz steps between 145–146MHz (and entry of 5kHz direct from the keyboard) rather than the 10kHz (+5 up) synthesizer steps only, when it is switched into circuit.

CPU2500R 25W standard	£292	CPU2500RKS 10W key mic	£292	CPU2500RK 25W key mic	£308	CPU2500RS 10W standard	£272
CPU2500St 25W c/w stepper	£319	CPU2500RKSSt 10W key, stepper	£319	CPU2500RKSt 25W key, stepper	£335	CPU2500RSSt 10W c/w stepper	£279

FT225RD MULTIMODE 2 METRE TRANSCEIVER

144–146–148MHz. USB, LSB, AM, FM, CW (semi-break-in with side tone). Smooth dual speed VFO control and 11 (×4) crystal channels. Simplex and (auto tone burst) repeater, 600kHz and auxiliary shifts both up and down. Single signal mix, with phase locked conversion oscillator, for spurious free output. Mains 234–100V 50/60Hz and 12V DC for world wide portability. Excellent selectivity, SSB 2.4kHz with 1.75: 1 SF, FM 12kHz at −6dB. High sensitivity with modern MOSFET RF stage. Good strong signal handling by careful gain distribution, mixer and crystal filter design. High power output 10W AM, 1–25W CW and FM, SSB 25W + + with great reliability and low IMD's. Mode sensitive digital readout to 100Hz and easy to service superior plug in board construction. Front panel controls for: SSB mic gain, FM power, squelch, 'Vox/Mox sensitivity, noise blanker, AGC, readout brightness, meter functions (S/centre plus relative power) etc etc. Digital and Analogue versions and memory option.

FT225RD Transceiver **£485.00** FT225R Transceiver **£445.00** MEM memory option **£85.00** COUNT Counter R/RD **£50.00**

FT227 SYNTHESIZED MOBILE TRANSCEIVER

The FT227s are 10W output 2 metre transceivers whose receiver performance—sensitivity and immunity to overload has become the standard against which others are compared. They use a signal knob (photo interrupter) to control the synthesizer, which basically turns in 10kHz steps with a 5kHz 'fill in' oscillator.
FT227RXS is an FT227R fitted with SMC's scanner. This maintains all the normal features of the 227 but the neat internal installation provides automatic tuning from 145 to 146 in 25kHz steps. When finding an occupied frequency the scanner pauses for about seven seconds and if not held will move on. A flick of the P.P.T. will lock out one (or all) unwanted channels next scan around.
FT227RBXSt is an FT227RB fitted with SMC's stepper. A four channel memory is provided in this model and tuning may also be accomplished by push buttons on the microphone. A single push moves the transceiver 25kHz, hold the button down for ½ second and it scans the band until a station is found.

FT227RXS Transceiver **£252.17** FR227RBSt Transceiver **£247.83** FP4 12V 4A PSU **£35.00** YD148 Desk mic **£18.50**

YD844 £19.50
Desk Microphone

YD148 £18.50
Desk Microphone

YM21 £12.00
Noise cancl. Mic

YE17 £12.00
Push tune mic

YD1846 £7.50
Hand microphone

YM2500 £22.00
Keyboard mic

FSP1
Mobile speaker

FF501 £17.50
Low pass filter

PRICES EXCLUDE VAT (15%) BUT INCLUDE DELIVERY—SECURICOR/POST IN THE UK

Access

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Chesterfield, Derbyshire
Chesterfield (0246) 34982
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NORTHERN (Leeds) BRANCH
Colin Thomas G3PSM
257 Otley Road,
Leeds 16. Yorkshire.
Leeds (0532) 782326
9·5; Mon·Wed & Fri·Sat.

S.M.C. (Jack Tweedy) LTD
Jack Tweedy, G3ZY
150 Horncastle Road,
Woodhall Spa, Lincolnshire
Woodhall Spa (0526) 52793
9·5: Tues·Sat (+appointments)

BARCLAYCARD VISA

South Midlands

SMC FOR ALL YOUR ACCESSORIES

ASCOT ANTENNAS VHF MOBILE (Carriage £0.95) + VAT 15%

340	¼λ	Standard Base	£2.10	085	¼ & ⅝	Cable Assembly	£2.80
310	¼λ	Swivel Base	£3.50	085L	¼ & ⅝	Fibreglass Mount	£3.00
344	¼λ	Sprung Base	£5.55	092	¼ & ⅝	Magnetic Mount	£8.95
440	⅝λ 2m	Standard Base	£3.50	084	¼λ	Cable Assembly	£4.15
330	⅝λ 2m	Swivel Base	£4.45	088	¼λ	Cowl Mount	£4.95
341	⅝λ 2m	Sprung Base	£6.65	091	¼λ	Magnetic Mount	£9.80
350	¼λ 2m	Fine Tune Base	£7.15	089		Gutter Mount	£4.75
351	¼λ 2m	Sprung 350 Base	£8.25	093		Boot mount	£2.90
057		127cm Tapered Whip	£1.95	031		Blank off ¼λ & ⅝λ	£0.80
056		63cm Parallel Whip	£0.95	044		Blank off ¼λ	£0.45

BANTEX VHF MOBILE ANTENNAS (Carriage £0.90) + VAT 15%

42SS	¼λ 4m	Stainless whip	£1.75	B5U	⅝λ	70cm whip	£2.15
40GF	¼λ 4m	Glass whip	£3.65	UCL	¼ & ½	70cm Colinear	£6.85
20SS	¼λ 2m	Stainless whip	£1.40	UDL	⅝ & ½	70cm Colinear	£13.65
18GF	¼λ 2m	Glass whip	£2.75	BM		Standard base ½"	£2.15
B5	⅝λ 2m	Glass whip	£7.65	BC		Claw base	£3.90
BGASS	¼λ 2m	Stainless whip	£7.00	BD		Trunk lip base	£7.00
BGAGF	¼λ 2m	Glass whip	£8.25	BMM		Magnetic base	£12.35

SMC–HS (Carriage Extra, call for quote) + VAT 15%

SMC15SE	¼λ	15m	1.72m	£11.00	GDX2	Discone 50-580MHz	£36.00
SMC10SE	¼λ	10m	1.72m	£11.00	GDX1	Discone 80-480MHz	£41.70
SMC2NE	⅝λ	2m	1.30m	£7.50	VHFL	Rx Discone 65-520MHz	£14.65
SMC78F	⅝λ	2m	1.75m	£10.00	LT606	Log Per. 50-500MHz	£75.95
SMC78B	⅝λ	2m	1.72m	£11.00	VS-BNC	Helical 145MHz BNC	£3.85
SMC258	⅝ + ⅝	70cm	0.94m	£10.00	145PL	Helical 145MHz PL259	£3.00
RG4M	Cable Assembly			£3.00	156PL	Helical 156MHz PL259	£4.35
GSS	Gutter clip			£3.00	GPV-5	Colinear 145MHz 6.5dB	£21.74

JAYBEAM VHF FIXED ANTS (P&P extra, phone quote) + VAT 15%

4Y/4M	4 element yagi	£14.95	5XY/2M	5 element crossed	£18.00
PMH2/4M	2 way harness	£10.60	8XY/2M	8 element crossed	£22.50
D15/23	15 over 15 slot	£26.90	10XY/2M	10 element crossed	£29.80
UGP/2M	Ground Plane	£8.15	PMH2/C	Circular harness	£5.90
C5/2M	Vert Colinear	£34.80	PMH2/2M	2 way harness	£7.80
5Y/2M	5 element yagi	£8.90	PMH4/2M	4 way harness	£18.70
8Y/2M	8 element yagi	£11.50	C8/70	Vert. Colinear	£39.50
10Y/2M	10 ele long yagi	£24.70	D8/70	8 over 8, slot fed	£17.80
14Y/2M	14 ele long yagi	£31.50	PBM18/70	18 ele. Parabeam	£21.50
PBM10/2M	10 ele Parabeam	£29.20	MBM48/70	48 ele. Multibeam	£24.50
PBM14/2M	14 ele Parabeam	£35.50	MBM88/70	88 ele. Multibeam	£32.60
Q4/2M	4 element quad	£18.70	8XY/70	8 element crossed	£27.00
Q6/2M	6 element quad	£24.80	12XY/2M	12 element crossed	£33.50
D5/2M	5 over 5, slot fed	£15.90	PMH2/70	2 way harness	£6.75
D8/2M	8 over 8, slot fed	£21.60	PMH4/70	4 way harness	£14.30

G-WHIP HF MOBILE ANTENNAS (Carriage £0.95) + VAT 15%

TRIBANDER	10-20M Slide	£21.50	FLEXIWHIP	10M Mast	£15.00
LFCOIL	40/80/160M	each £5.70	FF	15/20/40/80/160M each	£5.70
LFWHIP	Telescopic	£2.90	GW BASE	Standard base	£3.90
MULTIMOBILE	10-20M Auto	£25.00	35BASE	Heavy Duty base	£5.00
MMCOIL	40/80/160M each	£5.70	TA	35 to G-Whip	£0.80
MMWHIP	Telescopic	£2.90	EXTENDAROD	Extension	£10.00

GEM QUAD FIBREGLASS 10-20M (Carriage £4-£11) + VAT 15%

GQ2E	2 Element quad	£124.00	GQ4E	4 Element quad	£249.00
GQ3E	3 Element quad	£187.00	GQCK11	Element Conversion kit	£63.00

MOSLEY TRI-BAND BEAMS (Carriage £4-£9) + VAT 15%

TA32	2 ele. 200W RMS	£70.00	MUSTANG2	2 ele. 1KW RMS	£106.00
TA33	3 ele. 200W RMS	£105.00	MUSTANG3	3 ele. 1KW RMS	£130.00

SMC TRAPPED DIPOLES 10-80M. (Post £0.75) + VAT 15%

S500	Standard – 14 SWG	£26.50	P500	Portable – Cu/Terylene braid, c/w 75ft feeder	£32.50
HP1K	High Power – 14 SWG	£29.00			

WIRE & BRAIDS (Post and Packing extra) + VAT 15%

7/029H	Cu Hard Drawn	yd	£0.15	14 SWG	Cu Hard Drawn	yd	£0.13
7/036H	Cu Hard Drawn	yd	£0.18	BRAID	Cu/Terylene, ⅛"	yd	£0.14
7/044H	Cu Hard Drawn	yd	£0.24	7/029S	Cu Soft Drawn	yd	£0.13

AERIAL INSULATORS (Post Extra) + VAT 15%

SMCP1	3" Polyprop. ribbed	£0.37	EGG1	1½" Egg porcelain	£0.33
SMCP2	8½" polyprop. ribbed	£1.85	Commercial duty		POA

WIGHTRAPS AERIAL TRAPS (Post £0.40) + VAT 15%

WTS	Standard – White	£6.25	WHTB	"Space Saver", 3-5MHz resonance, for 1-8MHz	£8.50
WTHP	High Power – Blue	£9.40			

BALUNS 3-30MHz (Post £0.50) + VAT 15%

BN86	1:1, "U" bolt mount	£13.50	W2AU1	1:1, c/w spark gap	£9.50
HIQ	1:1, "Hang up" Type	£8.70	W2AU4	4:1, c/w spark gap	£9.50

LIGHTNING ARRESTORS COAXIAL (Post £0.30) + VAT 15%

SM566	Spark, SO239/PL259	£2.55	NSK7S	Gas, SO239/SO239	£7.50
SM567	Spark. SO239/SO239	£2.55	LA1	Gas, Bulkhead	£39.50

CABLES RF FEEDERS (Carriage extra) + VAT 15%

RG58U	50Ω 0·2" Stranded	yd	£0.18	307EP	75Ω "Economy"	yd	£0.12
UR43	50Ω 0·2" Solid	yd	£0.17	UR70	75Ω 0·225" Stranded	yd	£0.18
UR76	50Ω 0·2" Stranded	yd	£0.17	UR39	75Ω 0·306" Medium	yd	£0.27
UR67	50Ω 0·405" Heavy	yd	£0.42	UR57	75Ω 0·405" Heavy	yd	£0.45
RG213	50Ω 0·405" Heavy	yd	£0.42	302	75Ω Flat twin	yd	£0.11
306	300Ω Ribbon	yd	£0.12	3X21	240Ω Oval twin	yd	£0.08

COAX PLUGS UHF (Post and Packing £0.20) + VAT 15%

PL259	Standard UHF plug	£0.48	SO239	Free angle UR43	£0.88
UG175/U	Reducer UR43	£0.12	PL258	Back-back, female	£0.79
UG176/U	Reducer UR70	£0.12	PL274	Back-back, chassis	£0.93
PL259R	"Reduced" plug	£0.58	PL258M	Back-back, male	£1.20
PL259SL	"Solderless" UR67	£0.55	M359	Angle (1m + 1f)	£0.93
PL259SS	"Solderless" UR43	£0.55	M358AF	"T" (3 females)	£1.48
PL259P	Push-on plug	£0.69	M358	"T" (2 fem. 1 male)	£1.20
PL259E	Elbow plug UR43	£0.83	M458	4-way (3 fem. 1 male)	£1.85
PL259PM	Panel mount PL259	£0.93		SO239/Car + phono	£0.60
SO239F	4 hole socket	£0.42		SO239/2·5mm Jack	£0.69
SO239T	2 hole socket	£0.42		SO239/3·5mm Jack	£0.69
SO239NI	Socket "nut" inside	£0.51	255/U	SO239/BNC male	£1.53
SO239NO	Socket "nut" out	£0.51	273/U	SO239/BNC fem.	£1.53

COAX PLUGS BNC (Post £0.20) + VAT 15%

UG88	Plug, Stnd UR43	£0.54	UG491	Double male	£0.93
UG959	Plug, Large UR67	£2.66	UG274	"T" 2 female, 1 male	£1.44
UG291	Socket, 4 hole stnd.	£0.56		"T" 3 female	£1.74
UG1094	Socket, Nut fixing	£0.56	UG306	Elbow adaptor	£1.62
UG89	Socket, Free, UR43	£0.72	255/U	BNC male/SO239	£1.53
UG914	Double female	£0.93	273/U	BNC female/PL259	£1.53

MASTING (Carriage extra) + VAT 15% (N.B. Max 20', Max BRS 13')

1¼" od	Aluminium 16g	ft	£0.42	2"	Al. Thick wall 1⅜"		£1.05
1½" od	Aluminium 16g	ft	£0.46	2"	Steel Galv. 1⅜"		£0.82

MAST BANDS & PLATES (Carriage £0.40) + VAT 15%

SMP3	3 hole guy plate 2"	£0.85	SMB43	3 hook band	£1.15
SMP4	4 hole guy plate 2"	£1.55	SMB151	4 hook band 2"	£1.65

ROPES—WIRES (Post and Packing extra) + VAT 15%

3mm	HT steel, 0·63T.	yd	£0.18	X150	Rustproof, ⅛" D.	490'	£16.30
4mm	HT steel 1·5T	yd	£0.24	7X18g	Galvanised	100'	£4.40

ROPES—TERYLENE (Post and Packing extra) + VAT 15%

⅛"	BS150 lbs (circ.)	yd	£0.07	¼"	BS1250 lbs (circ.)	yd	£0.14
¼"	BS650 lbs (circ.)	yd	£0.10	1"	BS2450 lbs (circ.)	yd	£0.27

CABLE GRIPS (Post and Packing £0.30) + VAT 15%

⅛"	Bulldog, galv.	£0.19	HD9	Plated brass line clamp for copper wire	£0.44
¼"	Bulldog, galv.	£0.16			

SHACKLES (Post and packing £0.30) + VAT 15% N.B: Pin sizes given.

¼"	D galvanised	£0.24	⅜"	D galvanised	£0.33
⅝"	D galvanised	£0.28	⅞"	D galvanised	£0.42

THIMBLES (Post and packing £0.20) + VAT 15%

F1235	1¼" Nylon, for terylene	£0.14	1¼"	Galv. for steel	£0.13
F985	1¼" Nylon, for terylene	£0.16	1½"	Galv. for steel	£0.15

RIGGING SCREWS TURNBUCKLES (P&P £0.30) + VAT 15%

	4" × ⅝" pressed	£0.75		6" × ⅜"	£2.85
TPR933	4½" × ⅞"	£1.65		Miscellaneous	P.O.A.

GUY STAKES (Carriage £1.00) + VAT 15%

GS18	18" Angle galv.	£2.55	GS36	36" "T" section, Heavy Duty, Galvanised	£7.75
GS27	27" "T" galvanised	£3.75			

STAND OFF BRACKETS (P&P £1.75, Sec. £2.80) + VAT 15%

W12	12" bracket	pair	£6.50	W21	21" bracket	pair	£9.50
W18	18" bracket	pair	£8.75	W24	24" bracket	pair	£11.50
W18HD	18" Heavy Duty	pair	£11.75	W24HD	24" Heavy Duty	pair	£14.25

RAWLBOLTS (Post and packing £0.40) + VAT 15%

6mm	¼" rawlbolt	£0.24	10mm	⅜" rawlbolt	£0.42
D2	⅝" rawlbolt	£0.29	5mm	⅝" rawlbolt	£1.45

MAST TO BOOM CLAMPS (Post and Packing £0.70) + VAT 15%

SMC53	1-2" mast, 1" boom	£1.10	JBL73	1-2" mast, 1½" boom H.D.	£1.50
SMC63	1-2" mast, 1-1½" boom	£1.25	CP1	2" × 2", 6" × 6" plate	£2.30

MISCELLANEOUS HARDWARE (P&P extra) + VAT 15%

SMC59/15	2" mast sleeve 15" long	£4.20	MBP	Mast Base Plate 2"	£3.40
SH2	Snap hook 2½"	£0.68	ER4	Earth rod 4' c/w clamp	£4.25
MC1	Mast cap cast alloy 2"	£1.85	UB2	U bolts 2" × ⅜"	£0.32

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80W out for 10W nominal drive. 145MHz 12V dc (circa 10A). Switchable; SSB/FM Hang time. RF or manual cont. Low noise pre-amplifier.
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12V dc regulated supply, 240V 50/60Hz input 3 Amps cont. 5 Amp peak 3×4½×6". 3½lbs
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Through line, 1.8-54MHz, SWR scale.
LMP885 20, 200, 1000W FSD (p&p foc) **£51.00**
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LDM 880 5, 2, 120W FSD (p&p foc) **£79.00**

AERIAL ROTOR 'OFFSET TYPE'
Carriage UK, post free.
Silent self-calibrating control box
AR30—CDE manufacture **£41.00**
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2010—Stolle manufacture **£45.83**
Memomatic control box with moving light gives indication of beam heading during rotation period
2030—Stolle manufacture **£35.00**

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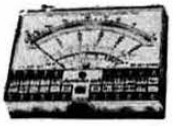
KSW1 3 SO239 (p&p £0.30) **£8.50**
KSW1A 2 SO239 + 1PL259 (p&p foc) **£9.10**



MULTIMETERS
20K ohms per volt. 1000X overload on ohms Plug in range selection.
80 Microtest 40 Ranges (p&p foc) **£16.50**
680G Supertest 48 Ranges (p&p foc) **£24.50**
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Twin Meter. 3.5 to 170MHz. Calibrated to 3:1 SWR. 50ohms. Relative Power. SO239 sockets
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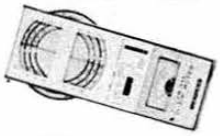
100kHz to 30MHz. 12V dc operation. 5-7 segment displays resolves to 10Hz only 6½×2½×5½"
RT75D New Low Price **£38.26**

HIGH EFFICIENCY VHF VERTICALS (illustrated right)
RINGO RANGER: 6dB gain over ¼λ ground plane. Uses 3 phased ¼λ and ¼λ stub. Ultra low angle radiation. No radials required.
ARX450 432MHz (p&p £1.00) New Low Price **£20.00**
ARX2 144MHz 9'6" tall, 1½lbs (p&p £1.00) New Low Price **£20.00**
Other omnidirectional VHF antennas—horizontal and vertical in stock.

V.H.F. LINEAR AMPLIFIER
160W out for 15W maximum drive. 145MHz. 12V dc (circa 18A). RF or manual switching. SSB/FM Excellent heat sink—over temp, trip out/reset.
PA 15-160BL (Post free) **£178.50**

ANTENNA COUPLER
3.5-30MHz. 50/75 ohm Coax (VSWR<5:1) and Single Wire (10-250 ohms) transformed to 50 ohms. To 500W PIP SSB
Wattmeter 20+250W FSD meter
LAC895 (p&p foc) **£92.00**



DIP OSCILLATOR
1-5 250MHz on fundamental c/w earphone, battery, 6 plug in coils 1-15MHz crystal test, 2kHz modulation.
LDM815 (p&p foc) **£45.00**

ANTENNA ROTATORS 'BELL TYPE'
Carriage UK (Post or Securicor) free.
Silent self-calibrating control box
AR40 to 3sq ft ant wind area **£52.00**
4 pre set plus manual control
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Continuous readout on large meter
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50 ohms impedance SO239 sockets
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CX520D 3 'N' sockets (p&p foc) **£18.50**

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Detachable RF head/indicator unit
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QUARTZ & CERAMIC FILTERS
QUARTZ 3.18, 9, 10.7MHz centre frequency, 350/600Hz, 2.4/6/12kHz, 6 & 8 pole CERAMIC 455kHz 2/4/6/12kHz, 9 & 11 poles
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FT107M

NEW SOLID STATE HF TRANSCEIVER

FULL EQUIPMENT MODEL WITH MEMORY FEATURE*

If you have been searching for an all solid state HF transceiver with a "broad band" output that will deliver 75 per cent of maximum power into a 3:1 load, then look no further than this top of the line Yaesu. The FT107M covers 160-10M (plus) and is fully equipped with: variable IF bandwidth, audio peak/notch filter, RF speech processor, variable threshold noise blanker, full metering—including SWR, and boasts a schottky diode ring mixer for excellent receiver dynamic range. The all new memory system provides 12 stored channels (with fine tuning), scanning from the optional microphone and the exclusive DMS—digital memory shift. This system using a photo interruptor (with fine tuning) to control the 100Hz synthesizer to provide any offset up to 500kHz, from the memory channel (almost the equivalent of 13 VFOs).

A full list of accessories is available to complement the FT107M. The illustration below shows (reading from left to right): the SP107P speaker/phone patch (normal speaker SP107 available); the FTV107R two band transverter (two from 432, 145 or 50MHz); the FT107, itself, the FV107 remote VFO (with 5 crystal channels); the FC107 antenna coupler with twin VSWR/power meters, and the FP107E AC psu with speaker.

Not illustrated is the FP107 slide-in AC PSU, or the microphone range. (YM34 desk—YM35 hand c/w scanning control—YM36 noise cancelling—YM37 hand).

For further details of this exciting new system, please contact any authorised sales outlets for a free colour brochure. Or better still, see it for yourself, try one out today!!!

- ★ 160-10 meters plus WWV plus 2 auxilliary bands
- ★ USB-LSB-CWW-CWN-FSK-AM multi-mode
- ★ All solid state, including reliable final amplifier
- ★ Full broad band "no tune" power amplifier
- ★ 240W PIP. 75 per cent power output at 3:1 VSWR
- ★ 12 memory channels with clarifier on memory*
- ★ Digital Memory Shift gives offset from memory*
- ★ Up/down scanning control from microphone*
- ★ Variable IF bandwidth—16 poles of selectivity
- ★ Bandwidths: 6kHz*, 2·4kHz-300Hz, 600Hz-300Hz*
- ★ Selectable CW "fixed" widths CW-W and CW-N*
- ★ Tunable Audio Peak (AFP) and Notch filter
- ★ Diode ring mixer for very high Rx dynamic range
- ★ Noise blanker—front panel adjustable threshold
- ★ AGC; slow-fast-off switchable from the front panel
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- ★ RF speech processor fitted—front panel adjustable
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- ★ Vox built in and adjustable from the front panel
- ★ Digital (100Hz) plus analogue frequency displays
- ★ Meter Reads; Vcc, Ic, ALC, Compression and SWR
- ★ Clarifier (RIT) switchable on Tx, Rx, or on both
- ★ Choice of built-in or separate power supply units
- ★ Plug in circuit boards to mother board for service

**Optional*

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PATRON: HRH The Prince Philip, Duke of Edinburgh, KG

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EDITOR
A. W. Hutchinson

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UK corporate: £10, including VAT — **Overseas: £10**

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Zone B:	Regions 3, 4 and 5
Zone C:	Regions 7, 8, 16 and 19
Zone D:	Regions 6, 9, 17 and 20
Zone E:	Regions 10 and 11
Zone F:	Region 15
Zone G:	Regions 12, 13 and 14

COMPOSITION OF RSGB REGIONS

Region 1	Cheshire, Cumbria, Greater Manchester, Isle of Man, Lancashire, Merseyside.
Region 2	All that part of Humberside north of River Humber, North Yorkshire, South Yorkshire, West Yorkshire.
Region 3	Hereford and Worcester, Salop, Staffordshire, Warwickshire, West Midlands.
Region 4	Derbyshire, all that part of Humberside south of River Humber, Leicestershire, Lincolnshire, Nottinghamshire.
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Region 6	Berkshire, Buckinghamshire, Oxfordshire.
Region 7	Greater London south of River Thames, Surrey including that part of London north of the Thames administered by Surrey.
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Region 17	Isle of Wight, Channel Islands, Dorset, Hampshire, Wiltshire.
Region 18	Cleveland, Durham, Northumberland, Tyne & Wear.
Region 19	Greater London north of River Thames, Hertfordshire.
Region 20	Avon, Gloucester, Somerset.

QTC
amateur radio news

Membership records
The RSGB prides itself in maintaining highly accurate and easily up-dated membership records; this applies particularly to address and callsign changes. However, it is evident that a number of members are not keeping us informed of their new callsigns. This applies to BRS members who obtain licences, and Class B licensees who obtain a Class A licence.

Please keep RSGB HQ informed so that membership records are always completely up to date.

Royal message
RSGB member HM King Hussein of Jordan (JY1) made a short visit to the UK in late January. In a letter to the general manager, JY1's personal secretary conveys His Majesty's best wishes to all RSGB members. JY1 was operational while in the UK using his UK callsign G5ATM.

RSGB publications in North America
With effect from 1 January 1980 the Ham Radio Publishing Group of Greenville, NH 03048, ceased to be the sole distributor of RSGB amateur radio publications in North America. However, it is anticipated that Ham Radio's Communication Bookstore at the Greenville address will continue to stock RSGB publications.

Trade enquiries from North America are invited, and these should be addressed to D. A. Evans, Radio Society of Great Britain, 35 Doughty Street, London WC1N 2AE.

QSL Bureau—G4JAA-JZZ and G8SAA-SZZ
The QSL Bureau sub-manager for these series has changed his address, and all future correspondence for Mr K. Baker, G3WTV, should be sent to 33 Ashdown Drive, Borehamwood, Herts WD6 4NA. The table of QSL Bureau sub-managers published on page 145 of the February issue of *Radio Communication* should be amended accordingly.

Radio Amateurs Examination
The Walsall College of Technology, St Paul's Street, Walsall, West Midlands, can accommodate an unlimited number of candidates for the RAE. Anyone wishing to sit the examination there should contact the examinations officer, Mrs C. Ayres, tel Walsall 25124, without delay for further information.

Members of the RSGB who are interested in the new style of RAE may like to know that the Education Committee intends to prepare an article on this new format for publication in *Radio Communication*. However, it is the committee's opinion that the results of one examination give insufficient information on which to base such an article. It is anticipated that when the statistics of the December 1979 examination are available, and considered along with those from the May 1979 series, it will be possible to write an informative article.

The RSGB Education Committee will again be presenting a programme of talks and films in the lecture room at the RSGB National Amateur Radio Exhibition at Alexandra Palace on 9–10 May.

It is also intended to provide an opportunity for RAE lecturers and members of the Education Committee to meet for an exchange of views. This meeting will be held at 2pm on Saturday 10 May in the lecture room. The committee has valued two similar meetings held at the Leicester exhibition, and looks forward to meeting those involved in coaching for the RAE at Alexandra Palace.

"Radio Transmitters and Modulation Techniques"
The above is the title of a conference to be held at the IEE, Savoy Place, London WC2, on 24–25 March 1980. It is being organized by the electronics division of the IEE, in association with the IERE and the RSGB.

There will be four sessions on each day, each consisting of two, three or four lectures and a discussion period. The sessions on the first day will deal with efficiency, modulation, filters and combiners, and hazards; and on the second day with active devices (two sessions) and transmitter techniques (two sessions). The speakers will be experts in the subjects under discussion and will be drawn from the UK and overseas electronics industry and universities.

Full details together with an application form may be obtained from: Conference Department, IEE, Savoy Place, London WC2R 0BL, or Tom Douglas, G3BA, QTHR.

Stolen equipment
The following was recently stolen in the Stratford upon Avon police area: GEC four-channel transceiver, type 60/D serial number 5007; GEC four-channel transceiver, type TRRC 660D, serial number 5014; Storno mobile transceiver, serial number F159561; six ten-channel GEC mobile radiotelephones, type RC6/20, serial numbers 185A, 192A, 193A, 205A, 211A and 212A; ten-channel GEC radiotelephone type RC666 serial number 6894; and a Stornophone 12V multichannel vhf transceiver serial number F149448.

Any information to TDC 226 Barrett at Stratford upon Avon police station, tel: S/Avon 68711, ext 248.

RTTY Journal subscription manager change
After 13 years as subscription manager, Arthur Owen, G2FUD, has handed over to Arthur Gee, G2UK, who now looks after UK subscribers. His address is 21 Romany Road, Oulton Broad, Lowestoft, Suffolk NR32 3PJ.

The *RTTY Journal* is an exclusively amateur radioteletype journal, edited and published by Dee Crumpton, California, USA. Specimen copies are available from G2UK at 35p post paid. Annual subscription rate is £6; 10 issues a year are published, the May/June and July/August issues being combined.

Sutton & Cheam RS annual dinner dance
The 32nd annual dinner and dance of the Sutton & Cheam Radio Society will take place at the Woodstock Hotel, Stonecot Hill, Sutton, Surrey, on Saturday 22 March 1980. The guest of honour will be the President of the RSGB, Mr P. Balestrini, G3BPT.

Tickets are available on application to L. Sandell, 19 Mount Park, Carshalton, Surrey.

The G3PAO Memorial Lecture

The Verulam ARC will be holding the 1980 G3PAO Memorial Lecture in the Jubilee Centre, Catherine Street, St Albans, Herts, on Thursday 27 March at 7.30 for 8pm. The lecture this year will be entitled "Frequency synthesis and receiver design" and will be delivered by William Poel, G8CYK.

All licensed amateurs, short wave listeners and other interested parties are invited to attend. Further details may be obtained from G8MAE, QTHR. Tel Hemel Hempstead (0442) 64751.

Merchant Navy net

The Merchant Navy College ARC has planned a schedule with a German nautical college for Sundays at 1300gmt on 14,290kHz. Any other amateur connected with the Merchant Navy who is interested in joining the net should listen for G4IWU, G4HUW, G4JEF and G4IIQ. Further details from: The Secretary, MNCARC, Merchant Navy College, Greenhithe, Kent.

Radio Fraternity Lodge

Mr John Masters, G3MBM, was recently installed as worshipful master of the Radio Fraternity Lodge of freemasons for 1980–81. The secretary of the lodge is Mr S. Howard, G8TY.

UOSAT launch approval confirmed

The National Aeronautics & Space Administration has formally agreed to launch Britain's first amateur spacecraft, UOSAT (*Radio Communication* March 1979). It will form a secondary payload on the launch of the Solar Mesosphere Explorer mission from the Western Test Range in California, at present scheduled for 30 September 1981. The Thor-Delta launch vehicle is planned to place UOSAT in a circular polar orbit at a height of 530km. The launch opportunity is being provided by NASA in view of the satellite's potential contribution to space science education and to the investigation of radio propagation phenomena. UOSAT is being built at the University of Surrey, in close collaboration with AMSAT, AMSAT-UK and the RSGB. Much support is being given by Britain's electronics, telecommunications and space industries.

The purpose of the spacecraft is primarily educational. It will carry a series of hf radio beacons, enabling individual radio amateurs and science groups in schools and colleges to study the changing effects of the ionosphere on radio-wave propagation. Further experiments of interest to schools are in the planning stage. An additional experiment likely to cause considerable scientific interest is a three-axis magnetometer. This should make possible a detailed study of the magnetic fields of the earth's polar regions. The instrument will be built by a radio amateur at the Goddard Space Flight Centre, Mario Acunia, and will be based on the very successful instrument he built for the Voyager mission to Jupiter.

Steady progress with the project as a whole is being made as follows (work is being carried out at the University of Surrey unless otherwise stated):

- the overall system design has been confirmed;
- the structure of the spacecraft has undergone redesign and structural analysis (British Aerospace Dynamics Group);
- a survey has been made to determine the most suitable method of stabilizing the spacecraft and of keeping it the right way up;
- a low-power microcomputer system has been constructed to "breadboard" stage (Mike Stubs, Ferranti);

RSGB 1980 EXHIBITION AT ALEXANDRA PALACE

- a telecommand receiver has been constructed to "breadboard" stage and has operated continuously for three months without problems;
- a first prototype radio beacon, operating at 145MHz, has been constructed;
- a number of spare solar panels from the UK-6 project have been donated (Science Research Council).

One of the limitations in building an unmanned spacecraft is that there is no way of repairing components which go wrong during or after launch. To avoid such problems as far as possible, spacecraft are built in three stages.

1. "Breadboard" stage. Each of the proposed electrical and electronic systems in the spacecraft is first constructed as a circuit on a flat board. The purpose of this is to test each circuit to check that its performance matches the original design specification.

2. Engineering model. Each of the systems and experiments is then built in its final form and everything is assembled on the spacecraft chassis. The engineering model is, to all intents and purposes, a finished spacecraft, but it is not normally launched. Instead it is subjected to heating, freezing, vacuum, vibration and other forms of maltreatment in order to trace any weaknesses.

3. Flight model. This is a repeat of the engineering model, incorporating improvements as a result of experience gained in testing and ground operation. It also goes through extensive tests, though not to the rigorous extent suffered by the engineering model. This is the version that actually goes into orbit, though if it fails completely (as a result of the launch vehicle failing to go into orbit, for example) the engineering model can be used as a successor if an alternative launch opportunity exists.

The three phases of construction overlap considerably in time. At present the "breadboard" stage is planned to be completed by August 1980, the engineering model by December 1980, and the flight model by August 1981.

A 144MHz synthesized fm transceiver

by N. G. HYDE, CEng, MRAeS, MIERE, G2AIH*

(PART 1)

Introduction

With the current high level of activity in the fm spectrum of the 144MHz band, a considerable number of channels are necessary if one is to enjoy interference-free QSOs. Using a conventional crystallized transceiver, either commercial or home-constructed, the many crystals required results in considerable expense, and the obvious solution to this is a synthesized equipment in which the number of crystals is reduced, to a minimum of one with certain types of synthesized configuration.

This article describes one approach to the development and construction of a synthesized transceiver. It is not the only method that could be adopted, by any means, as the number of different configurations possible to achieve the same end result is almost legion. Although it is not intended to be a constructional article as such, it is hoped that the information presented will be of interest to those contemplating development of a 144MHz synthesized transceiver.

The particular equipment covers the fm portion of the band from 145 to 146MHz in 25kHz steps. Provision is made for simplex, repeater and reverse repeater operation, with automatic toneburst on the repeater channels. Indication of the particular channel in use is given by a seven-segment led display controlled by the channel switches.

Phase modulation of the transmitter is employed, and the power output is continuously variable from approximately 1W to a maximum of 12W. The receiver is a single-conversion superhet, in which provision has been made for S-meter and squelch facilities, although these have not been incorporated at the time of writing.

A block diagram of the complete transceiver is shown in Fig 1. The 1MHz reference oscillator frequency is divided by a factor of 40 to produce a 25kHz signal which determines the channel spacing and is applied to one port of a phase comparator. Another signal from a voltage-controlled oscillator (vco) in the 11 to 12MHz range is applied via a programmable divider to the other port of the phase comparator. The programmable divider is controlled by channel switches to provide division ratios from 440 to 479, which results in a frequency of 25kHz at the output of the divider for frequencies between 11 and 12MHz from the vco.

By the action of the phase comparator this 25kHz frequency is locked in frequency and phase with the 25kHz reference frequency, and the resultant output from the phase comparator is a dc voltage of a magnitude dependent on the division ratio of the programmable divider.

Detailed information on the operation of phase-lock-loop frequency synthesizers is given in [1,2].

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The switched data input lines of the programmable divider are connected to two BCD-to-seven-segment decoder-drivers which operate seven-segment displays giving channel indication; repeater channels are indicated as 00 to 09, and simplex channels appear as 10 to 39.

DC voltage at the output of the phase comparator is applied, via a low-pass filter which eliminates any residual 25kHz component, to a variable-capacitance diode across the vco tuned circuit; this results in the vco being tuned from 11 to 12MHz as the division ratio is switched from 440 to 479. In practice, due to propagation delays that occur at frequencies of this order, the programmable divider drops one count, and thus the actual output frequency of the vco is from 11·025 to 12·000MHz in 40 steps of 25kHz each.

The output of the vco is applied to a vco buffer, the function of which is to isolate the synthesizer itself from external circuitry, and to provide two outputs, one of which is fed to the transmit mixer and the other to the receive mixer.

Considering first the transmitter: in addition to the 11·025 to 12MHz applied to one port of the transmit mixer, a signal at 133·975MHz is applied to the other port; this signal is derived from the transmit heterodyne oscillator-multiplier which also incorporates the phase modulator. The sum of the two frequencies (145 to 146MHz) is selected at the output of the mixer, amplified and applied through the transmit driver to the power amplifier stage.

Audio voltage from a speech processor, together with the output of the repeater access tone generator, is applied to the phase modulator associated with the heterodyne oscillator.

A similar process is employed to generate the receiver heterodyne frequency. A frequency of 11·025 to 12MHz from the vco buffer is applied to the receive mixer together with a frequency of 123·275MHz from a heterodyne oscillator-multiplier. Again, the sum frequencies of 134·3 to 135·3MHz are selected by the mixer and applied to a second mixer in the receiver converter. The output of the converter, which is preceded by an rf preamplifier, is thus 10·7MHz over the signal frequency range of 145 to 146MHz.

A 600kHz upshift for repeater and reverse repeater operation is achieved by switching crystals in the two heterodyne oscillators. For reverse repeater operation the transmit crystal is switched to provide an injection frequency to the mixer of 134·575MHz. Similarly, for repeater operation the receive oscillator crystal is switched to provide a frequency of 123·875MHz.

A frequency of 10·7MHz from the converter is routed to an i.f. amplifier, which incorporates a crystal filter, and it is in this circuit that receiver selectivity is obtained. The i.f. amplifier is followed by a limiter and quadrature detector, the low-level audio output from which is applied to an af power amplifier for operation of an external loudspeaker.

Circuit description

Synthesizer

Fig 2 shows the circuit diagram of the synthesizer, which uses low-power Schottky ttl for digital functions, and its peripheral elements. Three gates of a 74LSO4 hex inverter (IC1) are employed as the 1MHz reference frequency oscillator; the first two gates forming the oscillator proper, with the third gate acting as a buffer. The value of resistors R1 and R2 in the feedback circuit of the oscillator is fairly critical; if the resistance is too low there is a tendency to self-oscillation when the crystal is removed, while too high a resistance results in sluggish start-up. The oscillator is followed by two 74LS90 decade counters (IC2 and IC3) which are connected in ÷10 and ÷4 configurations respectively, giving a resultant reference output of 25kHz.

The 5V supply line to the reference oscillator and dividers is derived through a voltage regulator (IC4), input and output of which is decoupled by C7, C6 and C5. In a similar manner the power supply to each of the other circuits forming the phase-lock-loop is derived through individual regulators (IC6, IC8 and IC13) to minimize any possibility of feedback around the loop except through the desired pathways.

A 25kHz reference frequency is applied to one input port of the MC4044 phase comparator (IC5). The 25kHz signal appearing at the output of the programmable divider is applied to the other input port of this ic, the action of the phase comparator being such that this frequency is maintained in phase relationship with the accurate 25kHz signal derived from the reference oscillator. Operation of the MC4044, which consists of a frequency/phase comparator, a charge pump and an amplifier, is complex and will not be described here, detailed information being given in [3]. However, the resultant output from the device, consequent upon the two 25kHz signals applied to the input ports, is a dc voltage of a value dependent on the division ratio of the programmable divider.

A tunable low-pass filter consisting of C8 and RV1 is connected through an emitter-follower (TR1) between the charge pump and amplifier of the phase comparator. This suppresses any residual 25kHz component that may appear at this point; additional filtering is provided by C9 connected across the dc output line.

Filtered dc from the output of the phase comparator is applied via isolating resistors R5 and R6 to a variable-capacitance diode (D1), which is effectively connected in parallel across the vco tuned circuit L1, C15 and C16. The vco employs an

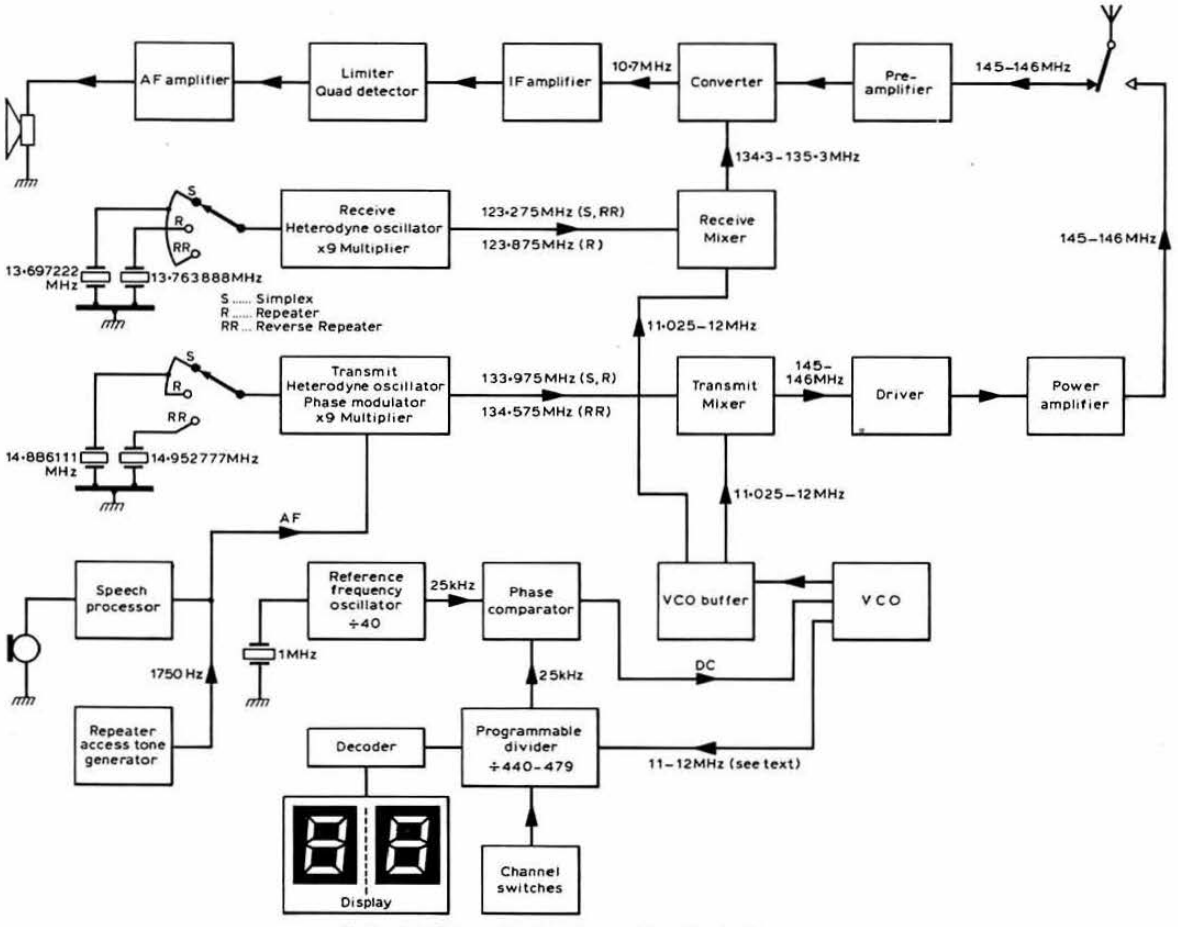


Fig 1. 144MHz synthesized transceiver block diagram

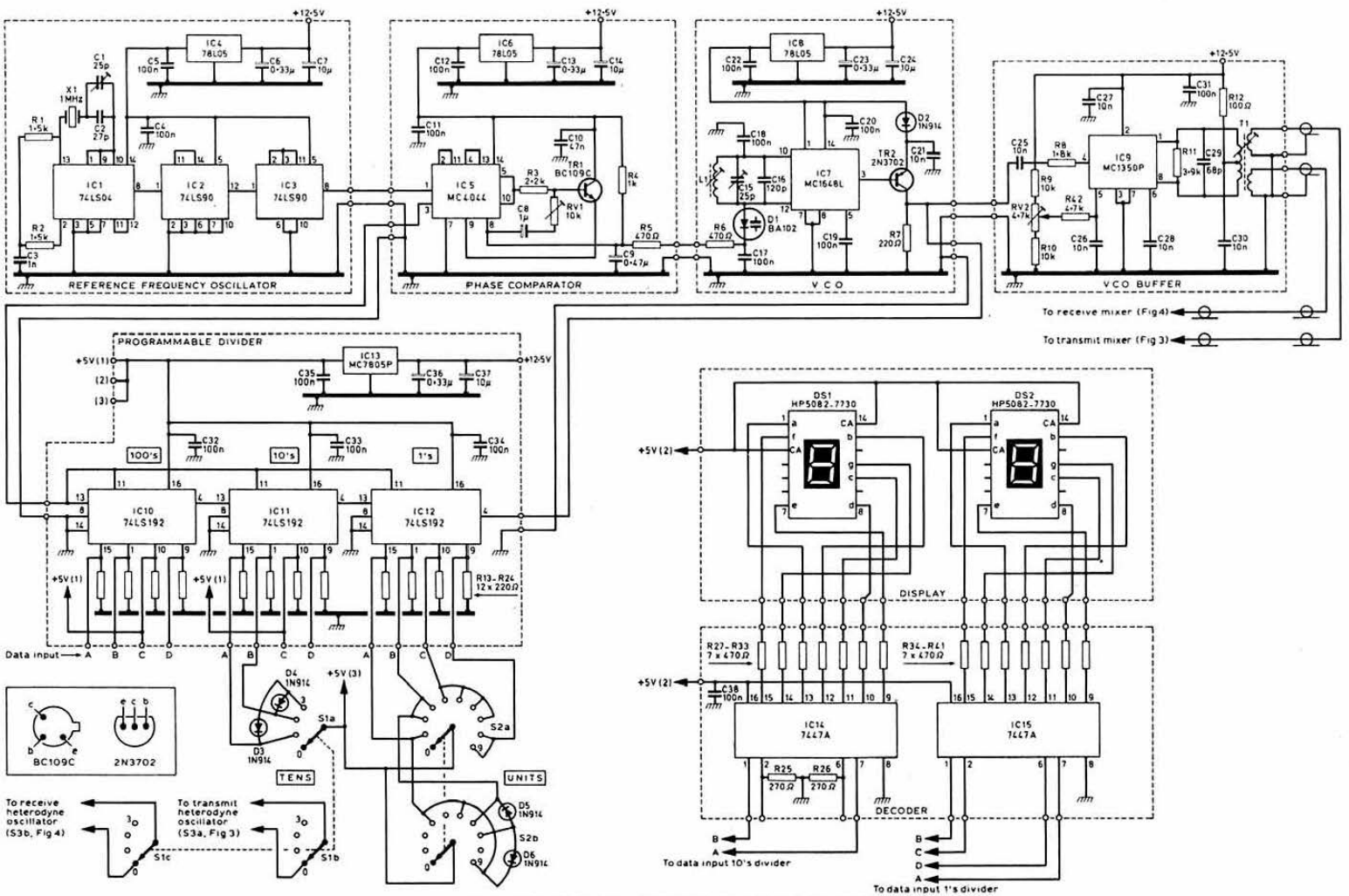


Fig 2. Circuit diagram of synthesizer and peripherals

Table 1. Synthesizer components list

R1, 2	1·5kΩ
R3	2·2kΩ
R4	1kΩ
R5, 6, 27-41	470Ω
R7	220Ω
R8	1·8kΩ
R9, 10	10kΩ
R11	3·9kΩ
R12	100Ω
R13-24	220Ω ¼W
R25, 26	270Ω
R42	4·7kΩ
RV1	10kΩ trimpot
RV2	4·7Ω 0·1W horizontal preset pot
C1, 15	25pF film dielectric trimmer
C2	27pF 63V cp
C3	1nF 50V c
C4, 5, 11, 12, 17, 18, 19, 20, 22, 31, 32, 33, 34, 35, 38	100nF 25V c
C6, 13, 23, 36	0·33μF 35V tb
C7, 14, 24, 37	10μF 35V tb
C8	1μF 35V tb
C9	0·47μF tb
C10	47nF 50V c
C16	120pF 160V p
C21, 25, 26, 27, 28, 30	10nF 50V c
C29	68pF 63V cp
IC1	74LSO4
IC2, 3	74LS90
IC4, 6, 8	78L05
IC5	MC4044 Motorola
IC7	MC1648L Motorola
IC9	MC1350P Motorola
IC10, 11, 12	74LS192
IC13	MC7805P
IC14, 15	7447A
DS1, 2	HP5082-7730 Hewlett-Packard
TR1	BC109C
TR2	2N3702
D1	BA102
D2	1N914
S1	Three-pole four-way rotary
S2	Two-pole 10-way rotary
X1	1MHz crystal 30pF parallel resonance HC6U
L1	20t 28swg enam 5mm id dust-core tuned
T1	Primary 22½t 28swg enam 5mm id dust-core tuned. Secondaries 4½t 28swg enam each side of centre of primary

All resistors ¼W 5% carbon film unless otherwise stated. Capacitors – c = ceramic, cp = ceramic plate, tb = tantalum bead, p = polystyrene

MC1648L emitter-coupled oscillator (IC7) which in the present application tunes over a frequency range of 11·025 through 12MHz. Output of the vco is buffered by a pnp transistor (TR2); a diode D2 in the emitter circuit of the transistor provides a constant bias of approximately 0·6V to interface correctly between IC7 and TR2. Detailed information on the functioning of the MC1648L is given in [4].

The vco has two output ports, one of which is connected to the vco buffer and the second to the programmable divider. This divider consists of three synchronous reversible counters (IC10, IC11 and IC12) which function as hundreds, tens and units dividers respectively. In the present application the circuit is arranged to divide by integers from 440 to 479. Normally the data input lines to the counters are held at logic "0" level (earth) by the pull-down resistors R13 to R24, and division is achieved by applying a logic "1" level (+5V) to the appropriate data input. The divider is preset to divide by 440 through the application of logic "1" to data input C of both the hundreds and tens dividers, this being derived from the +5V termination designated "1" on the circuit diagram. Division from 440 to 479 is then achieved by the setting of the two channel switches S1a, S2a and S2b, which apply a logic "1" level to the appropriate data inputs of the tens and units dividers, either directly or through diodes D3, D4, D5 and D6. The +5V level to the two channel switches is derived from the 5V termination "3" on the circuit diagram. Power supply to each of the three programmable dividers is decoupled by C32, C33 and C34.

Output from the first port of the vco at frequencies of 11·025 to 12MHz in discrete steps of 25kHz each is applied to the MC1350P buffer (IC9). This amplifier has a variable gain, with RV2 controlling the bias applied to the agc section of the ic. The push-pull output circuit formed by T1 primary and C29 is damped by R11 to give a flat response over the frequency range. T1 has two low-impedance secondary windings which provide independent outputs for application of the 11·025 to 12MHz signal to the transmit and receive mixers (Figs 3 and 4).

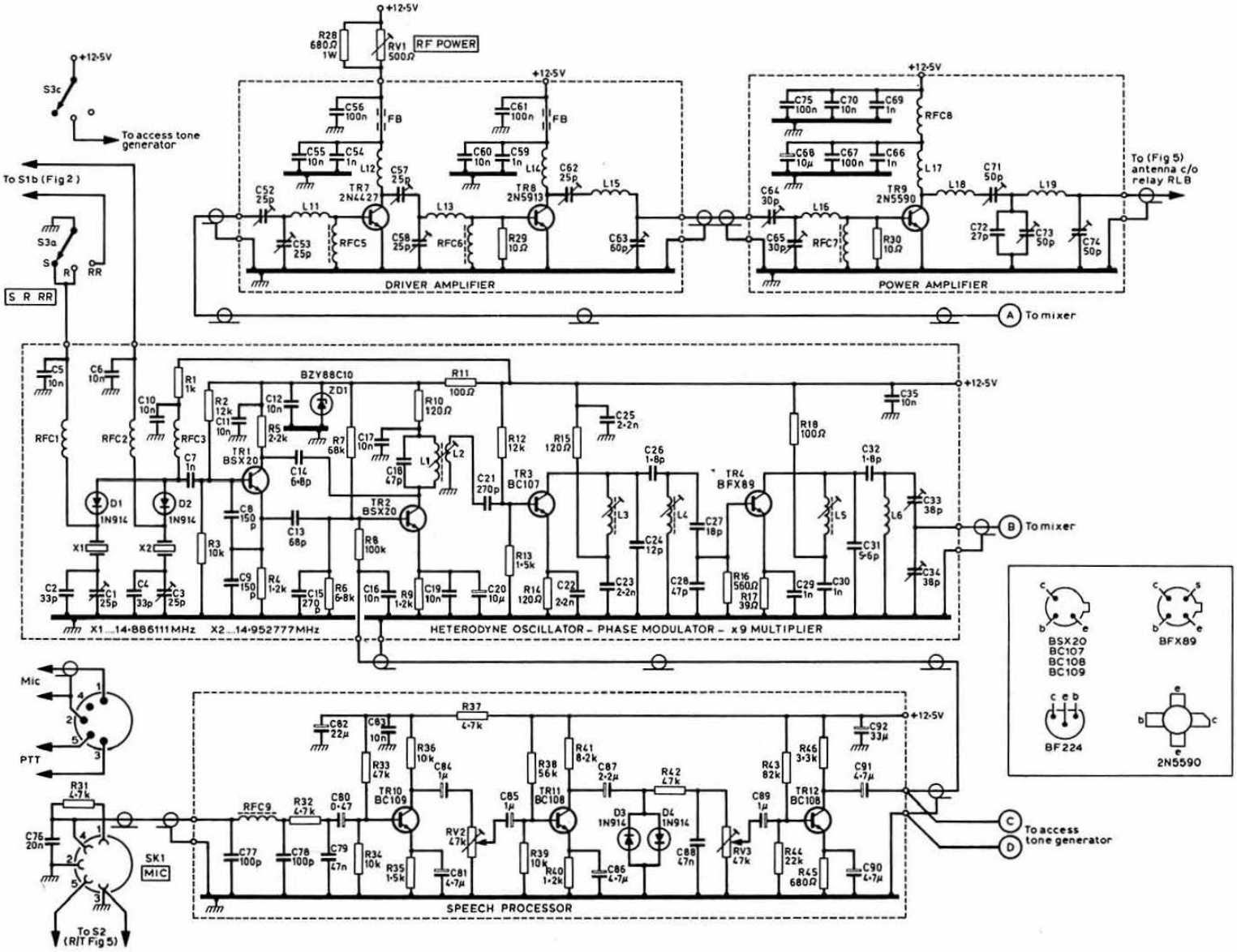
Operation of the two seven-segment displays DS1 and DS2, which provide channel indication, is achieved through two 7447A BCD-to-seven-segment decoder-drivers IC14 and IC15. The decoder inputs are connected to the corresponding data inputs of the programmable divider, and operate the displays through current-limiting resistors R27 to R41. R25 and R26, connected to the data input lines of the tens decoder (IC11), function as pull-down resistors and eliminate the need for these two points to be connected to the programmable divider. Power for operation of the decoders and displays is derived from the +5V termination "2" on the programmable divider board.

Transmitter (Fig 3)

As explained in the introductory paragraphs, the final radiated frequency is derived by mixing the output of the vco buffer with a second higher frequency from a heterodyne oscillator-multiplier. The oscillator (TR1) is connected in a crystal Colpitts circuit, with one switch bank (S3a) selecting one of two crystals (X1 and X2) to obtain either simplex or reverse repeater operation. Crystal switching is accomplished through the use of biassed diodes, the method employed being identical to that used in a transmitter-receiver previously described by the author [5].

RF output from the TR1 emitter circuit is applied via C13 to the base of TR2 which functions as a reactance device to provide phase modulation. The tuned collector circuit L1C18 of TR2 is loosely coupled through C14 to the collector of TR1. TR2 is thus effectively connected in parallel with the tuned circuit, via the associated bypass capacitors, and audio-frequency voltage applied to the base of this transistor results in phase shift of the rf current through L1. C16 and R8 form a filter which prevents feedback of rf into the speech processor; the value of R8 is not critical and may be decreased to at least 22kΩ with a corresponding increase in deviation of the transmitted signal. TR2 emitter is decoupled to both rf and af by C19 and C20. Collector supply to TR1 and TR2 is regulated at 10V by ZD1.

The crystal oscillator and phase modulator are followed by two ×3 multiplier stages (TR3 and TR4). Coupling between


+12·5V
RF POWER
R28 680Ω 1W
RV1 500Ω
S3c
To access tone generator
To S1b (Fig 2)
S3a
S R RR
DRIVER AMPLIFIER
POWER AMPLIFIER
TR7 2N4427
TR8 2N5913
TR9 2N5590
To (Fig 5) antenna c/o relay RLB
A To mixer
BZY88C10
ZD1
TR1 BSX20
TR2 BSX20
TR3 BC107
TR4 BFX89
X1 ...14·886111MHz X2 ...14·952777MHz
HETERODYNE OSCILLATOR – PHASE MODULATOR – x9 MULTIPLIER
B To mixer
BSX20 BC107 BC108 BC109
BFX89
BF224
2N5590
Mic
PTT
SK1 MIC
To S2 (RIT Fig 5)
SPEECH PROCESSOR
C To access tone generator
D
TR10 BC109
TR11 BC108
TR12 BC108
D3 1N914
D4 1N914
D1 1N914
D2 1N914

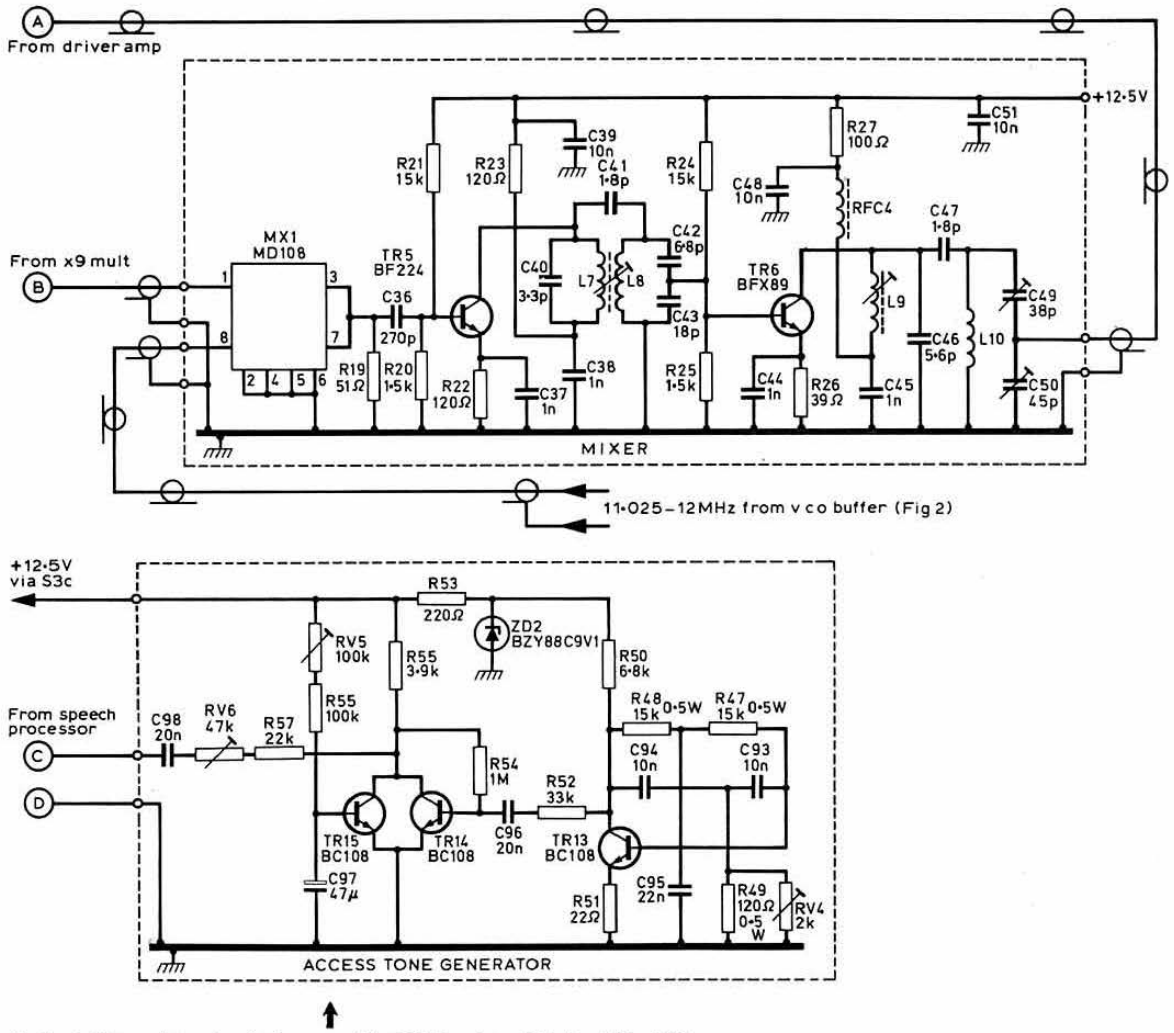


Fig 3. Transmitter circuit diagram. (The 100kΩ resistor R55 should be R56)

the two transistors is through a bandpass tuned circuit (L3, C24, C26 and L4, C27, C28), tuned to the third harmonic of the oscillator frequency, ie approximately 44MHz. An impedance match to the base of the second multiplier is achieved by a capacitance tap formed by C27 and C28. Similarly the tuned circuit associated with TR4 is a bandpass configuration; an output impedance of 50Ω at 134MHz being obtained by the preset tuning capacitors C33 and C34. Bandpass circuits are used extensively throughout the equipment to reduce the level of unwanted frequencies.

For simplex and repeater working, S3a switches a 14·886111MHz crystal (X1) into circuit, which results in a heterodyne frequency of 133·975MHz. A 600kHz upshift for reverse repeater operation is obtained from a 14·952777MHz crystal (X2), this giving an output frequency of 134·575MHz. When X2 is activated it would be possible for frequencies outside the 144MHz band to be radiated at certain settings of the channel switches S1 and S2; to prevent this the oscillator is defeated by linking its switching circuit with S1c, so that reverse repeater operation is possible only when the TENS channel switch is set to the "0" position.

The output of the heterodyne oscillator-multiplier is applied to the lo port of an MD108 double-balanced mixer (MX1). One output of the vco buffer is applied to the rf port of this device, with the result that the sum of the two input frequencies, namely 145 to 146MHz, appears at the i.f. port of the mixer. R19 is a terminating resistor at the output port of the mixer, which is followed by two stages of amplification (TR5 and TR6), the latter stage again employing bandpass coupling in the input and output circuits.

Output from the mixer at a level of approximately 30mW is applied to a two-stage driver amplifier (TR7 and TR8), the circuitry of which is conventional. Power output from TR8 can be varied by adjustment of RV1 (RF POWER) in the supply line to TR7. When set to zero resistance, a power of approximately 2·5W is available at the input of the power amplifier stage

(TR9). Again the circuit of this stage follows conventional practice, with extensive decoupling of the transistor collector circuits being incorporated. The pa output tuned circuit C72C73L19 and C74 form a low-pass filter to reduce radiation of harmonics generated by the transistor amplifier stages.

The 2N5590 transistor in the pa stage is not ideal but was used because it happened to be available; a better choice would be a Type 6081 which would give slightly higher power output for the same drive level.

The speech processor is a three-stage af amplifier (TR10, TR11 and TR12) incorporating clipping and filtering to achieve optimum audio characteristics. R31 and C76, mounted directly

Table 2. Transmitter components list

R1	1kΩ ¼W
R2	12kΩ
R3, 34, 36, 39	10kΩ
R4, 9, 40	1·2kΩ
R5	2·2kΩ
R6, 50	6·8kΩ
R7	68kΩ
R8, 56	100kΩ
R18, 27	100Ω
R11	100Ω ¼W
R12	12kΩ
R13, 20, 25, 35	1·5kΩ
R10, 14, 15, 22, 23	120Ω
R16	560Ω
R17, 26	39Ω
R19	51Ω
R21, 24	15kΩ
R28	680Ω 1W
R29, 30	10Ω
R31, 32, 37	4·7kΩ
R33, 42	47kΩ
R38	56kΩ
R41	8·2kΩ
R43	82kΩ
R44, 57	22kΩ
R45	680Ω
R46	3·3kΩ
R47, 48	15kΩ ¼W metal film
R49	120Ω ¼W metal film
R51	22Ω
R52	33kΩ
R53	220Ω
R54	1MΩ
R55	3·9kΩ
RV1	500Ω 3W wire-wound pot
RV2, 3, 6	47kΩ 0·1W horizontal preset pot
RV4	2kΩ trimpot
RV5	100kΩ 0·1W horizontal preset pot
C1, 3, 52, 53, 57, 58, 62	25pF fdt DAU
C2, 4	33pF 100V cp N750
C5, 6, 10, 11, 12, 16, 17, 19, 35, 39, 48, 51, 55, 60, 70, 83	10nF 50V c
C7, 29, 30, 37, 38, 44, 45, 54, 59, 66, 69	1nF 50V c
C8, 9	150pF 63V cp
C13	68pF 63V cp
C14	6·8pF 63V cp
C15, 21, 36	270pF 63V cp
C18, 28	47pF 63V cp
C20	10μF 25V e
C22, 23, 25	2·2nF 50V c
C24	12pF 63V cp
C26, 32, 41, 47	1·8pF 63V cp
C27, 43	18pF 63V cp
C31, 46	5·6pF 63V cp
C33, 34, 49	38pF fdt DAU
C40	3·3pF 63V cp
C42	6·8pF 63V cp
C50	45pF fdt DAU
C56, 61, 67, 75	100nF 25V c
C63	60pF fdt Mullard
C64, 65	30pF min air-spaced trimmer Oxley
C68	10μF 20V tantalum metal-cased
C71, 73, 74	50pF air-spaced trimmer
C72	27pF silver mica
C76	20nF 50V c
C77, 78	100pF 63V cp
C79, 88	47n 50V c
C80	0·47μF 35V tb
C81, 86, 90, 91	4·7μF 35V tb
C82	22μF 16V tb
C84, 85, 89	1μF 35V tb
C87	2μ2 35V tb
C92	33μF 25V tb
C93, 94	10nF 250V petp mf
C95	22nF 250V petp mf
C96, 98	20nF 100V mylar film
C97	47μF 16V e
TR1, 2	BSX20
TR3	BC107
TR4, 6	BFX89, 2N918
TR5	BF224
TR7	2N4427
TR8	2N5913
TR9	2N5590
TR10	BC109
TR11, 12, 13, 14, 15	BC108
D1, 2, 3, 4	1N914
ZD1	BZY88C10
ZD2	BZY88C9V1
X1	14·886111MHz 30pF parallel resonance HC25U
X2	14·952777MHz 30pF parallel resonance HC25U
MX1	MD108 double-balanced mixer Anzac
S3a, S3c	Two banks of three-pole three-way rotary switch
SK1	Five-pin 180° DIN socket
L1	29½t 28swg enam 5mm id dust-core tuned
L2	4½t 28swg enam at earth end of L1
L3, 4	13½t 26swg enam 5mm id dust-core tuned
L5	3½t 20swg enam 5mm id dust-core tuned
L6	3t 20swg enam 6mm id 7mm long
L7, 8, 9	3½t 20swg enam 5mm id dust-core tuned
L10	3t 20swg enam 6mm id 7mm long
L11	2t 20swg enam 6mm id 4mm long
L12	2t 20swg enam 5mm id 5mm long
L13	2t 20swg enam 6mm id 5mm long
L14	4t 20swg enam 5mm id 6mm long
L15	3t 18swg enam 6mm id 8mm long
L16	2t 20swg enam 6mm id 7mm long
L17	4t 20swg enam 5mm id 6mm long
L18	3t 18swg enam 7mm id 7mm long
L19	2t 18swg enam 7mm id 6mm long
RFC1, 2, 3	470μH Toko 7BA
RFC4, 5, 6, 7	2½t 28swg enam FX1115 ferrite bead
RFC8	2½t 26swg enam FX1898 ferrite bead
RFC9	17·5μH dust-iron core
FB	Two FX1115 ferrite beads

All resistors ¼W 5% carbon film unless stated
Capacitors – fdt = film dielectric trimmer, cp = ceramic plate, c = ceramic, e = electrolytic, tb = tantalum bead, mf = metallized film.

on the microphone socket (MIC SK1), match the particular microphone—in this instance a low-impedance dynamic type—to the input of the amplifier. C77, RFC9 and C78 form an rf filter to eliminate any possibility of rf feedback into the processor. R32 and C79 constitute a low-pass filter which attenuates the upper audio frequencies to compensate for the rising high-frequency characteristic of the phase modulator.

TR11 is followed by a shunt diode clipper (D3, D4), with the clipping level set by RV2. Harmonics generated by the clipping action are suppressed by a filter consisting of R42 and C48. RV3 connected between the output of the clipper and TR3 functions as a deviation control.

During the course of previous projects many unsuccessful attempts were made to construct a stable repeater access tone generator using ics in multivibrator circuits; the circuit employed in this equipment is a sine-wave oscillator (TR13). To achieve good frequency stability, resistors and capacitors in the feedback circuit (R47, R48, R49, RV4, C93, C94, C95) should be high quality components, metal oxide resistors and polyester capacitors being used in the current version. This results in an oscillator having good characteristics for the particular application, namely attainment of the required frequency immediately on start-up and an extremely small frequency variation with change in temperature.

RV4 controls the oscillator frequency, with the output buffered by TR14 followed by a timer consisting of TR15, RV5, R56 and C97. At switch-on C97 is discharged, the base of TR15 is at earth potential and the transistor, being cut-off, has no effect on the operation of the circuit; 1,750Hz tone is therefore passed to the output. C97 now commences to charge through RV5 and R56, and when the potential at the base of TR15 reaches a value of approximately 0·6V the transistor conducts, effectively short-circuiting the output and cutting off the tone. Toneburst duration is determined by RV5. Supply voltage to the tone generator is applied via S3c, so that it is only operative when S3 is switched to the repeater position.

(To be concluded next month)

NEW PRODUCTS

Coaxial connectors

A new range of low-cost uhf coaxial connectors specifically designed for the amateur electronics enthusiast has been introduced by Greenpar Engineering Ltd. Greenpar, a subsidiary of Dubilier Limited, is a leading UK manufacturer of coaxial connectors and rf components for the professional electronics industry. The introduction of this new range enables the company to supply the amateur market with a purpose-designed, quality product. The three basic designs—free plug, panel socket and straight adapter—meet most requirements, with the plug available in versions to suit popular coaxial cables. In keeping with existing standards of manufacture, all connectors in this new Greenpar range have nickel-plated brass bodies and silver-plated brass centre contacts. Plug and socket designs incorporate phenolic insulators for high temperature stability.

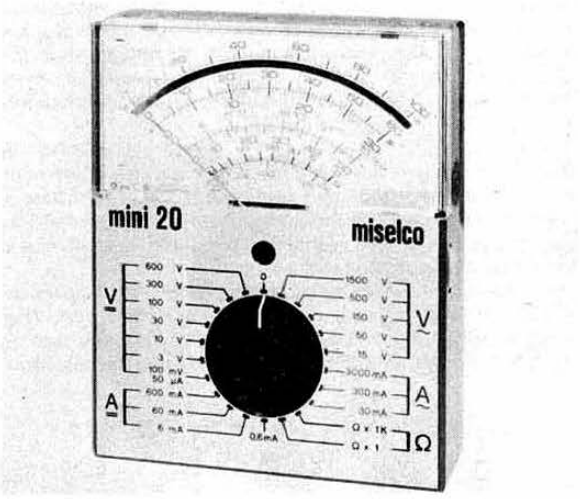
The new connectors will be supplied in packs of 10 to the following designations:

Connector type	Part designation	Popular cables/comments
Free plug	PL-259	RG 213: URM 67
Free plug	PL-259/6	RG 58, 59, 62: URM 43, 70, 76
Panel Socket	SO-239	Four-hole mounting
Straight adapter	PL-258	Mates with free plugs

They can be obtained directly from Greenpar Engineering Ltd, PO Box 15, Station Works, Harlow, Essex. Prices on application.

Mini 20 low-cost multimeter

The new Mini 20 from Alcon Instruments is a multimeter built in tough ABS plastic, with a full-view antistatic cover and the simplest of controls. One rotary switch selects any of 27 ranges in ac, dc (both V and I) or resistance. The scale used is provided with an antiparallax mirror and clear calibrations to avoid ambiguity and error. The only other control is the ohms zero potentiometer, the knob for which projects from the right-hand side of the instrument case. Only two terminations are used, so there is no possibility of confusion in selecting a wrong socket for a probe, and the ranges provided cover most situations. Sensitivity is 20kΩ/V dc and 4kΩ/V ac. Accuracy is two per cent on dc and on resistance, and three per cent on ac—sufficient for most professional uses and other applications.



The Mini 20 multimeter

Ranges extend from 100mV to 600V dc, 15V to 1,500V ac, 50μA to 60mA dc, 30mA to 3A ac, and up to 2kΩ and 2MΩ on resistance. There are also five decibel ranges corresponding to the five ac voltage ranges. An internal battery provides power for the resistance ranges and protection is by both movement diode and fuse.

The instrument comes complete with case, leads and instructions at £27.37, including VAT. Further information from: Alberto Coniglio, Alcon Instruments Ltd, 19 Mulberry Walk, London SW3. Tel 01-352 1897. □

The two-inductor "T" impedance matching network

by L. L. WILLIAMS, G8AVX*

THE matching networks required to couple high frequency power amplifiers to their loads are usually in the form of either a "TT" or a "T", both realized with two capacitors and one inductor. An alternative "T" network using two inductors and one capacitor appears to have significant advantages. The network is especially appropriate to the design of lumped constant-impedance matching networks for vhf power amplifiers using either transistor vmosfet or valve. It is also appropriate to hf use where it may have advantages over the single "TT" network when the high shunt capacitance consequent upon parallel operation of multiple output devices causes design problems.

Although superficially a single "T" network, the derivation shows it to be a two-stage transformation in which elements of the two parts are lumped into a single inductor. This results in unusually high values of inductance relative to the design frequency and impedances, enabling considerable lead inductance to be tolerated even at vhf.

Considered only as impedance transformers, all the possible three-element narrow-band impedance matching networks (Fig 1) are equally suitable. When practical considerations such as available or realizable component values, unavoidable stray reactances, circulating currents, applied potentials and the requirement for adjustment and dc blocking are added, it is apparent that all networks are not equally suitable.

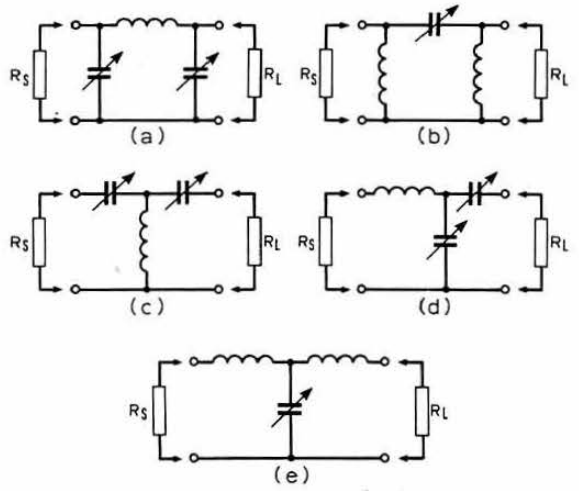


Fig 1. Five three-element matching networks

High-power devices and their associated cooling mechanisms are invariably relatively large. A natural consequence is a necessity for connecting leads with a self-inductance which may have quite serious effects at higher frequencies. Similarly, large devices, especially when parallel connected or coupled to a heatsink, can have an output shunt capacitance much greater than the desired input capacitance of a correctly designed "TT" section.

At full amateur power ratings the circulating current in the network may be as high as 20A, and any capacitors in its path must be able to carry it without excessive loss. This makes high-power transmitter variable capacitors of more than a few tens of picofarads physically large, and also gives them appreciable self-inductance. If it is necessary to have variable capacitors in a network, then networks which allow one terminal of the capacitors to be grounded will be preferred.

The five three-element matching networks (Fig 1)

(a) This two-capacitor "pi", much used in hf power amplifiers, has a range of impedance ratio and "Q" which is limited by the shunt capacitance of the amplifier device. This renders it unsuitable for vhf use, and may even pose problems at 30MHz when high input impedances are required.

(b) This two-inductor "TT" is theoretically less limited. The capacitor element, which is the natural choice for adjustment, has both ends "hot" to rf and, unfortunately, the section is "high-pass" and therefore provides no harmonic attenuation.

(c) This two-capacitor "TT" is also a high-pass function with both capacitor terminals "hot".

(d) This two-capacitor "T" network is well suited to low impedance sources, hence its popularity in transistor power amplifiers. The source impedance cannot exceed the load impedance with this network, and both terminals of the series capacitor are "hot".

(e) This two-inductor "T" will match a very wide range of impedances at any practical "Q" factor. It can accommodate low shunt capacitive reactance at its input, and considerable lead inductance can be absorbed into the two series inductors. At vhf, even when coupling from high source (1kΩ) to low (50Ω) loads, the capacitor is satisfactorily low in value and it has the required one terminal at ground. It is also a "low-pass" function giving good harmonic attenuation.

Derivation

It is instructive to follow how the two-inductor "T" is derived stage by stage; the objective is to transform the load, which will usually be a pure resistance of 50 or 75Ω, to the desired load resistance for the amplifier. The amplifier usually shunts the transformed load resistance with its output capacitance. At higher frequencies this shunt reactance may be more than one order lower than the optimum load for the amplifier, and if not dealt with will effectively short-circuit the amplifier.

Starting from the amplifier end, the network is terminated by the required transformed load impedance shunted by the device output capacitance (Fig 2). This complex termination is

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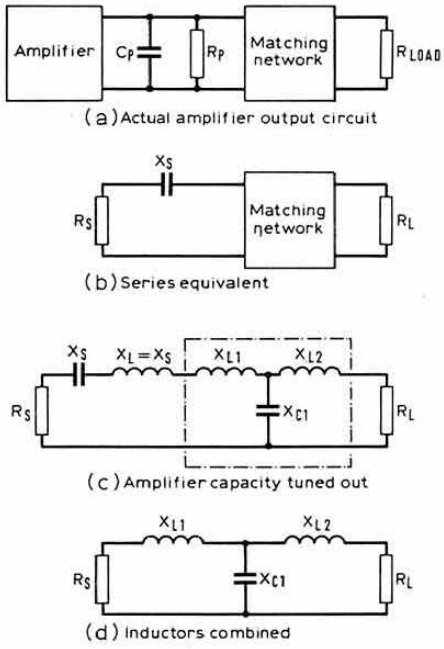

Fig 2. Evolution of the two-inductor "T" network

first turned into its series equivalent. (Many current high frequency power semiconductor data sheets give this impedance in the series form as Z_{OL} or Z_{out}.)

Having obtained the equivalent series reactance, an equal reactance of the opposite kind is connected in series, eg a capacitive reactance requires a numerically equal inductive reactance. The total series combination is thus effectively reduced to a pure series resistance.

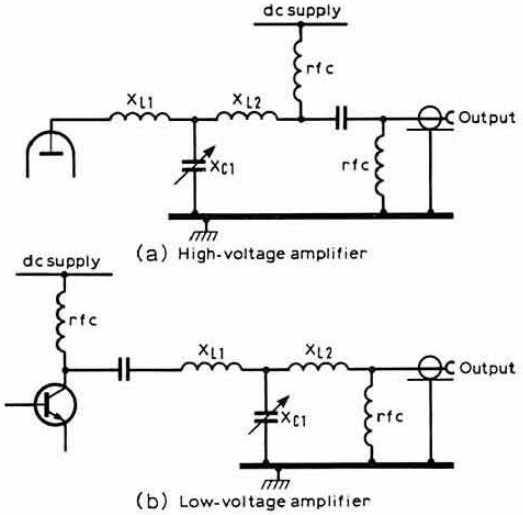

Fig 3. DC supply feed to the network

An impedance transformer is now required to transform the load to the amplifier series resistance. By choosing the two-inductor "T" which is the dual of the more familiar "TT", the series tuning inductor may be combined with one inductor of the "T", reducing the network to three elements.

The actual procedure for computing the values is as follows. If only the parallel equivalent of the amplifier load is known convert it to the series equivalent:

$$Rs = \frac{Rp\ Xp^2}{Rp^2 + Xp^2}$$

$$Xs = \frac{Rp^2\ Xp}{Rp^2 + Xp^2}$$

Select a value for "Q" and now calculate:

$$XL1 = Xs + QRs$$

$$XL2 = RL \sqrt{\left[\frac{Rs\,(1+Q^2)}{RL}\right] - 1}$$

$$XC1 = \frac{Rs\,(1+Q^2)}{Q + \sqrt{\left[\frac{Rs\,(1+Q^2)}{RL}\right] - 1}}$$

Hence find L1, L2 and C1.

When designing L1 and L2 allow for lead inductance.

Construction hints

The two inductors, and any chokes used to feed dc to the system, must be mounted with their axes mutually perpendicular to avoid mutual coupling.

DC blocking may be applied at either end of either inductor. The blocking capacitor may either have negligible reactance at design frequency, which is the usual practice, or it may be lumped with Xs, and XL1 compensated accordingly. Note that if the blocking capacitor is low in value, high rf potential may exist across it.

There will be a voltage node somewhere on the inductors, and this is the ideal dc feed-point. However, for low-voltage amplifiers a choke feed to the amplifier end will be satisfactory. For high-voltage amplifiers, blocking and choke feed at the load end will be more satisfactory (Fig 3).

Use thick wire, tube or strip for the inductors to carry the high circulating currents. Keep the capacitor leads short and direct.

A "T" network constructed on the above principles to match a 50Ω load to a 144MHz linear amplifier using a TY2-125 valve requiring a 4kΩ load and having a shunt capacitance of 6pF (X_P = 183Ω at 145MHz), gave an indicated efficiency of 63 per cent dc anode power to rf in the load under maximum single-tone condition. This is very close to the theoretical anode efficiency of the valve under the test condition, indicating a very efficient transfer of power to the load. A 5in anode lead required to mount the network well clear of the "big glass bottle" was absorbed easily into XL1 (294nH) contributing about half the required inductance. XC1 came to about 14pF. □

A comparator/tester for bipolar and field effect transistors

by P. B. BRODRIBB, G3ONL*

WHILE engaged in making a phasing-type transmitter for top band, the author several times felt the need to test the semiconductors used in the project: the audio phasing network required two reasonably matched fets; some junk box transistors were found to be wanting; and a brand-new fet turned out to be an excellent short-circuit. In the face of such frustrations it was decided to put together a simple transistor tester. The final result is based on two relatively simple circuits.

For bipolar transistors (Fig 1a)

This circuit supplies a predetermined base current to the transistor under test and measures the resulting collector current. The current gain of a transistor is the ratio of the collector current I_C to the base current I_B: gain = I_C/I_B.

Since the supply voltage V_{CC} is known and the base current may be calculated from $I_B = V_{CC}/R_B$, the collector current as read by the meter may be multiplied by a suitable factor to give the current gain. The collector supply is stabilized by a zener diode so that the base current will remain constant regardless of the condition of the battery and load current. This ensures that the accuracy of the meter reading remains constant. In fact there will be a difference between the base currents of silicon and germanium transistors due to the different values of V_{BE} for silicon and germanium, but, since the instrument is not intended for precision testing, the discrepancy in measured gain between silicon and germanium transistors was deemed to be acceptable.

Two bias resistors, R11 and R12, are available in the author's version, one for low-gain transistors (current gain up to 100, scale multiplying factor 10) and one for high-gain transistors, (current gain up to 500, scale multiplying factor 50). If only one bias resistor is used it should be the high-gain one, but in this case low-gain transistors will not give much deflection on the collector current meter. The two bias resistors are calculated from the expected collector current for a gain of 100 and a gain of 500.

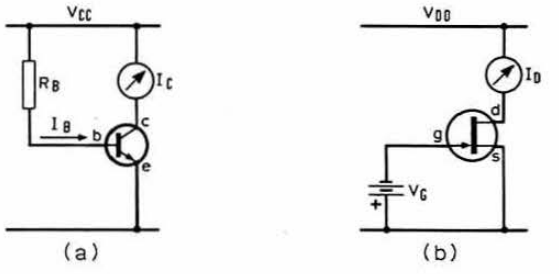

Fig 1. The circuits for testing (a) bipolar transistors, and (b) fets

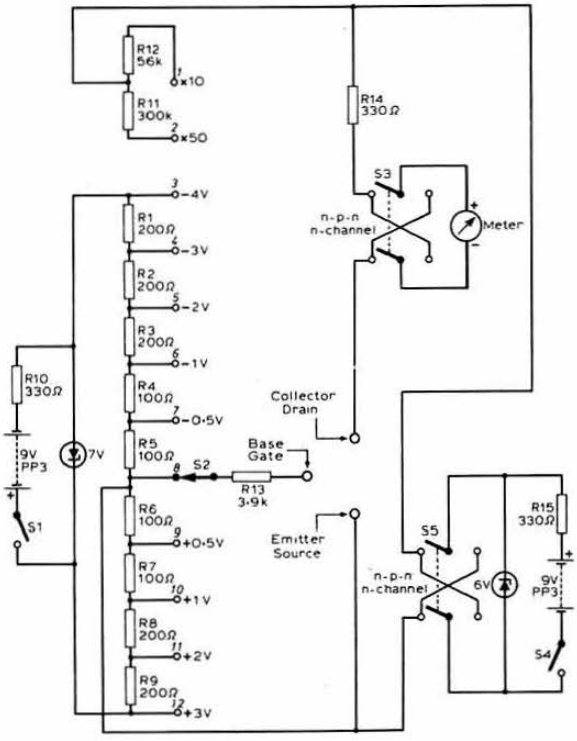

Fig 2. Circuit of the complete tester. S3 and S5 should be ganged

The collector/drain current meter in the author's tester is a modified surplus "ammeter hf". The thermocouple had been damaged beyond repair but the basic movement was still intact and gave a full-scale deflection with just over 2mA. A suitable shunt was made by winding resistance wire on to a 1W resistor to bring the full-scale deflection to 10mA.

A transistor with a gain of 500 will result in a collector current of 10mA if the base current is 20μA. If the collector supply is 6V, a value of 300kΩ for R11 will give this base current. A new scale was fitted to the meter and calibrated 1 to 10mA so that when S2 is in the "500" position the meter reading is multiplied by 50 to give the current gain. Similarly, a value of 60kΩ is needed for R12. The meter reading is now multiplied by 10 to give the gain. R13 is included in series with the base to give some protection against short-circuits, so R12 was given a final value of 56kΩ. R11 was left at 300kΩ, since the error in base current due to an additional 3·9kΩ was considered negligible.

For fets (Fig 1(b))

A known voltage is applied between gate and source, and the resulting drain current is measured. The ratio of the change in drain current caused by the change in gate voltage gives the mutual conductance, g_m or "gain": $g_m = \Delta I_D/\Delta V_G$.

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The gate supply is stabilized by another zener diode so that a potential divider consisting of a chain of resistors may be used to give known gate voltages. The source is returned to the centre of this chain so that positive or negative potentials may be applied to the gate for testing either p-channel or n-channel fets.

The complete tester (Fig 2)

A 12-position wafer switch is used for S2. This allows 10 positions for testing fets and two positions for testing bipolar transistors. S1 is another 12-position wafer on the same shaft as S2, wired so that the gate battery is in circuit for positions 3 to 12 (for testing fets) and out of circuit in positions 1 and 2. When the tester is not in use this switch is returned to position 1 or 2, thus opening the gate battery circuit.

The resistors in the potential divider chain may be whatever is to hand; there is no need for high precision, since the instrument is mainly used for checking and comparing. The values of R1 to R9 were chosen to give 0·5V and 1V increments of gate voltage. The zero gate voltage position allows I_{DSS} to be measured. A fair idea of the mutual conductance of a fet is found by noting the change in drain current for a 0·5V or 1V change in gate voltage.

Switch S4 in the collector/drain supply is a single-pole miniature push switch with one normally-open contact. It would be entirely feasible to simplify the switching of the gate battery by using a two-pole switch in this position, one pole to switch the collector/drain battery and the other pole to switch the gate battery. Even S2 need not be a 12-position switch. It is merely necessary to modify the gate resistor chain to suit whatever switch is available.

A four-pole changeover switch at S3 and S5 completes the switching. It converts the circuit from npn and n-channel to pnp and p-channel. R14 is included to give short-circuit protection. The two zener diodes are rated 400mW. All resistors are ¼W. The panel terminals to which transistors to be tested are connected consist of a TO18 transistor holder in parallel with three insulated terminals.

As an added bonus, diodes may be tested by connecting them across the collector-emitter terminals. □

RF power control for the FT7, without removing the covers

I. H. CROWTHER, G3KLF*

THE circuit to be described has been successfully used by the author for some time, and was developed to allow output power reduction from a maximum of 25W to zero for QRP operation, driving linears, and antenna testing at low power to reduce risk of damage to the rf pa transistors. It also allows the rf-derived alc to be set to just operate on normal speech peaks instead of being used as a power output control. The FT7 was reviewed by the author in *Radio Communication* June 1979.

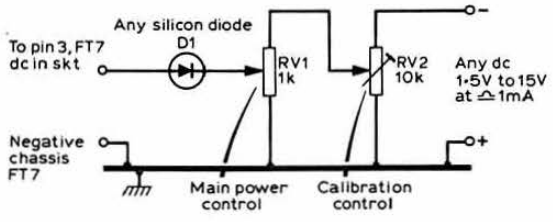

Fig 1. Circuit diagram

The FT7 utilizes a directional wattmeter circuit to sample rf output, which is then rectified by forward and reverse power diodes D1502, 1503 and 1504. The anodes of the diodes form an OR gate from which a negative voltage is derived, and fed back as alc to Q304 in the transmitter i.f. chain to control its gain and hence rf output. The diode OR gate lends itself to the addition of another diode, and this is what is done.

An attraction of this modification is that the alc line is connected to pin 3 of the dc power socket on the rear apron of the FT7, and therefore it can be incorporated without removing the covers.

Before commencing, connect a 50Ω rf wattmeter to the FT7 antenna socket and transmit on 3·5MHz; the output will probably be 15W. Adjust alc potentiometer RV1501 through the rear apron to just secure maximum rf output; this should be 25W for a meter current of 3·8 to 4A at 13·5V. This is within the output transistor's rating, but should not be sustained for more than 20s.

Switch to receive and prepare the circuit shown in Fig 1. The negative supply may be derived from a mains unit, but a 1·5 to 15V dry battery will work just as well, as current drain is only about 1mA. As the battery voltage begins to fall, the only effect will be that zero rf output will be unobtainable without readjusting RV2. Use an Avometer on the 10V scale to adjust RV2 to obtain −1V across RV1. Connect D1 to the FT7 pin 3 and the positive battery line to the chassis.

Switch on the FT7 and transmit into the dummy load. RV1 should vary power output from maximum to zero watts. If zero is not achieved, adjust RV2 until cut-off is reached. RV2 can be a small preset, as it is seldom readjusted once set.

Note that rf efficiency drops with reduced power output, eg for a 2A meter current, 5W are produced; for 3A, 12–15W, and for 4A, 25W—corresponding to efficiencies of 20, 45 and 50 per cent respectively. □

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technical topics

Pat Hawker, G3VA

THE aim of *TT* has always been to introduce new ideas rather than to provide yet another rehash of well-established or "standard" circuits. This means that I try to keep a reasonably alert eye open for novel circuits and ideas, whether stemming from readers or spotted in overseas journals. On the whole this policy seems to work out reasonably well, and there is plenty of evidence that most of the circuits and ideas selected for *TT* prove to work as claimed. But of course it means there can be no guarantee of this—or that in every case the claims made by the original authors are fully justified. Clearly one attempts to select those items that seem most credible but, as we have said before, everything is experimental. If you do ever feel strongly that there is a basic flaw in a circuit idea please let me know!

To quote two examples. R. Berkolds, G8DLQ, is not convinced that the "precision over-voltage detector" (*TT* December 1979) should be adopted, since the 4093 ic can exhibit large variations in trip voltage with temperature or between devices manufactured by different firms. He considers the switching points of this device should not be relied upon for timing or level detection in critical applications—and that standard over-voltage-detector arrangements are better. And Johnny Hodgkins, G3EJF, believes the simple 555 el-bug design (*TT* October 1979) has a basic flaw since he finds it will not immediately change from mark to space without generating an additional dot period when the paddle is operated. So apologies to all who have encountered problems!

Clear thinking on receiver specifications

Wes Hayward, W7ZOI, whose work on hf receivers is well known on both sides of the Atlantic, contributes a perceptive letter to *QST* (November 1979, pp48-9) on the question of the specification of receiver performance in manufacturers' literature and in equipment reviews and articles, with particular regard to the question of the growing practice of including figures relating to "dynamic range".

He considers that the common practice of specifying only an "intercept point" or combinations of "input-intercept", noise figure and dynamic range numbers which are not mutually consistent is causing confusion. He also points to the practice of carefully measuring the performance of components such as mixers and crystal filters outside the receiver, and then assuming a similar performance is maintained with the devices installed in the receiver. He notes also that some amateurs have measured the "intercept point" with, say, a 20dB front-end attenuator switched into circuit, resulting in a highly over-optimistic view of the basic performance of the receiver.

He prefers the parameter of "dynamic range number" as used by Anzac Electronics for components, but adapted to form a "receiver factor". This he then defines as receiver input intercept in dBm minus the noise figure in decibels. Unlike "dynamic range" such a receiver factor would be invariant with bandwidth. As an example he cites his high-performance receiver as having a +12dBm input intercept and an 8dB noise figure, thus giving a receiver factor of +4dBm (many current equipments would yield a negative receiver factor of around −10dBm or lower).

W7ZOI notes that, in modern receivers, intermodulation distortion (imd) problems rarely occur during on-the-air use, (European 7MHz excepted—*G3VA*) while blocking from gain compression is not common; in practice he cites reciprocal mixing (due to oscillator noise output) as often representing the limiting factor to receiver performance. He feels that the parameter "minimum detectable signal" requires a measurement procedure that is easier to describe than actually perform, as few receivers have filters providing sufficiently good ultimate rejection to make this meaningful, and few amateurs have signal generators with a sufficiently "clean" output to make this measurement. He is opposed to the establishment by national societies of "approved" standards of receiver performance since this would discourage construction of simple equipment. In fact he stresses a point that we have raised on several previous occasions in *TT:* "Many of the seemingly esoteric details of receiver performance never became significant in routine amateur communications. It is only in severe competitive situations where these details are important".

This does not mean that we should not continue to strive to improve receiver performance still further; but we need to recognize that measurement and evaluation techniques must also evolve. W7ZOI concludes: "Present trends are encouraging. However, great care must be exercised in applying the measurement results. The intercept concept should be used only if it is applicable. Measurements should include an evaluation of reciprocal mixing as well as imd-related effects".

Clearly it needs to be recognized that receiver specifications in manufacturers' literature and advertisements may well have been very carefully selected (not to mention "massaged") to present the equipment as favourably as possible, and may well give the unwary the impression that the standard of performance achieved in some particular respect is absolutely vital for good on-the-air use. Even in these days of consumer protection, the old tag says it all: "Let the buyer beware".

The VK2ABQ antenna again

Of the many published proposals for new forms of amateur antennas, relatively few appear to be taken up by substantial numbers of amateurs; one reason for this is that many designs are evolved to meet specific requirements or to make use of existing facilities or materials. Then again, it is not always realized that many amateurs are more concerned to find a design that can be built and adjusted very simply, and is not liable to fall down in the first gale, than necessarily with achieving the ultimate in performance.

One design, however, that has rapidly established itself and has been widely used during the past six years is the compact VK2ABQ triband wire beam array which, for 14, 21 and 28MHz, requires only a modest support structure and has only a 12ft turning radius. When first introduced in the UK (*TT* January 1974), I quoted Fred Caton, VK2ABQ (G3ONC), as saying "It is the simplest and best homebrew tribander yet". The intervening years have done nothing to undermine this view, even if it can be argued that it is unlikely to quite reach or outperform a good conventional full-size Yagi or quad array.

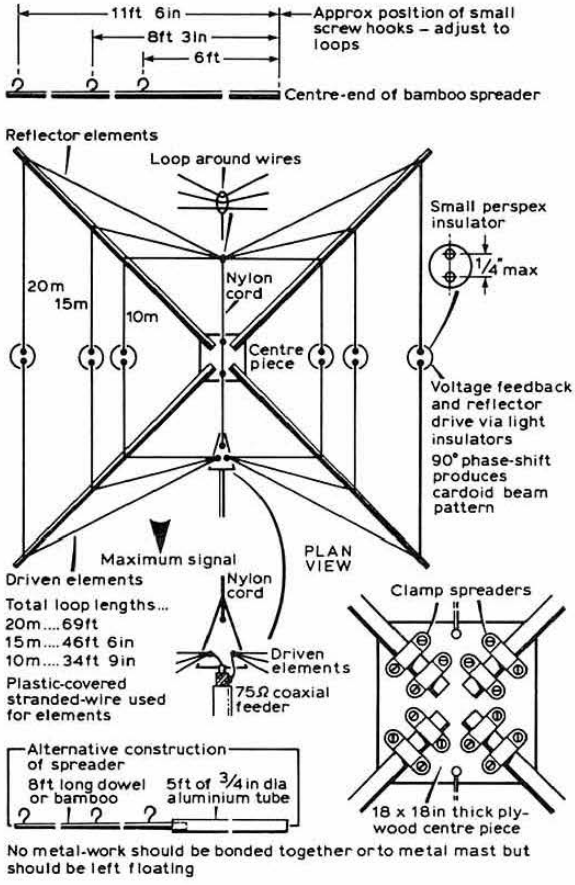

Fig 1. Constructional details of the VK2ABQ triband beam as erected by G3LZR

The real attraction is the low cost, the minimum constructional problems and the light weight.

When Fred Caton was back in the UK during 1978 he persuaded (and then assisted) E. J. ("Ted") Womack, G3LZR, to build one. At a height of 30ft this has enabled G3LZR to keep in touch with VK2ABQ (now back in Australia) as well as a good number of other VK and ZL stations on 14MHz. While G3LZR's antenna (Fig 1) basically follows the modified VK2ABQ design described in *TT* (September 1974, Fig 2), there are a number of interesting constructional differences which could well prove useful to other constructors.

Phantom stub quad/loop element

On several occasions last year (eg *TT* April 1979) we discussed the use of bisquare elements in which the perimeter is 2λ rather than the 1λ of conventional quad, delta and loop elements. It was pointed out by Les Moxon, G6XN, that multiband operation of a bisquare element is possible using his linear resonators; while the use of a conventional LC tuned circuit for this purpose is noted in *Radio Communication Handbook* (5th edition, Vol 2, pp12.86-7 and Fig 12.126(d)).

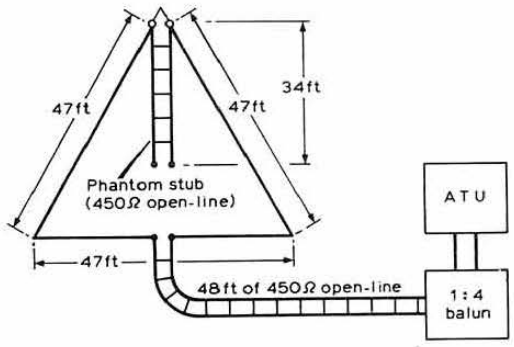

Fig 2. "Phantom stub" delta loop element as described by W7AAK. The dimensions shown are for 14, 7 and 3·5MHz but can be scaled for higher bands as noted in the text

In *QST* (December 1979, pp37-9) Harold E. Gullstad, W7AAK, uses a bisquare element to form a multiband delta single- or two-element beam, but replaces the LC circuit by what he calls a "phantom stub". By using an open λ/2 stub (and open-wire transmission line), he indicates how the 2λ element can be used effectively at f, $\frac{1}{3}f$ and $\frac{1}{5}f$ to form a multiband system with non-critical dimensions. With a 47ft (14·33m)-sided delta loop and 34ft(10·3m) stub, the element can be used on 14, 7 and 3·5MHz; W7AAK also claims that a half-size element will work satisfactorily on 28, 21, 14 and 7MHz. He describes his use of a two-element array based on this approach, but the article does not discuss the question of element spacing or whether this can be optimized for more than one band. Nevertheless the idea would seem worth investigating, if only as a simple delta loop antenna: Fig 2.

The subject of multiband hf arrays is clearly going to become of increasing concern as the new 10, 18 and 24MHz bands become available (due to the new "transfer" procedure, however, it may well be quite a long time before the 18 and 24MHz bands are released to us). Rhombics, vees, log-periodics, long-wires and other broadband designs, such as centre-fed doublets with open-wire feeder, should be able to take the extra bands in their stride, but the many popular designs based on trapped elements, nested elements, stubs and other frequency-conscious elements seem bound to raise problems. The attractions of open-wire feeders in conjunction with flexible antenna matching units will become even more evident than at present. The departure from harmonically related hf bands will present hf operators with some new problems to solve, particularly if they are keen on atu-less coaxial cable feeders.

Overvoltage protection with three-terminal regulators

David Long, G3PTU, points out that while overvoltage protection is provided on the chip of solid-state, three-terminal ic regulators (LM309 etc), this takes the form of a zener diode of limited size. In those applications where effective overvoltage protection is vital, a more valuable arrangement, he believes, can be provided quite simply by using an external scr (thyristor): see Fig 3.

Under normal operating conditions the 10Ω resistor has little effect on the performance of the regulator, as only minimal

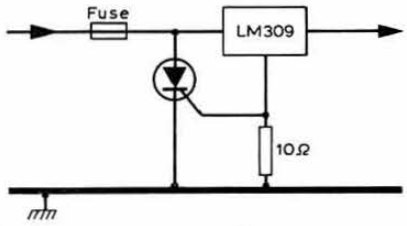

Fig 3. G3PTU's method of improving the overvoltage protection with three-terminal ic regulators

current flows through it. However, in an overvoltage condition all the current passing through the on-chip zener diode flows through the resistor, and the voltage then developed across it will exceed the knee of the scr gate. The scr thus fires, "crowbars" the supply and blows the fuse.

Optimizing Yagi gain

The publication in *TT* (January 1978) and *ART6* of some of the findings reported in "Yagi Antenna Design" by Peter P. Viezbicke, the subsequent debate in which G6XN pointed out the inconsistencies in those results for two- and three-element arrays, while other members defended them on the basis that they at least provided a helpful guide for the construction of long arrays for vhf/uhf, all showed once again how difficult it is to produce a set of practical, universal design parameters for Yagi antennas even after extensive theoretical and experimental studies. Indeed the optimization of Yagi designs, with so many possible variants, continues to be the subject of many papers in the professional journals.

Bill Pechey, G4CUE, brings a further source to attention: "A design of Yagi-Uda antennas by nonlinear optimization techniques" by Masanobu Kominami and Katsu Rokushima (English text in *Electronics and Communications in Japan*, Vol 61-B, No 1, 1978, pp47–54). This seems to introduce some potentially-useful new ideas, although the paper is highly mathematical and (even disregarding the maths) by no means easy to follow. As G4CUE points out:

Table 1—Yagi antenna design

	3-el	4-el	5-el	6-el	6-el (min side lobe)
h1	0·238	0·240	0·243	0·238	0·242
h2	0·222	0·225	0·230	0·231	0·245
h3	0·218	0·219	0·221	0·223	0·231
h4	–	0·221	0·218	0·218	0·216
h5	–	–	0·216	0·218	0·202
h6	–	–	–	0·217	0·191
d1	0	0	0	0	0
d2	0·264	0·275	0·268	0·270	0·340
d3	0·538	0·589	0·555	0·544	0·448
d4	–	0·851	0·856	0·858	0·771
d5	–	–	1·183	1·196	1·200
d6	–	–	–	1·522	1·552
Directive gain (dB)	9·25	11·06	12·09	12·74	12·16
Input impedance (Ω)	31·03+j2·68	28·90+j2·50	30·46+j4·84	36·04+j1·37	9·49+j9·92
SWR (Z=50Ω)	1·62	1·74	1·67	1·39	5·49
Actual gain (dB)	9·01	10·73	11·81	12·63	9·34

Where h1, h2 etc are half-element lengths (h1 reflector, h2 driven element etc) in terms of λ, and d1, d2 etc are element spacings from h1 in terms of λ. All element radii assumed to be 0·00337λ. Gain figures are reference isotropic.

"The paper deals with various criteria for optimization, including sidelobe suppression and broadbanding, so that arrays providing, for example, a gain of 7·7±0·3dB over the range 260–340MHz with six elements, can be specified. In the various tables the optimization assumes an element diameter of 0·00337λ. This is reasonable for 144MHz (0·7cm) but would represent 7cm on 14MHz!

"I was confused at first by the difference between actual gain and directive gain as used in the paper, but I feel that by directive gain the authors imply the gain over isotropic, assuming perfect power transfer from the feeder (ie with matching network at the antenna), whereas actual gain takes account of the mismatch loss at the antenna assuming a 50Ω feeder directly connected. In some of the calculations the input impedance turns out to be 12·48 + j98·46, or an swr of 19·74, suggesting that some pretty good matching will be needed to obtain the 13·51dB directive gain!"

I have simplified the authors' Table 1 which represents 3-, 4-, 5- and 6-element arrays optimized for maximum actual gain, although the original table has some features that I find confusing. I have also added information showing a modified six-element design optimized for minimum sidelobe level rather than maximum actual gain. Inspection of the table suggests that the results are likely to prove more applicable to vhf than hf, but it is interesting to note the appreciably lower gain likely to be achieved when an array is optimized for maximum sidelobe suppression.

Failsafe and surge reduction

Tony Martin, G4HBV, notes that while the switch-on surge reduction circuit shown in *TT* (September 1979) included an important warning that the 1Ω (or higher) resistor should be of the failsafe type, this warning was omitted from the simplified circuit shown in *TT* (December 1979, Fig 4(b)) as a follow-up item. He points out that experience with similar systems has underlined the real need to use failsafe components, and that conventional high-wattage wirewound resistors can in some circumstances prove a real hazard. Resistors with vitreous enamel coating, he points out, are liable to shoot off incandescent material when heavily overloaded; others with an extruded aluminum body can explode. In the December circuit, faults that could expose the resistor to protracted overloading include failure of RLB to operate; dirty contacts on RLB1; fault conditions in the equipment transformers (for example short-circuited turns which might prevent RLB operating but which might not blow the equipment's mains fuse unless this has been carefully and correctly chosen).

A form of resistor which is normally considered failsafe is the ceramic rectangular-cased type with fireproof filter.

While on this subject, a further design (from *Radio Handbook*) is shown in Fig 4 for a high-voltage power supply incorporating in-rush protection but using a dc relay, which with the R2,C1 time-constant is arranged to provide a delay time of about 0·5s; additionally R3,C2 provides secondary surge suppression; and shunts R4,C3 and R5,C4 provide equalizing networks across the diode stacks (D1,D2) of the voltage-doubler rectifiers. Filter capacitors, C5-C6, should preferably be high-grade computer-type electrolytic capacitors of suitable rating, shunted by 10kΩ, 10W wirewound resistors. The in-rush delay relay can be of the common 24–28V dc type with a suitably rated diode, D1. Again, in this application, R1, R2 should be failsafe, high-wattage components, R1 of a few ohms value.

In-rush current to power supplies is normally very high since the filter capacitors are initially uncharged and represent vir-

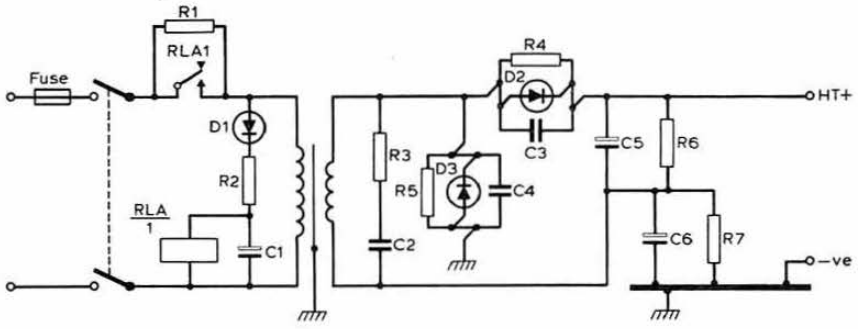

Fig 4. *Radio Handbook* design for high-voltage power supply incorporating in-rush protection using dc relay and with secondary surge suppression of transients

tually a short-circuit across the output. Unlike supplies based on the older type of thermionic diodes, the solid-state diode has no warm-up delay, resulting in heavy in-rush currents that, apart from other damage, may exceed diode ratings for a brief period.

5A switching regulator

One of the problems with most heavy-current voltage regulators for power supplies providing outputs of the order of 5–13V is the considerable amount of power that is wasted in the process (ie difference between watts input and watts output). One method of reducing this loss is to use a switching regulator similar to the switching-mode power supplies noted in *TT* (December 1979).

The design of a switching regulator providing, typically, 5V, 5A output from a 12–15V dc input at an efficiency of about 80 per cent (approaching 90 per cent for a 13V output) is briefly described by Bob Haver of Motorola in *Electronic Design* 26, 20 December 1979: Fig 5. This uses an LM317T three-terminal ic regulator, and the output voltage can be set as required by changing the value of R1, either for a fixed potential or made continuously variable by using a potentiometer as a variable resistor. Efficiency will drop with low voltage outputs, although even at 1·5V it can be as much as 60 per cent.

The operating frequency of the switching frequency depends primarily on the filter elements, the response time of the ic regulator and the load. Normally it will be about 1–2kHz, but this may drop to about 100Hz under no-load conditions. Ripple output (about 100mV p-p) can be reduced by using a

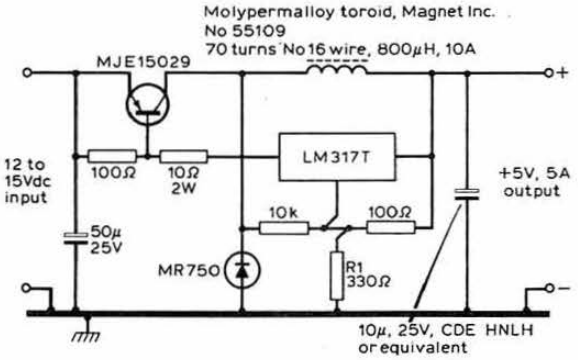

Fig 5. High-efficiency switching regulator used in conjunction with three-terminal ic regulator and operating at about 1-2kHz

filter capacitor with a very low equivalent series resistance (conversely it would be increased by using a lower-grade capacitor). Note that the circuit as shown does not include short-circuit protection.

The size and cost of the filter choke could be reduced by replacing the core specified by a choke consisting of 100 turns on the smaller 55439 core. It is not known whether these or similar cores are readily available in the UK, but it is felt that the basic design may prove of interest.

Solar flares and satellites

At a recent discussion on the future possibilities of direct-broadcast satellites in the 11·7–12·5GHz band, the question was raised whether such systems would be affected by the sunspot cycle. My immediate reaction, thinking in terms of trans-ionospheric 12GHz propagation, was to feel that any changes in propagation directly related to the ionosphere would be quite minor. While I still feel this is true, more careful reflection has made me realize that there are some quite important ways in which solar activity can affect satellites.

Amateurs are now looking forward to Phase 3 Oscar satellites in highly elliptical or geostationary orbits, with their promise of continuously available dx facilities; at least for stations equipped to work through them over the much longer paths than with all the earlier Oscar satellites, and always provided that amateurs can be persuaded to exhibit the high degree of operational discipline that may need to be observed. So it seems an appropriate time to look into this question.

An article by W. E. Flowers of the American Space Environment Services Centre in *Satellite Communications* (November 1979) indicates that not all of the possible effects of solar activity on satellites and on satellite operations are fully known. But it is clear that, for example, solar flares can be quite important. It has been estimated that the extraordinarily intense solar activity in August 1972 shortened the operational lifetime of a number of scientific satellites by as much as a year. Solar activity producing what are termed "High Z" solar particles (these are particles much heavier than protons; for example, iron particles) can be very damaging to sensors, solar cells etc. Such particles pass through surface coverings into the electronic circuitry and can cause arcing, short-circuits and other damage. A warning system in the form of the Space Environment Monitoring System has been established to allow scientists in charge of the most susceptible forms of sensors to shut them down in advance of a major particle event.

Then again X-ray emission from the sun causes sudden increases in the ionization of the ionosphere; this, as all dx operators appreciate, has a tremendous effect on layer-reflected

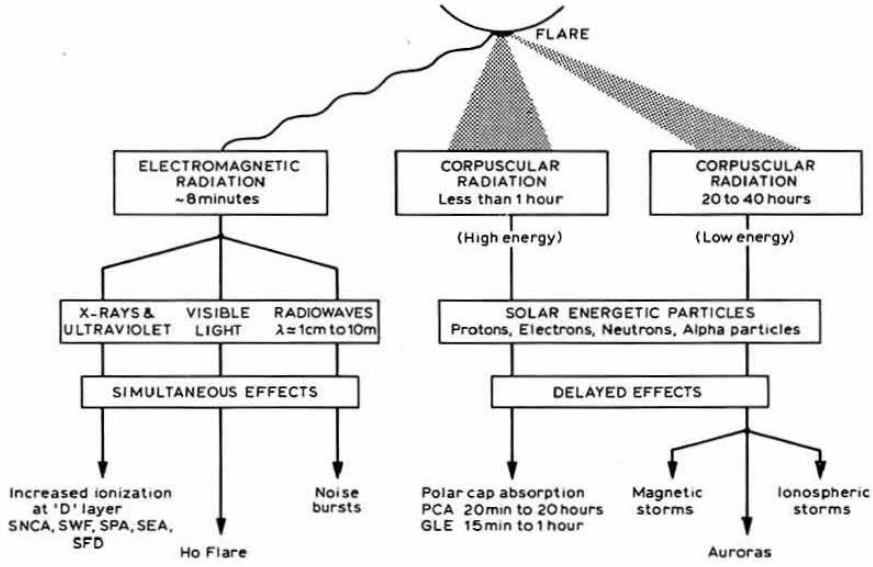

Fig 6. Effects of a solar flare

propagation; but apparently it can have some (slight) effect on trans-ionospheric propagation (ie propagation through the layers from outer space). IBA engineers concerned with monitoring OTS 12GHz signals at Winchester tell me they have never noticed trans-ionospheric propagation effects linked with solar flares, although an unexpected degree of scintillation can occur at times (possibly arising in the lower atmosphere). It is already well established that fading and depolarization of 12GHz signals from satellites can be caused by heavy rainfall and by ice particles in the atmosphere.

Solar flares are related, of course, to sunspot activity; as the number of sunspots increases so, normally, does the frequency of flare occurrence and the chances of large flares with high energy particles. Rather curiously, the last quarter of 1979, which may well prove to have been the peak of Solar Cycle 21, was notably free of major solar disturbances. Flares, like sunspots, come in the well-known 27-day pattern that results from the rotation of the sun.

There is also another way in which solar activity affects satellites, particularly those in fairly low orbit. The increased solar radiation at the peak of a cycle actually causes the earth's atmosphere to expand, resulting in increased atmospheric drag. This, of course, has been noticed in the changes that have been made from time to time in the Oscar predictions, and also led to the large Skylab re-entering the atmosphere rather earlier than originally predicted.

Fig 6, derived from W. E. Flowers' article, indicates the main effects of solar flare radiation and should prove of interest to all hf/vhf operators, whether or not they use the Oscar satellites. This shows graphically how electromagnetic radiation (x-rays, uv, light and radio waves) from a flare results very quickly in increased ionization of the absorptive D-layer, about 70km above the earth, and this can result in such effects as sudden shortwave fadeouts (swf), sudden cosmic noise absorption (scna), sudden phase anomalies on vlf (spa), sudden frequency deviation (sfd) etc. Particle or corpuscular radiation effects take longer to materialize: up to about an hour later in the case of high-energy particles, but with a delay of from 20 to 40 hours for low-energy particles, protons and electrons, carried on the solar wind.

Relays—electromagnetic and solid-state

For many years there have been determined efforts to find suitable solid-state replacements for the vast number of electromagnetic relays still used in electronic equipment. One remembers, for example, the long search by telecommunication engineers some 15 to 20 years ago to find a switching component for "electronic telephone exchanges". This led, as an interim measure, to the adoption of "reed" relays, though by no stretch of the imagination could these useful components be called electronic rather than electromagnetic. The basic problem was to find a solid-state device that could always be relied upon to provide effective isolation, even under fault conditions, between circuits at appreciably different potential. If I recall correctly, the Post Office ran into a different type of problem with reeds; even when mass-produced they cost a good deal more than had been confidently predicted?

It is interesting to find that a recent article by A. W. Sweet, of STL, in *Electrical Communication*, Vol 54, No 1, 1979, still carried the uncompromising warning that: "in some restricted applications, solid-state devices are now available that can perform the tasks previously undertaken by electromechanical relays; their main advantage is a longer operating life. However, as yet no single device is available with anything like the versatility of conventional relays".

Electromagnetic relays can possess many virtues: complete electrical isolation between control terminals (the coil winding) and the switching contacts; they can be designed to operate from virtually any ac or dc power supply rail; they can be used either as a straightforward switching device (actuator) or as a sensing device with close control over its operating margins; a single relay can provide a multiplicity of isolated contact functions; their switching can be very good ("off" resistance virtually infinite, and "on" resistance measured in milliohms); their contacts can be designed for virtually any required current and voltage rating; they can switch dc or ac (including rf)

loads; and they can today be made very small—a miniature rf relay is available in a TO5 transistor case! By comparison their faults (contact wear, contact dirt, often slow operating time) can usually be tolerated, though there is perhaps nothing more infuriating than a sluggish keying relay.

A. W. Sweet, in his article, admits that semiconductor technology has produced switching devices with attractive voltage and current ratings, but considers that they have two disadvantages that are immediately apparent: (1) finite "off" impedance which may be hundreds of kilohms for bipolar devices and rather higher for fet devices; and (2) they are polarity sensitive. The "on" resistance is also usually higher than for relay contacts, and there is normally a fixed potential difference across the device, ranging from 0·5 to 1·5V. Thyristor-type devices have problems of turning off in dc circuits and of turning on to high-speed noise spikes on the load or power rails.

However, there are quite a lot of applications in amateur radio equipment where these disadvantages do not matter and where speed of action and reliability encourage their use. The article discusses the use of three solid-state devices which can provide good high-voltage isolation: opto-couplers; pulse transformer isolation; and the growing use of Hall-effect sensors. At present only the first of these techniques is being used at all widely by amateurs. The opto-coupler consists of a led mounted near a phototransistor in a light-proof enclosure. The phototransistor is driven by light output from the led and, typically, electrical isolation of about 1·5kV is achieved.

A. W. Sweet notes that attempts have been made to use the opto-coupler as a sensing device, but that it is very difficult to realize an accurately-controlled switching threshold because the ratio of led current to phototransistor collector current deteriorates with time. The deterioration rate depends on the magnitude of the forward current through the diode and the ambient temperature, the poorest life characteristic being obtained with high currents and high temperatures. The operating threshold of a circuit using an opto-coupler must thus be expected to degrade with time.

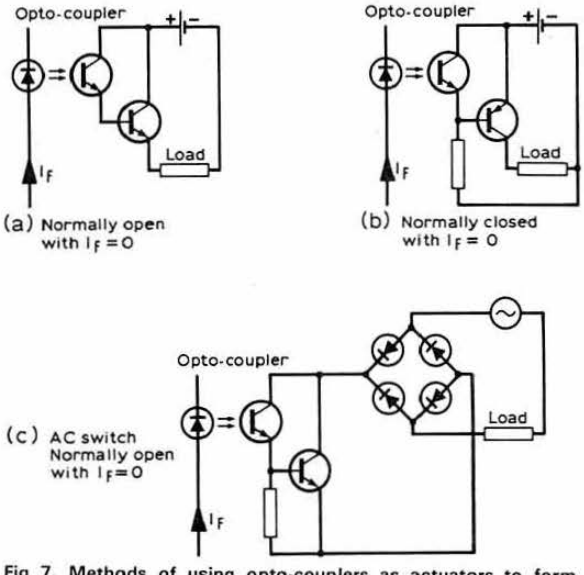

Fig 7. Methods of using opto-couplers as actuators to form electrically-isolated, solid-state relays

Nevertheless opto-couplers can be used effectively both for ac coupling (up to rf) and as actuators (switches). Three basic actuator arrangements are shown in Fig 7. Adequate life is usually achieved by limiting the current through the led. Optically-coupled thyristors and triacs can also form effective actuators.

Car electronics—the good news

The November and December *TT* included some rather gloomy prognostications about, and experiences of, the effects of high-power transmitters on car electronics. Happier prospects, however, are opened up by W. Blanchard, G3JKV. He writes:

"Some nine months ago I fitted a microprocessor system into my car and have no evidence at all that my 144MHz transmitter has any effect on it. There is a small unit that fits on the dashboard and measures time, distance, fuel flow, temperature and battery voltage; all this information is converted into speed, average speed, miles per gallon, gallons per hour, fuel gone, fuel remaining, fuel required to reach destination, time to destination, etc. It also provides cruise control, driving the car at any selected speed. The connections to all the sensors are ordinary unshielded pvc wires (about 15 or so) and there appears to be no rf decoupling (I have not fitted any). My 144MHz fm transmitter delivers a measured 90–100W to the antenna. At first I half-expected trouble; but so far there has been none.

"I have no knowledge whether this would apply also to electronic carburettors, but the car has electronic ignition (Lucas 'Opus') and again no trouble. The only rfi effect I have noticed is that the bulb failure warning device always illuminates during transmission; in fact it provides an effective radiated power monitor since it lights only with almost full power, and its absence shows me that I am on low power.

"Perhaps hf might cause trouble, but experience suggests that it is usually vhf that causes rfi."

FETs and gigahertz

A review of current microwave transistors notes the availability of gasfets with optimum noise figures of 3·4dB at 18GHz and with 8dB gain up to 14GHz, or capable of providing 17mW linear power output at 10GHz (HFET-2201 Hewlett-Packard). There are a number of gasfets with noise figures of around 2dB or less at 6–8GHz; the British devices include Plessey GAT6 (4dB at 14GHz) and GAT5 (3·3dB at 12GHz). For vmos there is the Siliconix DV1008 capable of 80W (minimum) output at 175MHz; Signetics are about to introduce a dmos fet (SD244) able to deliver 18W at 150MHz. Recent trends are summed up as "the rise of the fets"—though bipolars are continuing to improve with techniques such as individually optimized ballast resistors on each of 34 emitters enabling the Hewlett Packard HXTR-5102 npn transistor to provide 450mW minimum at 4GHz and specified to withstand infinite vswr above 2GHz. Unfortunately, of course, all such high-performance devices tend to be costly for amateur applications.

Quick tips

"When you want to clean pc boards or copper connections such as those on antennas do not overlook the use of copper pan cleaners"—W6TFJ in *QST*.

"Boots now sell a glue that sticks perspex, usually a difficult sticking job. And dumbell cycle spanners usually fit all the commonly found nuts on antenna accessories"—G3PTU. □

4-2-70

Graham Knight, GM8FFX*

Repeater of the month—GB3SC

This month's *4-2-70* details the success story behind the latest vhf repeater to go on the air—GB3SC on ChR1. The new repeater came on the air on schedule at 0001gmt on Christmas eve and was almost immediately christened "Santa Claus" due to the festive season. In fact the call letters stand for "South Coast" thus indicating that the coverage area extends from Portsmouth to Weymouth along the coast and to Yeovil, Southampton and Salisbury. GB3SC was designed, built and is operated by the Dorset Repeater Group, which was founded in 1978 under the chairmanship of Graham Wood, G3VPC, for the specific purpose of obtaining a licence for a 144MHz repeater to provide a service in the area known as the Hampshire basin.

Located at Corpe Mullen, a very high location near Wimborne, GB3SC has a 2min time-out period. Access is by the usual 1,750Hz tone for 200ms followed by a 5s period during which the input deviation is tested for the minimum requirement of ±1·5kHz. In the event of insufficient input deviation the repeater goes into high deviation beacon mode. When the input transmission ceases, the GB3SC callsign is sent, followed by the letter D to inform the user of a deviation problem with his transmission. Time-out is indicated to users in a similar manner: the beacon mode callsign is again sent but the letter T is added to indicate that the user has exceeded the 2min time-out. All valid accesses are shown by the response of a "K". Transmissions with more than 5kHz deviation cause a soft attenuator to act on the audio and reduce the output deviation; this method does not affect the readability of the signal. Quick break operation is allowed for 2min without access tones, provided that each transmission is taken up before the "K". Tone re-access is only required after the end-of-transmission character has been sent.

On the technical side GB3SC is one of the few repeaters constructed from entirely purpose-designed modules. The present repeater receiver has a sensitivity of 0·18μV for 12dB SINAD and uses a very high grade i.f. filter circuit. The group plans to further improve the receiver, and a second design which will have even better sensitivity is already being developed. The Mk2 design will soon be tested by several group members at their home stations before being incorporated into the GB3SC system.

The transmitter section of the repeater uses an all-transistor line-up and has a special power output control line to reduce the output by 3dB. This feature allows the control system to conserve power while the repeater is operating on stand-by batteries during failures in the mains electricity supply. All the dc power required to operate the repeater is generated in the special power supply either by the mains or battery. Care has been taken to ensure that each supply line has both over and under voltage protection and that all the supplies are interlocked so that any single failure closes down the whole unit.

A single colinear antenna is employed at 300ft asl, and signals are fed to the repeater system via a duplexer comprising two sets of triple-cavity filters. The cavity outers are fabricated from mild steel, copper plated; the inner tuned lines and coupling loops are made from copper, but these are silver plated. Considerable effort was put into the construction of the cavities, as greater than 100dB isolation is required in each group of three. One particular problem, now virtually eliminated, is the positional stability of the inner line within the cavity.

The group designed the control system around a Z-80 microprocessor, and the program is stored in a 2708 eprom. The program was developed on a home computer which was itself used to control the repeater for the first few weeks of operation so that minor adjustments to the program could be made quickly. This illustrates one particular benefit of the microprocessor system, another is the low number of integrated circuits used—in this case only seven. It is hoped that the group will be able to modify the program to provide a signal strength report feature on the GB3SC transmission. G3VPC plans to provide this unique feature by digitizing the voltage on the agc line and, by referring this to a look-up table, to output a simple code on the repeater's signal. The group hopes to incorporate this feature soon, thus enabling users to evaluate the effects of changing power levels, antennas, and propagation conditions.

Repeaters are often put together from surplus commercial radio equipment requiring little in the way of modification for amateur use. It is therefore refreshing to be able to detail the achievements of a large group of people which has put an amateur-designed and constructed repeater on the air which incorporates so many up-to-the-minute features. The GB3SC engineering team included Graham Wood, G3VPC, control system; John Fell, G8MCP, cavities and cabinet; Steve Perkins, G4FPV, power supplies; Nick Foote, G8MCQ, the transmitter; Chris Down, G8MXW, the receiver; and Owen Cochran, G8OWZ, who constructed the analogue interface. Each of these individuals undertook the design and construction of particular modules, conferring with each other at regular project meetings which ensured that all the modules operated correctly and interfaced together.

The group is interested in seeking the views of GB3SC users, and an open meeting is to be held on the 7 March 1980 at the Dolphin Hotel, Holdenhurst Road, Bournemouth. The group secretary, G8MCP, of 5 Lynn Road, Canford Heath, Poole, can be contacted for further details, and the engineering team is willing to assist other repeater groups.

Artificial aurora

Geoff Grayer, G3NAQ, of Newbury, has passed on information he has received about the "Firewheel" satellite which it is hoped will release lithium to cause an artificial aurora. Dr Bryant, of the Appleton Laboratory, told G3NAQ that the "Firewheel" satellite is a joint European project with UK participants. It has been named the "Firewheel" because it releases four sub-satellites in order to measure spatial as well as time variations of the solar wind. Amateurs will be interested to know that it is intended to release a cloud of barium (near apogee) which should be visible as a comet-like object, and a cloud of lithium (near perigee) which should cause the aurora.

The "Firewheel" launch is scheduled as part of the payload on the European Space Agency Ariane Test Flight, along with AMSAT Phase 3A as detailed in *Radio Communication*

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September 1979. It is hoped that the launch will take place in May 1980, and further details will be given in future *4-2-70* pages.

Auroral reports

Very few auroras have been reported to *4-2-70*, and your scribe must confess to not having the usual auroral monitor receivers on for the last three months.

A reasonable aurora took place on the last day of 1979, when GM stations were able to work each other and to work stations in Norway and Sweden. The low activity level was probably due to all the GM stations celebrating hogmanay in the traditional manner. One GM operator, GM4DSZ, was celebrating the new year in a non-traditional manner—climbing in the Cairngorms. From his 3,000ft asl site GM4DSZ had a clear view of the hogmanay aurora, and he reports it was a fairly weak visual display. He did, however, see a much brighter aurora on the evening of 4 January 1980, and this display stayed bright with many arcs for two hours. GM4COK was active for this event, but contacts were again confined to the more usual nearer countries.

Meteor scatter

Dave Cox, G8OPR, of Andover in Hampshire, is a well-known operator on the amateur television frequencies, and more recently has been making a name for himself as a dx operator on the 144MHz band. During a talk given by your scribe at the SMC symposium, Dave heard tape recordings of sideband dx being worked via meteor scatter. Inspired by this he tried ssb ms during the first week of January and was pleasantly surprised at the ease with which he was able to work stations in France, Sweden and Germany. G8OPR comments on the high standard of operating during the showers, and wonders if all the operators have been studying the excellent guide to ms techniques published in the RSGB *Amateur Radio Operating Manual*.

George Szymanski, GM4COK, got back from his round-the-world travels and work as a ship's radio officer to keep a few schedules in the Quadrantids meteor shower. George found conditions poorer than last year, with generally lower levels of activity. He did, however, manage to complete several contacts on cw; the best being a QSO with IV3HWT which was completed in 57min. George comments on the lack of Russian stations on the vhf net seeking meteor scatter schedules.

Alistair Simpson, GM8NCM, of Kirkcaldy in Fife, has been checking out his computerized meteor scatter predictor program, which shows graphically the best times to try for ms contacts to different areas. GM8NCM will be demonstrating this new technique during the microprocessor talk at the RSGB National VHF Convention at the Winning Post, Twickenham, on 8 March. GM8NCM reports very strong ms signals from F1JG and SM3BIU during the January showers.

MUF experiments at Cheltenham, part 2

Last month's *4-2-70* detailed maximum usable frequency experiments being conducted by the G3SSO group at its Cheltenham headquarters. These experiments have been continued into the new year, with crossband to 50MHz contacts being established on 60 separate days in the period between 20 October 1979 and 13 January 1980.

Despite the problems associated with a rather noisy site and with having a three-element Yagi just 20ft above the ground, the G3SSO group has done very well in making contacts on so many days, while at the same time monitoring and collecting propagation information and looking for an opening on 70MHz. The G3SSO group has also been less active at weekends, leaving the field free to those operators who cannot get on the air during the week. The group has now given contacts to 425 separate stations in 40 USA states and seven countries.

The 70MHz tests have been carried out with VE1AVX whenever conditions looked marginally suitable, and the group is full of praise for VE1AVX for his co-operation, which, of necessity, took place when conditions on 50MHz were at a peak. The "Late news" item January's *4-2-70* said that G8KG, one of the operators at G3SSO, thought that the peak of Cycle 21 took place on 16 November 1979—in fact this letter was not written by G8KG. G8KG's forecast as to the date of the solar peak is in fact contained on page 59 of the same issue of *Radio Communication*. G8KG reports that Ken Ellis, G5KW, had the first crossband to 50MHz QSO in 1980.

Claimed firsts from OZ to UK

Ivan Stauning, OZ7IS, is well known to readers of these pages as the leader of the highly successful dxpedition which went to the Faeroe Islands. OZ7IS normally operates from home in Copenhagen, and says he is looking for G contacts on the 432MHz band during auroras—he keeps a close watch on 432·050MHz during events. He has also asked for the following list of claimed firsts to be published so that the IARU records can be checked. If any operator has a prior claim please send details to Jack Hum, G5UM, 27 Ingarsby Lane, Houghton on the Hill, Leicester.

56MHz	G2VH	to OZ7G	on 30 June 1947.
56MHz	GM8MJ	to OZ7G	on 24 May 1947.
144MHz	G3WW	to OZ2FR	on 1 June 1951.
144MHz	GI5AJ	to OZ5AB	on 3 December 1962.
144MHz	GC2TR	to OZ9OR	on 22 September 1965.
144MHz	GM5KW	to OZ2IZ	on 24 July 1954.
144MHz	GC3EBK	to OZ2FR	on 5 March 1953.
144MHz	GW5MQ	to OZ2FR	on 8 September 1951.
432MHz	G3JMA	to OZ9AC	on 3 December 1962.
432MHz	GD2HDZ	to OZ9SW	on 21 July 1972.
432MHz	GM3FYB	to OZ7SP	on 10 November 1964.
432MHz	GW8AWS	to OZ9PZ	on 26 October 1975.

Supreme Award holders

We give below the list of Supreme Award holders. This award is undoubtably difficult to obtain, but the following 30 stations form an exclusive club by virtue of their skill as vhf and uhf operators.

No 1, G3MCS,	1970.	No 11, G5UM,	1975.	No 21, G3OSS,	1978.
No 2, G5NU,	1972.	No 12, G3XBY,	1975.	No 22, G3CO,	1978.
No 3, G3ZYC,	1973.	No 13, G3JXN,	1976.	No 23, G8IL,	1978.
No 4, G3COJ,	1973.	No 14, G3EHM,	1976.	No 24, G4BYP,	1978.
No 5, G4BEL,	1973.	No 15, G3BW,	1976.	No 25, G3HCW,	1978.
No 6, G5DF,	1974.	No 16, G3OHC,	1976.	No 26, G3DY,	1978.
No 7, G3DAH,	1974.	No 17, G3FIJ,	1977.	No 27, G3SPJ,	1978.
No 8, G3ZMD,	1974.	No 18, G4AGE,	1977.	No 28, G4ERX,	1979.
No 9, G3NHE,	1974.	No 19, G8GP,	1977.	No 29, G6XM,	1979.
No 10, GD2HDZ,	1975.	No 20, G4CMT	1977.	No 30, G2AMV,	1979.

G3IMV earns a third "Squares Award"

John Hunter, G3IMV, of Bletchley in Buckinghamshire, holds the unique distinction of being the first member to claim three awards in the new QTH Squares categories. Just before Christmas he submitted a claim to the vhf awards manager for an "80 squares and 18 countries" sticker to add to the 60 plus 15 and 40 plus 10 which he had earned earlier in 1979. All these

contacts were made on the 144MHz band, and as if to show that one does not need to work the remoter parts of Europe to earn a new squares award, his latest claim includes such easily worked squares as XL and XM—these thanks to the appearance of GW4FJK and GW3JXN/A in west Wales. Of the 20 extra contacts made by G3IMV to attain his latest award, 12 were on cw and the other eight on ssb, with a mixture of meteor scatter, auroral and tropospheric propagation modes.

No member has yet submitted a claim for the 70 or 432MHz bands in respect of the QTH Squares Awards. Who will be the first operator to earn the No 1 certificate for these two bands? A copy of the QTH Squares Awards claim form may be obtained by sending a stamped addressed envelope to the vhf awards manager, G5UM, QTHR.

Amsterdam VHF DX Certificate

Stations in the UK who wish to obtain the Amsterdam VHF DX Certificate can claim from Herman Klijn, PO Box 9, 1000 AA Amsterdam, Netherlands. It is awarded to stations who can prove contacts with five members of the Amsterdam DX Club, or alternatively have made contact with Amsterdam stations which together add up to a distance exceeding 2,000km. QSL cards, or copies of the log book entries countersigned by two other amateurs, are acceptable as proof by the Amsterdam DX Club. Claims should be accompanied by the equivalent of $5, and the eventual profits will go to the Wildlife Fund.

South African eme

Last month *4-2-70* detailed how Gary Howarth, ZS6ASO, became the first South African station to be active on 144MHz moonbounce. Just a few days after having received the letter from ZS6ASO, your scribe was awakened by an early morning telephone which had a familiar sounding voice on the other end—it was Joe Ludlow, ex GW3ZTH and now ZS5ZY. He was calling to say there were now two South African stations on eme and that he was on the air and had worked to Wales with an eme contact with Dave Price, GW4CQT. Joe had also had a contact with K1WHS in America. He is running a GW3ZTH designed linear with a pair of 4CX250Bs and Cushcraft Yagi antennas. The same type of antenna is also in use by K1WHS who has a 240-el moonbounce array. With two stations now active on moonbounce from South Africa there will no doubt be many more stations attempting Worked All Continents Awards on the 144MHz band.

50MHz studies

The last few issues of *4-2-70* have quite rightly devoted a great deal of space to reporting and commenting on the recent openings on the 50MHz band. The observations made by John Branegan, GM4IHJ, were detailed in the January issue, and the Cheltenham experiments were reported in February. Alan Clemmetsen, G3VZJ, of Reading, has made a very close study of a single 10-day period between 7 and 16 December 1979. His observations were made in a meticulous manner, and some of his conclusions are very thought provoking. As there is little likelihood of similar studies being made on 50MHz until the 'nineties we again devote a large amount of space to recording amateur experiments on this most interesting vhf band.

G3VZJ completed 140 crossband to 50MHz contacts in the 10-day period, working stations in 36 USA states. G3VZJ subsequently made an analysis of the average and peak signal strengths received from each state. He found the strongest and most consistent signals were received from VE1AVX and VE1ASJ—a distance of approximately 5,000km from the UK, corresponding to a single-hop ionospheric reflection.

This result on the closest stations was expected by G3VZJ, and the lower signals received from stations further afield from New York to California were also as G3VZJ expected.

G3VZJ also noted that signals from a band of territory about 7,000km radius consistently yielded very high strengths in the UK. This band starts in the Virgin Islands and runs through Puerto Rico, Florida, Mississippi, Louisiana, Texas, Oklahoma, Arkansas, New Mexico, Kansas to North and South Dakota. In addition, sometimes only very low power was needed to work from this belt to the UK. On 13 December, K0GJX was 5-and-3 in the UK, running just 3W to a halo antenna. G3VZJ did not expect these very strong signals from this area. His observations show that there was consistently good propagation from 5,000km to the UK, then something of a skip zone, and then good propagation from an area 7,000 to 8,000km from the UK. In his book *Short Wave Radio and the Ionosphere*, T. W. Bennington states that there should be no apparent skip zone with normal multi-hop propagation.

The distance involved is very similar to that involved with the te mode of propagation as described by W1JR in *QST* October 1978. This requires two ionospheric tilts—one at each end of the path to produce a "chordal hop" propagation mode. At the times when G3VZJ made his studies, ionospheric tilts could have been possible—one at each end of the path—due to the 40/50MHz muf contour moving between the UK and North America as the earth rotates.

G3VZJ feels that this would result in the very low path losses over the distance of around 7,000km, and this would tie in with his results which indicated that this mode starts with propagation to the Virgin Islands and Puerto Rico at about 1200gmt and moves around to North and South Dakota at about 1600gmt. Both ends of the path were only open on the best days, but the paths to Texas and Florida were open on all the observed days. G3VZJ thinks that the above explanation of this 7,000km path on 50MHz ties in with one of the statements in W1JR's *QST* article which says: "This allows higher frequencies to be propagated, typically 1·5 times the daytime maximum usable frequency." G3VZJ concludes that until now attempts at a transatlantic 70MHz QSO have been directed at the path between the UK and VE1 (single hop). He thinks that there might be a better chance of achieving a 70MHz contact by trying between a UK station and another operator in Texas or Florida.

50MHz still open

The 50MHz band continues to be open for crossband contacts between UK stations operating around 28·885MHz and North American stations around 50·1MHz. Willie Lowe, GM8NSU, recently purchased a Microwave Modules 50MHz converter and he was surprised to be able to copy states-side signals for over four hours on 9 January—especially as he was just using his 144MHz indoor beam as the antenna. The loudest station he heard was VE1AVX, who was 5-and-9 on this non-resonant antenna system.

EI2W has been doing extremely well with his special licence which allows him to transmit ssb signals on the band. Arthur Latham, EI6AS, in Dublin, has also now obtained a special permit to actually operate on 50MHz. Another newcomer who is able to operate on the band is TF3SG in Iceland, who has received permission to operate between 50·0MHz and 50·2MHz.

The openings on 50MHz have certainly inspired many European operators to conduct propagation experiments, and your scribe would like to take this opportunity to thank EI2W, G3WBQ, G3FXB, G8KG and GM4IHJ for sending detailed analyses of their results for publication in *4-2-70.*

Operation from OS7EH

Mike Speleir, ON7EH, had a great time operating on vhf with the special callsign OS7EH, often working large pile-ups of stations all anxious to log the OS prefix. Mike is the 18-year-old son of ON5SP and the grandson of EA5ASN, so dxing runs in the family. As OS7EH, Mike managed to work 352 G stations and GJ, GM, GW and GU operators. In all, 18 countries were worked with the special prefix, and those operators requiring a QSL card should write to OS7EH at BL Inkomststr 79, B-1830 Machelen, Belgium.

Now that he is back to normal with his ON7EH call, Mike Spelier is looking for schedules with stations who need to work the CK QTH locator. ON7EH also hopes to be able to operate from QTH locator square AY during the summer, and this should prove to be very popular with all the QTH square hunters.

New *Es* theory

Geoff Brown, GJ4ICD, of St Saviour, Jersey, together with F8SH and F8OP, has come up with a new theory to explain sporadic-E vhf propagation. They have spent many hours studying Meteostat satellite photographs taken on days when *Es* occurred and which were supplied by Dundee University. The unusual *Es* opening which took place early in January and enabled many French stations to contact operators in Russia on the 144MHz band was studied in great detail. GJ4ICD and his colleagues believe that *Es* openings occur shortly after meteor showers, but only when this is combined with special weather conditions. A full explanation of the new theory will appear in next month's *4-2-70.*

432MHz reports

Ian Gordon, G8IFT, of Rubery in Birmingham, took one look at the BBC Television weathermap on the night of 13 January and immediately rushed to the rig to find the 144MHz and 432MHz bands wide open. The map had indicated an area of high pressure (1,044mb) centred over Belgium and Denmark, and stations from that general area were working from Southend to the Midlands. G8IFT's best dx contacts were on ssb with OZ9FW in GP31b square, and with OZ7IS in GP22j —a distance of 1,002km.

Barry Titmarsh, GM8SAU, in Benbecula, who gave many operators their first 144MHz contacts with the Outer Hebrides, has been building a linear amplifier for the 432MHz band. Last year GM8SAU operated portable from St Kilda, and he promises to be active from the island again in August, but this time on 432MHz. Many UK and Continental operators will be on the lookout for GM8SAU/P from the extremely rare locator square of VR18g.

Grapevine

Those members keeping auroral warning calendars as detailed in the *Amateur Radio Operating Manual* were not surprised when the auroras of 31 December and 1 January repeated 27 days later on 26 and 27 January; another aurora occurred on 13 January, and during these events GM8MBP reports very strong signals from GM8PEV and GM3JIJ, who are both located on the Isle of Skye. Other popular stations during the events were GM4FZH in YS square, GM4ILS in Elgin and GM4IAO in Huntly . . . G8OPR continues to have great success with meteor scatter, working LA3WU in 45min, YU4TN (GK square) in 12min and OE5KE in 26min; all on ssb . . . Hardware for the proposed GB3SB vhf repeater now completed and undergoing continuous tests . . . Large-scale tropo openings on 144 and 432MHz on 28 and 29 January with G8BHH working many PA0, DL and ON stations on the higher band . . . During the sporadic-E opening on 5 January ON7EH worked RA3YCR in square RN5LF with 5-and-9 reports being exchanged. RA3YCR also worked F1CXW(D1) during this unusually early sporadic-E opening . . . G4IGZ has also been active on ms from home in Nelson, Lancs, and has been preparing for his next visit to Andorra in the summer; callsign will be C31SY, and schedules can be arranged by writing to G4IGZ, QTHR. □

BOOK REVIEW

Es stand in der CQ-DL, Vol 2. Published by DARC, Verlag, Postfach 1155, 3507 Baunatal, West Germany. 116pp. Price DM9.

One of the features of *CQ-DL,* the monthly journal of DARC, the West German national society, are the test reports on amateur equipment compiled by Gunter Schwarzbeck, DL1BU. A number of these comprehensive reports have now been published in Vol 2 of the series *Es stand in der CQ-DL,* including more than 20 test reports on equipment such as the TS820, IC211E, FT901 and IC701.

OSCAR The Ham Radio Satellites by Dave Ingram, K4TWJ. Published by Tab Books, USA (No 1120). Paperback, 140 pages, size 8¼ by 5in. Price $4.95.

This book sets out to describe the practical side of satellite operation rather than dealing with the technical aspect of such matters as orbital determination. Chapter headings are: *Introduction to Satellite Communication; The Fun of Satellite Operations; The Satellites; Setting Up Your Oscar Earth Station; In's and Out's of Satellite Operation; Satellite Tracking Simplified,* and *Satellite Equipment.* At the end of the book there is a 35-page section comprising glossary and useful appendices.

The text reproduction is satisfactory but a number of the photographs are of very poor quality. Naturally the book is USA oriented, particularly the final chapter. Although it does not describe any new techniques, the book brings together a useful amount of information concerning satellite operation.

microwaves

Charles Suckling, G3WDG *

Tropo opening on 10GHz

What is probably the first real recorded example of tropospheric ducting on 10GHz occurred during the lift in early December. Prompted by the excellent conditions prevalent on the lower bands on 6 December, GW3PPF went out portable to a site 5km north-west of Cardiff to check for all the UK 10GHz beacons. Nothing was heard from GB3LEX, GB3LBH, GB3SWH, but a good signal was obtained from GB3ALD, 215km away on Alderney. This constitutes a new beacon record on 10GHz, but of greater significance is the fact that the path was over both sea and land, meaning that the lift could not have been due to super-refraction, but to true tropospheric ducting.

GW3PPF had also checked for the beacons during the previous lift on 27–28 November, but on that occasion no signals were heard. Over a shorter path, however, good conditions on 10GHz were experienced by G2DSP, who was also checking for GB3ALD during the lift. Operating portable from the seafront at Bognor Regis, he received a very strong signal from the beacon, stronger than anything heard during the summer super-refraction season.

Both stations were using wideband equipment, with a 4ft dish at GW3PPF/P, and a 22dB horn at G2DSP/P. The observation of such lifts in conditions on 10GHz is very encouraging, as it suggests that paths which would normally be considered impossible with wideband equipment may in fact be workable from time to time. Thus it is always worth trying a path which would not normally be expected to work!

1980 10GHz Cumulative Contest dates

The dates for the 1980 10GHz cumulative contests will be as follows: 18 May, 22 June, 20 July, 24 August and 21 September. No major changes in the rules for this event are envisaged.

Microwave awards

Following the recent announcement of the Microwave QTH Squares award, the vhf awards manager has been very busy issuing certificates.

The first awards to be ratified were all for the 10GHz/5 category and went, in order, to G8GKV/P, G8BDJ/P, G3KSU/P, G3JHM/P, G8PMT/P, G4CNV/P, GW3YGF/P, G3ZME/P, F6DLA/P and BRS40670/P.

To work five different QTH squares from one site on 10GHz represents a considerable operating achievement, and these stations are congratulated on achieving this. The efforts of Dave Hall, BRS40670, of the Telford group, should be specially recognized, as he is the first swl to receive a Microwave QTH Squares Award. Hopefully his will not be the last swl claim—the writer is certain that at least one listener must have already qualified for a 1·3GHz award!

*31 Oakwood Road, Chandler's Ford, Hants SO5 1LW.

1·3/2·3/3·4GHz activity

The late November lift provided the opportunity for a number of good dx contacts on the lower microwave bands. G3ZEZ (Clacton-on-Sea) reports 13 QSOs into Germany and five into Holland, plus one G and one ON on 1·3GHz, while on 2·3GHz three German and three Dutch stations were worked. A 5-5 report was also received from OZ1ABE (GP square) on 1·3GHz, but unfortunately a two-way contact could not be made. On 1·3GHz G3ZEZ is using a 4ft dish with dipole and reflector feed, a homebuilt 2C39 transverter (1152 + 144MHz) driving a pair of 2C39s running 200W p.e.p. input. On receive an interdigital converter with BFR90 preamplifier is in use. The 2·3GHz equipment also uses a 4ft dish, and the transmitter generates 8W of ssb from a 2C39A. Another amplifier which is under construction will, it is hoped, deliver 25W output.

G4BYV (Dereham) was also active during the lift on 2·3 and 3·4GHz. He reports making over 20 QSOs on 2·3GHz into the Continent. In addition very strong signals from both the GB3LDN beacon and from G8ADC (Luton) were copied. On 3·4GHz, G4BYV made his first-ever contact on this band with G3LQR, thus giving G3LQR his first G QSO on 3·4GHz! G4BYV's 3·4GHz equipment consists of a BXY28 tripler driven with 5W at 1,152MHz, an interdigital converter and a 4ft dish antenna fed by a DC3QS dual-band 2·3/3·4GHz feed horn. G4BYV also notes that his 1·3 and 2·3GHz receivers now benefit from NE64535 transistor preamplifiers, which are giving excellent results.

During another spell of good conditions on 13 January, G8IFT (Birmingham) worked a number of dx stations on 1·3GHz using 15W of fm to a single G3JVL loop-Yagi. Six stations were worked over the 600km mark, the best dx being DK3UC in FN14a at 863km. He also notes his preference for the old counties plus countries award on 1·3GHz, which is still being continued, in addition to the new QTH squares award.

Further modifications to the G4COM receiver alignment aid

The value of an automatic alignment aid for setting up microwave receivers was emphasized recently in *Microwaves* (October 1979). Also discussed were some modifications carried out by the writer to enable the use of more powerful noise sources. Recently G3YGF has improved the design further, and his modifications are described below.

Sometimes difficulties have been encountered with the meter reading not being independent of audio drive level. This can be just a matter of incorrect use, as described previously, or it can arise when the alignment aid is used in conjunction with receivers possessing certain audio frequency responses. A cure for this is to change the interstage coupling components R4, R5 and C1 (these designations refer to the original article in January 1976) for those shown in Fig 1.

Two minor modifications may improve the performance of the logging circuit slightly. These are the replacement of R6 by

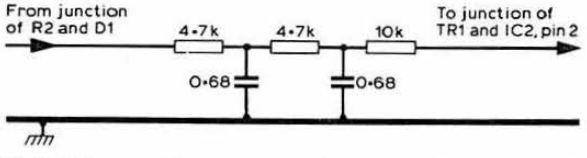


Fig 1. An improved interstage coupling network between IC1 and IC2

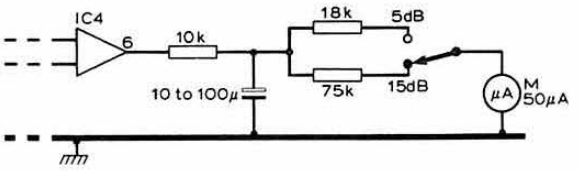


Fig 2. Modified meter circuitry

a short-circuit, and the reduction in value of C2 to 25μF. This latter modification reduces the time taken for the meter to return to its correct indication whenever the system gain is altered.

As suggested by G4COM, it is possible to reduce the fluctuations of the meter by using 50μA meter and a different time constant. G3YGF's circuit for this is shown in Fig 2, and includes a switch to set the full-scale deflection of the meter to correspond to either a 5 or 15dB noise-source-on to noise-source-off ratio. The fluctuations can also be reduced if a wider receiver bandwidth is used, but G3YGF warns that some receivers do not possess audio bandwidths as great as their i.f. bandwidths, under which circumstances little or no improvement is obtained by increasing the i.f. bandwidth.

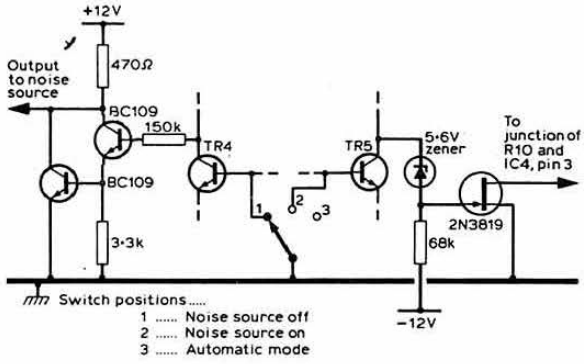


Fig 3. Additional circuitry to provide a higher output voltage for noise source, and with provision for switching noise source manually

Some noise sources require the use of a higher drive voltage than that available from the G4COM device. A neater solution to that proposed by the writer involves only two extra transistors, and is shown in Fig 3. This circuit will directly drive both the noise sources described in *Microwaves* (October 1979). Also shown are the use of a fet in place of the bipolar originally used as the switching element in the synchronous detector, and a three-position switch to allow either automatic or manual switching of the noise source.

The importance of impedance matching in stacked antenna arrays

When several antennas are stacked to achieve higher gain, as is often done with Yagi antennas on the lower microwave bands, it is very important to ensure that, if the theoretical increase in gain due to stacking is to be achieved, their impedances are all matched very closely. G3YGF has performed some calculations

Table 1

VSWR	Max Z/min Z	Power split ratio	Worst case stacking gain (dB)
1	50	1	3
1·1	55/45	1·2	2·6
1·2	60/42	1·5	2·2
1·5	75/33	2·25	1·6
2	100/25	4	1·0
3	150/17	9	0·5

to show by how much the stacking gain can be reduced when antennas of differing impedances are combined. His argument is as follows.

Assuming that an antenna has a given vswr, its impedance can be anywhere within the range $(vswr)^2$:1, eg an antenna with a vswr of 2:1 on a 50Ω line could have an impedance of 25-100Ω. When the two antennas are connected in parallel, as they are when they are stacked, the power fed to them splits between the two antennas in inverse proportion to their impedances. In the above case the 25Ω antenna will receive four times as much power as the 100Ω antenna. This will result in lower gain than expected, because the power has not divided equally. Table 1 shows how the stacking gain for two antennas varies with their vswr, assuming worst-case condition for the antenna impedances. Note that no power is actually lost in either of the antennas. All that happens as the mismatch between the antennas becomes worse is that the gain and radiation pattern of the array just tends to that of one antenna.

It can be seen from the table that even quite small vswrs can seriously degrade the stacking gain, and that for near optimum results the antenna should possess vswrs of better than 1·1:1. The actual reference for the vswr measurement is less critical—it could be anywhere around 30–70Ω, since the vswr of the array as a whole can be largely compensated for in the preamplifier and the transmitter tuning. The important criterion is the relative vswrs of the two antennas.

These arguments apply equally to arrays with more than one antenna, but with a larger number of antennas each has proportionally less effect on the overall gain increase.

Thus stations interested in achieving the best possible performance from arrays of stacked antennas would be strongly advised to measure and adjust the antennas individually before constructing the array.

Waveguide loads

Last month a matched load for 24GHz designed by G4CNV was described. He has recently investigated the use of conductive foam as the absorbing material, with excellent results. This foam is commonly used for packing cmos integrated circuits, and is black in colour.

Several loads were made by trimming the material to the shape described last month, and their vswr was measured at 24GHz. In all cases the loads measured better than 1·03:1, a slightly better result than that obtained using a load made of wood. The power dissipation of the foam loads will be less than that of wooden loads, but is adequate to handle the output from small Gunn oscillators, such as the Plessey GD033.

More 1·3GHz moonbounce activity

Another station has recently become active on 1·3GHz eme. He is VE7BBG, well known for his pioneering work on 432MHz eme. His equipment consists of a 20ft dish with a

circularly-polarized W21MU feed-horn, a UPX-4 type final using six 3CX100A5 tubes in parallel delivering 400–500W output, and a low-noise gasfet preamplifier. Initially very weak echoes were received with only 50W at the feed, but contacts with other stations were not possible at that level. With the new final, however, several contacts have recently been made, with PA0SSB.

Some faster growth in 1·3GHz eme activity now seems imminent, with OZ9CR reporting that he has now shipped 12 of his UPX-4 amplifier kits. LX1DB is now active again on 1·3GHz eme, with the facility to operate both 432MHz and 1·3GHz eme simultaneously with the same dish! Perhaps we may soon see the day of some crossband eme tests.

Photo feature

It is intended to include photographs of interesting microwave equipment from time to time to illustrate different techniques and to act as a source of ideas to others. So if readers have any interesting photographs of microwave equipment/operating etc, please send them to the writer, preferably with a short commentary.

G8AGN's portable 10GHz equipment

This month the G8AGN 10GHz portable system is featured. Of interest is the well-engineered homebuilt wooden tripod structure for the equipment. One of the problems with tripod-mounted equipment is that the tripod can easily be blown over in windy weather; a large base area is essential and very frequently it is necessary to anchor the legs with stakes or heavy objects. The limit of size of antenna that can safely be mounted on a normal tripod is about 18in, as used in the G8AGN system. The rest of the G8AGN equipment shown consists of a Gunn oscillator with a directional coupler-based receiver/transmitter arrangement. □

swl news

Bob Treacher, BRS32525 *

The tables

As the rules for the 1980 hf countries table were published last month, we are looking for a bumper number of entries this year. If sufficient entries arrive in time, the first 1980 table will appear in the April issue.

Last year's table was headed by Dave Whitaker, BRS25429, with a record total of 952; close behind were Keith Kerr, BRS35943, with 944, and Paul Tittensor, A8808, with 900. Any listener with a total of over 500 during 1979 has automatically been listed in the all-time table. One important change in the all-time table is the appearance of G3KMA's figures. Your scribe met him at the RSGB AGM in December last year, and he expressed an interest in comparing the top swl's scores with those of active dxers. The idea is certainly acceptable, and it is hoped that other active hf transmitting members might supply their figures as both a comparison with G3KMA's totals, and as a comparison with those of more active listeners. Your scribe can think of half-a-dozen active hf members whose totals would match those of G3KMA. The all-time list will next appear in the June issue.

G3KMA offered an acceptable argument on the merits of ssb and cw. Most swls are ssb only, and some believe the myth that "it all happens on ssb"; perhaps figures do show that ssb does have an edge, but nowhere near the margin often believed. He suggests that, on the hf bands, for every 10 countries which appear on ssb, nine will appear on cw. This suggests that in terms of overall performance the swl/amateur who uses both modes will normally have a marked advantage over the single-mode person, all other things (time on the air, equipment and operating skill) being equal.

3·5MHz

Conditions this year, up to the time of writing, have proved to be quite favourable but still not up to those experienced in 1977 and 1978. It seems unlikely that anyone managed DXCC on 3·5MHz during January, as there did not seem to be the early morning activity from the Caribbean area, which can account for 30 countries on its own. Although many W and VE signals were audible during the short path propagation in the mornings, the ultimate is to hear the American west coast long path during the afternoons. Several reported hearing AD6C, N2KK/6, W6RR, W7FU and W7AQB regularly, with their signals peaking at around 1550. VE7CC was also reported at 1605. As well as these west coast signals, other dx was audible from 1500 to 1800. VS6DO at 1524; JA2NOW, JA3HYF, JA4CQS, JA6BSM and JA6IEF between 1530 and 1600; ZL1BIL, ZL1BOQ, ZL2BGJ, ZL2BT, ZL4BO and ZL4KE between 1605 and 1745; AP2MQ 1720, UK9CAA 1700, ZS5LB 1710 and 4X4VE at 1610. These stations were the only ones reported in G-land, but the Scandinavians were heard working KC6IN on the Carolines at 1415, but this was far too early for G-land.

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

1979 hf countries table—final placings

Station	28	21	14	7	3·5	1·8	Total	Mode
BRS25429	202	227	257	124	110	32	952	ssb
BRS35943/GM	201	220	242	132	128	21	944	ssb
A8808	201	225	262	48	124	40	900	ssb
BRS25901	176	210	246	98	86	17	833	ssb
ARS8841	166	188	256	87	100	12	809	ssb/cw
RS41426	161	163	145	87	104	28	688	ssb/cw
ARS42604	121	167	111	65	43	8	515	ssb
ARS41386/GJ	129	146	140	53	38	5	511	ssb
A9191	82	116	162	65	51	9	485	ssb
BRS40293	90	75	136	51	42	7	401	ssb
BRS20185	100	83	116	36	23	1	359	ssb
BRS40634	92	125	107	15	12	0	351	ssb
BRS34740	86	94	81	33	38	7	339	ssb
BRS40814	70	70	114	47	31	2	334	ssb
BRS40705	96	79	76	40	22	1	314	ssb
BRS41333	77	106	56	19	44	2	304	ssb
BRS39161	59	78	126	18	19	2	302	ssb
A9107	97	43	88	29	33	2	292	ssb
BRS41136	78	75	79	27	17	0	276	ssb/cw
ARS39784	77	57	83	26	23	2	268	ssb
BRS35121	28	53	113	24	38	7	263	ssb/cw
ARS41554/GM	40	73	67	31	34	4	252	ssb
BRS18529	32	52	111	4	33	16	248	ssb
BRS40292/GU	45	61	76	26	33	2	243	ssb
ARS40745/GM	26	40	94	19	22	0	201	ssb/cw
RS27421	0	41	102	24	21	1	189	ssb
ARS40133	41	49	56	18	17	0	181	ssb

All-time countries list

(starting score 500)

Station	28	21	14	7	3·5	1·8	Total	Mode
BRS17567	265	304	349	163	224	33	1338	ssb/cw
BRS25429	247	291	322	214	217	45	1336	ssb
G3KMA	278	306	314	224	159	36	1317	ssb/cw
BRS32525	239	283	306	202	236	37	1303	ssb
BRS25901	220	280	312	182	189	22	1205	ssb
BRS35943	209	267	294	191	213	28	1202	ssb
A8808	209	244	276	127	149	42	1047	ssb
A8841	194	235	296	115	144	12	996	ssb/cw
A9191	144	187	232	72	95	11	731	ssb
ARS41426	161	163	145	87	104	28	688	ssb/cw
BRS20185	135	136	192	35	44	6	549	ssb
ARS42604	121	167	111	65	43	8	515	ssb
ARS41386/GJ	129	146	140	53	38	5	511	ssb

Later in the evenings dx was audible from the Far East and Africa, and very early one morning 4U1UN was heard—a very rare one on this band. N2KK may have provided a few new ones from Africa by the time this is read.

7MHz dx

In your scribe's opinion 7MHz was a better band for dx over the same period. In the mornings dx was audible until 1000, including W6 and W7 peaking 5-and-9, KH6 and KL7, and South Americans. During the late afternoons from 1600 to 1830 many surprises were in store on ssb, including AP2KS, FK8CR, HM1QD, JA9UX, JD1YAA, OD5MR, UK8JAR, VU2DPK, YC1BMI, ZS4PB, ZS6WN/ZS3, ZL1BIL, ZL4BO, 3V8AA, 4X4VE, 5T5CJ, 5Z4YV and 6W8DY.

Hopefully this apparent increase in 7MHz ssb activity will be maintained, as many dxers chasing 5BDXCC must still require contacts on this band more than on any other. Some of the rarer European countries were also active, namely HB0, JW5, JX9, FC, GD, TF and IS0. However, nearly every dx station working the band commented on the apparent lack of stations in GJ and GU interested in working dx. Perhaps they are too busy working the dx on 28, 21 and 14MHz.

The mailbag

Philip Aliband, ARS42876, who uses an FRG7, wrote for the first time and queried the letters "slp" which occur from time to time in these pages. They refer to a set listening period, a period of time allocated on various occasions during the year at which to listen on a certain band. Also queried were the locations of S79MC, WA1SQB/HC8 and HL9KE; in order, they are Seychelles Is, Galapagos Is and Korea.

Eric Spear, whose brother is G3SSQ, also wrote for the first time, and he too uses an FRG7, with a long wire. He has received a number of awards, including the Worked British Commonwealth and IARU Region 1 awards.

Ken Sketheway, BRS20185, reported that he had received his 100th country confirmation in the shape of GM3NJF and VP8NY (courtesy of Robert Small, ARS8841). Robert wrote from yet a new location in Suffolk, and his receiving set-up seems to work to an acceptable level wherever he moves! He reports T3LA, K7ZGW/3C1, D68AM, C21AA, D4CBS/J5 and TZ4AQS (very speedy QSL via ON6BC). The best of his QSL returns were 3V8ONU, KM6FC, 3B8DU and 5R8TV.

Mark Mullins, ARS42604, has rocketed quickly up the table, and perhaps he will challenge the more regular contributors near the top this year. He managed many new countries on 21MHz, thanks mainly to WB8ZJW's DX-DX net which meets on Mondays, Wednesdays and Fridays on 21,280kHz at 1700. Another net to watch for is W2LTP's Triple-H net which seems to meet daily at 0800 on 7,245kHz. Many W states, plus KH6 and KL7, can be heard.

The main dx trip to be reported this time is that to Palmyra Is/Kingman Reef. From what your scribe has heard it had much to contend with (see *MOTA)*. Nevertheless the trip was a success, and the group must be congratulated for sticking to its task in spite of all the ordeals faced. Keith Kerr, BRS35943, reported the group's signals as barely audible on 28MHz from KH5. Others reported KH5 on 21 and 14MHz at good strength, both long and short path, while KH5K was good copy on 14MHz and, according to G3ZAY, on 21MHz, in the DX-DX net around 1745.

G3ZAY also mentioned the N2KK trip. He had a landline QSO with K5CO who informed him that N2KK was due in J28 in early February. Activity was then scheduled from ST2 before K5CO joined him to go to FR7, FR7/T: FR7/G and FR7/J. Rumours suggest that activity was also likely from FH8 and D68 with the possibility of further stops in 3B8, 3B9 and 5R8.

Paul Corrigan, BRS35121, is now G8TJS, but is still combing the hf bands looking for countries as an swl. John Doughty, BRS40705 has been spending much time on the Worked All Britain frequencies around 3,760 and 7,060kHz.

G4HYD wrote complimenting Nick Bainbridge, BRS32388, on "one of the most useful swl reports" he or any of his locals had seen. This is not the first time that your scribe has heard favourable comments about Nick's reporting. He takes a great deal of time over each report, which includes a graph of readability and signal strength over a 15min period. Nick's report on G4HYD/VP9's signals was much appreciated. G4HYD also compliments the VP9s he met; they made him feel like an honoured guest and turned a routine business trip into an experience never to be forgotten. If anyone heard G4HYD between 27 and 29 September 1979, he will be pleased to confirm the report; he is QTHR.

Dave Whitaker and Keith Kerr reported hearing 273 and 264 different countries respectively during 1979, which shows just how good the bands were last year.

Apologies to those who do not get a mention this time. Remember, it is the news and comments you provide that form the bulk of this piece—so please keep putting pen to paper; and remember your scores for the 1980 table: next deadline 24 March 1980. □

the month on the air

John Allaway, G3FKM*

THE Kingman Reef and Palmyra Is expedition was plagued by a number of misfortunes, which included physical injury to several of those taking part. Jan Gould, WA6YQW, received multiple fractures when the aircraft crash-landed on Palmyra, and it will be many weeks before she leaves hospital. What a pity then that when WA2FIJ/KH5K and K6LPL/KH5 appeared on the bands they should have been greeted with such an abysmal display of bad operating. The chit-chat and abuse heard on the expedition ssb frequencies made many believe that the current code of practice of a small minority of hf operators has now gone beyond acceptance. The use of the transceive mode on ssb seems to be the most potent cause of trouble, and your scribe is tempted to think that if split-frequency operation is not possible major expeditions should remain on cw as much as possible in order to make more contacts. Fortunately behaviour in the cw parts of the bands has a long way to go to sink to the level of that in the phone sections.

Some trouble is being experienced at RSGB HQ as a result of requests by members for log sheets and cover sheets for Society contests. There are two distinct types available, and it really is important to say which is needed—for hf contests, log sheets are Form HFC1 and summary/cover sheets Form HFC2.

GW4GNY reports that the club callsign of the Powys ARC, GW4HVN, is being pirated. With one exception the real GW4HVN has only been active on Thursday evenings, and the club would like to receive details of any suspect contacts.

Readers requiring ircs may obtain a supply from G3KDB (Box 73, Lichfield, Staffs) price 15p each. Please order in multiples of 10 and enclose sase.

DX news

TJ1GC, Guy, is often to be found on 14,215kHz talking to N1ACW from about 2030. Mauretania has recently produced 5T5JD who seems to favour 14,220kHz after 2200, and 5T5AY who is on the air at the same time but near 14,240 or 21,280kHz.

F9UW, Christian, is in Monaco and should be heard using the callsign F9UW/3A or 3A0FY, most likely between 0430 and 0730 on 14,205kHz or from 1400 to 1700 on 21,275kHz or 28,505kHz. *Long Skip* says that Prince Albert of Monaco is licensed as 3A1A and has been on the air for eight months.

Stations currently active from Turkey include TA1HY, TA1KD, TA1MB, TA1MD, TA1SU, TA1ZB, TA2BAV, TA2DX, TA2SO and TA2TAT. TA1 is European Turkey and TA2 the Asiatic part.

ET3PG, claiming to be at PO Box 21321, Addis Ababa, has been worked on 21MHz ssb. J28AZ was due to visit Ethiopia and hoped to obtain operating permission. XT3AA is a Belgian and has been heard mostly on 21MHz ssb. Two other Belgians are currently in Burundi and hoping for licences.

*10 Knightlow Road, Birmingham B17 8QB.

KL7JEF (Mary) who has been nominated "1·8MHz dx yl of 1979" by W1BB. With her 660ft-long wire antenna she worked 5W1BZ for her first QSO. (A W1BB 1·8MHz photo/news item)

Anyone who would like a contact with India on 3·5MHz might try looking for VU2BX or VU2DPK after 2000 in the area between 3,890 and 3,900kHz. VU2AX, who was AC4AX in Tibet many years ago (and also operated from AC3 and AC5 in the early 'sixties), suggests that it would be possible for him to go to the Laccadive Is if suitable equipment could be loaned. VQ9KK, on Chagos, is being worked on the low end of the 3·5 and 7MHz bands—two frequencies have been mentioned in the USA bulletins: 3,518 and 7,007kHz around 2330. VK0KH is the new operator on Macquarie Is and is sometimes on from 0730 around 14,212kHz.

There seems to be an increase in activity from the Sudan, and VE3BDV/ST2 has been putting a good signal into Europe on 14 and 28MHz ssb. DJ1US/ST3 has been worked on 7, 14 and 21MHz cw; he is located in Medani and should be there for some time yet. K5LBU is hoping to be on the air from Juba in the south of the country during April and should be there for several years. ST0RK QSLs should now be sent to DJ3ES who took over from DL7FT on 1 January.

A note has been received from Peter Pike, 9X5PP, in response to the mention of his activities in January *MOTA*. He is, of course, in Kigali, which is in Rwanda (not Burundi), and says that at 2000 he is more likely to be found on 14MHz.

Dxpeditions

A group of German amateurs from Bochum plans to be on Pantellaria Is (IH9) from 1200 on 1 April until 2400 on 8 April. Frequencies will be as follows: 3,625, 7,035, 14,035, 21,035 and 28,035kHz (cw), and 3,657, 7,077, 14,277, 21,377 and 28,577kHz (ssb). Callsigns will be DK6DG/IH9, DJ3DA/IH9, and DK4DC/IH9. Pantellaria Is is located in CQ Zone 33 (from which there is little activity) and ITU Zone 28. DB9PS/IH9, DD1DL/IH9 and DG4JS/IH9 will also be active on 144·035MHz cw and 144·277MHz ssb.

In a letter dated 4 January, Lloyd and Iris Colvin said that they were leaving St Lucia that day, and that they had made 9,000 contacts from J6LOO. In all, they worked 130 countries and were on all bands from 1·8 to 28MHz, cw and ssb. They also had 1·8MHz QSOs with all 10 USA districts—a feat they

have not performed before from that general area. While on the island they met J6LHV (a resident) and J6LIM (who is also VE2EWS) and helped them to repair equipment and get back on the air. The next planned stop was to be Martinique, but if no licence was ready they would go to Dominica, and in fact they have already been heard using the J7DBB call.

Not a dxpedition in the amateur radio sense, but of great interest to many is the rumour that the 12-man party which left Freemantle on 29 February for Heard Is has an amateur with it. The group will be there for three weeks and also visit Macdonald Is.

News from overseas

Robin Francis, G3RWU, arrived in the Cook Is at the end of last year and is licensed as ZK1AC. His equipment has arrived and he should be on the air by now from a location which has a very good take-off for Europe on the short path (it faces north) but which has mountains in the other direction. Look for Robin mostly in the bottom 15kHz of the cw bands.

Ken Cutler, who was A4XFP and A4XFP/DL, has returned home to England and is G4JBT. He was in Oman for five years, during some of which he was the hon secretary of the Royal Omani ARS. QSL cards for his overseas calls should be sent to the address in "QTH Corner".

Vin Callaghan, G3JMH, reports that the number of QSOs he has made with Bill and Sybil Stevens (ZD7SD and ZD7SS) now exceeds 200. They began on 27 May 1977, and most of them have lasted for more than an hour—they have included the time when Jamestown, the town in which Sybil and Bill live, had to be evacuated because a 40-ton boulder was threatening to crash onto it! There is no airstrip on St Helena and their lifeline is the RMS *St Helena,* so QSLing is rather slow—but all contacts will be confirmed.

G3KVM spent most of the summer with VP5SDA (for whom he acts as QSL manager) travelling through Colombia, Panama and many Caribbean islands. Their aircraft crashed into the sea off Haiti and they spent several days under arrest on that island in conditions which reminded them of those in the Uganda of not long ago. After what amounted to an escape from Haiti they returned to VP5, and Paul arrived back in the UK in October minus most of his belongings, including many QSL cards to and from VP5SDA. Anyone contacting Sheldon, VP5SDA, who may be VP5SDA/HK1 by now, is asked to tell him that G3KVM looks for him every Sunday on 21,300kHz at 1730. Those still awaiting QSLs are asked to re-apply to G3KVM, who will rectify matters as soon as possible.

Top band

G3SZA has summarized this winter's conditions by saying that while the sunspot maximum seems to have reduced the number of normal openings on 1·8MHz, the frequency of "unusual" ones has increased. On many occasions the band has opened to the east, with UA9 and UA0 peaking up to S9 but then fading out before dawn with no real opening into the USA. The conventional dawn peak into the USA and Canada has almost disappeared, and has been replaced by a gradual build-up followed by a fade about an hour before dawn. Contacts have been possible on this path on most days, and on 27 January it was particularly good into W5 and W9 but appeared to be one-way. PA0HIP has applied for DXCC, and both GD4BEG and G3SZA are very near to having the coveted 100 QSLs. Some of the interesting dx noted on the band by G3SZA, G3LPS and G5MP was as follows: **0000** *UL7FAY;* **0100** *UL7GW, UA0WBD, PY1DMQ:* **0200** *PY1RO, UV9AX, UA9CID, 9H1BB, YV1OB;* **0300** *CO2FA;* **0400** *VE1BVL, VE1ZZ;* **0500** VP9BO, *KV4FZ;* **0600** *K8CC/HR1, EA9EU, N5NR, W6RW;* **0700** *K5GO, N5TP, W2EQS/9, W1-W5, W8, W9, W0, HP1XOJ;* **2000** *UD6DMR;* **2100** *VK6HD, UA9CKI.*

French amateurs overseas

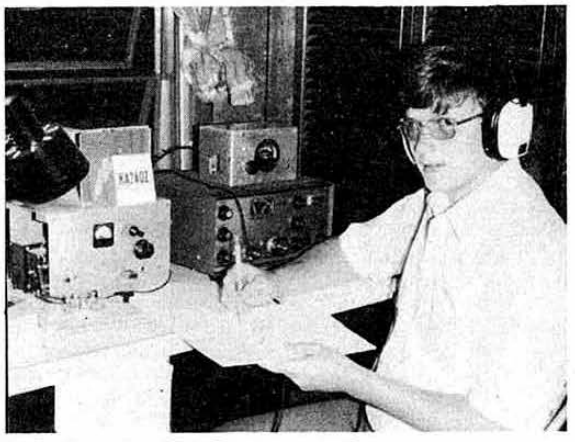
Michel Christ, XE1MD, who is himself French, is anxious to compile a list of French nationals who have licences in other countries. He would be very grateful to receive details, and hopes to publish a listing in the major magazines in due course. Please write to Dr Michel Christ, Cerrada Norena No 40, Mexico 19, DF, Mexico.

Welcome

During December the following overseas amateurs joined the Society: DF4NW, DJ4NF, EA7AKQ, EI2VGA, EI7AF, F2SD, HZ1TB, N9BN, PA0FOF, PA0RKT, TF5BWT, VE1BFZ, WA5HNK, WA5TBE, WA6SIX, W5UPR, ZL3DC, ZR6UU, 5B4GE, 5B4HN, 5B4PA, 9H1BX, and listening members P. Zaman (PA), A. Monteiro Grilo (CT), J. Hosty and C. J. Rowland (EI), J. Laib-Hoffmann (HB), B. Jonsson (TF), and K. Smyth and M. Jones (W). Apologies to SP9BQJ, whose callsign was incorrectly recorded in December *MOTA* as SP9BQI.

WAB

The Worked All Britain contests are mentioned elsewhere, but a letter received from G3XLZ makes the following plea: "Would any WAB book holders who have either obtained or changed a callsign since obtaining their book please drop a line to me at 9 Bainbridge Court, Colebrook, Plympton, Plymouth, stating book number, listener number or callsign, and any other data needed to produce an updated list of holders." The WAB group was formed by G3ABG in 1969 to encourage more activity between Britain and other countries. There is a comprehensive award programme and the details are part of the check book which is available from G4FQO, QTHR. Profits from book sales and awards programmes are donated to the Radio Amateur Invalid and Blind Club.



Mark Zevotek, KA2AOZ, is aged 15 and uses a National transceiver and multiband trap dipole

ZS1JJ, a member of RSGB and RNARS, at the operating position at his home in Capetown

South Sandwich Is

In view of the present illegal activity by LU3ZY a decision was taken by the RSGB Council on 12 January that, in future, QSL cards from stations located in the Falkland Is Dependencies which have not been licensed by the British administration should not be valid for Society certificates and awards. A similar decision was taken recently by the Wireless Institute of Australia.

Visit to USSR

Members who were interested in the amateur radio visit to the USSR which was mentioned in December 1979 *MOTA* will be sorry to learn that Mike Ockenden, G3MHF, has had to postpone the trip on account of lack of definite confirmation from Intourist that amateur radio clubs could be visited. There is a possibility that it may go ahead later.

Contests

The CQ WW WPX Contest

0000 29 March to 2400 30 March (SSB)
0000 24 May to 2400 25 May (CW)

1·8 to 28MHz. Contacts with stations in different continents count three points on 14, 21 and 28MHz, and six points on 1·8, 3·5 and 7MHz. QSOs between stations in the same continent count two and four respectively, but stations in the same country may be worked for multiplier credit only. The multiplier is the number of different prefixes worked—irrespective of band. Exchanges consist of RS/T plus serial QSO number (starting from 001). Single-operator single- and multi-band, and multi-operator all-band categories will be accepted, and there will also be a special QRP section for stations running no more than 5W output. QRP must be clearly indicated on the summary sheet. Single-operator entrants may only operate for 30 hours, and the 18 hour rest period may be taken in up to five sections—they must also participate for at least 12 hours, and multi-operator stations for 24 hours, if they wish to receive any award. Logs should indicate date, time, station worked, numbers sent and received, if new prefix, and points claimed. Duplicate QSOs must not be claimed for credit, and a check list of prefixes worked should also be included. Entries must be posted by 10 May for the ssb section, and by 10 July for the cw section. Please indicate "ssb" or "cw" on the envelope and send to: CQ WPX Contest, 76 N Broadway, Hicksville, NY, 11801, USA.

G3KDB has received a packet of badges from the USSR which are intended for eligible participants in the **1978 CQ-M Contest.** A total of 55 UK stations appears in the results—44 G, three GI, six GM and two GW. Those entitled to receive a participation badge are asked to send a suitable sase to: The RSGB HF Awards Manager, PO Box 73, Lichfield, Staffs.

In the results of the **1978 Bulgarian DX Contest,** which have just reached HQ, the only UK entrant was **G3ESF** who scored 22,844 points in the cw section.

WAB Contests

30 March—hf phone.
11 May—hf cw.
22 June—lf phone.
20 July—lf cw.
31 August—vhf.

In all cases the contest runs from 0900 to 2100. HF means 14, 21 and 28MHz, and lf 1·8, 3·5 and 7MHz. Full details from G4BFY, QTHR.

The Polish DX Contest

1500 5 April to 2400 6 April (cw)
1500 19 April to 2400 20 April (ssb)

3·5 to 28MHz. Contacts with SP/SQ/3Z stations count three points. Exchanges consist of RS/T and serial QSO number. Polish stations also give two letters to indicate their wojewodtztwo (county) and each of these worked (regardless of band) counts as a multiplier, the maximum being 49. There are single-operator single- and multi-band, multi-operator multi-band, and listener categories. Listeners must log the callsign of the Polish station, who being worked, and code sent; each SP may be logged only once per band. Logs should show date, time, exchanges, multipliers and points, and a summary sheet (with signed declaration) and a multiplier check list should be enclosed. Logs must be postmarked before 1 May for cw and 16 May for ssb, and sent to PZK, SP DX Contest Committee, PO Box 320, 00-950 Warszawa, Poland.

In the 1979 CW event UK entrants' scores were (multiband) G3ESF 49,896, GW3NYY 18,584, GM3MHG 13,932 and G4FUP 7,380 points. On 14MHz G8PR scored 8,904, GW3INW 8,670, G4GXL 3,354, G6NK 2,970 and G2WQ 2,706. In the ssb section multi-band G4EOW scored 12,036, GM4ELV 7,150 and GJ4HSW 1,586. On 14MHz G4CVZ scored 24,510, G4HLN 8,640 and G4GXL 4,992.

Awards

RSGB hf awards manager G3KDB reports that a few members are sending in applications for Society awards *without the necessary proof of membership.* He would like to remind sheepskin hunters that failure to comply with this simple requirement can result in delay and unnecessary correspondence.

The 9H Diploma

Awarded to any licensed amateur or listener who has confirmed contacts with, or reports from, a minimum of 10 Maltese stations. Applicants outside Europe require only five.

QTH CORNER

A4XFP	G4JBT, K. Cutler, 10A Moors Close, Hurn, Christchurch, Dorset.
FB8ZO	via F6EYB, 21 Bd Bremontie, St Pierre du Mont, 40000 Mont de Marsan, France.
HH2A	via AJ9D, F. M. Wessely, 254 Allegheny, Park Forest, Il, 60466, USA.
HS4AMI	via VE3DPB, B. C. Dekat, PO Box 137, Lynden, L0R 1TO, Ont, Canada.
J7DBB	YASME Foundation, PO Box 2025, Castro Valley, Cal, 94546, USA.
VE3BVD/ST2	via VE3FRA, A. Leith, 10 Fairington Cresc, St Catharines, Ont, L2N 5W3, Canada.
DJ1US/ST3	via DF2RG, G. Jaeger, Ruhseugstr 6A, 8460 Schwandorf, W Germany.
T2XYL	c/o Weather Station, Funafuti, Tuvalu.
TZ4AQS	via ON6BC, J. Denecker, 66 Sartlaan, B-8400 Oostende, WV, Belgium.
VK8GH/LH	via DJ9ZB, C. Kistner-Straße 19, D-7800 Freiburg i. Br, W Germany.
VS6BF	via G3KDB, PO Box 73, Lichfield, Staffs.
XT3AA	PO Box 575, Ouagadougou, Upper Volta.
ZK1CI	via G3ZXD, M. J. French, 73 Laburnum Rd, Wellington, Somerset TA21 8EJ.
3C1HJ	via EA4HJ, Consuelo Pernia G, G Pardinas 60, Madrid 1, Spain.

RSGB QSL Bureau, G3DRN, 30 Bodnant Gardens, London SW20 0UD.

Note that contacts with 9H4 (Gozo) and 9H1MRL (MARL Club station) count two points.

The Dip-Med

To licensed amateurs and listeners who have confirmed QSOs reports with a minimum of 15 of the 26 Mediterranean countries, which include 9H, EA, EA6, EA9, F, FC, CN, 7X, 3V, 3A, I, IT, IS, SV, 5B/ZC4, SV5, SV9, ZB2, YU, ZA, 4X, OD, SU, TA, YK and 5A. A contact with Malta is obligatory. A vhf version of this award requires contacts with five countries only. Applicants for either Maltese award should send a list of QSLs (certified by two other licensed amateurs) plus 12 ircs or US $2 to MARL, PO Box 575, Valletta, Malta.

Isle of Man Millenium Award

The sponsors wish to point out that the closing date for claims for this is 31 March 1980. A reminder that European applicants need to be able to supply certified log extracts of QSOs with one GT and four GD stations during 1979. Others need only three GD contacts plus one GT. GDs worked between 30 June 1979 and 8 July 1979 do not count. The fee is £2, 12 ircs, US $4, or equivalent in international currency notes. Apply to GD4FWQ, hon sec, Isle of Man ARS, 20 Terence Avenue, Douglas, Isle of Man.

The RNARS Mercury Award

Due to inflation and ever-increasing postal rates, it is regretted that the price of this award must be increased to 50p or six ircs from 1 April 1980. All other rules remain unchanged.

150 Years of Kingdom Belgium

Awarded by UBA to licensed amateurs and listeners who contact or have confirmed reception of at least 25 different stations using OR prefixes—at least four different and including contact with at least five provinces. All must have been between 10 January and 31 December 1980. OR prefixes are OR4, OR5, OR6, OR7 and OR8, and provinces AN, HT, BT, LG, LM, LU, NR, OV and WV. Applicants outside Europe need only 10 different OR stations. A station may be contacted once per band. A list, certified by the award manager of a national society, and showing full QSO details, should be sent with 10 ircs, US$4, or BF100 to ON4GO, Le Bon Michel, Traffic Manager, PO Box 537, B-1000 Brussels, Belgium, before 31 March 1981.

The Olimpiada-80 Award

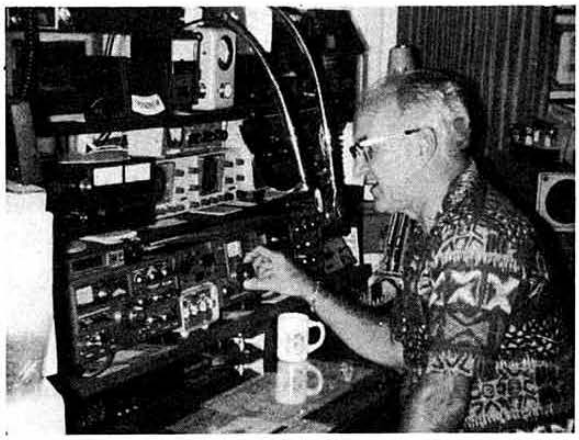
This is being issued to mark the holding of the 1980 Olympic Games in the USSR and is available to those who acquire 40 points in the following way: five points each for RM3O, RT2O, RL1O, RK5O or RM2O, one point for any other of the special prefix stations (see "DX news"), and one point for contact with any station in Oblast 170 (Moscow city). Only one QSO per station will count, and a log extract accompanied by the QSL cards for the USSR stations worked should be sent to PO Box 88, Moscow, USSR.

WPX Award

December CQ detailed changes in the requirements for this award, which has remained basically the same since it was first introduced some 20 years ago. For special band endorsements the number of prefixes is now increased to 50 on 1·8MHz, 175 on 3·5MHz, and 300 on 28MHz. The requirements on 7MHz (250), and 14 and 21MHz (300) remain unchanged. Continental endorsements are now N America 160 prefixes, S America 95, Europe 160, Africa 90, Asia 75, and Oceania 60. Any questions on the award will be answered by its manager, Bob Huntington, K6XP, 5014 Mindora Drive, Torrance, Cal, 90505, USA (sae and ircs please!).

Algoa Branch Award
Algoa CW Merit Award

Both issued by the Algoa Branch of the South African Radio League. The first-mentioned requires at least 10 contacts with branch members since its inception on 14 April 1979. Only one QSO per member per band may be counted, and full log details should be sent to: The Awards Manager, Algoa Branch, SARL, PO Box 10050, Port Elizabeth, 6015, S Africa. The second award is to encourage the use of cw and requires log details of at least 250 cw contacts since 1 January 1979—additional stickers will be issued for 500, 750 and 1,000 contacts. In this instance the application should be addressed to: The Algoa CW Merit Award, Awards Manager, at the same address. No mention of fee is made in the details received from ZS2U, but it might be advisable to enclose a few ircs towards postage costs. A list of members includes the following ZS2s: AC, AP, BE, BS, CJ, DK, EK, HU, IX, JC, JS, MG, NC, OC, OD, PH, RR, U, W and WG.



"Doc" Shaples, W4SME, Atlantic Beach, Florida, is also well known as VP1RX and VP5WS

Band reports

G8KG's latest summary reads as follows: "With a provisional Zurich number of 182·2 for December, it is now certain that Cycle 21 will prove to have a higher peak than Cycle 18, since the smoothed monthly number centred on June is now seen to be well above 150. Based on data up to November, NOAA is now forecasting a peak smoothed monthly number of 164 ±19 on the assumption that the peak proves to have been in November 1979.

"There was somewhat less sunspot activity during January, but the 27-day average of the 2,800MHz solar flux showed only small variations above and below 205 sfu and was rising slowly at the end of the month. The daily figures peaked at 273 sfu on 10 January.

"Published muf data for times of high solar activity show that the highest median mufs for the North Atlantic path in January and February are at least 10 per cent below those in November. This difference is not enough to have a significant effect on communications on 28MHz and below, but it suggests that reception of North American 50MHz signals will not have been as consistent this spring as in November and the first half of December."

The following kindly supplied logs from which this section was compiled: G2HKU, G3HB, G5s JL, MP, G3s AAE, GVV, IMW, KSH, LPS and SZA, G4s EAN, EHQ, ETN and GXL, and RSs 17567, 31301, 36928, 38934 and 42876.

Stations listed in italics were using cw.

3·5MHz. **0000** UK7AAH. **0600** JW5IJ, XE1APE, 4U1UN. **0700** KH6BZF, KL7MF, W6, YV1AD. **2000** VK3MR. **2100** DJ9YY/HB0, P29JS, VK6LK, YC1BMI, 9Y5KG. **2200** AP2KS, ZB2AX. **2300** 5T5CJ.

7MHz. **0000** *J7DBB, DJ3KR/KP4.* **0700** *CM,* TG, *VK,* XE, *YS2CCP,* YV. **0800** ZL4AV. **1000** OY5NS. **1600** *AA7C, AL7Y, FB8XV, K5UA/KH2, UM8MBA, W6MZ, W6TSQ, 9V1RS.* **1700** *FB8XV, JH4JLZ.* **1900** *OY7ML.* **2200** *N6ML, VU2BH.* **2300** *W5JMM/SU,* UK9CCC, *K9EF/8R1.*

14MHz. **0000** FB8ZO, HM, TU2IR, VP5WJR, 4S7EA, 9G1DY. **0800** FK8DD, JA, VS6, ZL. **0900** *HZ1AB,* VS5CW. **1000** *WA2FIJ/KH5K.* **1100** K6LPL/KH5, P29JS. **1200** WA2FIJ/KH5K, VK, ZL. **1600** FB8ZO, FH8AM, T3LA, VQ9DM. **1700** A22DW, D68AM, FB8XW, *KH6FX,* S79MC. **1800** *KL7HFV, DJ1US/ST3, SU1IM,* TZ4AQS. **1900** A7XD, FR7s, *KH3AA,* 5H3JR, *4K1A.* **2000** *EA9/5JG,* K6LPL/KH5, *VP1WT,* VP2MH, VP8SU. **2100** ZD9GH. **2200** A7XAH, *KL7PJ, VU2BK.* **2300** HS1AIV, 3C1AB.

21MHz. **0800** JA, VK, ZL. **0900** H44BR, JA, VS6, 9M2LN. **1000** HS4AMI, ZL, 9N1MM. **1100** VS6DO, 5T5CM/2. **1200** XT2AE (QSL to DJ9KR). **1300** S2BTF (QSL to LA5NM). **1500** ET3PG, YB3AI. **1700** TZ4AQS, W6-W7, ZA3KL (?), 3B6CD. **1800** HC8GI, HV3SJ, J7DBB, K6LPL/KH5, 9Q5GB. **1900** W6-W7, ZD7BW. **2000** HT1AZ. **2200** TN8AJ. **2300** WB3IQB/HR3, W6-W7.

28MHz. **0900** A4XGC, EA9GH, JA, UA0. **1000** AP2ZR, VK, VS6. **1100** JW7FD, N4HX/TT8, VS6, VU. **1200** A4XHK, C5AAP, FY7BC (QSL to F9LM), ZD7BW. **1300** HH5CB, SU1BA, VP2AZG (PO Box 549, Antigua). **1400** J7DBB, VE3BVD/ST2, W6-W7. **1500** *HK0BKX,* XE, ZP5AR. **1600** VE6, ZD7BW, *ZD8TC,* 4U1UN. **1700** *C6ABA,* VE6-VE7, W6-W7, W8URK (40mW input). **1800** HC5PJ.

G2PT reports that ZD7BW achieved WAS on 28MHz in 23h 37m on the Saturday of the ARRL 10 Metre Contest—your scribe would welcome claims from others who have done this in less time!

Thank you to the following publications for news items extracted: *CQ Magazine* **(W1WY)**, the *Ex-G Radio Club Magazine* **(W3HQO)**, *DX Bulletin* **(K1TN)**, the *Long Island DX Bulletin* **(W4UL/W2IYX)**, *DX News Sheet* **(Geoff Watts)**, *Long Skip* **(VE3FRA)**, and *DX'press* **(PA0TO)**.

All items for **May** issue to reach G3FKM by **1 April** and for **June** no later than **30 April.** □

Propagation predictions

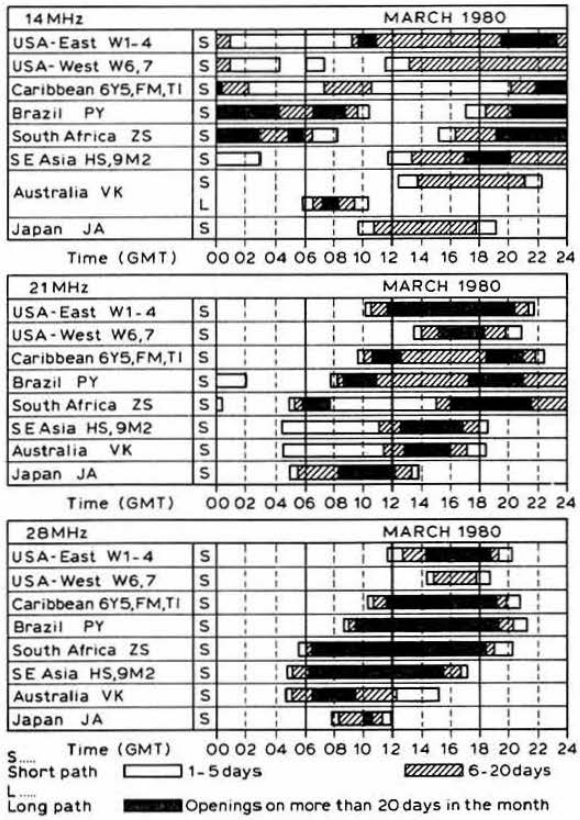
The seasonal decline in F2 mufs during the summer begins in March. This will at first be most noticeable on **28MHz**, ie western North America will not be heard with certainty compared with last month. Traffic with all other continents will be possible, even if only for brief periods. Conditions on **21MHz** will not be affected by the above-mentioned decline in daytime frequencies. Lengthening days in March mean that both **21** and **28MHz** will remain open longer in the evening. Seasonal changes mean that dx will be possible during the latter half of the night on **14MHz**, but only in April will this band become an expressly night-time dx band.

At present, dx via the indirect path is hardly possible on **14** or **21MHz**. An exception is traffic via the indirect path with Australia; this path often being more favourable than the direct one. Traffic with Hawaii and Alaska will be possible on **14MHz** under favourable conditions between 0700 and 0930gmt and from 1700 to 1900gmt. As the great circle in this case leads through the polar light zone, traffic will frequently be interrupted by static.

The **7MHz** band will still offer usable dx chances during March, when the longer part of the path lies in darkness. Eastern North America will be heard on this band from about 2200gmt until shortly after sunrise. It may be possible to work western North America on **7MHz** from about 0330 to 0600gmt, and under very favourable conditions Hawaii and Alaska from about 0430 to 0600gmt. On **3·5MHz** the east coast of the USA will possibly be heard from about midnight to 0530gmt. During the latter half of the night local traffic will be interrupted now and again by the dead zone.

The provisional sunspot numbers for September, October, November and December 1979 were 188·7, 188·2, 185 and 182·2 respectively. The highest daily number of the present cycle, 302, was recorded on 10 November, while 293 was noted on 9 December.

The predicted smoothed numbers for April, May and June from the Swiss Federal Observatory at Zürich are 140, 138 and 136 respectively.



HF propagation study

Predicted hpf + luf in megahertz for March 1980

	00	02	04	06	08	10	12	14	16	18	20	22
Suva (s)	2200	2200	2100	2400	2900	3400	3600	3500	3100	2600	2200	2100
Wellington (s)	2100	1700	2100	2600	3500	3900	3900	3100	2900	2600	2000	2000
Osaka	2011	1811	2012	2713	3714	4113	3312	2611	2310	2109	1909	2010
Hong Kong	1510	1612	2013	3115	4216	4516	4713	3910	3308	3006	2106	1808
Sydney (s)	1513	1616	1918	3120	4219	4316	3912	3608	3106	2905	2106	1809
Moscow	1304	1303	1303	2405	3307	3808	4008	3807	3705	3004	2004	1604
Bangkok	1608	1511	1913	3416	4517	4917	4915	4711	4408	3506	2306	1907
Singapore	1808	1610	2013	3416	4818	5017	4914	4810	4507	3505	2405	2106
New Delhi	1804	1606	2009	3412	4814	4914	5013	4809	3706	3104	2404	2104
Perth	2010	1813	2017	3620	4722	4520	4216	3911	3407	3005	2606	2307
Teheran	2004	1804	2006	3608	5111	5312	5211	5009	4705	3504	2704	2304
Colombo	2005	1807	2011	3614	5116	5317	5216	5011	4707	3606	2805	2305
Bahrain	2204	2004	2006	3609	5212	5414	5313	5109	4806	3704	3004	2503
Cyprus	2104	1904	1704	3107	4710	5111	4911	4709	4507	3505	2904	2304
Aden	2505	2306	2208	3711	5414	5616	5415	5212	5008	3906	3305	2805
Seychelles	2600	2500	2200	3800	5400	5300	5100	4900	4400	4000	3400	2900
Mauritius	2600	2500	2200	3800	5400	5400	5400	5200	5100	4100	3500	3000
Nairobi	2804	2604	2306	3609	5413	5415	5514	5210	4806	4404	3604	3004
Malta	1804	1703	1403	2205	3508	4009	4009	3909	3708	3206	2404	2004
Salisbury	3104	2903	2405	3410	5214	5416	5616	5314	5212	4707	3804	3103
Cape Town	3200	2700	1800	3000	4900	5100	5600	5000	5000	4800	3900	3400
Lagos	3305	3103	2704	2707	5012	5514	5615	5314	5113	4908	4105	3404
Suva (l)	3400	3100	2700	2600	3600	3500	3100	2700	2600	3100	4800	3500
Gibraltar	1602	1602	1302	1402	2604	3406	3506	3306	3205	3003	2302	1902
Ascension	3305	3104	2804	2508	4413	5315	5517	5317	5016	4811	4205	3504
Wellington (l)	3100	3000	2700	2300	3300	2600	2000	2000	1800	2700	3500	3400
Dakar	3306	3105	2805	2508	4412	5315	5516	5316	5015	4910	4306	3506
Las Palmas	2504	2403	2103	1905	3508	4609	4811	4711	4410	4307	3504	2904
Falklands	3107	3005	2706	2209	2413	4418	5122	5223	4921	4817	4313	3409
Rio de Janeiro	3106	3005	2705	2207	2611	5115	5319	5120	4919	4815	4310	3407
Buenos Aires	3106	2904	2605	2206	2810	4314	5319	5221	4920	4816	4312	3408
Sydney (l)	2813	2712	2411	2009	3110	2913	2518	2222	2124	2122	3118	3315
Lima	2900	2700	2400	2000	2900	2600	5100	5000	4800	4700	4300	3300
Barbados	2704	2603	2303	1903	2205	3608	5014	5016	4715	4612	4309	3306
Bogota	2600	2500	2300	1800	2300	2600	4900	4900	4600	4500	4200	3200
Jamaica	2300	2300	2100	1800	2200	2500	4500	4400	4400	4400	4000	3100
Bermuda	2300	2300	2100	1800	1800	3100	4400	4400	4400	4400	4000	3100
New York	2207	2006	1806	1806	1807	2510	3713	4015	4114	4112	3910	2808
Mexico	2100	2000	1800	1700	2100	2000	2900	4200	4200	4000	3800	2900
Montreal	2109	1908	1808	1809	1810	2512	3614	3915	4015	4013	3711	2709
Denver	1900	1700	1700	1800	1700	1700	2300	3400	3800	3800	3500	2600
Los Angeles	1900	1800	1800	1800	1800	1700	1700	3100	3600	3600	3400	2300
Vancouver	1900	2100	1800	2000	2000	1700	1800	2200	2400	2800	2900	2200
Iceland	1308	1208	1208	1307	2008	2509	2909	2810	2809	2609	2108	1508
Honolulu	2100	2100	2000	2000	2300	2300	2100	2000	2300	3100	2600	2100
Fairbanks	2100	2100	2100	2100	2500	2300	2500	2500	2600	2600	2500	2200

First two digits are hpf, last two luf. LUF 00 indicates data not available.

your opinion

PHONETICS

The Editor
Radio Communication

Sir—It is surprising to me that the report in "QTC" a few months ago regarding the use of phonetics has not resulted in some comment. It was stated, apparently with approval, that a Home Office spokesman had said that the continuing use of phonetics other than those recommended might well result in compulsion.

To say that the system is optional, but that failure to use it will result in its being made obligatory, is worthy of Orwell. The Society should tell the Home Office very firmly that there is nothing sacrosanct about ITU phonetics. I am old enough to remember the "Ack, Beer, Cork . . ." series, and many will recall the "Able, Baker . . ." series. The "Alpha, Bravo . . ." series has been around a long time and is overdue for change.

Phonetics are used to distinguish between similar-sounding letters when spoken. Official communications usually take place over reasonably clear channels and land-lines. In these circumstances any words having the right initial letters will do and the present ones seem to have been chosen because they are common to a number of languages.

The requirements of amateur radio are, however, very different. We seldom get clear channels and our phonetics need to be recognizable through heavy QRM. In addition, narrow receiver passbands remove high-frequency audio, so that s, sh, f, v, th, etc will be greatly attenuated. Vowel sounds vary greatly with pronunciation, and in any case are no good for recognition: eg "-a-i-e--i-i--e-" is meaningless, but "c-b-n-t m-n-st-r" is readily understood. Hard consonants are required, and the words should have several syllables so that they can still be recognized even if parts are lost in QRM.

"Golf" has at least three pronunciations, even in Britain, (golf, goff, gawf) and the soft "lf" is often inaudible. "Guatemala" is much more effective. "Sierra" is about the daftest word for a phonetic that could have been devised; "eh-uh" is what most of us hear, and "Santiago" is incomparably better. Similar criticism can be made of other words in the recommended series.

I shall comply with the terms of my licence in the avoidance of objectionable phonetics. I shall also avoid facetious words, though I really do not see why we have to be so solemn. But I shall not use the recommended phonetics insofar as they are inefficient for my purpose, and the Society should explain this to the Home Office, who obviously do not understand.

R. W. Price, GW3LIY

Comment

GW3LIY should re-read carefully the paragraph on page 515 of the June 1979 issue of Radio Communication, *and paragraph 9 (3) of the Amateur Licence A. The latter does not contain any reference to recommended phonetics. This is contained in note (M) appended to the licence.*

9 (3) states: "When telephony is used the letters of the callsign may be confirmed by the pronouncement of well-known words of which the initial letters are the same as those in the callsign; words used in this manner shall not be of a facetious or objectionable character." *This condition gives the operator a wide choice of words outside the recommended phonetics.*

While large numbers of operators continued to use phonetics which were facetious or objectionable, then a compulsory list of phonetics might have been introduced. However, it is interesting to note that since the paragraph appeared in Radio Communication *the number of contraventions of this licence condition has dropped very considerably.*

Sir—The amateur radio licence states that the callsign shall be sent for identification purposes at the beginning and at the end of each period of sending, and when telephony is used the letters of the callsign may be confirmed by the pronouncement of well-known words of which the initial letters are the same as those of the callsign.

I would suggest that the callsigns should always be transmitted phonetically when using telephony. In a very large number of cases the callsigns made are unreadable, and in many instances requests for a repetition phonetically are made. In order to comply with the licence requirement the callsign must be clearly readable; this is not the case in the majority of transmissions.

If the signal-to-noise is low, or in the presence of interference, the use of phonetic calls is essential, so why not use this system regularly; one is never sure what level of signal is being received at the other end, unless the received signal at the transmitting end is very strong. If the transmission is distorted, again the callsign is difficult to identify in many instances.

Please do not gabble your callsigns!

Harold Turner, G8VN

THE RST SYSTEM

The Editor
Radio Communication

Sir—I was most interested to read the commonsense written by DL7DO in his article "Will the RS(T) system last until judgement day?" on page 751 of the August issue of *Radio Communication*. I support his proposal. I also have heard quotations of 5 and 9 being given, followed by a request to spell names, QTH etc. I have rarely heard anything less than 5 and 5 awarded, and I think there is a reluctance on the part of operators, lest the "other chap" be offended. I think that the time has come to be realistic.

What are the views of the RSGB? Would they be prepared to conduct a census among members, and then to propose such a change? I would be pleased to see and support such an approach.

I. R. Cutler, G3XFV

Sir—I found Herzer's article "Will the RS(T) system last until Judgement Day?" (*Radio Communication*, August 1979) of great interest. Of course I agree with his viewpoint in general, having suffered through some of the "5-by-9, but QRM" nonsense he refers to, and I hope that the RSGB does take the initiative in changing this worthless grading system.

May I point out, however, that there are those who do strive to hand out meaningful R and S reports, and that other than T9 signals do appear on the bands either because commercial gear does go awry or homebrew gear will have bugs initially. Clearly the solution is to modify the RST system; but not radically. Perhaps the 333 system should replace the 599 system—that is, three levels of R, S and T (I defy anyone to discern nine levels of T, as we have now) for specifying the characteristics of a signal. With some backing, there is little reason why this scheme would not be accepted by most.

Vince Biancomano, WB2EZG

1980 PRESIDENTIAL INSTALLATION

The installation of Peter Balestrini, TEng (CEI), MITE, G3BPT, as the 46th President of the RSGB, took place on 12 January 1980 in a unique setting — afloat on the River Thames. This was most appropriate for the new President, who, as a senior engineering supervisor with the Port of London Authority, is responsible for the commissioning and maintenance of the port's radar, microwave, telemetry and communication systems.

A party of over 150 members, wives and friends boarded the river cruise vessel *Mayflower Garden* at Westminster Pier prior to departure at 7·30pm, and it was while the vessel was cruising up-river that the installation took place. In the crowded main deck saloon, the outgoing President, John Bazley, G3HCT, introduced the new President and spoke of his many years' work with Raynet and as a Council member and emergency communications manager. He then invested the new President with his chain of office.

The outgoing President, John Bazley, G3HCT, introducing the new President, Peter Balestrini, G3BPT, left

After thanking G3HCT, and remarking on his prowess at dx, the new President said:

"I would be less than human if I did not admit to being very pleased to be honoured in this way. I am proud to be a radio amateur, and proud to be a member of the Radio Society of Great Britain — a leader in a worldwide movement which, by communication, which is the name of the game, can achieve so much goodwill, and by example and leadership can advance scientific achievements.

"The last 10 years have been eventful ones for us all, culminating in the World Administrative Radio Conference in 1979. It is quite impossible to estimate or catalogue the amount of work carried out in preparation for this conference by many people, but outstanding above all was the dedication of Roy Stevens, G2BVN. Council regrets that he cannot be with us tonight. However, earlier today I had the pleasure on behalf of the Society to present Roy with a silver salver, signed by members of Council and inscribed in recognition and appreciation of his outstanding service to the Radio Society of Great Britain.

The President presenting an inscribed silver salver to Roy Stevens, G2BVN, in appreciation of the Society's gratitude for his efforts on behalf of the RSGB

"Our membership has steadily increased during the decade, and so we go into the 'eighties with a strong Society and a strong management team, and I for one have every confidence in the future. To those who are not used to being afloat, fear not, you are in the company of at least two ex-commodores; it is an appropriate venue owing to my long association with the river and the port's liquid history.

"To you, John, (*G3HCT*), thank you for your help and guidance. I now have the greatest of pleasure in presenting you with this plaque, as a memento of the occasion, and with your immediate past-President's badge."

To the amusement of the newly-installed President and the assembled company, Brian Rix enlivens the proceedings with a short and witty speech

The President then introduced Brian Rix, G2DQU, who was elected an honorary vice-President of the Society in 1979 for his work in promoting amateur radio on tv and radio. After a short and most humorous reply by Brian Rix, the President presented the new Council members with their badges and introduced other members of Council to the guests.

The rest of the evening was a most enjoyable social event, aided and abetted by liquid refreshments from the saloon deck bar and an excellent buffet served in the vessel's observation saloon on the top deck.

The cruise under the river's illuminated bridges and between floodlit buildings on its banks took the convivial company as far as Chelsea up-river and Tower Bridge down-river before returning to Westminster Pier at 10pm. □

obituaries

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

Mr D. Colligan, GM3IUI
Mr Colligan, who died in January, was an active hf bands operator.

Mr J. Crowther, G8MAH
James Crowther died on 20 November 1979, aged 53. He obtained his G8 licence in the summer of 1976 and was active on 144MHz from September of the same year. Despite failing health, he was studying hard to pass the morse test for his G4 licence.

Mr A. V. Howson, GW4DWT
Vic Howson, who died on 23 December 1979 aged 82, acquired a knowledge of telegraphy in the first world war, although he did not pass the RAE and take out a licence until rather late in life. He was an excellent cw operator and was a source of encouragement and inspiration during the revival of the Swansea ARS in the early 'seventies. He was active on the hf bands, mainly on cw, up to the time of his death.

Mr A. Paterson, GM4DGC
Archie Paterson died on 24 January. A keen operator on both the hf and vhf bands, he was active on the air until a few weeks before his death, and was an enthusiastic member of Dundee Kingsway Technical College ARC.

Mr R. S. J. Smith, G2DCI/VK1JS
Reg Smith, who died in Canberra on 8 January, had been interested in radio since the early 'twenties. He lived for some time in Speke where he was an active member of the local radio club, and later took considerable interest in vhf and uhf activity. A number of friends in the UK will miss his regular morning schedules on 14MHz.

Mr W. H. Symonds, G3STY
Bill Symonds died on 2 August 1979, aged 75. He had not been active on the air recently due to illness, but previously he had often been on 3·5MHz ssb, particularly in QSOs with Wally Wardrop, G3MOW, and other friends.

Mr F. A. Tuck, G2ABD
Fred Tuck died on 19 December 1979. An enthusiastic amateur for most of his life, and a long-standing member of the RSGB, he held the callsign 5XR in the early 'twenties (see *Wireless World and Radio Review*, 7 July 1923, p451). He made many friends on the air and, although eventually unable to operate his equipment due to ill-health, he retained his interest in amateur radio until his death. He operated mainly on the lower hf bands, as well as on 144 and 70MHz.

We have also been advised of the deaths of:
Mr W. A. Fletcher, G3PSX, on 27 November 1979;
Mr A. E. K. Townshend, RS28291, on 27 August 1979.

Mrs Gwen Perkins
The Society also records with regret the death of Mrs Gwen Perkins, wife of Mr Hal Perkins, G3NMH, who together formed Western Electronics (now Western Electronics (UK) Ltd) at Hook, Swindon, in 1969. While at Swindon she was a founder member and a committee member of the Swindon & D ARS. For several years she was a supporter of the Harwell Atomic Energy Research Establishment ARC, and was made an honorary member in recognition of her services.

Gwen Perkins, who was 47, studied for a transmitting licence over several years, but was never able to sit the RAE because of ill-health.

raynet

L. A. Crane, G3PED*

As explained in the December issue it is the intention that holders of special appointments within the Raynet committee will take turns to write this column, this month it is Len Crane, G3PED, who will also describe the work of the registration secretary, who is not a member of the committee.

At the meeting of the committee on 26 January 1980 there were some alterations in the allocations of special appointments: chairman is now Ingemar Lundegard, G3GJW; vice-chairman is Eric Yeomanson, G3IIR; publicity officer is Graham Cluer, G4AVV, and secretary, G3PED. As a result of G3GJW being appointed chairman, it was necessary to relieve him of the job of group information officer, and this work has now been transferred to the secretary. This means that all national records are now kept in the same place. G3PED will continue to deal with nominations for controllers, checking from the registration secretary's records that the nomination is in order.

There are three important requirements for records; they must be comprehensive, accurate and up to date. Membership records held by the registration secretary are filed in alphabetical order of surname, and it is essential therefore that the surname be written legibly. Care should also be taken with callsigns, especially those not in the call book; particular attention is necessary to distinguish between the letters V, U and Y; D, O and Q; and M, N and W.

Group records are filed under the name allocated by the committee, which is always the name of the county followed by a geographical location, preferably a town. Thus a name becomes an identity and is not required to indicate the area covered. There are at present 130 groups, and it is important when writing to the committee that the correct title is used. Requests for change of title will be considered by the committee but must not be assumed.

Changes in particulars such as address, telephone number and callsigns must be notified to registration secretary without delay. The registration secretary maintains a complete record of all members, over 3,000 at the moment. Applications for membership can be obtained from any Raynet controller or from the registration secretary at the address given below. A new system of registration which has been introduced recently requires the completion of a card and a paper form; the latter is for the use of the local controller but may be sent with the card to the registation secretary in the case of a new member. The card will be processed and returned to the member via a controller. Under the new system all members will be asked to complete a card and form annually.

A great deal of work is involved in running an organization such as Raynet, and this work is performed by members of the committee, the registration secretary and the supplies officer in their spare time. All members of the committee are active Raynet members, some of them controllers. The committee meets monthly and is in session from 1100 until 1800 and sometimes later, with travelling time this amounts to as much as a 12-hour day in some cases.

Routine work, such as appointment of organizers and controllers and the supply of recorded information, eg details of other groups, information about Raynet frequencies and "How to form Raynet groups" are usually dealt with fairly quickly if an sae is sent. Correspondence which has to be passed to other members of the committee is acknowledged, but replies will of course take longer. Matters which need to be discussed in committee are also acknowledged but replies may take as much as five or six weeks depending on date of receipt and date of next committee meeting. □

*"Greta Woods", Bromley Road, Ardleigh, Colchester CO7 7SF

council proceedings

A brief report of the Council meeting held on 17 November 1979

Present: Mr J. Bazley (President, in the chair), Dr E. J. Allaway, Messrs D. J. Andrews, J. Anthony, P. Balestrini, R. Bellerby, P. F. D. Cornish, T. P. Douglas, L. N. G. Hawkyard, G. I. Knight, W. F. McConigle, B. O'Brien, C. H. Parsons, G. M. C. Stone (members of Council), D. A. Evans (general manager), A. W. Hutchinson (editor).

Apologies were received from Mr D. Adams, Dr D. S. Evans, and Mr R. F. Stevens.

Society awards

After some discussion on the subject of Society awards, Mr Cornish suggested that the whole matter of awards being presented to the Society for administration be looked at by a sub-committee. It was agreed that Mr Cornish should form such a sub-committee.

General manager's report

The general manager circulated specimens of proposed badges to indicate designated lengths of continuous membership, and commented on Society shields and a new Society tie. The general manager also commented on other items of his circulated report which dealt with: Leicester exhibition; proposed postage, telephone and rail fare increases in 1980; WARC; student survey and data processing facilities for BARTG.

As a number of Council members were concerned about cb radio, the general manager reviewed the Society's present policy. A long discussion on all aspects of cb and its relationship to amateur radio and the RSGB took place. It was agreed to establish a small working group to keep the cb situation under constant review.

Review of committee business

Education (1.9.79)

Mr Anthony commented on a meeting of RAE instructors held at the Leicester exhibition.

Finance & Staff (13.9.79)

Mr Balestrini proposed that a special dispensation be given to Mr R. F. Stevens to serve on this committee during 1980. This was agreed unanimously.

HF

A point concerning the novice licence working party was deferred until the telecomms liaison officer returned from WARC.

HF Contests (13.9.79)

Mr Andrews spoke about the possible introduction of df events on the lines of European foxhunts.

Membership & Representation (30.8.79)

Reference was made to a meeting of the committee held in York on 3 November.

Microwave (18.8.79, 16.9.79)

It was reported that Microwave Associates in the USA had asked the Society to administer a microwave award on a worldwide basis which MA would provide. It was agreed to adopt this role.

Mobile & Exhibition (11.9.79)

Recommendations that (a) the 1980 Woburn Abbey Rally be held on 3 August, and (b) the name of the committee be changed to "Rally & Exhibition Committee" were approved. New terms of reference were also agreed.

Propagation Studies (6.9.79)

Accepted without comment.

Raynet (15.9.79)

Accepted without comment.

Technical & Publications (1.8.79)

It was reported that the first printing of the new *RAE Manual* (expected to be sufficient for two years) had been sold out within six months and a reprint was in hand. Sales of the *Operating Manual* were also going well.

Mr Knight having intimated his desire to retire as contributor of *4-2-70* due to pressure of business, the committee was discussing the recruitment of a successor. Mr Knight would continue to contribute *4-2-70* until another writer was selected to do so.

VHF (8.9.79) and RWG (30.6.79, 6.10.79)

Mr Douglas commented on a letter received from the Home Office asking for no more applications for high-power permits for vhf experimentation to be made for the time being.

Mr Stone outlined arrangements for the 1980 RSGB National VHF Convention.

It was noted that contacts in RSGB vhf contests made by entrants using high power under their special high power permits were not acceptable.

Some discussion took place on the activities of the Repeater Working Group; it was planned to have five regional members and three technical experts during 1980.

VHF Contests (22.8.79, 19.9.79)

Mr Andrews spoke of a clash of dates between hf and vhf field days.

Membership and representation

The following were noted and approved:

(i) subscriptions had been reduced in respect of six members;
(ii) subscriptions had been waived in respect of 13 members;
(iii) an application for life membership from one member;
(iv) the appointment of Mr E. Howe, G3FIJ, as area representative for Colchester.
(v) affiliation be granted to Amateur Radio & Personal Computer Club, ICL, Kidsgrove; BBC Ariel Radio Group, Birmingham; BSC Tinsley Sports & Social Club, Ham Radio Section, Sheffield; Braintree & District Amateur Radio Society; CLWB Radio Ysgol, David Hughes School, Menai Bridge, Gwynedd; Congleton Amateur Radio Club, Cheshire; Hammersmith Hospital Amateur Radio Society; Norcat Amateur Radio Club (Norfolk College of Arts & Technology) Kings Lynn, Norfolk; Mow Cop & District Amateur Radio Society, Stoke on Trent; Portsmouth Polytechnic Students Union Amateur Radio Society; and Sherborne School Amateur Radio Society, Dorset.

Tape library

The general manager reported on the situation regarding the video/audio tape, slide and film libraries following the ill-health of Mr Coursey. Mr Anthony had taken over responsibility for the video tape and film library. An offer of assistance had been received from Mr D. Simmonds, G3JKB, and Council accepted this offer with thanks; Mr Simmonds would be responsible for the audio tape and slide library.

"The Secret Listeners"

A discussion took place on the BBC television programme "The Secret Listeners" which, for the first time, had described the work of radio amateurs in the second world war as voluntary interceptors. Their excellent work had been kept secret for over 30 years because of Official Secrets Act restrictions.

Honoraria for 1979

Honoraria payments were agreed in respect of Intruder Watch organizer and assistants, hf and vhf awards managers, slow morse transmissions organizer, trophies manager. QSL Bureau sub-managers, and taped lecture library curator.

Financial report

Mr Cornish commented on the accounts for the current financial year, and the effect on them of increases in postage, rail and general administration costs.

Mr Cornish opened a discussion on a report which had previously been circulated to all Council members regarding an extension to the Society's data processing equipment. As a result of greater utilization of the IBM32 than had been originally envisaged, access time on the original equipment was becoming a problem. After considering the possible alternative, the report indicated that the most cost-effective solution would be to retain the IBM32 and extend the system using IBM34 hardware.

Mr Cornish and Mr Evans answered several questions from Council members on these proposals. Dr Allaway said that members of the Finance & Staff Committee fully endorsed them. On the financial side, Mr Cornish would consider the best funding arrangements and advise accordingly.

After full discussion a proposal to extend and update the equipment in line with the report was put to Council and accepted.

Correspondence
Mr McKechnie, RR for Region 14, had tendered his resignation because he was moving out of the region.

Mr Hawkyard had received a letter from members in Jersey regarding area representation. He would handle the matter in conjunction with the Membership and Representation Committee and report back.

A letter from Mr Barker, G8CAC, chairman of the Raynet Committee was discussed.

Vote of thanks to President
This being the last Council meeting of 1979, Dr Allaway proposed a vote of thanks to the President which was adopted with acclamation. In reply the President thanked all present for their help during the year.

1980 Council
Mr Balestrini asked Council to approve the attendance of Mr Stevens at the first Council meeting of 1980 to report on WARC. This was agreed.

The President said he had received a letter of resignation from Council from Mr C. Thomas, G3PSM, because of pressure of business. This would be effective from the end of 1979. Council thanked Mr Thomas for his contribution to the Society's work and hoped he would be able to retain membership of various committees.

At the request of the President, Council agreed to give Mr Balestrini a special dispensation to remain emergency communications manager during his Presidential year.

Society awards
Dr Allaway proposed that the Founders Trophy for 1979 be awarded to retiring Council member Cyril Parsons, GW8NP, in recognition of his outstanding contributions to the Society over many years. This was agreed unanimously.

It was decided to mark the retirement of the hf awards manager, Mr C. Emary, by awarding him a suitably engraved plaque in recognition of his outstanding service to the Society.

Mobile rallies calendar

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

30 March—White Rose Rally, Lawnswood School, Leeds 16. Open 11am. Two talk-in stations, on 144MHz S22 and 432MHz SU20, and a 3·5MHz demonstration station. Plenty of car park space, with provision for coach parties. Details from G4DZI.
13 April—North Midlands Mobile Rally, Drayton Manor Park, Tamworth, Staffs, (on A4091, well signposted, and within easy reach of M1, M5 and M6 motorways). Open 11.30am. Talk-in stations on 144 and 432MHz. Further details from G8BHE, tel 021-422 9787.
20 April—Southend & District Mobile Rally, Southend Airport Exhibition Centre, Aviation Way, Southend-on-Sea, Essex. Many attractions, licensed bar, refreshments, parking for 300 cars, aircraft museum, talk-in station, and bring and buy stall. Details from F. Thorogood, G8ORV, 30 Grange Gardens, Southend-on-Sea, Essex.
20 April—Welsh Amateur Mobile Rally, Barry Memorial Hall. Further details from K. B. Hodge, 16 Claude Road West, Barry, S Glam.
4 May—Spalding & District Amateur Radio Society Tulip-time Rally, Spalding Grammar School, Details from G. Parker, G4EMK, 33 Beech Avenue, Bourne, Lincs, tel 07782 2649.
18 May—Northern Mobile Rally, Victoria Park Hall, Keighley, Yorks. Details from G8DFZ, QTHR.
25 May—Plymouth Radio Club Rally, Tamar Secondary School, Plymouth, Devon. Further details from G4GWJ, QTHR.
25 May—East Suffolk Wireless Revival, Foxhall, Nr Ipswich, Suffolk. All usual attractions, plus improvements, as well as transceiver clinic, antenna testing range, trade stands etc. Further details from Jack Tootill, G4IFF, QTHR.
1 June—Hull & D ARS Mobile Rally, Hull University. Would traders please contact G8EAH, QTHR, for details of discounts for advanced booking. Further details nearer the date.
1 June—Sussex Mobile Rally, Brighton Racecourse, Brighton, Sussex. Free car parking, close to main buildings. There will be talk-in stations on 432, 144, and 3·5MHz, and a special QSL card will be available to callers at the station, which will be using a special GB callsign. Attractions will include the usual trade stands, in covered accommodation (most of the well known traders will be present), and demonstrations by specialized groups covering subjects such as Raynet, amateur television, rtty, satellite communications, microwaves and repeaters. It is also planned to have a working amateur radio station, to interest the more uninitiated. There will be dog handling and gymnastic displays, police and Post Office stands, a bring and buy stall, lucky dip, yl stall, and lucky programme draw. A free mini-bus will take people to and from Brighton Beach.

This rally is a first for Sussex, and it is intended to make it an overwhelming success. For further details contact the hon sec, Sussex Mobile Rally, 7 Dale Crescent, Patcham, Brighton, Sussex BN1 8NT, tel Brighton 693655 ext 2266 (office hours).
1 June—East Anglia Radio Amateurs Picnic, East Anglian Transport Museum, Nr Lowestoft. Further details from G3LYX QTHR.
8 June—Elvaston Castle Mobile Rally, Nunsfield House, Alveston, Derby. Further details from G4CTZ, tel Derby 71875.
15 June—RNARS Mobile Rally, HMS *Mercury*. 10am to 5pm. All usual trade stands and many attractions for the family. Further details from Wally, G4DIU, QTHR, tel 0705 479464.
13 July—Upton Mobile Rally, Upton-on-Severn, Worcs. Further details from G8NSL, QTHR, tel Worcester 620507.
13 July—Knowsley Park Mobile Rally and Convention, Knowsley Park, Liverpool. Further details from G3LEQ, tel 0565 4040.
20 July—Cornish RAC Mobile Rally, Truro; Cornwall. Further details from G8JML, tel Truro 78020.
27 July—Scarborough ARS Mobile Rally, Technical College, Scalby Road, Scarborough. Further details from G4JAQ. 43 Broadlands Drive, East Ayton, Scarborough, N Yorks YO13 9ET, tel Scarborough 862638.
3 August—RSGB National Mobile Rally, Woburn Abbey. Details from N. Miller, G3MVV.
24 August—Torbay ARS Rally. Further details from Mrs Ged Coker, c/o G4FCN, QTHR, tel Ipplepen 812117.
7 September—Vange ARS Mobile Rally, Nicholas School, St Nicholas Lane, Basildon, Essex. Details from G4FMK, QTHR.
7 September—Telford Amateur Mobile Rally, Telford town centre, Salop. Excellent indoor venue, with full facilities as previous years. Further details from G3UKV, tel Telford 55416; G8DIR, tel Shrewsbury 64273; or G8UGL, tel Telford 584173; (all QTHR).

RNARS Easter activity

The RNARS will be operating on board HMS *Belfast,* moored in London's Upper Pool, from 0001gmt Friday 4 April to 1800gmt Sunday 13 April. Primary operating frequencies will be as follows:

CW: 1,828 (QSX 1,802), 1,838, 1,858, 3,520, 7,020, 14,052, 21,052, 21,120, 28,052, 28,152.
SSB: 1,875, 3,660, 3,780, 7,070, 14,140, 14,245, 14,340, 21,175, 21,433, 28,470, 28,933.

Schedules are welcomed, especially with other stations of special interest, and can be arranged via G3HZL, QTHR, tel 01-892 3239; or via RNARS, Bridge Wireless Office, HMS *Belfast*, Symons Wharf, Vine Lane, London SE1 2JH, tel 01-407 6434 ext 39. QSL cards are answered only on receipt of incoming cards. All cards should be sent via the RSGB QSL Bureau. Direct requests will only be answered if accompanied by an sase, or one irc for surface mail or two ircs for airmail reply.

Looking ahead

8 March—RSGB National VHF Convention, The Winning Post, Twickenham, Middx.
11 and 12 April—RSGB Lectures, "Amateur radio—making a start", Science Museum, London, at 3pm on the Friday, and 11am and 3pm on the Saturday.
27 April—South East Raynet Symposium, Crawley, Sussex.
27 April—Northern Radio Societies Association Radio & Electronics Exhibition, Belle Vue, Manchester.
9-10 May—RSGB National Amateur Radio Exhibition, Alexandra Palace, London.
20-22 June—The Great British Electronics Bazaar, Alexandra Palace, London.
28-29 June—Jersey Radio Convention. Details from GJ4ICD, tel 0534 26788.
18-19 October—Jamboree on the Air.
24-25 October—Amateur Radio Retailers Association National Amateur Radio Exhibition, Granby Halls, Leicester.

contest news

Second 1·8MHz Contest 1979 results

Activity remained high throughout the contest, with Ken Riddoch, GM3ZSP the clear winner, only 12 points short of the record score he made in 1977. Although one hour shorter than previous events, his total of 152 contacts was five more than that achieved by the winner of last year's contest. Ken used a TS520 and transverter to an inverted-Vee dipole, the same type of antenna as Peter Linsley, G3PDL, who was runner-up. The equipment at G3PDL was an FT301S, the low power version of the FT301, while Dave Lawley, G4BUO, who came third, used an FTDX560 as the transmitter and a Trio JR99 as the receiver with a 220ft end-fed wire-antenna.

There were seven candidates for the First Time Award, which was won by Mike Pemberton, G4DDL, nine points ahead of J. F. Courtot, F6BWO, whose score of 450 points was sufficient to earn him second place in the overseas section. The winner of this section was once again Gunter Schwarzbeck, DL1BU, who also took first place in the summer event. USSR stations took part for the first time and helped to boost the bonus points for UK competitors, but their frequency band of 1·850-1·950MHz placed them just hf of the main area of contest activity. It is hoped that this handicap will diminish in future contests as more UK stations become aware of the presence of these stations.

Comments about the length of the contest were much appreciated, since the reduction was made to assess the effect of removing the last hour, when activity tends to decline. GM3ZSP, G3GC, G3YMC, G4DUS, G3LCH, G3SJE and G4CZB welcomed the change, while G4BUO and G2MJ preferred the longer event. G3IGW felt that the young ones cannot take it any more—this was once an all night affair—but G2MJ's three flasks of coffee and 60 cigarettes have now dwindled to only one flask! Increased activity from Europe was welcomed, but several entrants commented on the decline in the number of UK stations on the band.

Most entrants lost some points, mainly for incorrectly logged callsigns, or for claiming bonus points for the same county more than once. One station had his callsign copied incorrectly by several other entrants and, as a result, he lost many points, although the others were not penalized.

Subject to the approval of Council, the Victor Desmond Trophy will be awarded to K. Riddoch, GM3ZSP.

BRITISH ISLES SECTION

Posn	Callsign	Bonus QSOs	Points	Posn	Callsign	Bonus QSOs	Points
1	GM3ZSP*	56	715	20	GU4EON	38	417
2	G3PDL*	54	674	21	G4ELZ†	39	416
3	G4BUO*	52	646	22	G4BWP	37	415
4	G3TMA	54	644	23	G3ZGC	40	409
5	G3SYM/A	52	633	24	G4CZB	39	400
6	G3XUD	48	613	25	G3KLX	34	389
7	G3IGW	50	603		G3TZU/A†	38	389
8	G3XTT	49	562	27	G3JFF	34	380
9	G6BQ	44	521	28	GW3JI	34	349
10	G3SNX	45	496	29	G3HTI	33	321
11	G3GC	44	493	30	G3ZNH/A	33	315
12	G2MJ	45	474	31	G4EBK	29	308
13	G3YMC	43	473	32	G8IB	28	274
14	G4DUS	41	472	33	G3NKS	26	236
	GW3KOR	41	472	34	G4AFU†	25	223
16	G4DDL*†	40	459	35	G4HSD†	24	219
17	G3SJE	40	443	36	G3ILO	21	186
18	G3LCH	36	442	37	G3FVW	19	171
19	G3LHJ	38	436	38	G3ULY	19	155
				39	G2CIL	17	145

OVERSEAS SECTION

Posn	Callsign	Bonus QSOs	Points	Posn	Callsign	Bonus QSOs	Points
1	DL1BU*	41	488	11	OL5AUY	19	181
2	F6BWO*†	41	450	12	F8EX	18	153
3	OK1DFF*	31	344	13	OK1DFP	16	121
4	F0BMW	30	308	14	SP5IXI*	13	114
5	DJ0QE†	27	279	15	OL5BAH	11	97
6	OK1DWF	26	253		UT5DL*	12	97
7	UA2FCW*	26	231	17	OK1OPT/P	11	93
8	OL6AUL	23	209	18	OK1DEY	10	84
9	DL1YA	22	203	19	OL5AXU	10	78
10	UC2AAK*	20	191	20	UP2BAW*	8	62
				21	UB5CDX	5	37

*Certificate winners. †Entrants for First Time Award.
Check logs gratefully acknowledged from G2MI, G3RSD, OK1DKW, PA50FKP, UA1AWO and UP2BFB.

144MHz Fixed Contest results

Propogation had been good in the week before the contest but, unfortunately, these good conditions moved into Europe and only stations near the south and east coasts were able to work much dx. Nevertheless, increased entries were received for both sections and most entrants found the rules to their liking.

Last year's runner-up in the single-operator section, G3BDQ, doubled his score this year to beat G8KMW into second place. His winning total was achieved with his beam fixed due east. In the multi-operator section the leading station was again the Norfolk group, G3ZIG, operated by G3ZIG, G3MPN, G8GTZ and G8NGD. Runner-up was G4IJE operated by G4DEZ and G4IJE.

Congratulations and certificates go to these four stations.

G3VPK

MULTI-OPERATOR SECTION.

Posn	Callsign	Points	QSOs	QTH	Pwr	Best dx	Km
1	G3ZIG/A	4,470	360	AM27	400	F6AMQ	626
2	G4IJE	3,350	354	AL12	400	DD7PP	593
3	G3UNU	2,301	291	ZM04	400	DF7VX	693
4	G3NNG	2,298	295	ZL23	400	DJ0QZ	—
5	G4DGA	2,214	302	ZL58	200	GM8MJV	680
6	G3XBS	2,070	198	ZM20	350	DF6YH/P	698
7	G8RMA/A	2,058	172	AK12	350	DB7UZ	772
8	G3YMD/A	2,006	198	AL67	100	DB7UZ	705
9	G5MW/A	1,694	209	AL54	200	DL0BBC	582
10	G3ZPJ	1,567	139	XK63	300	G8PFC	555
11	GM8MJV	1,470	95	YR80	400	G8AKH	654
12	G3OUR	1,445	225	ZL14	400	DC2BM	632
13	GD4IOM	1,443	142	XO67	160	GJ8TDT	577
14	G3BBC	1,287	229	ZL46	350	HB7AEN/P	751
15	G4BEM	1,201	213	ZN71	200	GJ8TDT	412
16	G3OUL	1,189	186	YN46	300	G8LVC	381
17	G8AHK	1,174	208	ZL68	400	GM8MJV	656
18	G8RZP	1,137	191	ZL48	100	F1EZQ	632
19	G8NDT/A	1,056	212	ZM64	120	GM8MJV	546
20	G4FWC	938	184	ZM32	400	GM8MJV	502
21	G8IUB	914	181	ZM41	80	ON4BG	460
22	G3UER	888	142	ZN35	200	GJ8TDT	483
23	G8SXB	799	151	ZL42	150	PE1DAA	455
24	G3SNC	767	148	ZM31	120	ON7RB	420
25	G3KMI	707	137	ZK04	300	GD4IOM	417
26	G4ISQ/A	690	156	YM60	100	F6LKZ	395
27	G8EAH	627	89	ZN18	250	G3ZPJ	529
28	G8RWR	617	117	YL20	100	GM8MJV	579
29	G8LVC	599	125	ZK04	250	F1CYB	539
30	G8LED/A	567	115	ZM57	100	—	—
31	G4GCT	565	108	YL48	40	GD4IOM	341
32	G8GPO	547	85	ZO34	400	—	—
33	G8SZF	534	124	YM30	10	F6GIL	550
34	G4GTH	530	94	ZK21	400	GD4IOM	422
35	G3XEP	527	96	ZN13	150	GM8MJV	—
36	G8JC	526	114	YM60	60	GM8MJV	525
37	G3VZI	493	112	YM20	60	GM4IGS	349
38	G6UT	449	118	AL11	15	GD4IOM	390
39	G8OLI	443	123	ZL38	20	G3ZPJ	374
40	G8OIV	426	90	AL34	80	GD4IOM	450
41	G8FXG	415	103	ZL34	45	PA0FHG/A	421
42	G8TMI	409	91	ZM53	30	GM8HEY	445
43	G4HUN	371	105	ZM79	12	GD4IOM	380
44	G3TGA	370	67	AM73	25	—	—
45	G8RYT	333	113	AL41	90	GI4GVS	535
46	G8NVB	332	80	ZL80	12	F1BCS	305
47	G4EGG	306	68	YN38	10	G8HRO/A	311
48	G4ITG	267	57	ZK15	20	F1FHI	412
49	G3UHF	204	66	YN49	40	G3KEQ	276
50	G3XEU	147	27	YK23	3	G8GNE	185

SINGLE-OPERATOR SECTION

Posn	Callsign	Points	QSOs	QTH	Pwr	Best dx	Km
1	G3BDQ	3,697	257	AK04	250	DB7UZ	727
2	G8KMW	3,014	328	AM51	350	HB9AMH/P	763
3	G8PPS	2,375	196	AL07	150	DF7VX	513
4	G3NAQ	1,672	246	ZL34	400	DJ0QZ	641
5	GJ8TDT	1,540	153	YJ70	180	GD4IOM	577
6	G8DVK	1,516	232	ZL34	200	GM8MJV	614
7	GW4GTE	1,426	215	YN65	400	F6CER	635
8	G8OPR	1,046	187	ZL63	100	G8PNN	458
9	G4GXT	1,045	210	ZL39	25	HB9AMH/A	720
10	G4CJG	1,044	129	ZO22	400	G3ZPJ	554
11	G8IFF/A	914	99	AM37	60	DF7VX	523
12	G8SHX	885	149	YN50	400	F6CKZ	507
13	G4CMU	820	190	ZL60	300	GD4IOM	450
14	G4ASR	695	112	YM77	210	GM8FFX	560
15	G4FRE	666	122	ZM33	400	ON5UI	516
16	G8PFC/A	648	90	ZO22	300	G3ZPJ	556
17	G4ILI	636	134	YL10	400	GM8MJV	576
18	G8PCB/A	619	101	ZL71	100	G4CJG	402
19	G3PBV	571	79	YK32	100	G3ZIG/A	415
20	G8TGM	548	96	ZK17	25	G4CJG	435
21	G3XWZ	516	103	ZN64	10	GM8MJV	425
22	G4INL	510	105	YL10	45	GM8MJV	575
23	G8LHT	503	99	ZN34	120	G3ZPJ	465

Posn	Callsign	Points	QSOs	QTH	Pwr	Best dx	Km
24	G4HLX	474	116	ZM41	90	ON1QE	375
25	G3UFB	455	119	ZL19	80	G8ORO	379
26	G8TAK	449	119	ZL50	10	F1EHY/P	335
27	G8FAT	446	56	ZL39	200	F1FHI	490
28	G8RYG	428	76	AK03	10	G8NYR/P	385
29	GW4EAI	423	80	YL25	60	G3ZIG/A	320
30	G8OPS	402	68	ZN68	18	G8NOL	479
31	G4HGT	400	74	YN46	300	GM8MJV	410
32	G4HFO	321	49	YK03	60	G8SHX	310
33	G4DPT	309	79	YL10	200	G4CJG	312
34	G5UM	282	65	ZM35	15	G3ZPJ	382
35	G8FLH	263	49	ZM17	8	GD4IOM	293
36	G8ONB	257	88	ZL50	80	F6CHT	320
37	G4EDR	255	31	ZO69	100	PA0FHG	406
38	G8MFS	252	84	ZM41	3	G8OGL/P	271
39	G4IGZ	248	54	YN19	60	GM8MJV	361
40	G8EGF	238	74	AL61	12	G8NXR/P	362
41	G8O/WY/A	231	48	YN40	8	G3ZPJ	425
42	G4HIJ	230	50	ZN72	25	G8LVC	238
43	G8OMI	229	61	ZM41	40	G3ZPJ	350
44	G4AGQ	169	69	ZL66	70	F6CHT	344
45	G4FRK	167	29	YN05	100	GM8MJV	320
46	G8KMG	155	71	ZL10	40	F6AID	310
47	GW4HBK	116	24	YL25	30	GJ8TDT	280
48	G8GDW	113	51	ZL30	15	G3UNU	158
49	G8TNO	106	28	YN60	10	GM8MJV	440
50	G8LM*	97	21	ZM35	15	GD4IOM	273
51	G8TZJ	78	16	YN07	10	G4AHN	316
52	G8LXY	72	41	ZL09	10	G8OPR	104
53	G4BUO	62	24	AL42	3	G3UNU	201
54	G3ILO	15	9	YL29	3	G4FWC	130

* CW only

Check logs received from G8RXH, PE0JMK and PE1DAS.

Region Round-up Contest rules

Major changes have been made to the rules for this contest in an attempt to encourage more activity. The future of the contest will depend on the response to the revised rules and comments will be welcome.

TRANSMITTING SECTION

1. The general rules for RSGB hf contests, published in the January 1980 issue of *Radio Communication*, will apply.

2. Eligible entrants. All paid-up members of the RSGB resident in the British Isles (G, GD, GI, GJ, GM, GU, GW), holding a Class A licence. Single-operator entries only may enter.

3. When. 0700 to 1200gmt 4 May 1980.

4. Contacts. CW only. IARU Region 1 band plans must be observed: bands 3·5 and 7MHz. Entrants are requested to confine their operation on 3·5MHz to 3·510-3·590.

Reports; RST and serial numbers must be exchanged, followed by R and the operator's region. eg R07.

Section (a) Up to 150W input.

Section (b) QRP up to 10W input.

5. Scoring. Three points for each completed contact with a station within the British Isles (G, GD, GI, GJ, GM, GU, GW). Each station may be contacted for points once only on each band. The final score is the total points on each band added together and then multiplied by the total number of RSGB regions contacted. (An RSGB region worked on each band therefore counts as a multiplier of two.)

6. Entries. Separate log sheets must be used for each band, with the score for each band clearly shown. A cover sheet with the combined score and a signed declaration must accompany the logs, which should be sent to RSGB HF Contests Committee, c/o D. S. Booty, 139 Petersfield Avenue, Staines, Middx TW18 1DH, postmarked no later than Monday 19 May 1980.

7. Awards. Certificates will be awarded for the first, second and third places in each section.

RECEIVING SECTION

1. The general rules for RSGB hf receiving contests, published in the January 1980 issue of *Radio Communication*, will apply.

2. When. As transmitting section.

3. Operation. As transmitting section.

4. Logging. A station may only be logged once in the column headed "Station heard" and not more than 10 times in the column headed "Station worked" on each band. Where both sides of a contact are heard, claim for points may be made for one station only, not both.

5. Scoring. Three points for each contact heard. Other details as transmitting section.

6. Awards. Certificates will be awarded for the first, second and third places.

1,296MHz Contest rules

1600-2400gmt 12 April 1980

The following general rules, published in the January 1980 issue of *Radio Communication*, will apply: 1, 2, 3, 4a, 5a, 6a, 7b, 8, 9b, 10a, 11a, 12-22.

All entries and check logs to: VHF Contests Committee, c/o Mr L. Hawkyard, G5HD, The Eyry, Newton St Petrock, Nr Torrington, Devon EX38 8LU.

The VHF Contests Committee Cup will be awarded to the leading station.

432MHz and SWL Contest rules

0900-1700gmt 13 April 1980

The following general rules, published in the January 1980 issue of *Radio Communication*, will apply: 1, 2, 3, 4a, 5a, 6a, 7a, 8, 9a, 10a, 11a, 12-22.

All entries and check logs to: VHF Contests Committee, c/o Mr L. Hawkyard, G5HD, The Eyry, Newton St Petrock, Nr Torrington, Devon EX38 8LU.

The 1951 Council Cup will be awarded to the leading station.

144/432/1,296MHz Contest rules

1600-1600gmt 3-4 May 1980

This contest will be scored on a similar basis to that of VHF NFD (ie 1,000 points to the band leaders, etc). Only one callsign must be used and simultaneous operation of bands is not permitted.

The following general rules, published in the January 1980 issue of *Radio Communication*, will apply: 1, 2, 3, 4a, 5a, 6a, 7a (144/432), 7b (1,296), 8, 9a, 10a, 11a, 12-22.

Single operator stations, as defined in rule 4 of the general rules, must break for six consecutive hours.

All entries and check logs to: VHF Contests Committee, c/o Mr C. Sharpe, G2HIF, 20 Harcourt Road, Wantage, Berks OX12 7DQ.

Verulam ARC Transmitting and Receiving Contest 1979 results

The 1979 Verulam club contest provoked much more activity than in recent years, both on 144MHz and top band. As a result the number of entries and scores was higher than usual, assisted, no doubt, by a swing towards multi-operator stations. Although there is no award for a combined entry it was good to see some groups competing in both sections. Pride of place must go to G4EPY, operated by G4EKB, with a second place in both events, repeating his performance of last year. It has got to be a first place next year!

We congratulate Geoff, G3NAQ, on a most convincing win in the 144MHz leg, while there was a close battle for second place between G4EPY/P and G5BK/P. On top band, we had two Verulam members contesting for first place. Martin, G4CQZ, operating the Manchester University station, G3CXX, narrowly beat Dave, G4EKB, operating as GW4EPY/A from the county of Dyfed. The equipment used by the winners was:

G3NAQ:HW100 plus transverter to Tempo 6N2 pa, running 400W p.e.p. to 16-el F9FT antenna at 60ft; QTH 600ft asl.

G3CXX:KW2000A and 350ft end-fed wire at 150ft.

It was particularly encouraging to see so much activity on top band but, with over 100 stations taking part, where were all the entries? Also, where were all the Verulam members in the 144MHz event?

G4DUS

144MHz SECTION

Posn	Callsign	Points	Counties worked	Posn	Callsign	Points	Counties worked
1	G3NAQ	7,056	42	16	G4HUN	1,206	18
2	G4EPY/P	4,587	33	17	G4IVV/A	1,102	19
3	G5BK/P	4,455	33	18	G8RZA	1,020	15
4	G8RZP	3,968	32	19	G4HSS/P	988	19
5	G8KPZ/P	3,886	29	20	G8TMI	936	18
6	G8OPR	3,185	35	21	G4IDF/P	810	18
7	G8HGN/P	2,736	23	22	G8TYN	494	13
8	G8MWU	2,058	21	23	G4HFO	384	16
9	G8KNU/P	1,752	24	24	G8OMI	325	13
10	G8NQP	1,620	27	25	G8HOD	253	11
	G3VER	1,620	20*				
11	G3UFB	1,449	21				
12	G8SFM	1,408	22				
13	G4HLX	1,232	22				
14	G8TGM	1,218	21				
15	G8RXH	1,207	17				

Receiving section

Posn	Station	Points	Counties worked
1	RS41733	405	9

1·8MHz SECTION

Posn	Callsign	Points	Counties worked	Posn	Callsign	Points	Counties worked
1	G3CXX	6,048	48	11	G4DUS	882	21
2	GW4EPY/A	4,928	44	12	G4EBD	364	13
3	G3ZQM/A	4,410	45	13	G3PZF	168	7
4	G5BK/A	3,906	42				
5	G4GFN	2,485	35				
6	G3VUM	2,176	32				
7	G4IDO	1,943	29				
	G3VER	1,885	29*				
8	G3XYJ	1,836	27				
9	G4ARI	1,682	29				
10	G2AIA	1,092	21				

Receiving section

Posn	Station	Points	Counties worked
1	RS28198	2,960	40
2	RS42604	2,464	32
3	RS42959	49	7

*Verulam ARC station.

Barking R&ES 144MHz Contest rules

1300–1700gmt 30 March 1980

The following RSGB rules apply: 4b, 5a, 6a, 9a, 10a, 13–16, 18, 19, 20b, 20d, 21.

Section 1. All licensed operators residing in the county of Essex.

Section 2. All licensed operators residing outside the county of Essex.

Section 3. All short wave listeners.

Scoring. Section 1 and 2: one point per contact; 10 points per contact with G3XBF/P. The total score is to be multiplied by the number of UK postal counties worked. Countries outside the UK count as additional counties. Section 3: scoring will be as above but with these differences:

(a) Only contacts made by stations taking part in the transmitting sections of the contest will count for points.

(b) Logs must include: date; time; callsign of station heard; report RS(T) by swl on station heard; callsign of station being worked; and points claimed. A particular station must only appear once in the "station heard" column.

Contest exchange. The contest exchange shall consist of: (a) callsign; (b) RS or RST report followed by serial number beginning with 001; and (c) county (postal).

Awards. Certificates will be awarded to the winners and two runners-up in all sections. The ruling of the society's committee will be final in all cases of dispute.

Logs. All logs to be sent to: A. L. Sammons, G8IZN, 80 Lyndhurst Gardens, Barking, Essex IG11 9XZ. Telephone enquiries to 01-594 2471.

1st Spring BARTG VHF/UHF Contest rules

1. Duration. 1800gmt Saturday 19 to 1200gmt Sunday 20 April 1980.

2. Bands. 144 and 432MHz. Cross band and contacts via a repeater or satellite will not be valid.

3. Operators. Licensed amateur radio stations within zones 14 and 15 who are permitted to use rtty as a mode of communication. Portable operation is allowed but must be from one location or within one kilometre for the whole of the contest. Contest logs from swls will also be welcomed.

4. Contacts. Stations may not be contacted more than once on any one band during the period of the contest, however an additional contact may be attempted with the same station if the other band is used.

5. Messages. Messages shall consist of the following:

(a) Time of start of contact, in gmt, to consist of a full four-figure group. This information must be passed in both directions and logged. The expressions "same" or "same as yours" are not permitted.

(b) RST report, normal three-figure group.

(c) Message number. This will consist of a three-figure number starting from 001 for the first contact made and consecutive from this number, irrespective of the band in use. Numbers will continue in sequence throughout the period of the contest.

(d) QRA locator (normal five-symbol locator) is preferred, or QTH given as either a town or a bearing and distance in kilometres from a town (max 25km). The town must be identifiable on a 1:500,000 tourist or route planning map.

6. Scoring. All two-way rtty contacts will score in accordance with the distance chart below. Each band must be scored separately. There will be no multipliers applied to the scores from the two bands. Positions will be calculated as a proportion of the band leaders total points for that band, and overall dual band totals will apply by the addition of the proportions; eg, if a station wins one band and has 50 per cent of the leader's score on the other band then his total will be 150 out of a possible maximum 200.

Proof of contact may be required in certain cases where the station worked does not appear in any other contest log received.

Distance chart

0–50km scores 1 point	250–300km scores 11 points
50–100km scores 3 points	300–350km scores 13 points
100–150km scores 5 points	350–400km scores 15 points
150–200km scores 7 points	400–450km scores 17 points
200–250km scores 9 points	450–500km scores 19 points

and *pro rata* on 50km circles

7. Logs. Each band shall be entered on separate A4 size log sheets and be accompanied by a cover sheet similar to the form 427, giving address for correspondence, site and equipment details, comments and signature of responsible person, etc. The log entry shall contain: date, time of start of contact, RST report sent, message number, time received, callsign of station worked, his RST and message number (these may be combined, eg 599001), QRA and/or QTH received, estimated distance, and points claimed. It will be helpful to include the entrant's own QRA at the top of every log sheet.

8. Awards. Certificates will be awarded to the top scorers and runners-up in each section:

(1) Single-operator stations, UK and Europe
(2) Multi-operator stations, UK and Europe
(3) Short wave listeners, UK and Europe

} See additional note (d)

The judges' decision will be final and no correspondence can be entered into in respect of entries or logs received after the closing date for entries.

All logs must be postmarked no later than Saturday 17 May to qualify. Send logs to BARTG VHF/UHF Contest Manager, Chris Plummer, G8APB, 148 Porter Road, Brighton Hill, Basingstoke, Hants RG22 4JT, England.

Additional notes

(a) In order to achieve maximum compatability and to implement IARU recommendations, speed of 45·45 bauds and CCIT 2 code (Standard Murray code) should be used, although other speeds and codes may be used (if you can find anyone to work).

(b) To avoid confusion and congestion around the recognized rtty calling frequencies and to make more effective use of the bands, the use of vfo operation by participating stations is encouraged.

(c) Stations which are crystal-controlled are recommended to announce the fact when calling CQ.

(d) Single-operator stations may be fixed or portable but must be set up and operated by one operator only, otherwise entry must be made under the multi-operator section.

Contests calendar

8–9 March	Commonwealth *(Rules in December 1979 issue)*
15–16 March	Bermuda *(Rules in February issue)*
22–24 March	BARTG Spring RTTY *(Rules in December 1979 issue)*
29–30 March	CQ WW WPX SSB *(Rules in March issue)*
30 March	WAB (Phone) *(Rules in March issue)*
30 March	Barking R&ES 144MHz *(Rules in March issue)*
5–6 April	Polish DX CW *(Rules in March issue)*
12 April	1,296MHz Trophy *(Rules in March issue)*
13 April	Low Power *(Rules in February issue)*
13 April	432MHz Trophy and SWL *(Rules in March issue)*
19–20 April	1st Spring BARTG VHF/UHF *(Rules in March issue)*
19–20 April	Polish DX SSB *(Rules in March issue)*
26–27 April	HM The King of Spain Trophy *(Rules in February issue)*
3–4 May	144/432/1,296MHz and SWL *(Rules in March issue)*
4 May	Region Round-up *(Rules in March issue)*
11 May	WAB CW *(Rules in March issue)*
24–25 May	CQ WW WPX CW *(Rules in March issue)*
25 May	144MHz Low Power
1 June	70MHz and SWL
7–8 June	NFD *(Rules in February issue)*
22 June	WAB (Phone) *(Rules in March issue)*
28–29 June	Summer 1·8MHz
5–6 July	VHF NFD
20 July	3·5MHz Field Day
20 July	WAB CW *(Rules in March issue)*
3 August	144MHz QRP and SWL
11–12 August	Meteor Scatter
16 August	10th SARTG WW RTTY
17 August	70MHz Trophy and SWL
31 August	WAB VHF *(Rules in March issue)*
6–7 September	SSB Field Day
6–7 September	144MHz Trophy and SWL
4–5 October	432/1,296/2,304MHz and SWL
12 October	21/28MHz
19 October	21MHz CW
19 October	70MHz Fixed
November–December	432/1,296MHz Cumulative
2 November	144MHz CW
8–9 November	Second 1·8MHz
7 December	144MHz Fixed

Special event stations

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

club news

RSGB affiliated societies and clubs, and RSGB groups, are invited to submit items for inclusion in "Club News" to their regional representatives (not direct to the editor).

Items of news and dates of forthcoming events should reach RRs by 20 March for the May issue.

Club secretaries are QTHR unless otherwise stated.

REGION 1—RR W. M. Furness, G3SMM, 16 Coniston Avenue, Sale, Cheshire M33 3GT.

Ainsdale (AARC)—Thursdays, fortnightly; 6, 20 March, 3, 17 April. Ainsdale Scout HQ. Full details from G2CUZ.

Blackburn (East Lancs ARC)—First Thursday in each month, 7.30pm. New venue: YMCA, Blackburn. Sec F. Hill, G3YWH.

Blackpool (B&DARS)—First Monday in each month. Phone G5ND (Blackpool 64508) for details of venue.

Bolton (B&DARS)—First and third Wednesdays in each month. Horwich Leisure Centre, Victoria Road, Horwich, Bolton. Sec John Debney, G8RWY, 2 Coverdale Avenue, Heaton, Bolton.

Bolton (Edbro RC)—Details from sec, c/o Edbro Ltd, Lever Street, Bolton.

Bury (BRS)—Tuesdays, 7.30pm. Second Tuesday in each month (Main meeting). Mosses Community Centre, Cecil Street, Bury. Publicity officer, Mike Bainbridge, G4GSY, tel 061-761 5083. Visitors always welcome.

Carlisle (C&DARS)—Mondays, 7.30pm. Currock House, Lediard Avenue, Currock, Carlisle. A very full programme of lectures and demonstrations has been arranged for the coming months. Full details from G8DVD.

Chester (C&DARS)—Tuesdays, 8pm, except first Tuesday in each month. YMCA, Chester. New sec, from whom further details can be obtained, D. Cutts, tel Gresford 3344.

Douglas (IoMARS)—Mondays, fortnightly. Keppel Hotel. Cregny-Baa, Nr Onchan. Sec GD4FWQ, tel Douglas 22295.

Eccles (E&DARC)—Tuesdays, 8.30pm. White Swan, Worseley Road, Swinton. CW class each week. Sec Chris Harrison, G8KRG, 15 Cockey Moor Road, Starling, Bury BL8 2HD. tel 061-797 0031.

Leyland (LHARG)—Second Monday in each month, 7.30pm. Rose & Crown, Ulnes Walton, Leyland. Details from G3XII.

Liverpool (L&DARS)—Tuesdays; 4 March ("Safety in the shack" by G8CFM, 11 March (Bring and buy sale), 18 March ("More magic" by G3SIW), 25 March (Club constructional contest), 1 April (Lecture by BF39), 8 April (Club quiz), 15 April ("Antennas" by G6CJ, RSGB slides/tape lecture), 22 April (Winner of constructional contest explains "How and why!"), 29 April ("History of German amateur radio" by DJOPC/G4IHS), 6 May (Junk sale), 8pm. Conservative Association Rooms, Church Road, Wavertree, Liverpool. G3AHD cw practice session, Thursdays, 8.30pm on 144·250. Hon sec Al Neilson, G4CVZ, tel 051-220 5470. Club newsletter *Loud and Clear* recently launched. Visitors always most welcome.

Officials and founder members of the Bury RS, which recently celebrated its fortieth anniversary. L to r: F. Burnett, G3RSM, chairman; C. Turner, G8NL, founder member; E. Thirkell, G4FQE, secretary; G. Openshaw, G2BTO, founder member; T. Platt, G2GA, founder member; R. Lever, ex-G8QS, founder member; and W. Furness, G3SMM, RSGB regional representative

Liverpool (North Liverpool RC)—For details of meetings please contact R. Porter, G3VXK, 11 Cranmore Avenue, Crosby, Liverpool L23 0QD; tel 051-928 1610.

Liverpool University (UoLARS)—Lunchtimes. Shack in Reilly Building, open any time. Callsigns G3OUL and G8JUL active 1·8 to 432MHz. Would prospective members please contact Paul Broadhurst, G8LGL, UoL, 2 Bedford Street North, Liverpool L7 7BD.

Macclesfield (M&DRS)—Second Tuesday in each month, 7.45pm. For details of venue and programme contact Mary Roberts, 15 Park Brook Road, Macclesfield, tel Macclesfield 24383.

Manchester (M&DARS)—Wednesdays, 7.30pm. Morse practice most evenings, lecture on third Wednesday in each month. Newton Heath Community Centre, 203 Droylsden Road, Newton Heath, Manchester. New sec John Dent, G8OWY, 76 Lynwood Grove, Audenshaw, Manchester. Club station G3HOX active on hf and vhf.

Manchester (South Manchester RC)—Fridays; 7 March (Club quiz), 14 March ("Home video entertainment" by P. Barlow), 21 March (Lecture to be arranged), 28 March (Discussion evening on radio interference), 4 April (Closed), 11 April ("Test equipment for radio amateurs" by Dr D. Yorke), 18 April ("Logic made simple" by Tony Hopkins), 25 April (Home constructed equipment contest), 2 May (DF warm-up), 16 May (AGM, *please note*), 8pm. Mondays (informal) 8pm. Sale Moor Community Centre, Norris Road, Sale. Hon sec David Holland, G3WFT, 32 Woodville Drive, Sale, tel 061-973 1837. Visitors always welcome.

Manchester (UMISTRS)—Wednesday afternoons cw classes if required; Thursday evenings. The radio shack. UMIST Union bar. Prospective members please contact M. P. Doig, G4CQZ, UMIST RS, UMIST Union, PO Box 88, Sackville Street, Manchester M60 1QD. G3CXX/G8FOT active on 1·8/144MHz and, in the near future, on 432MHz/1·3GHz.

North Western Repeater Group—Third Thursday in each month (informal), 8pm. Globe Club, Willows Lane, Accrington, Lancs. Details from sec. G3RXH.

Ormskirk (OARC)—Tuesdays, 8.30pm. "Over 60's" Hut, Liverpool Road (opposite Christ Church). For details contact either G3SZV, tel Ormskirk 72100; or sec G4IGX, tel Ormskirk 75546. Club interests include vhf, uhf, hf, rtty and contests.

Penrith (Eden Valley RS)—Third Thursday in each month. Two Lions Hotel, Great Dockray, Penrith, Cumbria. Sec G4HYJ, *Herald* office, 14 King Street, Penrith, Cumbria. Full programme. Visitors welcome.

Preston (PARS)—Thursdays, fortnightly; 6, 20 March, 3, 17 April. Windsor Castle, St Paul's Square, Preston. Hon sec John Loftus, 14 Fishergate Hill, Preston, tel 53508.

Salford (Dial House RS)—Wednesdays, 5.30—9.30pm. Dial House, 21 Chapel Street, Salford, Lancs. Net channel 145·25MHz fm—the club station G3WDH monitors this frequency every club night for any other station. Details from sec G8JCL, c/o M43 at above address.

Stockport (SRS)—Second, third and fourth Wednesdays in each month. Blossoms Hotel, Buxton Road, Stockport. Apply to sec G3FYE for programme details. Club net Sundays 11am, 3,692kHz. Club now has G8SRS.

Thornton Cleveleys (TCARS)—First and third Wednesdays in each month, 8pm; morse practice from 7.30pm. St John Ambulance Hall, Fleetwood Road North (next to Gardner's Arms), Thornton. Details from sec G8MKQ.

UK FM Group (Western)—First Thursday in each month, 8pm. Grappenhall Community Centre, Grappenhall, Nr Warrington. Sec G3LEQ, tel Knutsford 4040.

Warrington (W&DARS)—Tuesdays, 7.45pm. Grappenhall Community Centre, Bellhouse Lane, Grappenhall, Warrington. Sec G3MMD, tel Lymm 3533.

Wigan (Douglas Valley ARS)— First and third Thursdays in each month; 7 February (Open evening for anyone interested in amateur radio). Shevington Conservative Club, Shevington, Wigan. Details from G4EHK, tel Appley Bridge 3320.

Winsford (Mid-Cheshire ARC)—Wednesdays. RAE class 7pm to 8pm. Morse class every third Wednesday. Technical Activities Centre, rear of Verdin Building, Verdin Comprehensive School, Grange Lane, Winsford. Net nights 1·8MHz Monday, 8pm; 144MHz (fm) Tuesdays. Hon sec G3JWK.

Wirral (WARS)—First and third Wednesdays in each month, 7.45pm. Sports and Recreation Centre, Grange Road West, Claughton, Birkenhead. Hon sec G3DLF.

Wirral (W&DARC)—Second and fourth Wednesdays in each month, 8pm. Sports Concourse, West Kirby, Wirral. Hon sec Malcolm Mackintosh, G8NMG, tel 051-334 1027.

Congratulations to Stockport RS on winning the RSGB Edgware

Trophy and the Region 1 trophies: RR's Cup, G3LWQ Rosebowl, 3·5MHz Field Day Trophy, and G2AMV Trophy. Also congratulations to Liverpool DARS on winning the G3SMM Shield and to GD2HDZ on winning the G2CIP Shield.

Will all club representatives please note that the deadline in the heading to "Club News" *is* critical.

REGION 2—RR D. S. Smith, G4DAX, Red Roof, Goathland, Whitby, North Yorks YO22 5AN. Tel Goathland 333.

Bradford (UBARS)—Thursdays, 7.30pm. N10, Main Building. Sec G8GOV, 30 Moorfield Drive, Baildon, Shipley, West Yorks. Net frequency 145·275.

Denby Dale (DD&DARS)—Second and fourth Wednesdays in each month, 7.30pm. 13 March (Special surplus sale). Pie Hall, Denby Dale. Sec G3FQH. Visitors always welcome.

Doncaster (Doncaster Metropolitan Institute of Higher Education ARC)—Details from sec Robert Lane, G4AWU, Kelston, Doncaster Road, Bawtry, Doncaster, S Yorks. Club call G3UER.

Goole (G&DARS)—Fridays, 7.30pm (during school term only). Goole Grammar School. Details from chairman G3VBI.

Halifax (Northern Heights ARS)—Wednesdays, 7.45pm. Bradshaw Tavern, Bradshaw, Nr Halifax. Sec G8NUC.

Hornsea (HARS)—Wednesdays, 8pm. New venue, The Mill, Mill House, Attic Road, Hornsea. New sec Mrs J. Heathershaw, G4CHH.

Hull (H&DARS)—Fridays, 8pm. RAE classes are held at 9pm each Friday. Kingston Community Centre, Fountain Road, Hull. Sec G8GLM, 27 Trafford Road, Willerby, Hull HU10 6AJ.

Hull (Hull University R&ES)—Tuesdays, 1.15pm. Room 313B, University Union Building, Cottingham Road. Enquiries to G8RPZ. All amateurs welcome.

Leeds (White Rose RS)—Wednesdays, 8pm. Moortown Rugby Football Club, Moss Valley, Alwoodley, Leeds 17. Sec G4DZI.

Leeds (LUUARS)—Tuesdays, 8pm. Union Annexe (second floor), Woodhouse Lane. All new students welcome. Sec G4CNG, or at "E" block, Lupton Flats, Alma Road, Leeds 6, during term.

Otley (OR&ES)—Tuesdays, 8pm. 14 Back of Court House Street, Otley. Sec G8DFZ.

Pontefract (P&DARC)—The club has just been offered new premises, three rooms for its exclusive use. Alteration and decoration is proceeding apace, with a shack high on the priority list, and a lecture room and lounge. New club night has not yet been fixed. Enquiries to P. Butterfield, tel Pontefract 71071. Sec G4DTO, 43 Red Hill Drive, Airdale, Castleford, Yorks.

Scarborough (SARS)—Mondays, 7.30pm. Scarborough Cricket Club, North Marine Road, Scarborough. Sec G4EDR. All visitors welcome. Talk-in by arrangement.

Sheffield (SARS)—Third Monday in each month, 8pm. Sheaf House Hotel, Bramell Lane, Sheffield. Sec G4APV, 321 Fulwood Road, Sheffield S10. Visitors and swls particularly welcome.

UK FM Group (Northern)—2 March, 6 April, 4 May. Sec G8PLJ. Do you use GB3NA? Your subs or donations would help support the service provided by this repeater.

Wakefield (W&DARS)—Second and fourth Tuesdays in each month. 7.30pm. Holmfield House, Thornes Park, Wakefield. Sec Andrew Walker, G4ARH, tel Horbury 274607.

York (YARS)—Fridays (except third in each month), 7.30pm. United Services Club, 61 Micklegate, York. Sec G3WVO.

RR2 hopes to be at the White Rose Rally on 30 March, to talk to anyone who has problems or who just wants to say "Hello". He is also available for club visits this year, to talk on RSGB matters.

REGION 3—RR H. S. Pinchin, G3VPE, 61 Cole Bank Road, Hall Green, Birmingham B28 8EZ. Tel 021-777 1320.

Birmingham (Midland ARS)—18 March (RSGB tape and slide lecture), 22 April, 8pm. Room 110/118, University of Aston, Gosta Green, Birmingham. Sec G8BHE, tel 021-422 9787.

Birmingham (Slade RS)—First Friday in each month, 7.45pm. The Committee Room, Church House, Erdington, Birmingham. Sec G4FGF.

Birmingham (South Birmingham RS)—Thursdays (HF night on the air), Fridays (Construction and morse classes), 7.30pm. 2 April, 7 May ("Tackling interference" by Jack Anthony, G3KQF), 8pm. Hampstead House, Fairfax Road, West Heath, Birmingham B31 3QY. Sec G4GZI, tel 021-427 7104

Birmingham (University of Birmingham ARS)—Thursdays during term, 8pm. Tuesdays (RAE classes), 7pm. Morse classes as required, lunch-time. Students' Union (above stage). Sec G8HTH. Club stations G3IUB and G8IUB. University and non-university visitors welcome.

Bromsgrove (B&DARC)—14 March (AGM), 11 April (Members' construction competition), 9 May (Raynet talk), 8pm. Avoncroft Art Centre, Bromsgrove. Sec G4HFP, tel Stourport (02993) 3818. Visitors welcome.

Burton-on-Trent (BonT&DARS)—Wednesdays, 8pm. Stapenhill Institute, Main Street, Stapenhill, Burton-on-Trent. Sec G3ACR.

Cannock Chase (CCARS)—First Thursday in each month (Formal); other Thursdays (Informal); 8pm. Bridgetown War Memorial Club, Union Street, Bridgetown, Cannock. Sec G4IDK, tel Penkridge (078571) 2067. Visitors and new members welcome.

Coventry (CARS)—14 March ("An encounter with Jupiter" by Bob Nash, G4GEE), 21 March (HF night on the air), 28 March (Cheese and wine evening), 4 April (No meeting), 11 April (HF night on the air), 18 April, 25 April (Night on the air), 2, 9, 16 May, 8pm. Baden Powell House, 121 St Nicholas Street, Radford, Coventry. Sec G8SEQ. Visitors welcome.

Coventry Technical College (CTCARS)—Mondays, 7pm. Winfray Annexe of the college. Sec G8ISJ.

Coventry (University of Warwick ARS)—Wednesdays during term, 7pm. Cryfield Farm, University of Warwick. Talk-in on S20, or contact G4BXI or G4DCW, Hurst Flat 40, Cryfield Village, University of Warwick.

Dudley (DARC)—Second and fourth Tuesdays in each month, 7.45pm. Central Library, Dudley. Sec Norman Rock, 28 Conway Close, High Acres, Kingswinford, Brierley Hill DY6 8PT.

Hereford (HARS)—First and third Fridays in each month, 8pm. Civil Defence HQ, Gaol Street, Hereford. Sec G4CNY.

Lichfield (Chad RC)—Alternate Wednesdays, commencing 26 March, 8pm. The Naval Club, Burton Old Road, Lichfield. Sec G4ESK.

Lichfield (LARS)—First Monday and third Tuesday in each month, 8pm. Swan (bar), Lichfield. Sec Ted Bowen, RS33003, tel Ibstock (0530) 60396.

Malvern Hills (MHRAC)—Second Tuesday in each month, 7.30pm. The Star, Cowleigh Road, North Malvern. Sec G8JAO.

Mid-Warwickshire (MWARS)—First and third Mondays in each month, 8pm. 61 Emscote Road, Warwick. Sec G8RZR, tel Warwick (0926) 496453.

Redditch (RRC)—Second and fourth Thursdays in each month, 8pm. WRVS Centre, Ludlow Road, Redditch. Sec G3EVT.

Rugby (RATS)—Wednesdays, 7.30pm. Cricket pavilion entrance to B Building, Rugby Radio Station, A5 trunk road, Hillmorton, Rugby. Sec G4ECO.

Shrewsbury (Salop ARS)—Thursdays, 8pm. Albert Hotel, Smithfield Road, Shrewsbury. Sec G3UDA. New members welcome.

Solihull (SARS)—18 March ("Microprocessors in amateur radio" by Paul Jessop, G8KGV), 15 April ("Citizens' band radio" by James Bryant, G4CLF), 7.30pm. The Manor House, High Street, Solihull. Morse classes available. Sec G4BBT, tel 021-743 7277. New members and visitors welcome.

Stoke-on-Trent (North Staffs ARS)—First and third Mondays in each month (Lectures, etc), other Mondays (Natternights, Raynet and club station, G4BEM), 7.30pm. Harold Clowes Community Centre, off Dawlish Road, Bentilee, Stoke-on-Trent. Sec G8ORU. New members welcome.

Stoke-on-Trent (SonTARS)—Thursdays, 7.30pm. 2a Racecourse Road, Oakhill, Stoke-on-Trent. Sec G4CWN.

Stourbridge (StARS)—17 March (AGM), 21 April, 19 May, 7.45pm. Library, Longlands School, Brook Street, Stourbridge. Sec G4IEB, 7 Hanbury Hill, Stourbridge, West Midlands DY8 1BE, tel Stourbridge (03843) 2006.

Stratford-upon-Avon (SuponA&DARC)—No regular meetings but occasional events. Help always given to new amateurs and swls. Chairman/sec G3OOQ, tel Stratford (0789) 5973.

Sutton Coldfield (SCRS)—Second and fourth Mondays in each month, 7.30pm. Central Library, Sutton Coldfield. Sec G8LTW.

Tamworth (TARS)—Second and fourth Mondays in each month, 7.30pm. White Lion, Lichfield Street, Tamworth. Other Mondays (Informal). Club shack. Sec G4FZN, tel Tamworth (0827) 69708. Club net Wednesdays 145·375MHz, 9pm. Visitors welcome.

Telford (T&DARS)—12 March (The club power supply project), 19 March (Discussion on portable outings for 1980), 26 March (Discussion on a start in amateur radio—especially for newcomers to the hobby), 2 April (AGM), 9 April (Informal; G3ZME on the air), 16, 23, 30 April, 7, 14 May, 7.30pm. Phoenix Centre, Webb Crescent, Dawley. Sec G3UKV, tel Telford (0952) 55416. Visitors welcome.

Walsall (WARC)—Alternate Wednesdays, commencing 19 March, 8pm. Forest Community Centre, Forest School, Hawbush Road, Leamore, Walsall. Sec G4GKC, tel Walsall (0922) 31675.

Willenhall (W&DARS)—Alternate Wednesdays, commencing 19 March. Three Crowns, Stafford Street, Willenhall. Sec M. P. Batchelor, 19 Newlands Close, Willenhall, West Midlands WV13 2DQ. New members welcome.

Wolverhampton (WARS)—17 March (Club project discussion—28MHz direct conversion receiver), 31 March (Night on the air on 1·8MHz), 14 April (Discussion on the Wolverhampton fiesta), 21 April (Spring clean

in the club room), 28 April (Natternight), 5 May (DF hunt on 144MHz—details from G8EDG), 12 May (Further discussion on the Wolverhampton fiesta), 8pm. Neachells Cottage, Danescourt Road, Stockwell End, Tettenhall, Wolverhampton WV9 9PH. Sec G8EDG, tel Wolverhampton (0902) 763617.
Worcester (W&DARC)—31 March (Annual construction contest), 28 April, 8pm. Old Pheasant, New Street, Worcester. Sec G4EKG, tel Evesham (0386) 41105. New members and visitors welcome.

REGION 4—RR N. J. H. Grassby, G4CPY, 22 St Cuthberts Avenue, Great Glen, Leicester. Tel 053 759 3387.
Following information is latest received.
Derby (D&DARS)—Wednesdays, 7.30pm. Tuesdays and Thursdays (Morse classes), 7 pm. 19 March (AGM). 119 Green Lane, Derby. Sec Jenny Shardlow, G4EYM.
Derby (NHARG)—Fridays, 7.30pm. Nunsfield House, Boulton Lane, Alvaston, Derby. Sec Ian Cage, G4CTZ.
Glenfield (Leicestershire Raynet Group)— Monthly. County Hall, Glenfield. Further details from M. G. Barker, G8CAC.
Grimsby (GARC)—First and third Thursdays in each month, 8pm. Alexandra Club, Cleethorpes.
Leicester (LRS)—Mondays, 7.30pm. Club House, Gilross Estate Cottage, off Groby Road, Leicester.
Leicester (LPARS)—Mondays, Wednesdays, Thursdays and Fridays, lunchtime during term. Leicester Polytechnic. Sec R. Newstead, G3CWI, 24 Richmond Road, Leicester.
Lincoln (LSWC)—Second and fourth Wednesdays in each month. Lincoln Corporation Social Club, Waterside South, Lincoln. Sec R. Shaw, G3VRD.
Mansfield (MARS)—First Friday in each month, 7.30pm. New Inn, Westgate, Mansfield.
Matlock (Derwent Valley ARS)—First Monday in each month, 7.30pm. The Royal Oak, Tansley, Nr Matlock. Guest speakers each month.
Melton Mowbray (MMARS)—Third Friday in each month, 7.30pm. St John Ambulance Hall, Asfordby Hill, Melton Mowbray. Sec Richard Winters, G3NVK.
Nottingham (ARCON)—Thursdays. 6 March (Forum), 13 March ("Amateur radio is dead" debate), 20 March (Activity night), 27 March ("Moonbounce" by D. Molyneaux, G3YUT), 3 April (AGM), 10 April (RSGB films), 17 April (Activity night), 24 April (Talk), 7.30pm. Sherwood Community Centre, Mansfield Road, Nottingham. Sec M. C. Shaw, G4EKW.
Nottingham (Trent Polytechnic RS)—Wednesdays. Newton Building, Room 105. Further information from the chairman Paul Robinson, via Students' Union, Trent Polytechnic.
Nottingham University (NURC)—Tuesdays. Contact R. Dixon, G4BVY, c/o Students' Union, Nottingham University.
Scunthorpe (SARC)—Tuesdays, 7.30pm. The Hobbies Centre, Franklyn Crescent, Scunthorpe. Sec J. Stace, G4FUH.

The RR would be pleased to hear from all club secretaries in the region, either by post or telephone.

REGION 5—RR R. E. G. Kendall, G8BNE, 19 Willow Green, Needingworth, Huntingdon PE17 3SW. Tel St Ives (0480) 67538.
Bedford (B&DARC)—First Wednesday in each month; March (Trade stand), April (Power supplies). Other Wednesdays (Informal). Club shack, Ravensden. Sec G8PZZ.
Cambridge (C&DARC)—Meeting place in course of change. Contact sec G8JKV for information.
Cambridge (CUWS)—Mondays. Queen's Bar. Details from Adrian Langford, G8PQP, St John's College.
Corby (CARG)—Fridays, 7.30pm. Hightrees Scout Centre, The Nook, Corby. Sec G8MLA.
Dunstable (DDRC)—Fridays, 8pm. Chews House, 77 High Street South, Dunstable. Sec G8ASP.
March (M&DRAS)—Tuesdays, 7.30pm. 2 Grays Lane. Sec G8GNE.
Northampton (NRC)—Thursdays, 8pm. Kingsthorpe Community Centre, Thornton Park, Kingsthorpe, Northampton. Details from sec I. P. A. Scott-Iversen, 35 Milverton Crescent, Abmington Park, Northampton.
Peterborough (GPARC)—Fourth Thursday in each month, 7.30pm. Southfields Junior School, Stanground, Peterborough. Sec G4FDF.
Peterborough (PR&ES)—For details contact G3EEL.
Shefford (S&DARS)—Thursdays, 8pm. Church Hall. Hon sec G4DAQ.
St Neots (Foster Cambridge RC)—Tuesdays, 8pm. Foster Cambridge Ltd, Howard Road, Eaton Socon, St Neots. Details from P. Dineen, 5 Reynolds Drive, Little Paxton, St Neots.

REGION 6—RR F. S. G. Rose, G2DRT, 84 Cock Lane, High Wycombe, Bucks HP13 7EA. Tel Penn (049481) 4240.
Banbury (BARS)—Last Friday in each month, 7.30pm. St Paul's Church Hall, Warwick Road, Banbury. Sec G. Reason, G4EBF, tel Croughton (0869) 810794.
Bracknell (BARC)—Mondays, 8pm. Coopers Hill Centre (adjacent to station). For meeting details please contact sec D. Williams, G4CVN, tel Windsor 56096.
Burnham Beeches (BBRC)—Second Monday in each month, 7.30 for 8pm. Hedgerley Village Hall, Hedgerley, Nr Slough, Bucks. New sec Janie Britton, tel Windsor 61723. New members, visitors and swls welcome.
High Wycombe (Chiltern ARC)—26 March (Construction contest). John Hawkins Ltd, Victoria Street, off Oxford Road (A40), High Wycombe. Further details from sec W. Catterall, 78 Fairacres, Prestwood, Great Missenden, Bucks, tel Great Missenden 4504.
Maidenhead (M&DARS)—First Thursday and third Tuesday in each month; 18 March (AGM). Red Cross Hall, The Crescent, Maidenhead. Sec P. J. Patrick, G3TWG, tel 06285 25275.
Mid-Thames RDF Club—For competition details, please contact sec T. C. Gage, 28 Aldbourne Road, Burnham, Bucks SL1 7NJ, tel Burnham 63363.
Newbury (N&DARS)—Second Tuesday in each month. Newbury Technical College. Details from sec G8LTD, tel Newbury 46078.
Newport Pagnell (Milton Keynes ARS)—8pm. Lovatt Hall, Newport Pagnell, Bucks. For further details contact sec D. White, G3ZPA, Rose Cottage, Whaddon Road, Shenley Brook Road, Milton Keynes MK5 7AF, tel Shenley Church End 310.
Oxford (O&DARS)—Second and fourth Wednesdays in each calendar month, 7.30pm. Civil Service Social Club, Marston Road, Oxford. New sec J. G. Bright, G4HJL, 22 Westfield Road, Long Wittenham, Abingdon, Oxon OX1 4RF.
Oxford University (OURS)—Please contact sec M. Evans, G8LTE, Worcester College, Oxford, for meeting details.
Reading (RARC)—Details from sec Chris Young, G4CCC.

REGION 7—RR D. A. G. Pedder, G3LFX, 97 Elgar Avenue, Tolworth, Surbiton, Surrey KT5 9JS.
Addiscombe (AARC)—Tuesdays, 9.15pm. Spreadeagle, Portland Road, South Norwood. Sec G3SJX, tel 01-656 9054. New members and visitors most welcome.
Ashford (Echelford ARS)—Second Monday and last Thursday in each month, 7.30 for 8pm. The Hall, St Martin's Court, Kingston Crescent, Ashford, Middx. Sec G8LEL, tel Byfleet 46847.
Bexley Heath (North Kent RS)—8pm. St Mary's Institute, 2 North Cray Road, Bexley. Sec G3VFD.
Coulsdon (CATS)—Sec A. R. Bartle, G6HC, tel 01-684 0610.
Cray Valley (CVRS)—First and third Thursdays in each month, 7.30 for 8pm. Christchurch Centre, High Street, Eltham, London SE9. For details of morse classes run by the club contact sec G4FUG.
Croydon (Surrey Radio Contact Club)—First and third Wednesdays in each month; 7 March (Surplus equipment sale), 4 April (AGM), 7.30pm. TS Terra Nova, 34 The Waldrons, Croydon. Sec G4FFY.
Crystal Palace (CP&DRS)—Third Saturday in each month; 19 April ("Amateur tv" by Mike Bues, G8AAI), 8pm. Emmanuel Church Hall, Barry Road, London SE22. First Tuesday in each month (Open house). Members' QTHs. Sec G3FZL.
Guildford (G&DRS)—Second and fourth Fridays in each month; 14 March (Tag bring and buy sale), 11 April (Technical forum and club affairs), 25 April (AGM), 8pm. Model Engineers HQ, Stoke Park, Guildford. Sec G4BHQ, tel Guildford 76375.
Guildford (University of Surrey E&ARS)—Informal meetings, lunchtimes during term. Lower Bar, Union House, G8AHK is active on vhf, and G3IGQ on hf. Skeds and QSOs always welcome. Sec G8MIO, tel Guildford 71281.
Kingston (K&DARS)—Second Wednesday in each month, 8.15pm. For details contact Sec R. Pellatt, RS41392, tel 01-399 8113.
New Cross (Clifton ARS)—Fridays, 8pm. 225 New Cross Road, London SE14. Details from R. A. Hinton, 42 Sutcliffe Road, Welling.
Redhill (Reigate ATS)—Third Tuesday in each month, 8pm. Constitutional Centre, Warwick Road, Redhill. First Tuesday in each month. Marquis of Granby, Hooley Lane, Redhill. Sec G3XSZ.
Sutton & Cheam (S&CRS)—14 March ("Quads and other antennas" by Dr Underhill), 25 April (AGM). For meeting details contact hon sec G. W. Brind, G4CMU, tel Burgh Heath 54497.
Thames Ditton (Thames Valley ARTS)—4 March (AGM), 1 April (Junk sale), 6 May (Caernarvon Trophy and talk), 3 June (NFD arrangements). Giggs Hill Green Library, Giggs Hill Road, Thames Ditton. Sec G3ZNW.
Tolworth (Decca ARG)—First Thursday in each month, 8pm. Decca

Sports and Social Club, Kingston Road, Tolworth. Sec G3NFV, tel Leatherhead 72587.
Wimbledon (W&DRS)—Second and last Fridays in each month, 8pm. St John Ambulance HQ, 124 Kingston Road, Wimbledon. Sec J. W. Todd, tel 01-540 9031.

RR7 would be *very pleased* to receive clubs' entries before the copy date published at the beginning of "Club News".

REGION 8—RR D. N. T. Williams, G3MDO, Seletar, New House Lane, Thanington, Canterbury, Kent. Tel 0227 66586.

Brighton (B&DRS)—8pm prompt. Catholic Church Hall, Bristol Road, Brighton. Details from N. Hewitt, G8JFT.
Burgess Hill (Mid-Sussex ARS)—Alternate Thursdays, 7.30pm. Marle Place Further Education Centre, Leylands Road, Burgess Hill. Details of future events from G3JMB or G4HHB.
Canterbury (East Kent RS)—6 March ("Micro comps" by G8IZJ), 3 April ("Coast guard, Warden Point"). Further details from G3MDO.
Chichester (C&DARC)—Details of future events from J. Chinn, 5 Shrubbs Drive, Middleton-on-Sea, Bognor Regis PO22 7SL, tel 2335.
Crawley (CARC)—Details of future events from G3MGL, tel 0293 20986.
Dartford (DHDFC)—Second Friday in each month. Scout House, Broomfield Road, Dartford. Details from Jeanette Maggs, 25 Leybridge Court, Eltham Road, Lee, London SE12.
Dover (South East Kent YMCA ARC)—5 March (Natternight), 12 March ("Test gear, part 1" by G8EGT), 19 March (Activity night 14MHz), 26 March (Construction contest judging), 2 April (AGM and awards), 9 April (Natternight), 16 April ("Test gear, part 2" by G8EGT), 23 April (Activity night CQ USA), 30 April (Fox hunt). Further details from G8KEN.
Eastbourne (Southdown ARS)—First Monday in each month. Details from R. Jeffries, G8KQN, 84 Mill Road, Hailsham, Sussex BN27 2HU; or pro G3LFZ.
Gravesend (GRS)—Mondays, 7.30pm. Windmill Tavern, Shrubbery Road, Gravesend. Details from G4GML.
Hastings (HE&RC)—Fridays. 479 Bexhill Road, St Leonards-on-Sea, Sussex. Third Wednesday in each month, 7.30pm. West Hill Community Centre, Croft Road, Hastings. Details of events from G4FET.
Horsham (HARC)—First Thursday in each month. Parish Rooms, The Causeway, Horsham. Details of future events from A. C. Wadswirth, G3NPF.
Kent Repeater Group—The group is responsible for GB3KR (Dover) and the proposed GB3KN (Mid-Kent), and for 432MHz repeaters GB3CK (Charing), GB3EK (Margate), GB3NK (Wrotham), and GB3SK (Folkestone). Information leaflet and membership details from G3XDV.
Maidstone (MYMCAARS)—Fridays; first and third in each month devoted to the beginner; 7.30pm. Y Sports Centre, Melrose Close, Loose, Maidstone. Details of events from sec J. A. Hastie, tel Medway 251387.
Medway (MARTS)—Details of events and venue from G4EVY.
Sussex Repeater Group—Information from G8HVV.
Tunbridge Wells (West Kent ARS)—Alternate Fridays; 14 March ("Home-made colour tv camera and 10GHz microwave link" by Ian Daniels), 25 April (AGM), 9 May (Construction contest). Adult Education Centre, Monson Road, Tunbridge Wells. Tuesdays following the Fridays (Informal). Drill Hall, Victoria Road. Details from Brian Castle, G4DYF.
Worthing (W&DARC)—Tuesdays, 8pm. Adult Education Centre, Union Place, Worthing. Details from G8MSQ.

REGION 9—RR H. W. Leonard, G4UZ, 4 Start Bay Park, Strete, Dartmouth TQ6 0RY. Tel Stoke Fleming 505.

Camborne (Cornish RAC)—First Thursday in each month; 6 March (Film from marine department of Plymouth Technical College), 3 April (AGM) followed by film on system protection by G3XFL), 7.30pm. SWEB Clubroom, Pool, Camborne. Full details from G3VGO, tel Devoran 864255. Cornish net each weekday 10am on 3·715MHz, and on Sundays 11am on 3·682MHz. Visitors always welcome at club meetings.
Exeter (EARS)—Second Monday in each month, 7.30pm. Community Centre, St Davids Hill, Exeter. Full details from Jack Bawden, 232 Exwick Road, Exeter EX4 2BA.
Exeter University (EUARS)—Sundays, 2.30pm. Full details from Julian Corben, G4EXT, c/o "Devonshire House", Stocker Road, Exeter EX4 4PZ.
Exmoor (ERC)—Second and fourth Thursdays in each month, 7.30pm. "Loughrigg", East Street, South Molton. Full details from Dave Stone, tel North Molton 377.
Exmouth (EARC)—Alternate Wednesdays, 7.30pm. Rolle College, Exmouth. New hon sec Mrs J. Nicholson, 35 Hollymount Close, Symonds Farm, Exmouth, tel 77263.
Newquay (N&DARS)—Alternate Wednesdays, 7.30pm. Treviglas School, Newquay. Full details from new sec Ted Warne, G3YJX, tel Wadebridge 2772.
North Devon (NDRC)—Second Wednesday in each month, 7.45pm. Pilton Community College, Barnstaple. Fourth Wednesday in each month. QTH of G2FKO, 38 Clovelly Road, Bideford. Full details from G4CG. Tel Barnstaple 3683.
Plymouth (PRC)—Alternate Mondays, 7.30pm. Whitleigh Methodist Church, Budshead Road, Whitleigh, Plymouth. New chairman Trevor Day, G3ZYY. Further details from John Butcher, G4GWJ.
Plymouth (Plymouth Polytechnic ARS)—For details contact R. Taylor, G4HZA, Amateur Radio Society, Plymouth Polytechnic Students' Union, Drake Circus, Plymouth. Club station is G3TCP, with listening facilities available on 3·5-28MHz, 144 and 432MHz, for 24 hours every day in term time.
Saltash (S&DARC)—First and third Fridays in each month, 7.30pm. Burraton Toc-H Hall, Saltash. New sec R. S. Pridham, G4BVB, tel Gunnislake 83289.
Torbay (TARS)—Fridays, with special meeting on last Saturday in each month; 8 March (Annual Dinner), 29 March ("My American visit", with slides, by G3LHJ), 26 April (AGM), 7.30pm. Bath Lane, rear of 94 Belgrave Road, Torquay. Full details from Mrs Ged Coker, c/o G4FCN, tel Ipplepen 812117. Torbay net Mondays, Wednesdays and Fridays at 10.30am on 3·756MHz, and Saturdays at 10am, 144MHz net Mondays 8pm on S22. Visitors most welcome at club meetings.

REGION 10—RR R. G. Barrett, GW8HEZ, 23 Carshalton Road, Beddau, Pontypridd, Glam.

Following information is latest received.
Barry (BCoERS)—Thursdays, 8pm. In addition, special events are arranged every fortnight. Weycook Cross, Five Miles Lane, Barry. Details from M. E. Woodberry, GW8OPK, 60 Pen-y-Graig, Rhiwbina, Cardiff, tel 613635.
Blackwood (BARS)—Fridays, 7pm. Oakdale Community Centre, Oakdale, Blackwood, Gwent. Details from GW4BLE, 10 Llanthewy Road, Newport, Gwent.
Bridgend (B&DARC)—Second Wednesday in each month, 7.30pm. NCB Social Club, Tondu, Bridgend. Details from sec GW4BDV.
Cardiff (CRSGBG)—Second Monday in each month, 7.30pm. Pantmawr Inn, Pantmawr Estate, Cardiff. Details from GW3GHC.
Loughor (LAR&EC)—Every second Monday, 8pm. Loughor Boating Club. Further details from sec T. Griffin-Thomas, GW8TYS, 77 Castle Street, Loughor, Nr Swansea, W Glam, tel Swansea 893392. All amateurs, enthusiasts and swls welcome.
Merthyr (Hoover ARS)—Mondays, 7.30. Hoover Social Club, Pentrebach, Merthyr. Details from GW3RNC.
Newport (NARC)—Mondays, 7pm. Adult Education Settlement, Brynglas Road, Newport. Details from GW8MER.
Pembroke (PRSGBG)—Last Friday in each month, 7.30pm. Defensible Barracks, Pembroke Dock, Dyfed. Details from sec GW3XJQ.
Port Talbot (British Steel Corporation ARS)—Thursdays, 7.30pm. BSC Sports and Social Club, Margam, Port Talbot. Details from GW4BDV.
Rhondda (RARS)—Every other Thursday, 7.20pm. Transport Employees' Club, Porth. Details from GW3PHH.
Sully (S&DSWC)—Mondays fortnightly, 7pm. Sully Bowls and Social Club, 58 South Road, Sully, Cardiff. Details from David Hughes. 13 Nailsea Court, Sully.
Swansea (SARS)—Tuesdays fortnightly, 8pm. Sketty Sports and Social Club, Aneurin Way, Sketty, Swansea. Details from GW4GRI.
Swansea (University College of Swansea RS)—Mondays, 7.30. Room 801, Applied Science Building. Details from sec J. Morris, 1 Hadland Terrace, West Cross, Swansea, tel 68675.

REGION 11—RR P. H. Hudson, GW3IEQ, Silhill, Dinas Dinlle, Caernarvon.

Following information is latest received.
Bangor (UCNWARS)—Thursdays, 7.30pm. Small Lecture Theatre, School of Engineering Science, Dean Street, Bangor.
Conway Valley (CVARC)—Second Thursday in each month, 7.45pm. The Quaries, Llandulas, Colwyn Bay.
Rhyl (R&DARC)—Fourth Thursday in each month. Ambulance Station, Coast Road, Rhyl. Other Thursdays (On the air on 144MHz), 8pm. Newcomers and visitors welcome.

REGION 12—RR F. Hall, GM8BZX, 45 Priory Cottages, Lunanhead, Forfar, Angus DD8 3NR.

Aberdeen (ARS)—Fridays, 7.30pm. 80 Guild Street, Aberdeen (next to Station Hotel immediately adjacent to railway station). Sec GM4BKV. The club now has a print board service from your own artwork.

Dundee (Kingsway Technical College ARC)—Tuesdays; 6.30pm morse practice, 7-8pm arranged lectures, 8-8.15pm coffee, 8.15-9pm any other business and discussions. Programme details from sec GM8RDU.

Elgin (Moray Firth RS)—First Wednesday in each month. External venue. Other Wednesdays. Within Elgin Technical College. Due to small membership the arrangements may be varied. For full details contact GM4IAO or GM3KHH.

Invergordon (Easter Ross RC)—Every second Tuesday. 100 High Street, Invergordon. Details from sec GM4DKL.

Inverness (Technical College ARC)—Every second Wednesday, 6.45pm. Room C30. Sec W. Lee, 36 Old Mill Road, Inverness.

Kirkwall—Members now meet on a few occasions during the year to discuss various aspects of amateur radio. Information from GM3IBU, tel Kirkwall 3232.

Perth (P&DARG)—First and third Tuesdays in each month. Room M1/15, Perth College of Further Education. Chairman GM8JCR. Details of programmes from sec Ian McLaren, GM8RYZ, 75 Viewlands Road West, Perth.

Shetland (Lerwick RC)—Wednesdays, 7.30pm. "Annsbrae House". Information from sec GM4BBL. Visitors always welcome. It is anticipated that a move will be made to new premises in Lerwick sometime during the coming year.

RR12 would be pleased to hear from club secretaries regarding club programmes. Please note the closing dates for information at the beginning of this feature.

REGION 13—RR A. B. Givens, GM3YOR, 41 Veronica Crescent, Kirkcaldy, Fife KY1 2LH. Tel Kirkcaldy (0592) 200335.

Berwick-upon-Tweed (B&DARS)—First and third Fridays in each month, 7.30pm. Avenue Hotel, 122 Marygate, Berwick-upon-Tweed. Details from sec GM8IIO.

Dalgety Bay (Marconi Space & Defence Systems ARC)—Open to employees and ex-employees of the company. Tuesdays, 7.30pm. MSDS Social Club, Hillend Industrial Estate, Dalgety Bay, Fife. Details from GM3YND, tel Dalgety Bay 822678.

Dunfermline (DARS)—Second Wednesday in each month, 7.30pm. CCTV Studio, Pittencrieff School, Maitland Street, Dunfermline. Details from GM3CIG.

Edinburgh (E&DARC)—Tuesdays, 7.30pm. City Observatory, Calton Hill, Edinburgh. Details from GM3RFQ.

Edinburgh (Ferranti Recreation Club AR Section)—Membership is restricted to company personnel. Details from GM8JKG, tel 031-441 5684. Visits by other clubs by prior arrangement.

Edinburgh (GB3ED Repeater Group)—GB3ED is a 432MHz repeater situated at Napier College, Edinburgh, and operating on channel RB14 (output 433·350MHz, input 434·950MHz). Details of group meetings from GM3GBX, tel 031-447 2611.

Edinburgh (Heriot Watt University ARC)—Open to persons attending any of the city's universities or colleges. Wednesdays, 2pm. Aerial Laboratory, Top Floor, Mountbatten Buildings, 31-35 Grassmarket, Edinburgh. Informal get-togethers, 7.30pm. University Bar, Riccarton Campus, Currie, Midlothian. Details from GM4EAU, tel 031-443 5061.

Edinburgh (Leith Nautical College ARC)—First and third Thursdays in each month, 7.30pm. Leith Nautical College, 24 Milton Road East, Edinburgh 15.

Edinburgh (Lothians RS)—Second and fourth Thursdays in each month; 13 March (Constructional contest), 27 March, 10 April, 24 April ("Contests" by GM3WOJ), 8 May, 7.30pm. Room 3, Cannonball House, Lawnmarket, Edinburgh. Details from GM8BJF, tel 031-447 5527.

Glenrothes (G&DARC)—Wednesdays and third Sunday in each month; 16 March (Film and talk, GM3OPW), 20 April, 18 May, 7.30pm. Provosts Land, Leslie, Fife. Details from GM4HBG, tel Glenrothes 771057.

St Andrews (University of St Andrews R&ES)—Details from Physics Department, North Haugh, St Andrews.

REGION 14—RR *(Post vacant)*

Following information is latest received.

Ayr (AARG)—Community Centre, 24 Wellington Street, Ayr. Sec GM3THI.

Dumfries (D&DARG)—Details from GM3WOJ.

Falkirk (Stirlingshire ARG)—Details from GM4DGT.

Glasgow (West of Scotland ARS)—Fridays. 22 Robertson Street, Glasgow. Further details from sec I. McGarvie, 3 Kelso Avenue, Paisley. New members welcome.

Greenock (G&DARC)—Tuesdays and Fridays, 7.30pm. 22 Inverkip Street, Greenock. Details from sec GM3LYI.

Helensburgh (HARC)—Try GM4FEO for information.

Motherwell (Mid-Lanark ARS)—Alternate Fridays, commencing 2 March 1979, 7.30pm. Wrangholm Hall Community Centre, Jerviston Street, Motherwell. RAE and morse classes every Friday. All details from sec GM4FKD.

Stevenson (Ardeer RCARS)—Details from GM3SUL.

REGION 15—RR I. J. Kyle, GI8AYZ, 2 Galgorm Gardens, Ballymena, Co Antrim BT42 1BA. Tel 0266 2024.

Following information is latest received.

Ballymena (BRC)—Tuesdays, (RAE and morse classes), 7pm. Fridays (Club night). Sundays (Special projects), 3pm. 86 Old Cullybackey Road, Ballymena. Sec GI4HCN.

Bangor (B&DARS)—First Friday in each month, 8pm. Redcliffe Hotel, Bangor. Sec GI4AAM.

Belfast (BRSGBG)—Third Wednesday in each month, 8pm. 90 Belmont Road, Belfast. Details from GI3USS.

Belfast (CoBYMRC)—Tuesdays, 7pm; Saturdays, 2.30pm. 12 Wellington Place, Belfast. Sec Paul McTaggart, 14 Thirlmere Gardens, Belfast BT15 5EF.

Belfast (Queen's University of Belfast RC)—Tuesdays during term, 7pm. Morse and RAE tuition available. Queen's University, 37 Fitzwilliam Street, Belfast. Sec GI4FVM.

Dromore (Lagan Valley ARS)—Second Monday in each month, 8pm. Scout Hall, Mossvale Road, Dromore, Co Down. Details from AR GI4GDV.

Londonderry (North West Ireland ARS)—First Thursday in each month, 7.30pm. Technical College, Strand Road, Londonderry. Sec GI8MOA.

Mid-Ulster (MURSGBG)—First Sunday in each month. GI4BAC's QTH. Details from AR GI8RJW, tel Armagh 524453.

North Ulster (NURSGBG)—Now reconstituted. Details of meetings from GI4HVI, GI8JTS QTHR.

REGION 16—RR M. S. Appleby, G3ZNU, 45 Cedar Avenue, Kesgrave, Ipswich IP5 7HA. Tel Ipswich (0473) 622559.

Braintree (B&DARS)—First and third Mondays in each month; 17 March (EGM), 21 April ("Digits in the telephone system" by D. Penny, G3PEN, of the PO), 7.30pm. Braintree Community Centre, Victoria Street, Braintree. Details from Dave Boniface, G3ZXX, 131 Humber Road, Witham.

Bury St Edmunds (BStERS)—Third Tuesday in each month, 7.30pm. Red Cross Headquarters, Mustow House, Eastgate Street, Bury St Edmunds. Details from John Munro, 29 Angel Hill, Bury St Edmunds.

Chelmsford (CARS)—First Tuesday in each month, 7.30pm. Marconi College, Arbour Lane, Chelmsford. Details from A. Mead, G8KQE, 9 Abraham Drive, Silver End, Witham.

Colchester (CRA)—Thursdays, fortnightly; 6 March ("Radio direction finding" by Eric Mollart), 20 March ("Energy and nuclear power" by CEGB) 7.30pm. Colchester Institute, Sheepen Road, Colchester. Details from Frank Howe, G3FIJ.

Felixstowe (FARC)—Tuesdays, (Informal), 8pm. Felixstowe Golf Club. Details from John Hobin, G3XIX.

Great Yarmouth (GYRS)—Last Thursday in each month, 7.30pm. 67 Southdown Road, Great Yarmouth. Details from Tony Besford, G3NHU.

Harlow (H&DRS)—Tuesdays, 8pm. Mark Hall Barn, First Avenue, Harlow. Details from sec Dan Evans, G4HFR, 17 Alsa Gardens, Elsenham, Bishop's Stortford, Herts CM22 6HD, tel 0279 812300.

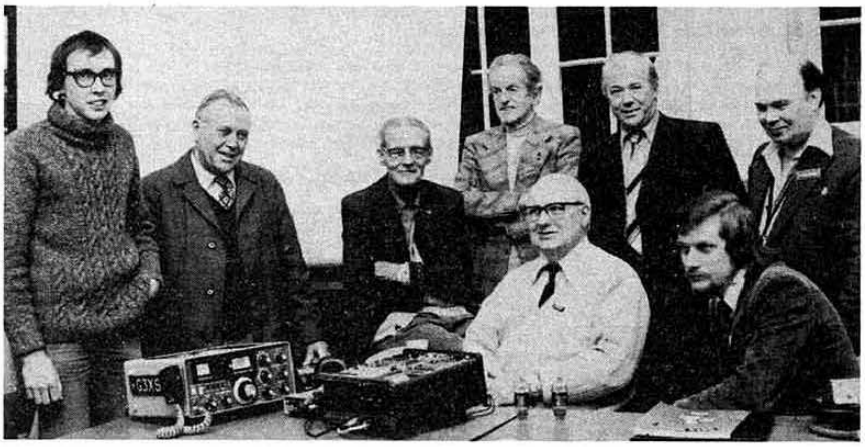
Harwich (H&DRA)—Thursdays, 7.30pm. Harwich Adult Education Centre. Details from sec Tony Free, G4EYE.

Haverhill (H&DRS)—Fridays, 7.30pm. Steeple Bumpstead Road, Haverhill. Further details from Chris Kitchener, G8IMI, tel Haverhill 2852, evenings.

Ipswich (IRC)—Second and last Wednesdays in each month during school term; 12 March ("Interference" by G. Emmeney of Colchester Telephone Area), 26 March (RAE questions and answers), 8pm. 30 April (AGM and EGM). Morse classes also available. Handford House, Ranelagh Road, Ipswich. Details from Jack Tootill, G4IFF, 76 Fircroft Road, Ipswich.

Loughton (L&DARS)—Fridays, fortnightly; 7 March (Informal), 21 March ("HF propagation" by Martin Railton, G8AB), 18 April (AGM), 2 May (Informal), 8pm. Loughton Hall, Rectory Lane, Loughton. Details from John Ray, G8DZH, tel 01-508 3434, evenings.

Lowestoft (L&DARC)—Fridays; 14 March (Lecture by Dr A. C. Gee, G2UK, about recent visit to USA), 28 March (Quiz given by Jack



A recent photograph of some members of Lowestoft & D ARC: G4GUF, G3RXF, G3RAE, G4BRZ, G3XSK, G8KPI, G8TAE and G3KJU. *Photo:* G8JBD

Walker, G3GNK, 11 April (Lecture and demonstration of XITEX system of morse/rtty conversion by G3WDI), 25 April 144MHz fm df hunt), 7.30pm. North Suffolk Teachers' Centre, Lovewell Road, Lowestoft. Details from Paul Godfrey, G8JBD.

Martlesham (MRS)—First Wednesday in each month, 7.30pm. PO Research Centre, Martlesham Heath, Ipswich. Visitors always welcome but must first contact Simon Garrett, G4EVN.

Norwich (Norfolk ARC)—Wednesdays; 5 March ("1,296MHz" by G8LUA), 12 March (Informal), 19 March (Junk sale), 26 March (Informal), 2 April (AGM 1980), 9 April (Informal), 16 April (HF discussion), 23 April (Informal), 30 April (VHF Field Day discussion), 7.45pm. Crome Community Centre, Telegraph Lane East, Norwich. Details from Peter Forster, G3VWQ.

Southend (S&DRS)—Fridays, fortnightly, 8pm. Church Hall, Sir Walter Raleigh Drive, Rayleigh, Essex. Contact sec G3YOA.

Stowmarket (S&DARS)—First Monday in each month, 7.30pm. Red Cross Hall, Stowmarket Railway Station. Details from Ray Preston, G8MYE.

Thurrock (TARC)—First and third Tuesdays in each month, 8pm. Grays Park Hall, Orsett Road, Grays. Morse tuition available. Details from sec G3KMD. Club net on 144MHz S21/22, on second and fourth Tuesdays in each month, 8pm. New members and visitors welcome.

Vange (VARS)—Thursdays, 8pm. Main Hall, Barstable Tenants' Community Association, Long Riding, Basildon. Details from Mrs D. Thompson, 10 Feering Row, Basildon SS14 1TE.

REGION 17—RR H. G. Cunningham, G8FG, 235 Station Road, West Moors, Wimborne, Dorset BH22 0HZ. Tel Ferndown (0202) 876018.

Basingstoke (BARC)—Third Wednesday in each month, 7.30pm. Chineham House, Popley, Basingstoke. Sec, G4HTM, tel Basingstoke 23421.

Basingstoke (UK FM Group Southern)—First Wednesday in each month; April ("Tropospheric propagation" by G3LTP), May (Talk on Chalk Pit Museum by Ron Ham), 7.30pm. Chineham House, Popley, Basingstoke. PRO Jan Payne, tel Aldershot 26108.

Bournemouth (BRS)—First and third Fridays in each month, 8pm. Dolphin Hotel, Holdenhurst Road, Bournemouth. Sec Bob Freeth, G4HFQ, tel New Milton 618092.

Chippenham (C&DARC)—Tuesdays, 7.30pm. Sheldon School, Hardenhuish Lane, Chippenham, Sec P. J. Tuck.

Fareham (F&DARC)—First and third Wednesdays in each month, 7.30pm. Porchester Community Centre, Room 9. Sec David James, G8GRV, tel Titchfield (03294) 45977.

Farnborough (F&DRS)—Second and fourth Wednesdays in each month, 7.30pm. Railway Enthusiasts' Club, Access Road, off Hawley Lane, Farnborough. Sec G3TMQ, 103 Hawley Lane, Farnborough.

Guernsey (GARS)—Tuesdays and Fridays. Details from sec GU8KUT, PO Box 100, St Peter Port, Guernsey.

Horndean (H&DARC)—Second Thursday in each month, 7.30pm. Merchiston Hall, Horndean. Net Thursdays, 7.30pm 28·4MHz; and 8pm S16. Sec V. Lear, G3TKN, 18 Alten Road, Waterlooville, Hants.

Jersey (JAEC)—Details from sec, tel 0534 23249.

Jersey (JARS)—Sundays, 10.30am. Fridays, 8pm. Le Hocq Tower, St Clement, Jersey. Sec R. H. Ford, Sanaldi House, Plat Douet Road, Bagot, St Saviour, tel 0534 31131.

Poole (PARS)—Last Friday in each month, 7.30pm. Poole Technical College. Sec Phil Ciotti, G3XBZ, 214 Rossmore Road, Parkstone, Poole.

Portsdown Hill Repeater Group—Repeater going QRT for re-engineering prior to fitting at a new site. Sec G8GNB.

Portsmouth (P&DRS)—Wednesdays, 7.30pm. Portsmouth Community Centre, Malins Road, Buckland, Portsmouth. Sec G3JZV.

Salisbury (SR&ES)—Tuesdays, 7.30pm. Salisbury Activity Centre, Wilton Road. Sec G2FIX, 74 Victoria Road, Wilton, Salisbury.

Southampton University (SUARC)—Tuesday evenings. Also informal meetings every lunchtime in the clubroom, Old Union Building. Sec A. C. Talbot, The Radio Club, JCR Post, The University, Southampton.

Southampton (SRSGBG)—First Monday in each month. Lanchester Building, Southampton University. Wednesdays. The Clubroom, Kent Road. Both at 7.30pm. AR J. R. Compton, G4COM, Aysgarth, Beech Corner, Durley Brook Road, Durley, Southampton.

South Dorset (SDRS)—First Tuesday in each month, 7.30pm. Lecture Hall, South Dorset Technical College, Newstead Road, Weymouth. Sec John Nailer, G4CFY, tel 0305 5411.

Swindon (S&DARC)—Alternate Wednesdays, 7.45pm. Clubroom, Oasis Leisure Centre. Sec K. Clinch, G8OQY, 13 Pound Piece, Ashbury, Swindon.

Winchester (WARC)—Third Saturday in each month. The Scout Log Cabin, Stockbridge Road, Winchester. First Friday in each month (Informal). Crown Hotel, North Walls, Winchester. Both at 8pm. Sec Peter Simpkins, G3MCL, Lawn End, Park Road, Winchester.

Many thanks to all secs and pros who have reported to RR17 recently. The secretary of the Chippenham & D ARC is requested to get in touch with RR17.

REGION 18—RR W. A. Ricalton, G4ADD, 4 South Road, Longhorsley, Morpeth, Northumberland.

Durham (DURES)—During term. Physics Dept, Science Site, Durham University. Details of events from G3ZJY, G4FOP, or sec I. P. Jefferson, BRS41816, Grey College, Durham. External members especially welcome.

Easington (EAR&EC)—Tuesdays and Thursdays, 7.30pm. Easington Village Workmen's Club. RAE and morse tuition if required (the club has a good pass record). Details from sec G4GXI. All welcome.

Great Lumley (GLAR&EC)—Wednesdays, 7.30pm. Great Lumley Community Centre. Sec G4DWM.

Hartlepool (HRC)—Mondays, 7.30pm. Methodist Church Hall, Grange Road. Sec G3NWU.

Middlesbrough (Post Office ARC)—All amateurs welcome, but first contact sec G8CDP.

Middlesbrough (Teesside Repeater Group)—Last Tuesday in each month, 7.30pm. 196 Marton Road, Middlesbrough, Cleveland. All amateurs and swls invited but first contact sec G8MBK.

Morpeth (Northumbria RC)—For details contact G4GWB.

Newcastle Upon Tyne (Tyne & Wear Repeater Group)—Arts Common Room, Claremont Tower Block, Newcastle University. Sec G4DOB, tel Newcastle 744444.

South Shields (SS&DRS)—Fridays, 7.30pm. Trinity House. Old and new members welcome. Sec G8BQF, 67 Lauderdale Avenue.

Tyneside (TRS)—Mondays, 7.30pm. The Community Centre, Vine Street, Wallsend. Morse tuition can be arranged. Sec G8OFA, 69 Rectory Lane, Blaydon-on-Tyne. New members welcome; club equipped for multiband operation.

REGION 19—RR R. J. C. Broadbent, G3AAJ, 94 Herongate Road, Wanstead Park, London E12 5EQ.

Barking (BR&ES)—Weeknights Monday–Friday. Westbury School, Westbury Road, Ripple Road, Barking. 30 March (BR&ES 144MHz Contest), 12–13 July (Dagenham Town Show). Further details from sec Alan Sammons, G8IZN. All are welcome.

Central London (Post Office HQ ARG)—Third Thursday in each month (Lectures), 5.30pm. Location varies. First Thursday in each month (Bar socials), 12–2pm. Central London. For specific details of this group, for members of PO only, contact P. H. J. Houseago, G8SGB, tel 01-388 6161 ext 202 or 204.

Cheshunt (C&DRC)—Wednesdays; 5 March (Club slides by G8LNM), 12 March (Natter/RAE/CE night), 19 March (Visit of RR19, Ron Broadbent), 26 March (Natternight), 8pm. Church Room, Church Lane, Wormley, Herts (off the A1170 Cheshunt to Broxbourne Road). Further details from sec Roger Chastell, G8LNM; or chairman Jim Sleight, G3OJI, tel Ware 4316.

Chingford (Silverthorn RC)—29 February ("SSTV" by John Bundock, G4CJQ), 11 April (Film show by G4AJA), 7.30pm. Friday Hill House, Simmonds Lane, Chingford E4. Hon sec Chris Hoare, G4AJA, tel 01-529 2282. All are welcome to attend any meeting.

Chiswick (Acton, Brentford & Chiswick RC)—18 March ("Workshop construction" by G3IGR), 15 April (Members' problems—discussion), 7.30pm. Committee Room, Chiswick Town Hall, High Road, Chiswick. Please note new time and venue. Hon sec G3GEH, tel 01-992 3778.

Ealing (E&DARS)—Tuesdays, 8pm. Northfields Community Centre, Northfields Road, London W13. Hon sec E. Batts, G8LWY, 27 Cranmer Court, Richmond Road, Kingston Upon Thames. All welcome.

East London (ELRSGBG)—Third Sunday in each month; 16 March ("Microprocessors" by G3AAJ), 20 April ("Early days of amateur radio" by G3AMF and G2MI), 18 May ("Backyard antennas" by G6NR), 3pm. Wanstead House, The Green, Wanstead, E11 (near The Grange pub, Wanstead). For further details contact hon sec G3PKQ; or chairman, G3AMF; or come up on 144MHz in E London and ask any member. All welcome.

Edgware (E&DRS)—13 March ("SSB transceiver construction" by G3TDR), 27 March (Natternight, G3ASR on air, and slow morse class). Watling Community Centre, 145 Grange Hill Road, Burnt Oak, Edgware. At AGM for 1980 Eric Godfrey was re-elected as chairman, and G3MNO as secretary. All information about this very active radio club can be obtained from Howard Drury, G4HMD.

St Albans (Verulam ARC)—Fourth Thursday in each month; 27 March (The G3PAO lecture: "Frequency synthesis and receiver design" by W. S. Poel, G8CYK), 24 April ("Radio control of models" by J. Jackson, G3TZZ), 7.30pm. Jubilee Centre, Catherine Street, St Albans. Second Thursday in each month during winter (Informal). RAFA HQ, St Albans. Hon sec A. Clarke, G8MAE.

Shelburne (SRC)—Thursdays, 7pm. Shelburne Youth Centre, Hornsey Road, London N7. RAE courses available. Hon sec T. C. Clark, G4BZW, tel 01-249 1843. Sec would be pleased to hear from any prospective members. The club has a 2000E transceiver, and G5RV for licensed members to use.

Southgate (SRC)—10 April (Junk sale), 15 May ("It could happen to you—first aid), 7.45pm. The Scout Hut, Wilson Street, Winchmore Hill Gardens N21. For details contact John Fitch, G8EWG, tel 01-440 7353.

South West Herts UHF Group—The building of GB3BH (1·3GHz/beacon/repeater) is progressing, and the group's 10GHz beacon, GB3SWH, is now operational. Reports are requested from as many amateurs as possible to evaluate GB3SWH's catchment area. Talks can be arranged for interested groups. Contact hon sec G8BBE.

At the Barking R & ES Christmas party, Jeff Rowlinson, G8GQB, found himself the centre of attention from Joan, Julie, Janet and Sue

Frank Collet, G3OVT, president, presenting the Fred Davies, G3KSS, Memorial Award to Trevor Tugwell, G8KMV, at the Stevenage & D ARS Christmas dinner. L to r: Betty, xyl of G3OVT; G3OVT; G8KMV; and Peter Hipkin, G8KMG, chairman. ***Photo:*** **G8MCV**

Stevenage (S&DARS)—First and third Thursdays in each month; 6 March ("AMSAT UK", information on satellite communications" by G3AAJ or G3RWL), 26 March (AGM—come along and give your society a bit of support, and advice for coming year), 8pm. Senior Staff Canteen, Site B, British Aerospace, Gunnels Wood Road, Stevenage. Information from Peter Byrne, G8MCV, tel 0438 64624; or on net Mondays, 7.30pm. 145·550 fm.

West Drayton (LT District Line ARC)—Thursdays, 6pm. DLAA Sports Ground, Park Place, Gunnersbury Avenue W3. (Bar). This club requires the attendance of former members, who lost interest, to enable the club to survive. It would also like the assistance of local amateurs who could give talks on any radio topic. Hon sec R. Ball, G8JEB, tel 01-422 0414. Club net 144·250 ssb, 2000–2100 local.

REGION 20—RR G. Mather, G3GKA, 8 Hills Close, Keynsham, Bristol. Tel Keynsham 61625.

Bridgwater (HPSSARS)—Second Monday in each month, 7.30pm. YMCA, Nr St John Ambulance Hall. Further details from G4ETN.

Bristol (BARC)—Tuesdays, 7.30pm. The University Settlement, Barton Hill, Bristol 5. Sec G8KGE.

Bristol (BRSGBG)—Last Monday in each month, 7–9.30pm. Small Lecture Theatre, Queens Building, University Walk, Clifton, Bristol. Hon sec G4FRG.

Bristol (North Bristol ARC)—Tuesdays (with RAE instruction), 7pm. Lockleaze Community Association, Romney Avenue, Lockleaze, Bristol. Hon sec G2BSU.

Bristol (Shirehampton ARC)—Fridays, 7pm. Twyford House, Shirehampton. Hon sec G4GTD. HF and vhf station all modes, lectures and films, df hunts etc, planned for 1980. RAE and morse classes in progress. New members welcome.

Cheltenham (CARA)—First Thursday and third Friday in each month. The Old Bakery, Chester Walk, Cheltenham. Hon sec G8MZV.

Gloucester (GARS)—Thursdays; first Thursday in each month (Society business followed by a talk), remaining Thursdays (Activity nights with G4AYM in operation), 7pm. Chequers Bridge Centre, Painswick Road, Gloucester. Hon sec G3MA.

North Avon Repeater Group—Provisionally GB3AA at Alveston, Avon. Group meets on an *ad hoc* basis. Further information from G8NNU.

Weston-super-Mare (WsMARS)—Second Monday in each month, 7.30pm. Lewis Block, Worle Comprehensive School, Redwing Drive, off Mead Vale, Weston-super-Mare. Hon sec Irvin Barr-Sim, The Old Dairy, Eastertown, Lympsham, Somerset.

Yate (Y&DARC)—First Friday in each month, 8pm. G3RQN QTH. Further details from G8LGC. All welcome including swls.

Yeovil (Y&DARC)—Thursdays (Lectures most weeks), 7.30pm. Building 101, Houndstone Camp, Yeovil (off A3088). Hon sec G3NOF. Club net 10.30am Sundays, 3·660MHz.

The Brunel Technical College RS wants new members. Contact Students' Union, Cabot House, Brunel Technical College, Bristol, or Martyn, Bristol 678467.

members' ads

These subsidized flat-rate advertisements are accepted as a service to members of the RSGB. They must be submitted on the Members' Ads order form printed in alternate issues of *Radio Communication*, or on a postcard similarly laid out. Each **must** be accompanied by a **recent** *Radio Communication* mailing label addressed to the advertiser, as proof of membership, and a remittance by postal order or cheque for 75p (stamps not accepted) for every 40 words or part thereof. They will not be acknowledged. Those not clearly worded or punctuated will be returned. No correspondence concerning this service can be entered into.

Closing dates in 1980 for issues in brackets: **28 March (May), 25 April (June), 23 May (July), 20 June (August), 18 July (September), 29 August (October), 26 September (November), 24 October (December), 21 November (January), 19 December (February).**

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 may be edited or abbreviated as necessary.

Advertisements for 27MHz equipment will not be accepted.

Post to: MEMBERS' ADS, RSGB, 88 BROOMFIELD ROAD, CHELMSFORD, ESSEX CM1 1SS.

Do not post to RSGB HQ or Advertising Representative

FOR SALE

C146A Standard, 5ch, 2m, hand-held, leather case, Basemaster charger, whip, helical antennas, ext antenna connector, handbook, £70 ono. Digiratt 1K memory kit by PCB Associates USA, *Ham Radio* November '78, £25 ono. *Wanted:* Termaline. G3AZI, QTHR. Tel 0772 37815.

Clarks Super QT3/HP mast, pneumatic, telescopic, 8-40ft, wall clamps, locking collars, accessories to convert to vehicle use obtainable. G3ZNX, QTHR. Tel Budleigh Salterton 2300.

TR7010, fitted SD306 preamp, £140. SF1 Starphone, hand-portable, xtalled SU8, £45; ditto, unmodified, £35. 4CX250B bases, valves, £10 ea. New 4CX250Bs, £7. Bantam nicads, £5. PF70 mic/loudspkr, plug, £4. Carr extra. G8ENI, 14 Julian Close, Great Wyrley, Walsall, Cheslyn Hay. Tel 0922 415374.

DX31 three-band 2kW trap dipole, unused, £30. HM102 1·8-30MHz power meter, £5. 10m RG8U low loss coaxial, £3. Elf EL102 intercom, £5. Colour prefix world dx map, 50p. G3NWG, QTHR.

KW2000A, ac psu, h/bk, £185. KW600 linear, £140. Standard 828, 2m, portable, £115. G3YIS, QTHR (S London). Tel 01-697 2136.

FL110, 160-10m, solid-state, linear, £125. VFO820, still in box, £100. TR2300, nicads, £180. Two WG16 circulators, new, £20 ea. MMT28-432S transverter, one month old, £115. MMT144-432R transverter, one month old, £160. MMT28-144 transverter, £70. RA17L rx, £200. Prefer buyer collects Racal, or deliver 50 miles Manchester. All ono, plus carr. G8JHL, QTHR. Tel 061-792 2697.

JR599CS, 2m converter, £160. TR2200GX, 5ch fitted, nicads, charger, £110. TS700G, 2m rx preamp fitted, £350. Tel Ashby, 021-445 4472; or 021-427 1220.

Trio TS510, 10-80m, 100W p.e.p., ssb/cw, vgc, incl 600Hz filter, mic, psu, £175 ono; E-Zee match, SWR25 meter, £20; HS4 'phones, £9; or the lot, £200. Liner 2, clean, £105. Pye tulip mic, £5. Please buy! G4HAO, G8LYH QTHR. Tel Bob, 051-724 1209.

KW2000E, ac and dc psus, vox, calibrator, manual, £275 ono. ETM3C keyer, £35 ono. Datong rfc board, in die-cast box, full controls, switching, Jap, DIN mic sockets, £20 ono. *Wanted:* Thruline wattmeter, hi-power vhf/uhf elements. G3AZI, QTHR. Tel 0772 37815.

8K Pet computer, under one year old, mint, work books, some amateur related programs. Buyer views and collects. G8LOB. Tel Windsor 67440.

Heath SB300 amateur band rx, comp with three xtal filters, revalved, aligned, £75; or exch Microwave Modules MMT144/28 transverter. Creed Envoy ASCII upper and lower case printer, V24 interface, £300. G4GRT. Tel Watton (Norfolk) 882110.

IC215, fm, 2m, portable, R0-7, S8, S11, S20, S22, S32, R0R, 0·5/3W, nicads, helical, 25W pa, preamp, £150; or split. G4BER, QTHR (Chichester). Tel 0243 783898.

TS520S, exc cond, £450 ono. KW103, £15 ono. KW E-Zee match, £25 ono. TH3JR, unopened, £115 ono. G3PLX vdu, comp set boards, £50 ono. Catronics uhf modulator, unused, £20 ono. Walker, G3EFB, QTHR. Tel 0494 28038.

Western DX-5V 5-band vertical, unused, still untuned, £30. Joystick and Joymatch 111B, £25. Hallicrafter to Keyer, model HA-1, speed 10-25 and 30-65, £20. Transistor checker FTC401, £10. Carr extra. A. Stewart, GM4IKB, 49 Glenmuir Crescent, Logan, Cumnock, Ayrshire. Tel 0290 21378.

Icom IC280E 80ch 144MHz fm mobile rig, mint cond, orig carton, mobile mount, all nuts, bolts, screws, etc, £240 ono. Capital needed for hf gear. *Wanted:* hf tx/rx. GW3YTL, QTHR. Tel Knighton (Powys) (0547) 528030, evenings only.

HC6U 8MHz xtals for R7, S32, £1.50 ea. 10MHz rx xtal Storno Viscount for S16, S32, R7; large quantity high and low band commercial HC6U and HC25U xtals; sae for lists. G4DDI, QTHR.

Trio TR7010 2m ssb tx/rx, £130 ono. Jaybeam 8XY antenna, £14.50. Going QRT due to excessive QRM from local high-power stations. G8CVI, QTHR. Tel Southend 232215.

FT221, 144-148MHz, giving full cov for 70cm transverter, correct repeater shift, 600kHz vhf, 1·6MHz for uhf, built-in preamp, a "hot" rig, worked 90 countries, 19 countries from 100ft asl QTH, £280 ono. G3AZI, QTHR. Tel 0772 37815.

Telford TC7 Mk2 comm rx, 2m, 10m, all mode, perfect wkg order, clean cond, £25. Brass key, £5. Smith. Tel Pershore 5167.

Pair L-C 100kHz i.f. filters, 500Hz, 3kHz bw, hermetic silver plated, conn data, £8. 10·7MHz xtal filters for 25kHz channel spacing, data, unused, £5. B/new QQV06-40A, base, Pye vhf tank unit, c/o relay, £10. Three b/new unused 829B vhf double tetrodes, £9 ono. 2m conv xtal 38·6666MHz, unused, £1.50. "Transcendent 2000" 3-octave music synthesizer, professionally built Powertran kit, fully operational, uses ext pa/hi-fi amp, only four months old, kit is £190, £140 ono. GM8JFZ, QTHR. Tel 03552 30860, after 7pm.

Solartron digital voltmeter LM1867, ac/dc converter, accuracy ±0·001%, this is a laboratory instrument, £75. G4FYP, QTHR. Tel Cheslyn Hay 412567.

FRDX400S, 2m, 4m, all options, exc cond, £160; KW107 atu, mint cond, virtually unused, £85; Trio TR2200GX, S20-23, S0, R4-7, nicads, helical, vgc, £115; all with orig packing. FL200B tx, 80-10m, ssb/cw, will transceive with FR400, good cond, £95. G4FYG, QTHR. Tel 0732 359291.

Hills 42ft Teletower, 25ft lattice, 17ft tubular ext, £50. TA33Jr Mosley antenna, £50. SB200 Heath linear, exc cond, £200. Buyer collect. G3ZNX, QTHR. Tel Budleigh Salterton 2300.

G3PLX rtty vdu pcbs, fully assembled, sockets fitted for every ic, moving cursor incl, deluxe job, ready to go, needs only keyboard, 5V psu, tu, tv set, £70 ono. *Wanted:* KW109 coaxial relays, preferably 12V. G3AZI, QTHR. Tel 0772 37815.

G3PLX rtty vdu boards, set of three by Catronics, memory timing, input, unused, £10. GM4BIT, QTHR. Tel Troon (0292) 315711.

Heathkit GC1U Mohican Mk2 gen cov rx, 600kHz-30MHz, good cond, int batteries, mains/12V psu, handbook, circuits, £40 ono. G8ICT, QTHR. Tel 051-355 1070.

Microwave Modules converter, MMC432/1445, as new, £18. Pair TT21 and one 5R4GY valves, new, boxed, £14. G4GSE, QTHR. Tel Swanley 64486, evenings.

TS700S, three months old, £450; matching vfo, £65; both in mint cond. G8TZD. Tel Castleford (0977) 556488.

Yaesu FTDX401, exc cond, fitted cw filter, fan, 560W p.e.p., 80-10m, manual, £300 ono. Owner going mobile. G4HSG, QTHR. Tel North Weald 2704.

Orig National Velvet Vernier dials, two, 3in dia, large calibrated skirt, ideal linear Z-match, £4.50 ea. US Navy cw audio filter unit, 1kHz, plug, mint, £5; USAF model, £4. Full set AR88 knobs, new, £5.50. All postage extra. G3GUU, QTHR.

KW2000A, stabilized psu, comp with Sentinel hf rf amp, all in exc cond, £200. Europa B 2m transverter, spare valves, £70. All buyer collects. G3TSL, The Shaftesbury Private Hotel, 26 Shaftesbury Avenue, Blackpool. Tel 0253 52453, any time.

Yaesu FT223 2m tx/rx, fitted 6ch, comp with 30W rf amplifier, £150. Homebrew 25W solid-state 2m fm tx, £30. G3WUW, QTHR. Tel 073529 3694.

Creed 7ERP, 45·5Bd, in good cond, £30. Creed 7B, 50Bd, £25. FRG7, mint cond, fine tune, £155. Aiwa aircraft rx, tunable 156-162MHz, £50. Other interesting bits. G4DFX, QTHR. Tel 01-560 7450.

FT200B/FP200, good cond, £265. HB hf linear, wkg, £30. Pye Bantam, s/con R6, nicad, spare xtals for S21, £35. GM4EIW. Tel John, Cumbernauld 33869.

"QST", 1974-78, comp, £5. *Radio Communication*, 1973-78, comp, earlier years from 1965 with few copies missing, £10. KW103 swr/power meter, perfect, £15. Carr extra. G8MY, QTHR. Tel 0252 511086.

KW Atlanta tx/rx, extras incl matching vfo, fan, various valves, owned since new, £220. 2m tx/rx, Icom 240, used nine months only, £160. G3RK, QTHR (Suffolk). Tel Wangford 619.

Standard C146A, 2m, fm, hand-held, S0, S20-22, R6, toneburst, nicads, helical, external mic, charger, case, handbook, £90. Yaesu FRG7 rx, fine tune, all accs, mint, £180. MM a.m. tx, £25. Parker, G8HNM, QTHR. Tel Taunton 3635, evenings.

IC22A, xtalled for R3-7, S0, S20-23, £115. Nixon 13·8V 5A output power supply, £12. G3AJZ, QTHR. Tel 0305 4350.

FT221R, mint, £325. Icom IC240, all channels fitted, plus key pad, mint, £150. Buyer collects. G4FHE, QTHR. Tel Reigate 42411 ext 216, office hours only.

Pye Cambridge, 2m, fm, fully modified; HW17A 2m tx/rx, 10W; the pair, £65. B44, no psu, £7. Buyer collects or plus carr. M. Kennett, G8MGT, QTHR. Tel Chelmsford (0245) 61535, after 7pm and weekends.

FT301S, all xtals, rf proc, cw filter, built-in HB9ABO keyer, FP4 psu, £500. Tel 0474 4694.

Kokusai mechanical filters, type MF-455-30W, 455kHz i.f., b/w 6kHz, £5 ea. Cambridge AM10D, tx on fm, rx requires alignment, spare boards, handbook, £45 ono. G8IXP, QTHR. Tel Maidstone (0622) 65635.

Marconi TF801D/1 10-470MHz a.m. sig gen, offers; TF791D carrier deviation meter, 4-1,024MHz or xtals; both h/books. Solartron CD1400, CX1441 10mV Y amp, CX1442 dual i/p differential Y amp, CX1443 200ms-0·5μs t/b, handbook. G8EZT, QTHR. Tel Ray, 01-749 2584.

Atlas 210X tx/rx, £430; AR200 power supply, £63; Dentron MLA2500 hf/2kW linear, £540; MT300A 3kW atu, £225; Honda generator, 115V, 60Hz, 1·5kVA, £225; all new, unused. D. A. Evans, G8UMQ, QTHR. Tel 0703 556746, after 7pm.

Low output on your linear? Float charge the battery with constant-voltage battery charger with current foldback, short circuit and reverse polarity protection, 12V 3A, £25. Bench psu, 0-30V dc 5A, 0-25V ac 5A, £25. Varactor tripler, 144/432, 20W, £10. FR101 4m converter, £10. FR101 fm pcb, XF30D filter, £15. G8ARV 2m tx, a.m/fm modulator, vfo, £8. Regulator ics, CA3085, £1 ea. Bridge rectifier, 250V 6A, 50p each. 22MHz xtal, £1. S. M. Sherratt, G8FAK, 32 Springfield Way, Cranfield, Beds MK43 0JN.

MFJ901 Versa tuner, 10-160m, three variables, balun, £30; MMC432/144S converter, £22; Modular Electronics 2m solid-state linear, 10W in, 40W out, rf switched, £30; all as new. G3AAV, QTHR. Tel Leeds (0532) 751100.

TA33Jr, needs slight mechanical attention, £40. Buyer collects. G3VQL, QTHR (Salop). Tel Nesscliffe 230.

GR78 Heath portable gen cov rx, featuring bandspread, nicads with built-in charger, xtal calibration osc, double-conversion on highest range, etc, in exc cond, comprehensive handbook, £39. Buyer collects. G8DV, QTHR. Tel Cheltenham (0242) 20195.

TR2200GX, R0, R5-7, S20-23, rev R0, nicads, charger, helical, case, orig packing, exc cond, £120. G8JCW, QTHR. Tel 021-476 3695.

MMT 432/144 transverter, good cond, checked and realigned at MM before sale, £100. Pair PF1s, 433·2MHz, nicads, h/brew charger, £28. Pair PF1s, 433·5MHz, nicads, £26. G8JNJ, QTHR. Tel 061-330 1992, 6-9pm.

Atronics morse decoder speed and level controls, offers around £100. U450L tx and rx, SU8. Heath HW17A, fm unit. HG10B vfo. Hallicrafters SX122A communications rx. CT471A electronic voltmeter, prefer inspect and collect, reasonable offers. G4DEL, QTHR. Tel Hornchurch 51410.

901D, as new, £650. FRDX400, FLDX400, mint, £295. Labgear top band tx, ac/dc psu, £35. MM 144/28 transverter, one month old, £65. Grundig vcr, two tapes, remote control, £385. *Wanted:* Atlas 180. G3RCQ, QTHR. Tel Dave, Hornchurch 55733.

SB200 kilowatt linear, spare pair 572B valves, exc cond, comprehensive handbook, £195. Buyer collects. G8DV, QTHR. Tel Cheltenham (0242) 20195.

Liner 2, psu, fitted four bands (144·1-144·32, 144·28-144·51, 144·8-145·03, 145·75-145·98), SD306 preamp, 2N204 mixer, BF173 30MHz rf 2N204 mixer, pip-tone and Pye mic insert, £125. S. M. Sherratt, G8FAK, 32 Springfield Way, Cranfield, Beds MK43 0JN.

2m converter, SEM, i.f. 28-30MHz, three months old, £11. A Sillence. Tel Southampton (0703) 782545.

Mobile generator 240V ac 50Hz at 2·5kVA, 24V dc outputs, in small box trailer with brakes, engine only used about 16 field days from new, £230 ono. A. Platt, G8KTB, Weare Street Gill, Ockley, Surrey. Tel Oakwood Hill 418.

Europa 2m tvtr, coaxial relay, all cables for use with FT101, spare pa valve, £35; Samson ETM3 mains-powered squeeze keyer, £29; both items vgc. Buyers collect. G8DV, QTHR. Tel Cheltenham (0242) 20195.

Trio 2200GX, nicads, charger, R3-7, S20-23, £125. 10/40W 2m pa, £20. Pye Vanguard, wkg on 70·26MHz, £15. Codar AT5, homebrew psu, £15. PA1 2m preamp, £5. Homebrew comm rx, £5. Hammond, G4DBW, QTHR. Tel Bob, Swanley 64356, after 6pm.

Hallicrafter FPM300 Mk2 base/mobile tx/rx, mic, mobile mount, £275. Heath linear, SB200, 1,200W p.e.p., £185. Trio 2300, new 31/12/79, nicads, £165. Daiwa SR9 monitor, 11 popular channels fitted, antenna mains unit, £60. G4EMG. Tel 01-534 3460.

IC215, R0-9, S0, S20, S22, S24, orig packing, etc, £125. 5/8 mobile whip, £8. GP, £3. B128 tx/rx, 2-8MHz, 12V psu, circuits, spare valves, £25. G3JPX, QTHR. Tel Canvey Island 63004.

Hallicrafters SX101A amateur bands rx, vgc, variable selectivity, **0·5**-5kHz, variable notch filter, calibrator, WWV, manual, circuit, £75. Trio 9R59DS, matching spkr, manual, vgc, £50. Tel Letchworth 74334, after 6pm.

Icom IC215, portable, vgc, auto toneburst, manual, fitted S15-16, S19-23, R1, R3-R8, R6 input, λ/4 whip, helical, shoulder strap, £140 ono. Airmec 365 sig gen, 1-320MHz, £45. G8OST, QTHR. Tel 0440 5553.

Computer power supplies: one 5V 2A, £8; one 24V 2A, £10; both fully regulated and smoothed, each on small compact sub-chassis. Kode P72B keyboard, in case, £5. All items in exc cond. G4FLY, QTHR. Tel 0734 594495.

Sommerkamp TS280 80ch tx/rx, mic, mobile mount, used little, £170. 10·7 gig Gunn tx/rxs, CL8920, £8. 90° bends, 10 gig, WG16, offers. G3KPW, QTHR. Tel Gravesend 62051, evenings.

Yaesu FT101ZD, fan, mic, three months old, £575. SEM Z match, £35. 14AVQ vertical ant, £35. KP202, 6ch, nicads, charger, £85. Jaybeam colinear, approx 70ft low loss coaxial, £40. Codar AT5, £30. G4CEU. Tel 0268 778202.

FT221R 2m multimode tx/rx, preamp, handbook, £330. G8MLC, QTHR. Tel Cowes 293038, after 7pm please.

Multi U11 uhf tx/rx, as new, £185. Trio 2200GX, fitted 10ch, incl mounting tray, helical, nicads, 15W pa, preamp, charger, £130. G8PML. Tel 01-806 3266.

FT101 Mk2 fitted fan, 350Hz cw filter, G3LLL's rf clipper, mod kit, improved front-end and agc action, mic, ext spkr, immac cond, £375. G4DJC, QTHR. Tel Witham (0376) 514845.

FT200, psu. Phone for details. GW4EPF, QTHR. Tel 0792 62439, after 6pm.

Rotator, AR22XL, unused, boxed, control unit, four-way cable, £25. Universal bridge, Marconi TF868B, good wkg order, £45. G4HED. Tel Stevenage 62829.

Forgestone 400 colour tv, 26in, fully built, aligned, in good cabinet, used domestically for three years, still to find a fault, ideal base for Teletext or /T, all manuals available, solid-state except line-output, £175. G3UZF. Tel Luton 424696, evenings.

Tifax XM11 teletext decoder, interface module, keypad, power supply, full installation instructions, Texas spec sheet, cost £200, best offer for quick sale. Tel Nantwich (0270) 64050.

Trio 7010, vgc, preamp, pip-tone, 144·2-·4, £145 ono. Trio 2200GX, xtals for all Rs, plus six simplex, charger, nicads, £120 ono. Codar T28, needs alignment, £10. G8HKK, QTHR. Tel Bath 832426.

Collins 51S1 gen cov rx, 0·2-30MHz, round emblem late model, fitted a.m. mechanical filter, manual, mint cond, £750 ono. Tel Chester 24763, evenings.

Trio TR7010 2m ssb/cw tx/rx, comp with cw band xtal, cmos pip-tone unit (orig, see *Radio Communication* December '78), all accessories, £135. GM3HBT, QTHR.

FTDX401 tx/rx, good cond, orig plastic skin on front panel, YD844 mic, matching spkr, £250. Drake TV3300 lp, £10. AR40 rotator, control unit, cable, stays, £25. Yamaha 4B electronic organ, two manual, good cond, bargain, £280. G3XHC, QTHR. Tel Dartmouth 3621.

FT101B, £350. Transverters: Magnum Two, £85; Magnum Four, £90; MM 2m, £75; MM 70cm, £80. LA106 2m linear, £200. EDL432P 70cm linear, £100. Converters 18-20MHz i.f.: 2m, £10; 70cm, £10. RAK 80/40 T/dipole, £20. FT101 nbfm unit, £30. G3WHK, QTHR. Tel 01-330 5795.

Yaesu FT201, 160-10m, 170W, mic, fan, Junker precision key, Yaesu FC301 antenna tuner, Kenwood LF30A low pass filter, all cables, vgc, no marks, all for £300, plus Securicor. Ward, 40 Oole Road, Cleethorpes, Lincs. Tel 67881.

Colour tv, 26in Bush, *WW* Teletext, full manuals, both wkg, need attention, spare i.f., decode boards, £100. Avo 8 multimeter, ER case, £40. Rigonda VL100 6in bw 12V/mains tv, data, £25. G3TCG. Tel Fairseat (Kent) (0732) 822043.

IC22A, S17-23, R0, RR0, R3-7, xtal t/burst, ETI amp, 5/8 mag mount, the lot, £150. Europa psu, £15. YF90F filter, xtals, £12. G4EAX, QTHR. Tel Long Eaton 69238, after 6pm.

HQ1 mini quad, three months old, used little, £70. *Wanted:* FV101B; two 2m hand-held tx/rxs. G3SHL, QTHR. Tel Market Harborough 64384, evenings and weekends.

PF1s, RB4, £25. MM 2m a.m. rx, needs tweaking, £11. RF26B, £4. Prefer buyer collects. G8TNR. Tel Bedford (0234) 781 323.

KW Viceroy Mk3 tx, Hallicrafter SX117 rx, both in good cond, ideal beginner's station, the pair, £100. Will deliver within 50 miles or buyer collects. G3WVV, QTHR. Tel Bedford (0234) 54507, evenings.

IC700 hf tx/rx, wkg, 80-10m, £120. Hudson base stn, on 2m, £50. *Wanted:* high power linear amp for 70cm, psu. G8IZN, QTHR. Tel 01-594 2471.

Lowe SRX30 0·5-30MHz rx, £120; NR-56VF1 2m fm rx, fitted R6, vfo, £35; 6-el quad, £17.50; all ono, in good cond. Broad, G4IXS, Pastures New, Whitchurch Road, Nr Nantwich. Tel Tim, Crewe 780546.

Atlas 180 160-20m tx/rx, h/b psu, £240. *Wanted:* Pye Compak 8Hf, on 80m, h/b ssb rig, G3ZVC. Part exch welcome, would consider G2DAF. G4GXU, 6 Spinney Bank, Kings Sutton, Banbury OX17 3RL.

DX5V vertical, not suitable new QTH, perfect, £30. Dentron 300W ant tuner, unused, £30. Drake 2B rx, exc cond, £80. G3CPM, NOT QTHR. Tel Broadway (Worcs) 2753, evenings.

TR2300 2m portable tx/rx, comp with nicads, helical antenna, in orig packing, in immac cond, bought in August '79 for £215, genuine reason for reluctant sale, quick sale £155. G8OSC (SE7). Tel Mark 01-858 2510, Mondays to Fridays.

Belcom 2m fm FS1007P, exc living room type tx/rx, good cond, etc, all self-contained, eg swr meter, clock, psu, scanner, just plug in, 16ch, 10 fitted, 10W out, £100. Buyer collects or pays p and p. Tel 0532 568814.

IC215, portable, channels R1-8, S0, S20-24, R6 input, fitted nine, 1,650mAh nicads, C size, charger, case, helical, spare telescopic whip, handbook, circuits, orig packing, mint cond, £140 ovno. G8OYV, QTHR. Tel Basingstoke 28241, after 6pm weekdays.

Trio 7500 fm tx/rx, 80ch, box, manual, £185 ono; 2m valve linear amplifier, EDL144, linear/preamp, 100W out ssb, 50W fm, rf sensing, fitted cooling fan, QQVO6-40A pa, small size, costs about £150 new, £85 ono; both wkg perfectly. Can deliver/demonstrate. G3XXQ, QTHR (Newcastle). Tel 0632 746723.

Swan 100MX mobile/fixed tx/rx, c/w mount, mint cond, superb audio, minimum output 100W, all bands, £400 ono. Beautiful teak-finished organ console, stool, oak pedalboard, keyboards, electrics, unfinished project, ideal home constructors, offers around £500. G3MIN, QTHR. Tel Shoreham-by-sea 3552.

U10B, 6ch, xtal RB0, RB14, RB2, SU8, £50. UHF sf1s, from £35. SF1 unit charger, £10. PF1 unit charger, £10. Avo TFM sig gen 5-220MHz, handbook, £45. Burndept BE357, uhf, handbook, £30. Racal SA535 1·2MHz counter, £15. Racal SA520 0·5MHz counter, £12. YL1130s, ex eqpt, ok, £3. Advance power module type A4 3A 12V, £12. Pref buyer inspect and collect, carr at cost. *Wanted:* remote spkr/mic for Storno 500, CQP51Z. G4CFH, QTHR. Tel Willenhall 405294.

Heath HQ16 cw tx/rx 80, 40, 15m, dual conversion rx, variable input, 50/90W, £50. Carr extra. G3ZCO, QTHR. Tel (0262) 78066.

IC240, £150. IC30A, 70cm, 8ch fitted, six rptr, two simplex, £150. IC202, £140. MML 144/25, 25W amp, £40. G8IFN, NOT QTHR. Tel Chelmsford (0245) 441504.

Marine vertical dipole, 156-164MHz, C & S Antennas Ltd, type gmd, £24.50. Toyo xtal filter, 21·4MHz, type 21J-4B, £8. Telefunken 100kHz usb/lsb mech filters, £15. TRW MV30, 40W pa module, 140-175MHz, c/w data £28. G3JMJ. Tel 0732 863467.

Microwave Modules 432/144R transverter, 12 months old, £130. MM psu, 4A, £20. FT227R, £150. Two pairs PF1s, RB6, SU8, nicads, car adapter, plus pair spares, ccts, £45. 70cm Parabeam, £12. W15FM boards, various, pa driver etc, SEM 2m preamp, £5. Whiston, G8RCL. Tel Penketh (Warrington) 4766.

IC202, 144·0-144·6, 144·8-145·0, MML25 linear/preamp, as new, Stolle 2050 rotator, 8-el Yagi, pip-tone, 12V 6A psu, £175; or exch for hf tx/rx. Will split. G8TGM. Tel Bognor Regis 820095.

FDK Multi 2000 2m tx/rx, fm, ssb, cw, 10W o/p, synthesized, 200ch, built-in mic, preamp, £260 ono. G3ODB, QTHR. Tel Orpington 22598, after 6pm.

Shack clearance: Tentec mini qrp cw rig, £45; SB200, £225; TA33, £55; several eht transformers; linear amp components; text equipment; many items, sae for list. G4IQT. 54 Sharpenhoe Road, Barton, Beds. Tel Luton 881323.

Trio JR500S rx, SP5DS, 160-10m, mods, incl xtal calib, 10m preamp, 2m converter, audio notch filter, hb atu, antenna switch, handbook, £70 ono. 3kV transformer, fused at 2·5A, heavy, rectifiers, chokes, etc, £30. G4IVF. Tel Pete, Oakham 56012, evenings or weekends.

FTDX 560 hf tx/rx, 10-160m, accessories, £270; Eddystone EC-10 Mk2, 550kHz-30MHz rx, £90 ono; both in good clean cond. G4DOV, QTHR. Tel Cheslyn Hay 0922 414927.

Sanyo vtr 2000E, 0·5in reel-to-reel, mono video recorder, as new, £210 ono. Pye Cambridge, a.m., single channel, high band, £25. Pye Vanguard, 6ch, fm'd, S0, S20, S22, £25. G8ETI, QTHR. Tel Swindon (0793) 22264, day; or 0793 825350, evening.

HW101 hf tx/rx, mint cond, comp with homebrew psu, £185. Belcom vhf fm scanning tx/rx, vgc, £100. G3TUY, QTHR. Tel 0843 68166, day time; or 0843 601737, evening.

Tilt-down mast, self supporting, anodized, winch, used on densely populated housing estate, erected 8m high, £95. Four-section 12m portable alum mast, rigging but without couplers, £25. Buyer collects. G4FDC, 29 Eversfield Place, St Leonards-on-Sea, E Sussex TN37 6BY.

FT101E, cw filter, as new, comp with mic, leads, etc, £415. Ext vfo FV101, £60. C. Twine, G4EBH, 4 Dunbar Road, Bournemouth. Tel 0202 26486; or 514551.

IC30A 70cm 10W fm mobile tx/rx, channels SU8, SU20, RB0, RB2, RB4, RB6, RB10, RB14, mint cond, orig packing, handbook, circuits, mobile mount, etc, £190. G8OYV, QTHR. Tel Basingstoke 28241, after 6pm weekdays.

Labgear LG50 a.m./cw hf tx, £25. 20m to top band transverter, homebrew, £15. Class D wavemeter, £6. Buyer collects. G3TIS, QTHR. Tel Wye 812888.

Heathkit DX40, vfo, £45. Icom IC22, S0, S20-22, 144·8, 144·48, 144·9, R5-7, £75. Lafayette HA55 valve aircraft rx, needs attn, £30 ono. G4GJV. Tel 01-574 3872.

4CX250, rugged, base, plus vhf/uhf coaxial relay switch, £10. Other pa components available. G4INX. Tel Chester 374584.

Yaesu CPU2500R 25W 2m tx/rx, 10 months old, SMC stepper, superb cond, £280. Icom ICRM3 microprocessor control unit for IC211E, IC245E, £75. G8IMI, QTHR. Tel Haverhill 2852, evenings.

Storno Viscount, modified iaw *Radio Communication* article, preamp, toneburst, 8ch, S0, S20-22, R5-7, 145·8, £50 ono. Can deliver within 30 miles of a line from QTH to Wallingford, Oxon. G8IHV, QTHR. Tel (0462) 813848.

Minimitter tx, 80-10m, cw/a.m./fm, 150W, wkg, 25 by 13 by 18in approx, £25. Heath VF1 vfo, handbook, £5. Collect or carr extra. G3RFI, QTHR. Tel Potton (0767) 260800.

Trio 7400A 800ch fully synthesized 2m rig, 35W output, 18 months old, £225. Three 10ft-sections lattice tower, can be transported on car roof-rack, best offer over £30. G3POX, QTHR. Tel 0480 811549.

Inductance decade 0·01% tol, £15, plus carr. Harmonic distortion meter, Heathkit IM12U, £20 plus. Call any time. Tel Ken, 0632 678828.

Jaybeam antennas: 12XY, only used in loft, exc cond, harness, £27.50; 5Y, £5.50; 5XY, brand new, never used, harness, £15.50. Electronic bug key, Telegraphic Systems SK2, iambic paddle, £25.50. Strong aircraft canopy motor, suitable for small beam rotation, reversible, 12V, chain, cogs, £12.50. RF field indicator FL30HA, ok up to 30MHz, £5. All ono, carr extra. G3OJI, QTHR. Tel Ware (0920) 4316.

Drake TR4 tx/rx, RV4 remote vfo, AC4 psu, KW lpf, mic, phones, £350. Prefer buyer test and collect. G3ONU, QTHR. Tel 09276 76344.

TR2200, R5-7, S21-22, auto toneburst, charger, £70. G3ZJN, QTHR. Tel 021-360 3387.

Four 4X150s, bases, £20. 10·7MHz xtal lattice filter, £8. Yaesu mic, audio compressor, £8. Three Oxley Tempatrimmers, £8. In-line rf 2A thermocouple meter, £6. Muffin blower, 115V ac, £4. Finned 20W dummy load, 0·5-200MHz, £7. Add p&p. G4AWJ, QTHR. Tel 04352 4803.

Trio TR2300 2m synthesized tx/rx, c/w case, carrying strap, nicads, charger, in orig box, used little, £130. Homebrew psu, charger, for 2200 series tx/rx, £8. G8JAO. Tel Malvern (068 45) 63270.

Eddystone EC10 Mk1, £50. TW 2m converter, £10. PF1 tx/rx, batts, £40. Pye 12-way charger, £10. Pye Bantam, wkg R0, nicads, helical, charger, £40. CCTV camera, £75. Monitor, £20. Stereo cassette player, £20. Prefer buyers collect. G8BFF, QTHR. Tel 0455 46493.

TR2200G, fitted, 11ch, nicads, helical whip, £120. Mobile amp, 30W, £30. G8MVM, QTHR. Tel 01-643 3853.

ETM3C, immac, boxed, £40. Pair PF1s, RB4, batteries, rx rf mod, vgc, £40. Standard C828M, fully xtalled, handbook, £135. *Wanted:* Eddystone EC10 Mk2, or EB36. Lockwood, G3XLL, QTHR. Tel Mellis (Suffolk) 596, evenings; or Ipswich 57607, day time.

Pye AM10D Cambridge fm/a.m. tx/rx, Garex fm mod, later model, vgc, 6ch, S20-22, S14, R6, R7, 12·5kHz filter, rx recently tuned, ideal starter rig, requires 12V dc, circuits supplied, £55. GM8MNG, QTHR. Tel Ford, 0875 320 383.

FT101E, £425. FV101B remote vfo, £65. FL2100B linear, £275. FT101 workshop manual, £8. FT101/901 fan, £8. TR2200G nicads, 12ch, £115. Shure 444, £16. QQVO2-6, £2 ea. 12BY7A, £1.50 ea. 6JS6C, pair, £6. Poulter. G3WHK, QTHR. Tel 01-330 5795.

Swop: S45 Tektronix db 'scope; for hf beam rotator, or why? HV transformer 3kV CT·2A, £10. CT54 vvm, £10. Carr extra. *Wanted:* Drake T4X. Wilson. Tel 07014 50086, evenings.

IC22A, toneburst, mobile mount, 11ch R0, RR0, R4-7, S18, S20-23, £125 ono. *Wanted:* IC240, TR7500, etc. A. P. Brown, G4EZT, QTHR. Tel Maidenhead 30185.

FRG7, new September '79, absolutely mint, under two year warranty, rare opportunity, £170. Tel Stow-on-the-Wold (0451) 30749.
QRO equipment: 3000V/2000V transformers, 750mA; solid-state rectifier; oil filled condensers; all cheap. Vari vac, condensers, sae for details. G2MF, QTHR. Tel Sheffield 360210.
Trio TR7010 2m ssb tx/rx, £120. Pair of xtals for SF1 Starphone handheld, RB0, £8.50. 4EP1 'scope tube, new, £8. VCR 97, £2. Cossor db type, £3. Transformer, 350-0-350V 250mA, lts, £5. G8JAO. Tel Malvern 63270.
Eddystone 940, £70. BC221AA, charts, needs 6V 135V, £20. Shure 444, £20. Four Evershed Vignoles sub-standard type meters, 4·25in mirror scale, wooden box, 6·5V ac, 0/10/20/50/100/200mA dc, 30/150V dc, 150V ac, £5 ea. G2KV. Tel Fontmell Magna 811273.
KLM amplifier, 10w in, 70W out, mint, £75. HAL DKB-2010 dual-mode (rtty/morse) k/board 128k memory, RVD-1005 video control unit, all as new, £450. Taylor model 68A/M Mk2 rf sig gen, 100kHz-240MHz, unused, £70. Tel 0803 312879.
G-whip tribander, coils, whip, 80-10m, £20. Jaybeam 8-el 2m Yagi, new, £8. 1974 *Radio Communication*, bound, £2. Bosch choke input filter for mobiles, 75A, £4. Atlas MT1 antenna matching transformer, £5. G4DUS, QTHR. Tel Rickmansworth 77616.
IC202E, used very little, immac cond, orig packing, handbook, brand-new nicads, charger, the lot, £145. Tel 040 12 3205 (N Humberside).
Trio 7010 ssb tx/rx, comp with accessories; will sell or exch, plus cash adjustment, for either TR2300 portable rig, or TR7500 mobile rig. G8ORS, QTHR. Tel Blackpool 592211.
Adonis compressor mic, AM502G, unused, advertised £39.95, accept £25. 23yd 300Ω ribbon, £2. 26yd 75Ω coaxial, 0·306in, both brand new, £4. 3in Sangamo desk milliamp meter, 0-1mA, sloping bakelite case, new, boxed, £4. G5FH, QTHR. Tel 0425 25974.
MMT144/28, £70. TWS150 coaxial switch, £9. MMT432/28S, £110. AR40 rotator, £42. EDL144 2m linear, £115. LP30 lpf, £10. HRL250 dummy load resistor, 75Ω, £10. 70cm converter, £8. 4m converter, £7. Sykes, G3NFV, QTHR. Tel Leatherhead 72587, after 6pm.
Europa transverter, 2m, internal c/o relay, £50. Unfinished 5FP7 type sstv monitor, incl all data, £50. Macleod, G4DZX, QTHR. Tel 041-959 4455, after 6pm or weekends.
FT200, FP200, exc cond, checked by dealer, £250 ono. G4IXX, NOT QTHR. Tel Cheltenham 26945, evenings.
Hy-gain 12AVQ, matching 12RMQ radial, roof kit, both new, boxed, unused, pair, £45. G3NJP, QTHR. Tel Sissinghurst 482.
Drake TR4CW, AC4 and DC4 psus, remote vfo RV4C, all vgc, offers. G4EHF, QTHR. Tel 0273 508136.
30W 10/80 cw tx, Geloso vfo, £35; 80/160 QRP rig, cw, two rxs, £30; TCS/1Z rx, psu, spkr, £20; Heath HR10B rx, preselector, £40; all wkg. Carr extra. G3OAZ, QTHR. Tel Basingstoke 65126.
TS120S, the high-power one, £395; PS30, £70; both near new, perfect. G2KF, QTHR. Tel 072 681 2337.
IC202S, comp, as new, used little, high power nicads, charger, £180. TR2200G, good cond, nicads, charger, auto toneburst, R0-7, S20-23, £90. G4FJB, QTHR. Tel 021-705 7158.
Two Pye Ranger 12V a.m. tx/rxs, dash mount, xtalled 70·26MHz; Pye Cambridge AM10D, boot mount, partly converted to fm, channel 20; valve, 61646B, old but unused; offers. G3XRM, QTHR. Tel 0724 845436.
HQ1 Minibeam, brand new, still in box, £75. Datong UC/1 up-converter, £75. Sampson ETM3 electronic keyer, £25. Marconi marine morse key, type 365A, £25. G3LWI. Tel Reading (0734) 476205.
FT200, FP200 power supply, FV200 vfo, all in good cond, £225; HC1400, boxed, as new, £150; Kenwood PS20, as new, £40; would prefer to exch the lot for TS700S or G. Tel 021-440 4721, evenings or weekends.
12V/hf linear amp, made in USA, 120W rf out, preamp, £110 ono. HRO, coils, immac cond, £35. Sony reel-to-reel TC530, £75 ono. 2m 5-over-5, £7. 70cm 18-el, £10. GW4ACU, QTHR. Tel 0443 226365.
IC22A, xtal t/burst, 11ch, mobile mount, handbook, nice cond, £115. Sommerkamp hf separates, FR100B, FL200B, can be used tx/rx, 240W p.e.p., 80-10m, 160m rx, handbooks, spare pa valves, absolutely immac, £200. GW3WMY, QTHR. Tel Cardiff 703076.
FDK Multi U11, fitted 10ch, RRB2, £210. KW 2000E, 160-10m, handbook, £280. Buyer collects or pays carr. G8HED, QTHR. Tel 0253 853632.
Trio TS520SE hf tx/rx, 160-10m, ssb/cw, external vfo 520S, both only two months old, absolutely mint, genuine reason for sale, the pair, £475 ovno. May separate. G3SYL, NOT QTHR. Tel Ferndown (0202) 893767.
Heathkits HW17A 2m a.m. tx/rx, £20. HG10B vfo, £10. IB101 15MHz frequency meter, £40. IB102 frequency scaler, £30. Sentinel 2m converter, 4-6MHz i.f., £10. G3ZVC ssb tx kit, £60. AR22R rotator, £30. G8DCL, QTHR. Tel Tunbridge Wells (0892) 31700.
Trio TR7500, two years old, mobile mount, 5/8 magnetic mount ant, mic, £185. G3XWA, QTHR. Tel Saltash (075 55) 4305, evenings.
HW8 tx/rx, 80-15m, QRP, cw, five-band vertical antenna, £130. Would split. RX converter, MMC28/144, 10m in, 2m out, £15. G8FCH, QTHR. Tel Evesham 830525.
Comp hf/vhf stn, incl TS520S, VFO 520, 444 mic, hf vertical, bug key, PM2000 power meter, hand mic, KR400 rotator, MM 2m transverter, Jaybeam 8-el XY, cables, connectors, etc, £799 ovno. Buyer inspects and collects. G4HHR, QTHR. Tel Thanet 42930.
IC215, xtals, DEACS Coutant psu, heavy, £130. FRG7 digital, internal 432MHz conv, 2m conv on top, antenna switch, fitted 12V sealed accumulator, £185. *Wanted:* PX FT202R, Standard; Trio 70cm portable. Gomer, G8UNZ, 55 Hythe Hill, Colchester. Tel 74427 ext 10, day time.
Standard C146A, 2m, fm, handheld, S0, S6, S21-22, R6-7, leather case, nicads, base charger, circuits, the lot, £110. Must sell, so very willing to haggle. Geoff Plucknett, 432 York Road, Stevenage, Herts. Tel Stevenage (0438) 59019.
Drake T4XB, power supply, R4C, £550. R4B, £200. KW Viceroy, £40. G2QT, QTHR.
FDK Multi U11 70cm fm tx/rx, 10ch fitted, incl four in auto scan, mint cond, mainly used as rx only, £210. Evans, 4 Woodend Walk, Bristol BS9 2JB. Tel Paul, 0272 686825, any time.
IC215 Icom 2m fm portable tx/rx, 15 xtalled channels, S0, S19-24, R2-9, c/w nicads, battery charger, telescopic and helical whips, shoulder strap, handbook, perfect cond, in orig packing, £145; or exch for FRG7. G8KNO. Tel 0823 2782.
Yaesu Musen FR100B communications rx, 1·7-29·5MHz, matching separate spkr, £92; Eddystone EC10, 550kHz-30MHz, bfo, afc, af filter, etc, £58 ono; both in exc cond. G3RGJ (Dorset). Tel Parkstone (0202) 742142.
KW2000B, ac power supply, good cond, £220. Tel Hove (0273) 731391.
20m 2-el monoband beam, £10. 3M dry photocopier, £30. New depth sounder, for boat, offers. 12V dc pu, suit KW1000 series, £10. 160m whitraps, £5 pr. Antenna tuner, £5. G2MF, QTHR. Tel Sheffield 360210.
KW202 rx, £160. KW204 tx, £200. VOX, £5; 444 mic, £15 if required. Dials, 0-500kHz, integral psu, immac cond, bought new by advertiser, used testing only since serviced June '77 by Decca. Buyer collects. G3PPH, QTHR. Tel 051-525 2162.
Trio TR3200, 70cm, charger, orig packing, mint cond, used little, xtalled for 9ch, only few months old, £150. Marine df rx, mw, lw, vhf, mb (vhf), mb (sw), Fujion 2000A, vgc, £90. G4AYV, QTHR.
Hallicrafters SX133, 240V ac, a.m., ssb, cw, 0·538/31MHz, nine band-spread wavebands, int spkr, rod antenna, separate spkr; Codar AT5 tx, 240V ac mains psu 250/S; KW antenna tuning system 107; no reasonable offer refused from inspect and collect cash buyers. *Wanted:* B2 or similar suitcase tx/rx psu, must be comp with coils, in good wkg cond. G3FVE, QTHR. Tel 074786 472.
KW202 rx, £185; KW Vanguard cw tx, £20; three-function swr meter, £10; Nombrex 42, sig gen, £40; all vgc nearest offers secure, buyer collects. G4FKH, QTHR. Tel 0245 61082.
Antec CPW58 2m whip antenna, window clip mount, £8. Slim Jim 2m omni-directional vertical base stn antenna, £10. 4m beam antenna, £5. Tel Chestfield (Kent) (022779) 3262, evenings.
Trio TS520S, superb, as new, matching vfo, mic, spkr, spare new 6146Bs, comp stn, £455. G4HAK, QTHR. Tel 01-302 5052.
Multi 700E, still under guarantee, £178; Liner 2, psu, vgc, £96; or the pair, £265. Going one-box multimode. G8ONU, QTHR. Tel Hitchin (0462) 54642.
Electroniques gc and hb front ends 1·6MHz i.f., type HB166T and GC166T, £10 ea. *Wanted:* atu, not homebrew, for swl. Tel Weymouth (03057) 72759.
Pye Bantam, fm, high band, £20. *Wanted:* Pye Cambridge AM10D rf rx board; Pye Cambridge LC10FM tx boards; or comp sets. G8ONX. Tel Wolston 542086.
TR2200GX, 6ch, nicads, charger, helical whip, case, auto toneburst, mobile mount, 7W mobile pa, £110. G8EPQ, 4 Prince of Wales Close, Wisbech, Cambs PE13 3HN. Tel 0945 63614, evenings.
Eddystone 730/4 rx, exc cond, £130. Tech Associates speech compressor, £15. American mobile tx/rx, Regency HR2A, 15W, fitted S20-22, R4-6, £80. Large Morganite 80Ω dummy load, £5. Shure 401A mic, £5. Meters, xtals, from £1. State requirements. G3IDW, QTHR.
2m gear: IC22 12ch tx/rx, S0, S20, S22, R0, R1, R5-6; Bantex 5λ/8 whip ant, magnetic base mount; 5-el Yagi ant; 10-el crossed dipole ant, unused, boxed; 144/28MHz converter, 12V dc, unused; 40W linear pa, 12V dc mod; or exch. *Wanted:* R1155 rx, with or without psu, must be in good cond, wkg on all bands. G3FVE, QTHR. Tel 074786 472.
Standard C146, xtalled R0, R6, leather case, handbook, £75. G. Austin, G8CIA, QTHR. Tel Chelmsford 380740.
Eddystone 730/1A rx, £80. Pye Cambridge AM10D, modified for 2m fm, £40. Yaesu FT224, 2m, mobile, comp with 8ch, £110. BC221 frequency meter, £18. G4CGE, QTHR. Tel Aylesbury (0296) 27812.
Eddystone EA12 rx, manual, as new, bargain, £110 ono. G2MF, QTHR. Tel Sheffield 360210.
QR666 gen cov rx, 170-400kHz; 540kHz-30MHz. 87-109MHz, 500kHz cal, good cond, £95. Sentinel 2m conv, 28MHz i.f., £10. DJ70S, mono, 4ch disco amp, 70W rms into 4Ω, £35. G4FQF, QTHR. Tel Romford 47998.

Ex US Navy ssb equipment, AN/URA 31, p/pack, rf oscillator, rf amplifier, no info, £35. Wide range oscillator, 0·1Hz–1kHz in four bands, £10. Racal dual diversity antenna selector, MA168, £10. *Wanted:* manual for TA12B. Barnes, G4DVH, QTHR. Tel 0229 54466.

G3PLX vdu system, encased, comp with 3A NASCOM psu, keyboard, keypad, full details available on request or sae. Trio TS500, 80/10m, psu, mic, spare 6146Bs, £120. Heath valve gdo, exc cond, £10. GM3XNE, QTHR. Tel 0294 67326.

Complete hf and 2m ssb stn, Heathkit SB300 rx, SB400 tx, 180W p.e.p., hf bands tx operation, Magnum Two transverter, nearly new, psu, mic, 18-el 2m Parabeam, £280. G8POI, QTHR. Tel 01-654 6803.

Liner 2, preamp, exc, com, £90. KW Vanguard cw/a.m., with 160, £30. G4ICN, QTHR. Tel Lincoln (0522) 37119.

Eddystone EC10 Mk 1, mains psu, £65. G3SFV, QTHR. Tel Market Harborough 64827.

TS700G 2m multimode, mint, £320 ono. SB101, hb, psu, £200 ono. KW160 top band a.m./cw tx, £20. G3DWQ, QTHR. Tel 0772 53810.

TS700, Hi-Gain front end, auto tone, reverse repeater, mint cond, £280 ono. KW2000B, comp stn, spkr, psu, remote vfo, new pa, Datong rf clipper, £200 ono. G8OXA, QTHR. Tel Barnsley 754050, evenings.

Offers wanted for British and American magazines dating from '32 onwards: *Modern Radio; Radio Constructors; Radio Craft; Radio News; CQ; RSGB Bulletins; SWM: Wireless World;* and others. Sae for list. Ormiston, Wall, Hexham NE46 4DH. Tel Humshaugh (043 481) 649.

Creed 7B, silence cover, tape reader 2F, rectifier unit 66C, good cond, wkg order, the lot, £15. Buyer collects. G3DAV, QTHR. Tel West Drayton 48440.

Drake TR4C, AC4 psu, spare set of pa valves, £350. Hy-Gain 12AVQ three-band vertical, 10m UR67 coaxial, £25. G3XXM, NOT QTHR. Tel Biggleswade 315440, after 6pm.

Creed 85 B/M printing reperforator, spare tapes, silence cover, £27. Buyer collects. G3RGF, QTHR. Tel Danbury 4700.

Heath SB104A tx/rx, SB604 spkr, PS1144 psu, SB644 remote vfo, SBA104-1 noise blanker, HDP-121 Electrovoice desk mic, all equipment in mint cond, will separate, deliver 100 miles, accept any reasonable offer. GM3ZXL, QTHR. Tel 041 779 2303.

PSU for R216, new, boxed, £20; FRG7 smc four digit read-out, Collins 2·1kHz mechanical filter, commercial fm detector, as new, in box, £180; FRDX400 MM 2m preamp SP400, vgc, all options fitted, £175; FLDX400, mint, in box, £175; YD844 desk mic, £12; FT7 hf tx/rx, mint, in box, £250; Eddystone 880/2 rx, rack model, no case or base plate, £125; Pye PF70, fitted RB6, leather case, spare battery, charger, as new, £80; all except PF70 with handbooks. TS175U 85–1000MHz freq meter, £35. BC221N, £25. Tiger TR2M 100W a.m. tx, £25. Buyers collect or carr extra. GW3JAZ, QTHR. Tel Gresford (097 883) 2584.

IC22A, R0, R3–R7, S18–S23, good cond, £115. Gen cov rx, 1·8–18MHz, power pack, £40. Two new 6146B valves, £10. G8SER, QTHR. Tel 07737 67846.

TS700G, mint cond, comp with vox unit, handbook, etc, £340. MM 432-28 transverter, late model, £70. G8CVO, QTHR. Tel Bolton 57775.

Microwave Modules 432/28 ssb transverter, £90. Elect dev 2m linear/preamp, £80. G4GGV, QTHR. Tel Maidenhead (0628) 20651.

Transformers. USA 230V, 115V input, 235-0-235, 200mA, 6·4V, 6·7A, 5V 4A, choke 10H, 200mA, 160Ω, £4. New Gardners 240V tapped input, 260V twice, 55mA, 310V, 210mA, 6·3V, 2·2A, 1·25A, 1A, 300mA, £4. G3MBL, QTHR. Tel 01-445 4321.

Atlas 210X, mint, used little, £355; FT224, most xtals, £125; both boxed. 8-el 2m Yagi; 40W 2m amp; two unused Eimac 4CX250Bs, bases, another boxed/sealed; offers. Wyatt, 17 Harbour View Road, Poole, Dorset. Tel 0202 747756, after 7 March.

KP202, hand-held, nicads, charger, xtal t/b, leather case, fitted R5–7, S0, S20-21, λ/4 whip, helical, £85. Pair Pye Pocketfones, wkg SU8, nicads, charger, xtals, RB14, £35. G8KHU, not QTHR. Tel David, Oxford 64961.

Liner 2, one year old, SD306 preamp, manual, etc, £120. Pye Cambridge AM10D, a.m./fm, full tunable rx, tx S0, S18, S20-24, R5, R7, toneburst, manual, £60. G8FKH, QTHR. Tel 0895 51022.

Heath SB102 tx/rx, SB600 psu, SB650, dig display, £200. SB610 monitorscope, £50. Buyer collects. G3TND, QTHR (Nr Bristol). Tel 027 587 2241.

Yaesu FT2F tx/rx, power supply, £90. Standard 146A tx/rx, charger, helical, £85. ITT SL53 cassette recorder, £18. Manuals for Pye Reporter and Ranger, £1. Buyers collect or carr extra. *Wanted:* MM 432/144 converter. G8CJM, QTHR. Tel Medway 47280.

Joymatch tuner system A, unused, £10. SST T1 random wire tuner, as new, £15. SWR/fs meter, AEC SWR40, as new, £5. Two-way coaxial toggle switch, 1XPL259 in, 2XSO239 out, unused, £3. G4HKN, 49 Stansfield Street, Todmorden, Lancs. Tel 6165.

Trio TR2200G, auto toneburst, nicads, MB1 mobile mount, eight repeater, four simplex channels, £110. Heathkit HA201 2m 8W pa, £12. Mizuho 2m ssb/cw hand-held, nicads, xtals for 144·10–144·40MHz, £100. G8ANU, QTHR. Tel Stafford (0785) 52693.

Icom IC201 2m multimode tx/rx, preamp, £260. QM70 40W 2m linear, mains psu, £30. 50ft Telomast, £30. 2m 14-el Parabeam, £10. G8DWD, QTHR. Tel 01-552 6275.

Yaesu FT207R hand-portable 3·5W, helical antenna, case, YM24 spkr/mic, NC2 quick charger/eliminator, all new, cost £254.30, take £200, comp. G4IOF. Tel 01-486 8286.

KW2000 ac supply, good cond, comp homebrew Z-match, £110, or exchange vhf/fm mobile rig. G4ATW. Tel Pete, 0284 64318, between 9am and 6pm.

FT101, fan, £270. SP600JX gen cov rx, £100. Jaybeams: 12-el crossed Yagi, 432MHz, £10; 144MHz XY, £10; 6-over-6 144MHz, £10. Barlow Wadley rx, £95. Active cw filter, £8. Grundig Satellit 3000, used little, £275. Collect or buyer pays Securicor. G3CDK. Tel 01-647 1866.

Hammarlund HQ170A amateur bands rx, 1·8–146MHz, exc cond, spare valves, matching spkr, orig manuals, £135. Buyer collects. G8PSY. Tel Hatfield 07072 65182.

TW 28–144MHz transverter 640, 70W out, own power pack, £75. 4E quad, £10. SWR PM2001 power meter, ssb, £30. Mullard 5/10 amplifier, £10. 660V, 365V stabilized 250mA power pack, heaters, £10. *Wanted:* AT5 for a/c. G4JFE. Tel Newbury (0635) 41613.

Trio 2200G, good cond, 12 channels, R0, R3–7, S0, S20–24, nicads, charger, power leads, orig packing, £110. Xtals: 146·46–147·06 for Canadian rept for 2200 series, pair, £4. G4DGM. 106 Goldthorn Hill, Wolverhampton.

Comp stn, KW2000A, psu, serviced by Decca August, handbook, spare valves etc, Shure hand mic, H1 mound key, Osker SWR200, KW E-zee match, the lot, £230; will consider splitting. G4GWT, QTHR. Tel Allen, Grays Thurrock (0375) 71134.

FT101 Mk2, 160–10, blower, mic, dc and ac leads, £320. Icom 202, £145. Europa B transverter, £45. All used little, look like new. Carr extra. G3GVV, QTHR. Tel Tonbridge (0732) 353360.

Colour monitor solid state Pye 19in, Shibaden video tape recorder, Philips vtr colour adaptor, £300, the lot, or will split. Buyer collects only. *Wanted:* Aircraft radios, vors, adfs or why? G3WJG, QTHR. Tel Chorley Wood 3337.

Trio TR2300 2m portable, 12 months old, new cond, all accessories, packing, manual, as supplied from Lowe, £170 ono. G8CCI, QTHR. Tel Oxford 880229, evenings/weekends.

IC240 with Superscanner SS240, lockout, ref *Radio Communication* April '78, only £190. FDK Palm 4, 6-channel 70cm hand-held, neat YM24 spkr/mic, mod, £140. Puch moped, L reg, helmet, etc, £45. G4FIR. Tel 01-708 0402.

Yaesu FT101, 160–10m, FV101 vfo unit, new pa valves, fan, cw filter, Shure mic, £330. 432–28MHz converter, £8. G4CTZ, QTHR. Tel Derby (0332) 71875.

Heathkit HM-2102 25/250W vhf power meter, Heathkit HN-31 Cantenna 1kW dummy load filled with transformer oil, both in mint cond, the pair, £45. Will haggle over split. G8CCI, QTHR. Tel Oxford 880229, evenings/weekends.

Silent key, 10–80m transmitter, Geloso, £12. 2m transmitter, power unit, £10. Many spares: valves; relays; wide capacitor, transformer, xtals, give away prices, say, the lot, £15. Buyer collects. G4EAH, QTHR. Tel Crowthorne 71591, evenings only.

Standard SRC146A 2m fm hand-held 2W, 5ch helical, charger, offers over £70. Pye Vanguard FM25B, control, wkg 2m fm, offers. John, G8SZW, QTHR. Tel 061-736 8407, after 6pm.

Versatower SP60, Autobrake Loughing, electric hoist winches, spare cables, AR22 rotator, TA33Jr, 2Q6, cables, coaxial, £550. G3MTX, QTHR.

Four GEC Courier hand-helds, c/w nicads, helicals, etc, a.m., high band; exch for equivalent low band a.m. Two Pye AM25B Vanguards, some control gear, £10 ea. *Wanted:* Pye F27 remote control panel. C. Walton. Tel Southampton (0703) 551580.

WANTED

Swan remote vfo, type 410C or 508, for specimen in vgc will pay £100. Furness, GM3RUI, QTHR. Tel 0224 741741.

Information: anything on ex-marine tx and/or associated rx, coastal radio type Curlew 350. *For sale:* old Eddystone rx, type 358X, spare parts only, not in wkg order, any offers. Tel Ralph, 031-551 1706, evenings/weekends.

SOS: my KW Viceroy tx has gone QRK, unable to locate fault, senior citizen, no transport, could anyone call to locate and correct fault, suggest letter first for full details. Fee paid. Pryse, G3WXT, 36 Hart Road, Byfleet, Surrey.

Suitcase type tx/rxs: especially Mk119, Mk122, Mk128, Mk217, BP5 or T5, AR11, A3, B2 (type 3 Mk2), B2 Minor (type A Mk3). Any manuals or literature, plus incomp or damaged items welcome. Letters only. Taylor, G3UCT, c/o 31 Willow Walk, Culverston, Gravesend, Kent.

Manual for Trio JR60 rx, not in Japanese, for purchase or loan for photocopying. Full manual for Cossor 'scope 1071K. HRO rack-mounting items: psu; loudspkr; coil storage unit; why? R. Williamson, G4GGI, QTHR. Tel Walton-on-Thames 23253.

Accessories for FDK Multi U11; SB110 sound box console and vfo; U11 ext vfo; price and details. Willis, G8TJA, 16 Oatfield Close, Hereford HR4 0RP. Tel 0432 66858.

Collins mechanical filter, part no 526-9427-00, type F455 FA21. G3VMM, QTHR. Tel 045385 2888.

Moseley Elan beam, for 15 and 10, or similar. G4ESF, QTHR.

HF linear, good cond, base use. Scanner rx, similar Belcom or Bearcat. VFO for Multi U11. Spectrum analyzer. K Hatton, 8 Alnwick Street, Newburn, Newcastle upon Tyne, Tyne & Wear NE15 8PT. Tel 0632 678828.

LG300, with psu, good cond, transport arranged, good price paid. GM4AEA, QTHR.

KW E-Zee match. The following Heath gear: SB620 spectrum analyzer; coaxial switch; desk mic (HDP-121); and SBA-301-2 400Hz xtal filter, for HW101. G4GTU, QTHR (W Sussex). Tel Steve, Rustington 4123.

Service manual, circuit, Hallicrafters SX28 rx, buy, borrow, copy, expenses refunded. Maddocks, 70 Kings Road, Southsea, Portsmouth. Tel Portsmouth 29129.

Eddystone 880/2 w/shop manual or handbook, buy, borrow or steal, as I have a deaf one! Jenkins, 76 Hillfield Avenue, Hornsey, London N8 7DN.

TX 15/25W, 40MHz-21MHz, must be well protected, tvi fone not essential, first class job. All letters answered. G3RY, QTHR (Stockport).

HQ1 minibeam, give price and cond please. Evetts, G4HZD, QTHR. Tel 0905 426323, day; or 20135, evening.

Purchase or loan for copying, manual for Trio TS510. G8HRZ, QTHR. Tel 0533 61212, day; or 0533 768034, night.

Sommerkamp FR100B rx, good cond. Write or phone. G2AQN, 51 Osgodby Crescent, Scarborough, N Yorks. Tel 582493.

Very old gear for the National Wireless Museum, especially pre-war txs, rx, spkrs, test equipment, QSL cards, radio mags, cats, books. Collection arranged. Details please to hon curator. G3KPO, QTHR. Tel Shanklin 2586.

Electroniques QP166 amateur band coil pack. Kokusai MF455-10K filter, without xtals. GW8UH, QTHR. Tel 0222 25062.

HC6U xtals, for 7,002-7,030, 3,502-3,535, 14,002-14,080kHz. G8PP, QTHR.

Urgent, for Rhodesian family, 2/3 bedroomed house, furnished or unfurnished, in Herts area. Phone or write. ZE1FS, 7 Granby Avenue, Harpenden, Herts AL5 5QF. Tel Harpenden 4705.

HRO bandspread coils for amateur bands. P. Rosamond, 13 Newnham Close, Hartford, Huntingdon, Cambs. Tel Huntington 52304.

Ferrograph tape recorder type 4AH service handbook. Stereo head for this deck, type FP14. F. Schneider, 35 Alexandra Road, Well End, Borehamwood, Herts WD6 5PB. Tel 01-953 2306.

FV101B, remote vfo for '101. GM4DZX, QTHR. Tel 041-959 4455, after 6pm or weekends.

Eddystone 888 rx. Spkr and S meter for S750. Butler, 16 Alexandra Road, Bridgwater. Tel 2873, office; or 4093, home.

Information, circuits, vintage items, Truimph (USA) model 77 oscillograph Wobbulator (pre-war), and MCR1 wartime rx, for copying, expenses reimbursed. Rees, 53 Wyndham Street, Treherbert, Treorchy, Mid Glam CF42 5BS. Tel 0443 771359.

HQ1 Miniquad. Circuit diagram for CR100, to copy. Circuit for Datong FL1. Lonnon, G3ZUM, QTHR. Tel 025 681 298, evenings.

Trio 520S or 120S. G3XFB, QTHR. Brewood, (0902) 850033, after 6pm.

Sig gen, must be in decent cond, range 100Hz through 200MHz. RF/af 240V wkg, Marconi, Advance, or similar. Call any time. Tel Ken, 0632 678828.

Vintage valve PX4 or PX25, HT4, by pre-war wireless collector, for use in '34 Pye Cambridge. Have you a circuit for this rx? G4HPD, QTHR. Tel Kingswinford 271076.

Scrap BRT400 rx for spares: cabinet; cover; knobs; gear drive; etc. BC348 rx, 25kHz bandwidth, 455 filter for Pye Vanguard. Vertical antenna for 20/15/10. G3DVF, QTHR. Tel Alnwick 2487.

Urgent, mixer xtals for National NCX5: 24·5, 25·0, 25·5, 26·0 MHz, HC6U preferred, but other minatures acceptable. Handbook to buy or borrow. *For sale:* 12AVQ vertical, £25. Property deceased amateur. G3OEI, QTHR.

KW109 or similar, linear amp, FL1000 or similar. G4HTS. Tel 061 865 3873.

RCA tx tetrode, type 7094, used in Green & Davis linear, c 1965, or info where obtainable. Trio TS700S 2m tx/rx. Lunar or KLM 2m linear 150W, why? GM3XNE, QTHR. Tel 0294 67326.

Creed 444 reperf/tape reader, comp with cover/base, mint cond essential, good price paid. Rtty-vdu equipment, details and price please. Creed 75 gears for 45 bauds, (swop gears for 75 bauds). K. W. Scott, 38 The Gardens, Whitley Bay, Tyne & Wear. Tel 527141.

KW600 or KW1000, in good cond. G3VRB, QTHR. Tel 0803 613782.

IC22A xtals, 18MHz tx, 14MHz rx, for USA (California) channels, borrow or hire 4/5 weeks July and August. S. Fletcher, G4GXL, 58 Elm Grove, Bromsgrove, Worcs B61 0EJ.

Gen cov rx AR08, Eddystone, or why? Tx/rx HW100, FT200, KW200, or why? G. Puan Brenkelen, 8 Grimshawe Terrace, Creetown, Scotland.

TR7 plus extras, R820, R4B/T4B, R4C/T4C, 4/1000s, 3/1000s. S. J. Brown, School of Electronic Engineering, Dean Street, Bangor, Gwynedd, N Wales. Tel (0248) 78335.

HQ180, good cond, essential. *For sale:* KW103 swr and power meter, £20 ono. GW3YTL, QTHR (Mid-Wales). Tel Knighton (0547) 528030, 6-8pm.

Yaesu FT7 tx/rx, g-whip mobile antenna. Atkinson, 17 York Crescent, Alnwick, Northumberland.

Bakelite cover for morse key type D ref no 10F/7373, or comp key. G3ABM, QTHR. Tel 051 355 5978.

Circuit diagram for Sommerkamp FL200B, expenses gladly paid for photocopying, etc. Wilson, 35 Charlotte Street, Rochdale. Tel 061-330 1182, daytime, not Tuesdays.

IC215E portable, in good cond, nicads, etc. Datong D75 rf clipper. G8OVQ, QTHR. Tel Tiptree 816677.

Rotator, med vhf. Valves: 6GK6; 6KD6; 6BZ6; 6BA6; 6AH6; 6CB6; 6BE6; 12AU7; 12AX7; 6BM8; 6U8. R. Shelley, G3NZY, 1 Meadlands, Apple Tree Village, York. Tel 0904 55491.

Output transformer AR88. 156MHz Sea Voice xtals. Manual Decca 50 radar. FT75 vfo homebrew, ok, cw xtals. Information second world war German rxs FUHEU, FUHEB. Storno 600 tone tx, TT683. G3VVB, QTHR. Tel Mevagissey 2368.

Valves: 4D32; 6AB4; 6AK6; 7C5. G3RFI, QTHR. Tel Potton (0767) 260800.

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Type	Output	Gain(dB)	Volts	Freq	Price Exc Vat
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2N4427	1	10	12	175	**£1.04**
2N3553	2·5	9	28	175	**£1.16**
2N5913	2	7	12	470	**£1.45**
SD1127	4	12	12	175	**£2.10** (1)
2N6080	4	12	12	175	**£4.62**
SD1143	12	10	12	220	**£6.00**
2N6081	15	6·3	12	175	**£7.26**
2N6082	25	5·7	12	175	**£8.25**
2N6084	40	4·5	12	175	**£11.55**
RF2127	70	6·6	12	175	**£24.00** (2)
SD1019-5	100	6+	28	175	**£16.00**
2N5590	10	5·2	13	175	**£5.80**
2N5591	25	4·4	13	175	**£7.75**
SD1428	45	6·5	12	175	**£11.55** (2)
2N5944	2	9	12	470	**£6.49**
2N5945	4	8	12	470	**£7.70**
SD1135	5	7·5	12	470	**£4.50**
SD1136	10	5·5	12	470	**£7.92**
2N5946	10	6	12	470	**£9.65**
SD1088	25	6·8	12	470	**£16.75** (2)
SD1089	40	4·3	12	470	**£24.40** (2)
SD1434	45	5·0	12	470	**£24.90** (2)

NOTE (1) G.Emit. IC202/215 P.A. (2) Controlled "Q" Type

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TRW TP393 2dB N/F at 500MHz T Pack	**£2.00**
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3N204 2nd Generation MOSFET to replace 40673	**£1.10**
40673 RCA Low noise MOSFET	**£0.75**
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Hewlett Packard Diodes. 5082 Series. 2800 H.Car. **90p** 2835 H.Car **70p**. 3080 Pin **70p**.

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FX1898 6 hole **10p**. FX2049 2 hole trans **10p**.

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144.4 (433.2)	b	e	b	e	e	b	e	e	e	e	e	e	e	e
144.480	e	e	e	e	e	e	e	e	e	e	e	e	e	e
144.800	c	e	e	e	e	c	c	c	e	c	c	e	e	e
144.850	e	e	e	e	e	e	e	e	e	e	e	e	e	e
145.000/R0T	a	b	a	c	c	a	b	b	c	e	a	c	b	e
145.025/R1T	a	b	a	e	e	a	e	b	e	e	e	e	e	e
145.050/R2T	a	b	a	e	e	a	e	b	e	e	e	e	e	e
145.075/R3T	a	b	a	e	e	a	e	b	e	e	e	e	e	e
145.100/R4T	a	b	a	e	e	a	e	b	e	e	e	e	e	e
145.125/R5T	a	b	a	e	e	a	e	b	e	e	e	e	e	e
145.150/R6T	a	b	a	e	e	a	e	b	e	e	e	e	e	e
145.175/R7T	a	b	a	e	e	a	e	b	e	e	e	e	e	e
145.200/R8T	a	b	a	e	e	a	e	b	e	e	a	a	e	b	e	e
145.300/S12	e	e	e	e	e	e	e	b	e	e	e	e	e	e
145.350/S14	e	e	c	e	e	c	c	c	e	c	c	e	e	e
145.400/S16	e	e	e	e	e	e	e	e	e	e	e	e	e	e
145.425/S17	e	e	e	e	e	e	e	e	e	e	e	e	e	e
145.450/S18	a	e	a	e	e	a	b	b	e	a	a	e	e	e
145.475/S19	a	e	a	e	e	a	b	b	e	a	a	e	e	e
145.500/S20	a	b	a	c	c	a	b	b	e	a	a	e	b	e
145.525/S21	a	b	a	c	c	a	b	b	e	a	a	e	b	e
145.550/S22	a	b	a	c	c	a	b	b	e	a	a	e	b	e
145.575/S23	a	b	a	c	c	a	b	b	e	a	a	e	b	e
145.600/R0R	a	b	a	c	c	a	b	b	e	a	a	e	b	e
145.625/R1R	e	e	e	e	e	e	b	b	e	a	a	e	b	e
145.650/R2R	e	e	e	c	e	e	b	b	e	a	a	e	b	e
145.675/R3R	e	e	e	c	c	e	b	b	e	a	a	e	b	e
145.700/R4R	e	e	e	c	c	e	b	b	e	a	a	e	b	e
145.725/R5R	e	e	e	c	c	e	b	b	e	a	a	e	b	e
145.750/R6R	e	e	e	c	c	e	b	b	e	a	a	e	b	e
145.775/R7R	e	e	e	c	c	e	b	b	e	a	a	e	b	e
145.800/R8R	a	b	a	c	c	a	b	a	e	a	a	e	c	e
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A Low frequency fundamentals in HC13/U or HC6/U

Adj. tol. ±50ppm, Temp. tol. ±100ppm 0 to + 70°C

6·0 to 19·999kHz	£28.12	80 to 99·999kHz	£7.30
20 to 29·999kHz	£17.75	100 to 149·99kHz	£6.68
30 to 59·999kHz	£15.51	150 to 499·99kHz	£6.20
60 to 79·999kHz	£12.41	500 to 799·99kHz	£7.30

B High frequency fundamentals/overtones in HC6/U, HC18/U or HC25/U

Adj. tol. ±20ppm, Temp. tol. ±30ppm −10 to +60°C

†800 to 999·9kHz (fund)	£9.50	*25 to 30MHz (fund)	£7.56
*†1·0 to 1·499MHz (fund)	£9.46	*15 to 20·99MHz (3 O/T)	£4.72
*†1·5 to 2·599MHz (fund)	£4.21	*21 to 62·99MHz (3 O/T)	£3.94
*†2·6 to 20·99MHz (fund)	£3.94	*60 to 105MHz (5 O/T)	£4.53
*ø3·4 to 3·999MHz (fund)	£5.43	*105 to 125MHz (5 O/T)	£7.09
*ø4·0 to 5·999MHz (fund)	£4.21	125 to 180MHz (O/T)	£6.48
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***Delivery** Normally 4/6 weeks (express available)—all other frequencies 6/8 weeks.

Holders—Low frequencies HC13/U or HC6/U dependent on frequency.

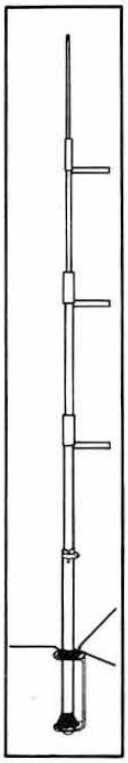
Mid and High frequencies are available in HC6/U, HC18/U or HC25/U unless marked † only available in HC6/U or ø only available in HC18/U and HC25/U.

HC17/U (replacement for FT243) and **HC33/U** (wire end HC6/U) available as per HC6/U above at **25p** extra on HC6/U price.

Unless otherwise specified, fundamentals will be supplied to 30pf circuit conditions and overtones to series resonance.

2 ALEXANDER DRIVE, HESWALL, WIRRAL, MERSEYSIDE, L61 6XT

Tel: 051-342 4443. Cables: CRYSTAL, BIRKENHEAD. Telex: 627371



HIGH GAIN 2m ANTENNAS

DB 11 — 4 Section Colinear — 11 dBi 100 watts 5.47 metres long 2.7 kg £35.00
DB 6 — 2 Section Colinear — 6 dBi £19.00
KT 852 — 5/8 Mobile Whip c/w Mag Mount, Cable and Plug £15.00
KT 872 — 7/8 Mobile Whip £8.77
GCL — Gutter Mount £2.74
C43 — Cable Assembly and Plug £3.00
VAT at 15% on all above antenna prices.

SUGIYAMA F850

AN all band (160 to 2m including 4m) all mode transceiver, with a specification to suit the most discerning operator.

Price and specification as last month's Radcom. — Full details and feature on manufacturers in next month's edition.

ZYCOMM Z5800

A no nonsense synthesised rig free of gimmicks. Covers 144-148 MHz in 5 KHz steps. Simplex or Repeater Operation — High/low power (over 5 watts from internal NiCd pack).
PRICE £199.00 inc VAT c/w Desk Charger and Remote Microphone.

Full range of amateur and commercial antennas and Home Office approved two way radio equipment.
Detailed leaflets available for all products — SAE please.

SEE US WITH THE PROFESSIONALS AT COMMUNICATIONS 80 NEC — APRIL 15-18

Zycomm Electronics Ltd.

G3ZYC
G8CNB
G3NJX

47/51 Pentrich Rd., Ripley, Derby DE5 3DS
Tel Ripley (0773) 44281 Telex 377466

GAREX (G3ZVI)

VHF RECEIVERS SR-9 MkII for 2-metres FM with 144-146MHz full coverage VFO, also 11 xtal controlled channels, ideal for fixed, /P and /M use. Built-in LS, 12V DC operation, **£47.15.** Xtals **£2.60** each.
MARINE BAND version, same spec. 156-162MHz **£47.15.** Xtals **£2.95.**
MAINS PSU for above, 13·8V regulated **£11.95.**
HF12 POCKET VHF FM RECEIVER 12ch xtal controlled. 4MHz bandwidth in range 140-175MHz. With nicad and charger, **£57.95.** Amateur and marine xtals in stock, prices as SR-9. Wide range available.
AMPLIFIER MODULE new fully assembled 6W IC unit 12V dc low imped. (4-8Ω) in and out for extn speaker amplification. With cct. **£2.75.**
Integrated circuits: 723 (TO5), **75p;** SN76660, **75p;** CD4001AE, **25p;** NE555, **56p;** 709 (TO5), **30p;** 741 (DIL 8), **30p;** 7410, **25p;** 7472, **25p.**
Resistor Kits. E12 series, 22Ω to 1M, 57 values, 5% carbon film, ¼W or ½W (please state). **Replenishments available.** Ratings at 70°C.
Starter pack, 5 ea value (285) **£3.10.** Standard pack, 10 ea (570) **£5.55.**
Mixed pack, 5 ea ¼W + ½W (570) **£5.55.** Giant pack, 25 ea (1425) **£13.60.**
PL259 UHF Plugs + reducer **75p** each, 5+: **67p.**
SO239 UHF Socket panel mtg **60p** each, 5+: **50p.**
NICAD RECHARGEABLES—physically as zinc carbon: AA(U7) **£1.30;** C(U11) **£3.35;** PP3 **£5.55. ANY 5+**: less 10%; **ANY 10+**: less 20%.
Slide switches, min, DPDT **20p** ea; 5+: **16p;** 10+: **14p.**
GAREX FM detector and squelch conversion ready assembled with full fitting instructions. Tailor made, easy-fit design for AM Cambridge, replaces squelch board with minimum of other modifications, **£5.7!** Transistor Vanguard (AM25T) version (modified squelch), **£6.35.**
LARSEN 70cm 5dB COLLINEAR MOBILE AERIALS
420-440MHz. Whip and coil only, **£7.90.**
420-440MHz with lug to fit hinge base (eg REVCO), **£8.48.**
420-440MHz with adapter to fit ASP base, **£8.48.**
420-440MHz complete with hinged base (⅜in hole), **£11.50.**
420-440MHz complete with snap-in base (⅜in hole), **£11.00.**
420-440MHz complete with LM base (⅜in hole), **£10.60.**
450-470MHz versions of above-same prices.

AUTHORISED DISTRIBUTOR OF REVCO AERIALS

PRICES INCLUDE UK POST & PACKING & 15% VAT.
ACCESS INTERBANK BARCLAYCARD TRUSTCARD

GAREX ELECTRONICS, 7 NORVIC ROAD, MARSWORTH, TRING, HERTS HP23 4LS MAIL ORDER ONLY
Phone 0296 668684. Callers by appointment.

G8NMU **G8NVV**

AMACIT ELECTRONICS

3 NORTH STREET, BRISTOL BS3 1EN

Tel: 669454 9.30-5.30 **Tel: 633647 after hours**

March already and time to think of mobile/portable operation. So be a "Mad March Hare". Buy now before prices rise. Don't be an April Fool!
If you live in **Devon** or **Cornwall** watch next month's issue for details of how you can obtain stocks from our agent in **Newton Abbot.**

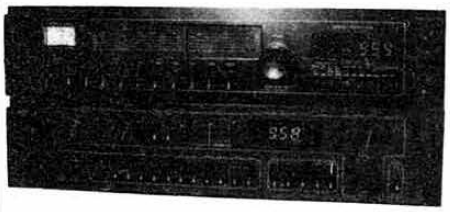
F.D.K.
MULTI 700E 2mtr F.M. 25 watt ..... ONLY **£195**
PALM II 2mtr F.M. HANDHELD ..... ONLY **£99**
PALMSIZER 2mtr F.M. HANDHELD ..... ONLY **£149**
PALM IV 70cms F.M. HANDHELD ..... ONLY **£159**

STANDARD
C8800 2mtr F.M. mobile with scanning and 5 memories. Automatic S20 select **£252**
C7800 70cms F.M. mobile with scanning, 5 memories. Automatic SU20 select **£275**

Trio, Yaesu, Icom, ring for details.
Revco aerials—Panorama aerials—Fantastic J.V.L. collinears 6db gain 145MHz **£36.80,** 70cms **£36.80.**
Twin S.W.R. meters—Coax—PL259's etc.

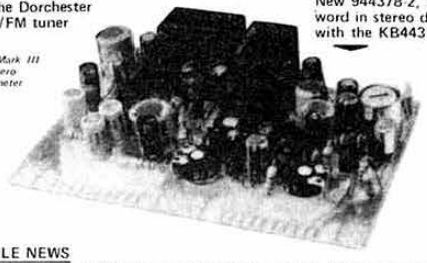
We'll sell your gear for you—no commission
H.P. TERMS **PART EXCHANGE**

BEWARE! RADIO ACTIVITY



The new MK III FM tuner sitting under the Dorchester multiband AM/FM tuner

Revisions to the Mark III include a centre zero tuning indicator meter and silent preset switching



New 944378-2, the last word in stereo decoders with the KB4437/4438.

Choosing the products to advertise each month can be quite a task at AMBIT, since we tend to introduce at least one new line per week. So it is nearly impossible to say all we would like in this space - other than to bring you as far up to date as possible with current events. The major medium for finding out about what we have to offer is our unique catalogue system, and we ask that you invest in a copy of parts 1,2 & 3 since many questions we are asked can be readily answered by reference to these.
Each part costs 60p, or £1.60 for all three current editions.
We are also launching a new and greatly elongated version of our PRICE LIST, which now includes a large number of quantity listings, and many items not previously listed. The new style price list is a quick reference short form to our general catalogues - available FOC with a large (A4) SAE please.

As a result of the soaring price of oil - and the subsequent huge increases in the cost of wax for Mr Tom Jackson's famous moustache, the Post Office have increased their charges (Feb. 4th). Accordingly, our standard cover charge has been increased to 35p per order (CWO).

COMPONENTS

DIGITAL FREQUENCY READOUTS / SYNTHESISER SYSTEMS

Ambit has the biggest range of digital frequency readout systems for various applications in Broadcast and Communications. Prices range from £18.50 for a complete AM/FM broadcast frequency display (kit of DFM2). Most are detailed in the latest catalogue.

TUNING SYNTHESIZERS are also heavily featured, and we offer our first complete system covering MW/LW/SW2 and FM based on Hitachi parts. The unit is retrofittable to voltage tuned radio systems - and will shortly be incorporated in a complete tuner project. Cost for the synthesiser will be circa £40
A versatile communications system based on the new Mullard 2 IC system is nearing completion, together with 16 station CMOS memory and optical shaft encoder system with fast tune facility. Synthesiser circa £70, memory £50.

Latest semiconductor news:

CMOS, TTL and LPSN TTL are in stock (ask for our OSTS price leaflet). Some of the very popular types are still "difficult" but we have things like 4011s, 4017s at the time of writing.
RADIO ICs - - -interesting developments here, we now have the Hitachi HA11225 and the HA12412 ultra high specification members of the CA3089E family. The PLESSEY SL1600 range now includes the SL6600 high performance PLL NBFM IF and detector.

CA3089E	2.11	HA1197	1.61	SD6000	4.31	SL1610	1.84	SL1626	2.80
CA3189E	2.53	CA3123E	1.61	TDA4420	2.59	SL1611	1.84	SL1630	1.86
HA1137W	1.95	TDA1072	3.09	MC1330P	1.38	SL1612	1.84	SL1640	2.17
HA11225	2.47	TBA651	2.53	MC1350P	1.38	SL1613	2.17	SL1641	2.17
HA12412	2.81	TDA1090	3.51	KB4412	2.24	SL1620	2.50	SL6600	4.31
KB4420	1.95	TDA1220	1.61	KB4413	2.24	SL1623	2.80	SL6640	3.16
TBA120S	1.15	TDA1083	2.24	KB4417	2.53	SL1624	3.77	SL6690	3.68
KB4406	0.80	TDA1062	2.24	MC3357P	3.16	SL1625	2.50	MC1496	1.44

TRANSISTORS : New lower prices, wider range, large stocks. Also the world's lowest noise audio devices (2SC2546E and 2SA1084E) first from AMBIT of course. Power MOSFETs & all sorts of other devices. Our 3SK51 MOSFET replaces the 408XX and 40673 families.

BC237-8-9	0.092	2SC1775	0.207	2SA1084E	0.368	BF256	0.437	BFY90	1.03
BC307-8-9	0.092	2SA872A	0.207	2SC2547E	0.391	2SK55	0.368	BF224	0.253
BC413-5	0.115	2SD666A	0.345	2SA1085E	0.391	2SK168	0.402	BF274	0.207
BD414-6	0.126	2SB646A	0.345	2SK133	6.32	3SK51	0.62	BFT95	1.138
BC546-556	0.138	2SD760	0.52	2SJ48	6.32	3SK60	0.667	VN66AF	1,092
BC550-560	0.138	2SB720	0.52	2SK135	7.29	BF960	1.426	2N4427	0.977
BC639-640	0.265	2SC2546E	0.368	2SJ50	7.29	3SK48	1.426	J176	0.747

RADIO CONTROL: A special section for all RC fans. New and exciting stuff:
KB4445/KB4446 : complete 4 channel RX/TX dig.prop IC pair RF&control in one 4.75pr
MSL9362/MSL9363 : logic section of a four channel dig.prop link, with switch opt. 3.75pr
NE5044 : Signetics versatile 7 channel encoder, suitable for mixing etc. £2.14 ea
NE544 Signetics famous servo driver IC £2.07 MC3357P as used in RCME design £3.16 ea
AMBIT RCRX4 - RCME FM system compatible, complete RX kit with box/connector and AMBIT design screened front end with 27MHz ceramic filter £16.10 (kit)
XTALS: FM pairs £3.74 (no splits) TX is fund. ½ op frequency, RX 3rd OT 455kHz
AM pairs £3.57 (no splits. Both 3rd OT types, again RX IF at 455kHz

MODULE NEWS

We are at last able to quote for quantities of our modules, following a program of standardization and revision to speed manufacture and test. The following types are the results of the standardization program:

UM1181	5 varicap MOSFET input VHF band 2 tunerhead	£12.00 inc
911225 A	High Performance FM IF system, with switched BW	£23.95 inc
911225 B	Single BW filters, single tuned detector	£14.95 inc
91072 A	DC tuned and single pole switched MW/LW tuner	£14.43 inc
91072 B	As type "A" but with either SW1 or SW2 band	£15.90 inc
92242 A	Combined LW/MW tuner, with FM IF/detector section	£29.00 inc
92242 B	As 92242A but with 5-10MHz SW section	£34.00 inc

All are supplied housed in screened metal cases 97x56x24mm, with all connections along a single edge, suitable for verticle or horizontal mounting.
Previously advertized units are still available - although there may have been some price changes in the latest edition of the Price List (Date Feb.80). A separate leaflet covering the new range of modules is available from April 80, with an A4 SAE please.

NEW LINE : ALPS switches and rotary potentiometers. With a general catalogue that's over 3 inches thick, we cannot begin to offer a comprehensive list of what we can offer - but we are already stocking the keyboard switches, keyswitches, pushbutton switches etc. In particular, the pushbutton switches really put all others in the shade (schadow?) when it comes to quality and price. A special new shortform is being prepared (and may be ready when you read this). All the potentiometers and switches you could ever need from a single source. Keypad switches cost as little as 15p ea (1 off), with a range of two part caps for easy ledgending. You must see the shortform catalogue (30p) and our new pricelist for full details of this huge range of components

AMBIT SHOP NOW OPEN

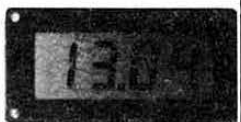
We are gradually getting our caller sales area sorted out, with displays of the products on offer and a browsers corner to sit and study data/catalogues. Call in next time you are in the area - parking outside the door.

COMPUTER CAPABILITIES

Ambit has been keeping a low profile on the subject of the MPU and its applications. Interestingly enough, the first project we offer with MPU content does rather more in the way of processing than simply playing a daft game, or looking like an enormous calculator. Our MPU facility and expertise is now for hire on a fully commercial basis. Z80, 6800, 6809, 2650 etc.

Keyboard switch
SCK41505
typ 6m ops
23p each (1-24)

NEW LINE : DC/DC+AC converters for fluorescent displays. TOKO CPS series 12v IN, -20 and 3v AC out at 65mA. Thick film design £2.34 ea Qty. prices OA



GENERAL INFORMATION

Ambit stocks the following ranges of components for ex-stock volume delivery. SIGNAL COILS, CERAMIC, MECHANICAL and CRYSTAL FILTERS. RADIO ICs for AM/FM/SSB. TOROID CORES FOR RADIO and EMI FILTER CIRCUITS. INDICATING AND PANEL METERS. AUDIO ICs, RF TRANSISTORS, FETS, MOSFETS, DIODES (PIN,VARICAP,SCHOTTKY), PASSIVE DBMs (like MD108 etc), IC SOCKETS, LEDS, TRIMMER CAPS, SWITCHES, KEYBOARD SWITCHES, TUNERHEADS, IF AMPS, AM RADIO MODULES, etc etc

NEW LINE : DVM176 - the definitive ICM7106 LCD DVM module. 3½ digit £22.37 ea.

CM161: LCD 12/24hr alarm clock/day/date/backlight (eq.RS308-499) 7mm digits £11.44 each
CM174: LCD 12hr alarm clock/stopwatch/backlight with 30mm height digits £14.32 each

CATALOGUES 60p ea ; all three for £1.60
PRICES SHOWN HERE INCLUDE VAT
POST/PACKAGE CHARGE NOW 35p

CWO PLEASE. Commercial MA terms on application
Goods are offered subject to availability, prices subject to change - so please phone and check if in doubt.

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NICOMTECH

WE HELP YOU WHERE IT HURTS

Pretty pictures are fine . . . Journals these days are packed full of them—Trouble is they're so repetitive . . . Same Gear . . . Same Price . . . Even the same dialogue! Check now, you'll see what we mean—Only the address is different!! The question is—What do they cost you?

The quality of sales and service comes down to overheads, you know it and we know it—Simply stated, use it one way and you can't use it the other—So that's why we're at this end of the Mag—No pretty pictures here; only value for money deals—In a nutshell that's our aim—TO HELP YOU WHERE IT HURTS—In your pocket! For example look at our HP deal—A real super saver—The best ever offered to Radio Amateurs, so if you're looking for easy payments—Look no further—Our deal is aimed TO HELP YOU WHERE IT HURTS and we know WHERE IT HURTS—In your pocket! Ask the Amateurs who've bought from Amcomm—They'll tell you—First Class Service—Absolutely No Quibble Guarantee—Express collection and return guarantee service—Average Repair Time 48 hours—Top Trade Ins—That's where our overheads go—No pretty visuals, just top deals and service TO HELP YOU WHERE IT HURTS—In your pocket!

Yaesu FT 901DM Cash Price £920.80 Deposit £352.00 12 monthly repayments of £47.40	**Yaesu FT 101ZD** Cash Price £670.20 Deposit £240.00 12 monthly repayments of £35.85	**Yaesu FT 225RD** Cash Price £557.76 Deposit £216.00 12 monthly repayments of £28.48	**Yaesu FT 7B** Cash Price £432.12 Deposit £168.00 12 monthly repayments of £22.01	**Yaesu FT 101Z** Cash Price £575.76 Deposit £234.00 12 monthly repayments of £28.48
Yaesu FT 107M/107E Cash Price £862.04 Deposit £335.00 12 monthly repayments of £43.92	**Yaesu FRG 7000** Cash Price £377.04 Deposit £150.00 12 monthly repayments of £18.92	**Yaesu FT 207R** Cash Price £199.60 Deposit £91.00 12 monthly repayments of £9.05	**Standard 8800** Cash Price £252.00 Deposit £99.00 12 monthly repayments of £12.75	**Standard 8700** Cash Price £275.08 Deposit £109.00 12 monthly repayments of £13.84

MAIL AND TELEPHONE ORDERS? . . . Well our competitors are terrific at this—We just do our best. That means if we have your order before Midday it leaves before 4.00, no parcel post—Everything First Class Mail or Securicor (not Jaybeam or Hygain) because we know you want it NOW. If we're short on stock (almost never) we'll ring you, if you can't wait we'll recommend another dealer to you. So whatever you're after, check the glossies then call the "Try Harder People" at Amcomm.

The opportunity is below—Try us once and we'll prove it—Cash or Terms we're with you—TO HELP YOU WHERE IT HURTS—In your pocket!

★ Check our Mail Order list in last 3 Radcomms. Prices haven't changed.
★ If you need pretty pictures send us 25p and we'll send you a bundle—in colour too!
★ Other low charge deals available over 18 & 24 months. Call us with your requirements and we'll tailor a deal for you.

WE HELP YOU WHERE IT HURTS (PART II)

If you're an HF man you'll love this—We've a fair number of them arriving during the last week of February—A rather big, rather special purchase and all the benefits being pushed out to you—Before you look down we'll anticipate your question and say "YES THERE IS A CATCH!" a small one.

YAESU FT 101ZD £615.00 inc. VAT
Carriage £8.00

So what's the catch? Well the rigs on offer above have no AM facility—Otherwise the same as the top price units—All are unopened, factory fresh and carry our fully comprehensive guarantee—We've quite a number coming but not enough to meet the demand—So get on the phone before they vanish and WE'LL HELP YOU WHERE IT HURTS—In your pocket!

JAYBEAM—HYGAIN—BANTEX—AMTECH—CUSHCRAFT—SWAN—ATLAS
and 50 other major lines—all ex stock.

AMCOMM

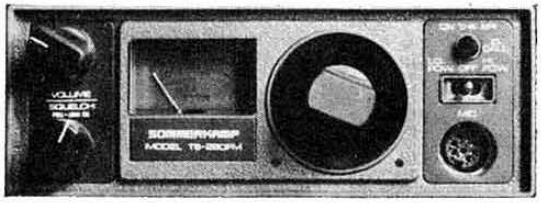
AMCOMM SERVICES

194A NORTHOLT ROAD, SOUTH HARROW, MIDDX. Tels: 01-864 1166 & 01-422 9585

OPENING HOURS: Mon-Sat 9.00-5.00 Sunday 12.00-3.00

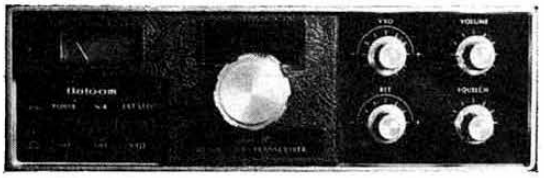
YAESU

THE WORLD'S MOST COMPACT
2m 80 channel 50 watt TRANSCEIVER



Just stop and think what it will cost you to buy the average 2 metre synthesized rig to replace your crystalled job? Then look at the cost of a 50 Watt Burner? Doesn't it make sense to grab one of our **TS280FM's at £203.55 all in!** And you can have a telephone handset for privacy in the car, or a selective tone mic. etc etc. And it's a rather nice shade of blue!

"LINER 10" FIRST EVER 28MHz SSB MOBILE is now freely available from stock to class "A" licensees. It's about the size of a 2 metre box and has excellent performance.



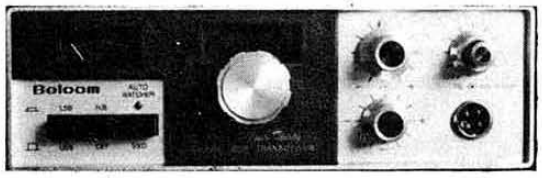
Both Liner 10 & 15 (21MHz version) at £167.90

LS707—Belcoms excellent 70cm all-mode now from stock at new low price **£495.00** includes VAT **and** carriage. Matching R707 Power supply also from stock at **£60**—all in.

SOMMERKAMP FT7B just arrived—your very best buy for this excellent HF set—**£415.**

TS802 SOMMERKAMP brand new 80 channel 2 Watt 2 metre handheld with built-in toneburst and repeater shift plus DIGITAL CHANNEL READOUT. Optional telephone handset for privacy on the bus! Robust aluminium case—**£172.50.**

FRG-7 ANALOGUE READOUT SOMMERKAMP Lowest price in UK **£195.00**



LINER 430 70cm SSB MOBILES STILL EX-STOCK—£212.75 including VAT & delivery.

FT101ZD. If you are thinking about one of these excellent HF rigs think about FT277ZD SOMMERKAMP at **£661**—the price includes VAT/carr, and you get the microphone, CW filter and cooling fan **at no extra.** Discount if you collect.

LITERATURE: Please send a SAE for a quick reply with our literature, price lists. If you want one of the 1980 Sommerkamp colour brochures please ask. We will buy or trade your clean secondhand gear at good prices. Open 6 days per week.

ARROW ELECTRONICS LTD

7 COPTFOLD ROAD BRENTWOOD ESSEX

Tel: 0277 219435 **73 de G3LST & staff**

BRAND NEW COMPONENTS BY RETURN OF POST

VAT inclusive. Postage 10p (free over £4). SAE for list.

RESISTORS

Carbon Film, ¼W E24 series 1R to 3MO E12 series to 10MO **1p**
Metal Film ¼w, ½w & 1w E12 Series 10R to 2M2..... **2p**

CAPACITORS

Mullard Submin. ceramics E12 Series. 2% 1·8 pf to 47 pf..... **3p**
2% 56pf to 330pf..... **4p** 10% 390pf to 4700pf..... **4p**

Plate Ceramics 50V working for vertical mounting

E12 Series 22pf to 1,000pf and E6 Series 1K5pf to 47Kpf, **2p**

Miniature Polyester 250V working for vertical mounting

·01, ·015, ·022, ·033, ·047, ·068 **4p.** 0·1 **5p.** 0·15, 0·22 **6p**
0·33, 0·47 **8p.** 0·68 **11p.** 1·0 **15p.** 1·5 **20p.** 2·2 **22p**

Electrolytics, Wire Ended (Mfds/Volts)

·47/50	5p	22/16	5½p	47/50	6p	150/16	7p	470/25	11p
1·0/50	5p	22/25	5½p	100/10	6p	220/16	8p	470/40	16p
2·2/50	5p	22/50	6p	100/16	7p	220/25	8p	1000/15	15p
4·7/50	5p	47/16	5½p	100/25	7p	220/50	10p	1000/25	18p
10/50	5p	47/25	5½p	100/50	8p	470/16	11p	1000/40	35p

Tag-ended cans 3300/25 **20p.** 4700/16 **25p.** 2500+2500/63 **£1.00.**

Tantalum bead subminiature electrolytics vertical mounting

0·1/35	14p	4·7/6	14p	15/16	20p	22/16	30p	100/3	30p
0·22/35	14p	2·2/35	15p	22/6	20p	22/25	35p	47/10	35p
0·47/35	14p	4·7/25	15p	15/25	35p	47/6	30p	47/16	60p
1·0/35	14p	10/25	29p	15/25	35p	68/3	30p	33/10	30p

Polystyrene 63V working E12 Series long axial wires

10pf to 820pf **3p** 1kpf to 10kpf **4p** 12kpf **5p**

TRANSISTORS

BC107/8/9	10p	BC558B	7p	BCY70	15p	2N2926	7p
BC147/8/9	10p	BC182L	8p	BF194	9p	2N3055	50p
BC157/8/9	10p	BC184L	8p	BF197	9p		
BC547C/8C/9C	7p	BC212L	8p	BFY50/51/52	15p		

8 pin DIL I/Cs 741 Op/Amps **18p.** 555 Timers **24p.**

DIODES (p.i.v./amps)

75/25mA 1N4148	2p	1000/1A 1N4007	7p	60/1·5A S1M1	5p
100/1A 1N4002	4p	1250/1A BY127	10p	30/10mA OA90	6p
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Kit £16.20 Assembled £22.25

144LIN10B. Details are as the LIN10A but having full PIN C/O on input and output with manual or RF sensing circuit operation. With no volts applied the unit is transparent to r.f. Ideal for mobile use with our 144FM2TR or TR2200's etc. Size 2·1" x 2·4".
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70PA/FM10. Amalgamation of the 70FM10/70PA1 kits to give 10 watts output for 500mW drive and 12dB receiver gain. Full PIN diode changeover on input and output with full r.f. sensing. Size 3·1" × 2·1".
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MD10PA. Power booster for the MD05T to give 10 watts output. Size 2·75" × 1·0".
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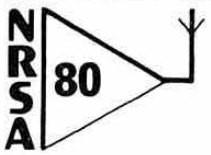

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Home Office

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FM TX MOD DRIVER PCB		
AT26826/68 B band (will tune High band)	Order code WS5	**£15.00**
PA BOARDS WITH ALL TRANSISTORS AND HEATSINKS (screen covers not supplied)		
AT10784/10 P band (will tune Low band)	Order code WS7	**£18.00**
Low band pcb only, complete except for transistors and heatsink (for spares only)	Order code WS8	**£1.50**

A selection of items below from our 1980 catalogue, the products we stock are by Eagle, Weller, Draper, Spiralux, Knipex, Servisol, Barnard's & Babani, Newnes, Jaybeam, Vero, and others. If you send us £1.35 you will receive the catalogue plus five bi-monthly shortform catalogues to keep you up to date with prices and special offers. A free pack of Blob Board comes with this months issue.

EAGLE MA780T Electric fully automatic 6 section retractable car aerial with built-in voltage sensor. Remote drive system makes fitting easier. Aerial length, 1,000mm, below wing 220mm, lead length 9,000mm, flexible drive link 700mm. Price **£16.95** plus VAT.
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EAGLE MULTIMETER EM50 50,000 opv. DC volts: 0-1200 volts, AC volts: 0-1200 volts, DC current 0-6A, Resistance 0-10 megohms. Price **£19.95** Plus VAT.
DRAPER super-chrome ¼" square drive socket sets. 38 piece, 9 AF hexagon sockets, 3 AF bi-square sockets, 11 MM hexagon sockets, 9 BA hexagon sockets, and 6 accessories. Price **£12.75** plus VAT.
SPIRALUX metric nut spinner sets, contains 8 nut spinners 4, 4·5, 5, 5·5, 6, 7, 8, 9, 10mm. Packaged in a plastic wallet with cellulose acetate handle. Price **£7.53** plus VAT.
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WELLER cordless soldering irons Model No. WC100 **£25.47** plus VAT.
JAYBEAM "STEREOBEAM" VHF/FM antennas Model SMB2, folded dipole and reflector with universal clamp. **£8.00** each. Full range of Jaybeam aerials and accessories available. (See 1980 Catalogue).

AUCTION NOTICE
As from Saturday 3rd February 1980 we will hold weekly auctions on Saturday mornings of Radio and Electronic components and equipment, you bring and buy. Entries will be accepted on morning of sale from 8am. The Sale will start at 10am. So come along and bring something with you to sell. Light refreshments will be available.

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VHF/UHF Manual	£7.24
World at their Fingertips	£3.08

Logbooks

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Mobile Logbook	£1.12
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Great Circle DX Map (in tube)	£2.10
Oscar Map (in tube)	53p
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QTH Locator Map of Western Europe (wall)	£1.30
QTH Locator Map of Western Europe (card for desk)	67p
UK Beacon List	30p
UK Repeater List	30p
IARU Region 1 Beacon List	30p

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Members' headed notepaper (50 sheets) octavo	73p
QSL card holders	£1.11
Radio Communication back issues *(As available)*	87p
Radio Communication bound volume, 1978	£14.78
Radio Communication Easibinder	£4.12
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RSGB teeshirt (small, medium, large) (new design)	£3.38

**Delivery approximately five weeks*

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"I'm monitoring ·5 are you?" (two colours)	66p
RSGB badge	38p

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Antenna Book (13th edn)	£4.13
Course in Radio Fundamentals	£3.10
Electronic Data Book	£3.33
FM and Repeaters for the Radio Amateur	£3.88
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Radio Amateurs' Handbook 1980 (Hardback)	£11.42
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VHF Manual	£4.03

Radio Amateur Callbook Inc

American Callbook (USA listings) 1980	£11.67
American Callbook (DX listings) 1980	£11.28
World Atlas (Amateur radio prefixes)	£1.88

Radio Publications Inc

Beam Antenna Handbook	£4.02
Better Short Wave Reception (3rd edn)	£3.56
Cubical Quad Antennas	£2.90
Simple, Low-cost Wire Antennas	£3.07

Miscellaneous

Amateur Television *(out of stock)*	
Care and Feeding of Power Grid Tubes	£2.98
Complete Handbook of Slow-scan TV	£5.72
International VHF FM Guide *(out of stock)*	
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NOTE all boards negative earth.

The above units are all matched to one another to make a superb VHF monitor receiver with a sensitivity of 0·2μV for 20dB quieting, the boards can be used individually in your own receiver designs i.e., the converter board can be used with synthesiser etc. SPECIAL OFFER the set of four boards **£58.00.**

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ERIE R.F.I. SUPPRESSION FILTERCONS type 1202/052 quantity available to manufacture.

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FERRITE RINGS approx 6mm dia. wound 4 turns wire easily removed, **40p** per 10.

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FX1115 single hole, 4½p ea. 10 for **32p.**

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TOKO 470kHz IFT 10mm sq. single tuned **15p,** double tuned 10 × 20mm **20p.**

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2N4381 **30p,** "P" chan. fet.
BF256 **40p,** "J" fet.
TIS88A **42p.** "N" chan. fet.

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OA90 **10p.**	10 for **30p.**	BYX94 **8p.**
OA91 **10p.**	1N4001 **5p.**	1N54A **5p.**
BA243 **25p.**	1N4004 **5p.**	BA244 **25p.**

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