July 1979

radio communication

journal of the Radio Society of Great Britain

1979 RALLY VIEWS

Raffle prizewinners G4HEB and his wife, with raffle organizer G3ZBA (centre)

WHITE ROSE

◄ ►

Photos: G4HSZ

▼

G8GSF and G2BXZ at the stand manned by G4AOG and partner Brenda

Admiring the boxes . . .

The RSGB bookstall

DRAYTON MANOR

◄ *Photos:* G4AJD ►

. . . and the miscellany

NEW FROM Catronics

A NEW VIDEO DISPLAY UNIT MODEL CD300 ESPECIALLY DESIGNED FOR THE RTTY ENTHUSIAST

The video display unit is designed to be an all-electronic replacement for a Teleprinter, and therefore does not suffer its disadvantages—bulk, unreliability and noise.

The basic function is to take Murray Code—either from a Terminal Unit (on receive) or from a Keyboard—and produce a complete TV signal. This signal may be fed into a monitor or modulated and fed into the aerial of an ordinary domestic TV set. The resulting display is a page of 16 lines of up to 64 characters.

It may also be used (with its keyboard) to send fully encoded Murray Code signals for transmit purposes.

16 lines per page
64 characters per line
Standard TTL compatible input
Standard IV video output
Flashing cursor
Auto-scroll at end of page
Cabinet size 9" × 2½" × 7" approx

Front panel controls for: Letter shift
Figure shift
Page reset
Carriage return
Line feed

Built-in mains PSU
Styled to match the Catronics CT100 Terminal Unit

Price: £150.00 inc VAT (Add £3.50 Securicor delivery)

and don't forget the RTTY TERMINAL UNIT CT100 Mk2

Now incorporating a number of modifications, YOU have asked for: including Completely automatic receive/transmit modes.
Protected and buffered input provided for TTY keyboard.
Automatic re-generation of incoming tones.
Special r.f. interference suppression circuit, etc, etc.

Inputs for:
Audio FSK signal in
Data in from VDU (eg G3PLX).
TTY Keyboard or Tape Reader

Outputs for:
VDU or other TTL compatible equipment
TTY Magnet – single or double current
AFSK to drive Transmitter

Featuring a unique digitally controlled **'Autoprint'** circuit which is a superior replacement for the 'Antispace' and 'Autostart' facilities found on some other terminal units. The terminal will ignore most CW and phone signals but will respond to a correct RTTY signal.

Tuning correctly into an RTTY signal is made simple with a single **'correctly tuned'** LED plus an additional **'Mark frequency'** indicator.

The FSK demodulator circuit utilises a special 'state-of-the-art' system to give excellent performance and stability at low cost. The demodulator is set to decode signals within 75Hz of nominal frequency i.e. 1200–1350Hz for space and 1370–1520Hz for mark, when in narrow shift position.

The teleprinter interface unit incorporates electronic 'de-bounce' circuitry to eliminate spurious switching from the Keyboard. The loop supply is protected by a separate fuse and is suitable for driving all single current and double current magnets known to be available.

VAT inclusive prices are as follows: CT100 Receive only **£90.00**, CT101 Receive/Transmit **£93.50**, CT102 with Teleprinter interface **£94.50**, CT103 Complete Terminal Unit **£98.50.** All models plus **£3.50** Securicor delivery

G3PLX RTTY VIDEO DISPLAY

(April 1977 Rad Com)
Kit (excluding modulator, keyboard and P.S.U.), **£83.55**
Set of printed circuit boards **£15.20.**
UHF Modulator kit **£11.95.**
Flashing cursor kit **£8.60.**
Diode Matrix kit **£13.25.**
Suitable mains P.S.U. Transformer £2.75.
Catronics UHF Modulator, £15.00.

Please add 30p postage.

NOTE regarding PROM program: The PCBs and programmed PROMs supplied by us make use of a slightly different program sequence resulting in different pin connections to those published in the 'Rad Com' article. Whilst constructors buying PROMs and PCBs from us will have no difficulty, those producing their own PCBs or having PROMs programmed elsewhere should note this important difference. A detailed modification sheet is available with the PCBs.

KEYBOARD KIT

The printed circuit board is designed to take a maximum of 70 keys but may be assembled with a smaller number of keys for a simpler keyboard.

The board is not dedicated to any specific coding, allowing it to be used for any project whether it requires ASC11, Baudot or any other code. This makes it suitable for many projects including;

G3PLX RTTY VDU
Auto morse sender, etc.

The Keyswitches themselves are single pole push-to-make type and require no extra mechanical mounting arrangements.

A legend sheet is provided with each kit enabling the constructor to label the keys to suit individual requirements.

Price: only £29.00. Please add 50p for postage.

Pay by cheque, PO, Access or Barclaycard. HP also available

CATRONICS LTD, DEPT 907, COMMUNICATIONS HOUSE,
20 WALLINGTON SQUARE, WALLINGTON, SURREY SM6 8RG. Tel: 01-669 6700

Shop/showroom open Monday–Friday: 9.00–5.30, closed for lunch: 12.45–1.45. Saturdays: 9.00–1.00.

ISSN0033-780

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Correspondence concerning the distribution of the journal and all other Society matters should be addressed to:

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35 Doughty St,
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radio communication

July 1979 Volume 55 No 7

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

ABC MEMBER OF THE AUDIT BUREAU OF CIRCULATIONS

21,498 copies per issue average circulation in 1978

Closing date for contributions unless otherwise notified: 1st of month preceding month of publication

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ICOM®

HOW ABOUT GOING /M . . .

THE LEADER BASE STATION

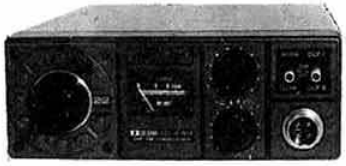
IC-211E

Fast becoming one of the most popular base station rigs because of its superb performance and advanced technology, the IC-211E leads the field in 2M base stations. With a full synthesizer which employs state of the art technology it provides all you want for full coverage on FM USB, LSB or CW on 2 metres with that extra bit of quality for which ICOM are so renowned, plus the chance to use the latest digital technology and even drive it from your home computer if you wish!
Less VAT = £481.78 With VAT = £542

THE MOBILES

The IC-245E is probably the only multi-mode mobile on the market. Of course, it can also be used as a base station, and many own one for just this purpose. It employs all the same technology as the IC-211E, and is in fact virtually the same electronically with the exceptions that it only operates on USB, FM and CW and does not have VOX and sidetone or full seven digit readout. As with the 211 you have access, via a multi-way plug on the back, to the LSI synthesizer for connection of a keypad, computer or other bit of home-brewed logic.
Less VAT = £354.67 With VAT = £399

IC-245E
NOW £399 inc.



IC-240
NOW £189 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 = £168.00**	**With VAT = £189.00**
With Superscan	**Less VAT = £230.22**	**With VAT = £259.00**
	(while stocks last)	

IC-280E
NOW £245 inc.

★ WITH SCANNER £255

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 = £217.78 With VAT = £245

AGENTS (PHONE FIRST—All evenings and weekends only, except Norfolk and Burnley)
Scotland—Jack GM8GEC (031-665 2420) **Norfolk**—Ted G3FEW (05088 632)
Wales—Tony GW3FKO (0222 702982) **Burnley**—(0282 38481) **Midlands**—Tony G8AVH (021-329 2305)
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THANET ELECTRONICS

143 Reculver Road, Beltinge, Herne Bay, Kent (02273 63859)

Access

ICOM®

. . . OR /P FOR THE SUMMER?

IC-215
£159 inc.

The IC-215 is getting more and more popular also as it combines the advantages of a portable, which can be operated anywhere, with the ability to double as a low power base station by virtue of its 3 Watts of output and SO239 antenna connecter on the back. Of course there are facilities to operate it from an external power supply, and if it is fitted with Ni-Cads you can arrange to trickle charge these at the same time. The batteries used are of a sensible size being C type (or UII) instead of the 'penlight' batteries used by most of its competitors. This gives at least three times the operating power when you are away from home which you will appreciate if ever you have run out of battery in the middle of a QSO! It comes already crystalled up for 12 channels, S20, S22 and all the repeater channels 0 to 9. We think the extra power and larger batteries far outweigh the advantages of having the extra channels produced from a synthesizer.
Less VAT=£141.33 With VAT=£159

IC-202
£199 inc.

ICOM's range of sideband portables has been recently expanded. The well known and tested IC-202E has now been improved in the form of the IC-202S which has lower side band fitted also and provides sidetone on CW. The receiver has been hotted up making it even more suitable for use as a base station, either barefoot or as a prime mover. The new IC-402 is the 70cm version of the 202S giving the same facilities as its 2m cousin over the range 432-435·2 MHz. Both use a very stable VXO circuit, to give fully tuneable coverage of the band in 200kHz segments and both have extremely clean signals so that using them to drive a linear to the full legal limit presents no problems. We are very impressed with both the 202S and the 402.
The IC-202E was good . . . these are even better!
IC-202S Less VAT=£176.89 With VAT=£199
IC-402 Less VAT=£256 With VAT=288

IC-402

OR IF YOU WANT A HAND-HELD—
HOW ABOUT THE AR-240?

IC-202

AR-240

Although not made by ICOM, we decided to take this exciting new little hand held into stock because it fills the need for a really good portable where size is of prime importance. It has an amazing performance with a truly excellent receiver. A synthesizer is used, with decade switch read out to cover the range 144–148MHz in 5kHz steps and 600kHz repeater shifts and a tone burst are built in. It comes with NiCads, a charger and a telescopic whip antenna—though if you want to make things even neater then you can use the ICOM FA1 flexible helical in place of this. At £195 inc VAT we think this is really good value for money.

AVAILABLE NOW DIRECT FROM HERNE BAY
Less VAT=£173.33 WITH VAT=£195

240 Channelizer

We have now a new mod. for the IC-240 which gives 80 Channels, displayed as channel numbers selected on thumbwheel switches.
Kit £36 inc VAT

Phone—or put a message on the ansafone for further details

ALSO AVAILABLE FROM OUR SHOP IN HERNE BAY

MICROWAVE MODULES **ANTENNA SPECIALISTS**

J-BEAM **YAESU MUSEN** **FDK**

HP AND PART EXCHANGE WELCOMED

ICOM®

THE 'REMOTABLE' 2m RIG

IC-280

£245
inc VAT

★ WITH SCANNER FOR £255! ★ (Contact us first)

25kHz SPACING OVER THE WHOLE BAND: 3 MEMORIES: LED READOUT: BUT MOST IMPORTANT—ICOM QUALITY

Icom's new 2 meter mobile has a detachable microprocessor controlled head, easy to read LED's and a new style meter set in a brushed aluminium front panel.

The 280E comes as one radio which can be mounted in the normal manner but as an option the entire front one third of the radio detaches and can be mounted in that small location in the car (such as the glove pocket) where other sets are just too large to fit, while the main body tucks neatly out of sight several feet away—such as under the passenger's seat. No longer do you have to mount a radio in a position where it is poised all ready to smash your right kneecap should you have an accident!

With the microprocessor head the IC-280E can store three frequencies of your choice, which are selected by a four position front panel switch. These frequencies are retained in the 280E's memory for as long as power is applied to the radio. Even when power is turned off at the front panel switch the programmed memories are maintained; and the 600kHz repeater shift is always retained.

It goes without saying that the usual high quality engineering for which Icom are renowned is found in the 280E. There are no nasty shortcuts to try to keep the price down to the detriment of performance.

It includes the latest innovations in large signal handling FET front ends for excellent intermodulation performance and good sensitivity at the same time. The IF filters are crystal monolithics in the first IF and ceramic in the second, providing narrow band capacity for today and tomorrow's crowded operating conditions. Modular PA construction with broad band tuning provides full rated power across the full 2 meter band.

FROM **THANET ELECTRONICS** OF COURSE

ICOM®

TWO GREAT STATE-OF-THE-ART RIGS

1 IC-211E 2m All-mode

Covering the full 2 metre band with fully synthesised multi-mode operations, the IC211E is the most advanced, highest quality 2 metre transceiver available anywhere. The IC211E comes complete with ICOM's single-knob frequency selection and two digital VFO functions, standard features at no extra cost.

The large weighted flywheel knob mounted with low friction ball bearings is used to drive an optical chopper to provide pulses to the synthesisers LSI, which shows a full 7 digit readout. A breaking mechanism, which operates electrically, engages to provide a smooth feel at slow speeds; and a "dial lock" button holds the reading at the time it is pushed, even though the knob continues to rotate.

The IC211 incorporates computer compatible interface via the 24 pin accessory socket on the reat panel which enables PIA connection for the microprocessor buff.

The IC211's synthesiser steps are displayed, with positively no time lag, backlash or uncertainty in display stability, in increments of 100Hz or 5kHz from 144-146MHz. Any offset for repeater use can be programmed.

SMALL ENOUGH FOR MOBILE!

The IC211 contains both 240vac and the 13.6vdc power supplies and has a built-in high SWR autopower control. Variable output power contributes to the IC211's versatility. Output between 500 milliwatts and 10 watts may be front panel controlled on FM.

More of the maximiser's built-in standard features include: a pulse type IF noise blanker; front panel discriminator meter, SWR meter; VOX with adjustable VOX gain delay and antivox; CW monitor volume level; and semibreak-in CW operation.

And your new IC211 carries the THANET 1 year warranty backed by spare parts and technical expertise if bought directly from us.

COMPARE THE IC211 WITH THE OTHERS! £542 inc VAT

2. Computer compatible

IC-701 HF £891

ICOM's superior LSI technology takes the lead in Amateur HF. The extremely compact **IC-701** delivers 100 watts output from a completely solid state, no tune (broad band design) final, on all modes and all bands, from 160-10 M. With single knob frequency selection and *built-in dual VFO's*, the LSI controlled **IC-701** is the choice in computer compatible, multi-mode Amateur HF transceivers.

The **IC-701's** single frequency control knob puts fully synthesised instant tuning at a single finger tip. **WIDE** bandspread, with 100Hz per division and 5kHz per turn, is instantly co-ordinated between the smooth turning knob and the synthesiser's digital read-out with positively no time lag or backlash (no waiting for counter to update: less operator fatigue). And at the push of the electronic high speed tuning button, the synthesiser flies through megacycles at 10kHz per step (500kHz per turn).

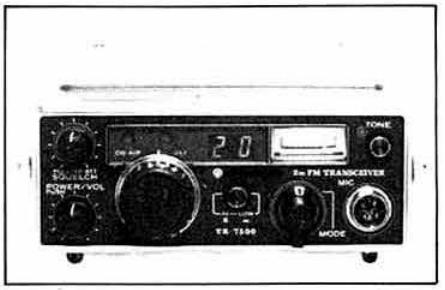
The computer compatible **IC-701** LSI chip provides input of incremental step or digit-by-digit programming data from an external source, such as the microprocessor controlled accessory which will also provide remote band selection and other functions.

Full band coverage of all six HF bands, and continuously variable bandwidth on filter widths for SSB, RTTY, and even SSTV, help to make the **IC-701** the very best HF transceiver ever made. **IC-701** includes two CW widths, all of this standard at no extra cost.

Sold complete with the high quality electret condenser base mic (SM-2), the **IC-701** is loaded with many ICOM quality standard features. Standard in every **IC-701** are *two independently selectable, digitally synthesised VFO's at no extra cost.* Also standard are a double-balanced schottky diode 1st mixer for excellent receiver IMD, and RF speech processor, separate drop times for voice and CW VOX, optionally continuous RIT, fast/slow AGC, efficient IF noise blanker, fast break-in CW, and full metering capability.

from THANET of course.

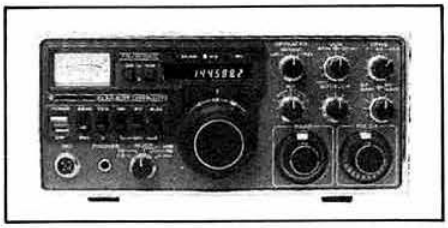
LOWE ELECTRONICS Ltd



TRIO TR7500 The sensible one, £235 inc. VAT

The TR7500 gives you the ultimate FM mobile rig. Full band coverage 144–146MHz in 80 channels at 25kHz spacing—and no programming or crystals due to the use of an advanced synthesiser. Dial indication is commonsense itself; if you want S20, simply turn the dial to 20; R7, turn to 7, no need to remember complicated frequency plans. If you are operating on a repeater and you wish to listen on the input frequency or operate reverse repeater, simply touch one switch; there is no knob twiddling involved. Should you need a 1·6MHz shift—that's also available on the synthesiser—but remember, you may qualify for the WACS Award (worked all cop shops!).

Potent performance in a package not much larger than the TR-2200 with 15–18 Watts transmitter output and better than 0·2μV sensitivity together with the unparalleled Trio quality and attention to detail make the TR7500 the *sensible* man's choice.

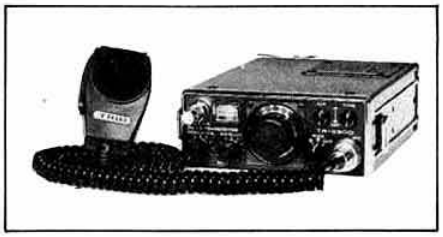


TRIO TS700S £537 inc VAT

This is the ultimate TS700 with every possible extra. Full 2 metre coverage on VFO or 22 crystal controlled channels with digital readout on all modes to 100 Hz using the Trio exclusive easy on the eyes readout rubes. Built-in Vox and break-in CW with keyed sidetone. Low power facility for all modes in case you don't need the full 15–18 Watts normally given by the TS700S. Better than ever receiver performance, particularly in strong signal handling when compared to other equipment, and a built-in switched RF preamplifier. Automatic tone burst with repeater and reverse repeater shifts for no fuss use of 2 metre repeaters.

The remote VFO700S offers for the first time in a VHF rig the facility of splitting transmit and receive frequencies by any amount and also operation on two different transceive frequencies at the touch of a switch (invaluable for monitoring net frequencies or OSCAR checking). The VFO will also give VFO control of the TR7010 with a small adaptor unit.

All in all the TS700S is the best, so see it soon at your nearest stockist; you will not be disappointed.



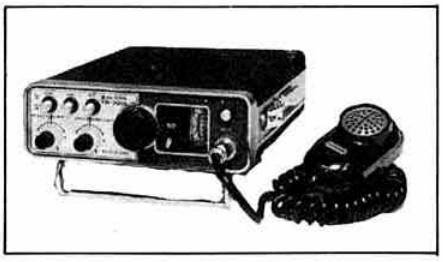
TRIO TR2300 £195 inc VAT

The TR2300 is a remarkable package which combines all the advantages of a portable station with those of a sophisticated mobile set. With the TR2300, you get full band coverage from 144–146MHz in fully synthesized 25kHz channels together with 600kHz repeater shift (and reverse repeater if required) with automatic 1750Hz tone burst.

The dial is directly calibrated in frequency and has switched illumination for ease of use at night.

The transmitter puts out a very clean signal at a power in excess of one watt, and the receiver is very sensitive, in fact better than many big rigs. The external power and external antenna sockets allow one to use it as a fixed station when desired.

The TR2300 is amazingly small, much smaller than its predecessor the TR2200GX and uses a more sophisticated case design and modular construction making a really rugged rig. It comes complete with carrying case, shoulder strap, battery charger, external power cord, etc. Needless to say, you don't need any crystals!



TRIO TR7010 £189 inc VAT

Work real DX with ease on 2 metre SSB and CW. The TR7010 combines a high performance receiver with a 10 Watt transmitter and provides mobile or fixed station capability at low cost. Supplied ready to operate from 144·1–144·34MHz, the TR7010 covers all CW, SSB and beacon activity. 48 channels with 5kHz spacing plus VXO and RIT provide continuous coverage. Operation in other parts of the 2 metre band can be carried out by a simple crystal change and no re-alignment is required.

Single conversion using an IF of 10·7MHz with a first class crystal filter gives outstanding selectivity. Wide range amplifed AGC and newly developed FET devices in the RF and mixer stages allow maximum sensitivity to be used with freedom from overload due to adjacent signals. The single conversion transmitter using fully balanced mixers generates a beautifully clean signal with crisp audio quality.

Join the SSB gang and work real DX. Send for full details now.

TRIO TR3200 £185 inc VAT

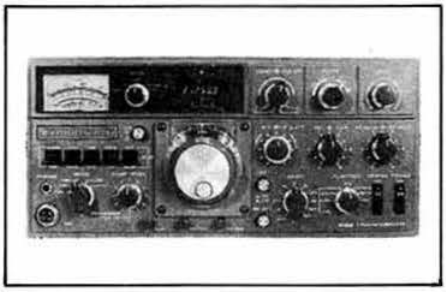
70cm FM repeaters are now so numerous and so efficient that it's almost possible to go anywhere in the country and still be within range of one. As many operators are finding, you don't need high power to be successful, and the TR3200 70cm portable/mobile rig provides the perfect solution to the search for a go-anywhere rig.

The TR3200 power output is two watts or more, switchable to 400mW, it has a really good receiver, a high gain ¼ whip antenna and top performance under all conditions. Use it portable on the internal battery pack or mobile using an external antenna and power from the car. Supplied with three channels fitted, carrying case, shoulder strap and all accessories, the TR3200 is the complete 70cm FM answer.

Drop us a line and ask for full details, or better still, come along and see the TR3200 and all the Trio range in comfort.

SEND 50p IN STAMPS FOR COMPLETE CATALOGUE AND ANTENNA BOOK
PLEASE SPECIFY ANY PARTICULAR INTEREST AND WE WILL SEND FULL INFORMATION

LOWE ELECTRONICS Ltd



TRIO TS820S £814 inc VAT

You can always tell who's running a TS820S. Its superb quality stands out from all the other rigs on the band...and when the QRM gets heavy, the TS820S's RF speech processor utilising fast acting 455KHz compression, will get the message through. RF negative feedback is applied from the PA to the driver to give unbeatable linearity, and 3rd order intermodulation products are better than 35dB down. Operating on all bands from 160-10 metres, the TS820S gives you 200W PEP input on transmit and 0·2 microvolt for 10dB S-N ratio on receive. The TS820S is known for its superb selectivity and its IF shift or passband tuning system easily copes with the heavy QRM. That's why the TS820S is the DXer's choice.

For the true measure of the TS820S, you must simply see it and use it. It's on show at all authorised Trio dealers and if you want complete information, simply send a S.A.E. to Matlock marked "TS820 info".

TRIO TS520S £530 inc VAT

The logical development of the TS520, one of the world's most popular transceivers now includes full 6 band coverage 160-10 metres with all the performance, reliability and quality we expect from Trio. An outstanding receiver with high sensitivity (0·2 uV for 10dB S/N ratio on all bands) together with an equally excellent transmitter make the TS520S the best value for money rig around.

As a TS520S owner, you go on the air with a sense of pride and confidence. Thousands of these precision built transceivers are in use all over the world—in amateur shacks, field day sites, in DX and contest winning stations and no other rig offers you the performance, dependability, versatility and value that is built in to every TS520S.

See it soon and send for full details today.

Matching accessories: DG-5 digital readout/counter, AT-200 antenna coupler/power meter and, of course, the TL-922 2kW linear.

TRIO TS120V £399 inc VAT

Measuring only 9¼" × 3¼" × 9¼"—which is about the size of a packet of cornflakes, the TS120V can best be described as a miniature TS820. The rig covers all bands 80-10 metres—and all of 10 metres 28-30MHz so it's ideal for transverter driving, has digital readout built in, vox, break-in CW, RIT, noise blanker and the unique Trio passband tuning system used in the 820. The power output is 10W and a matching linear will be along shortly.

The TS120V is clearly a winner for mobile operation but is equally attractive at home and is perfect for the VHF/UHF enthusiast who requires a high performance I.F. system for his transverters.

The transceiver is based on an advanced PLL system and the digital readout gives you the *correct* operating frequency at all times unlike many other rigs. Remember my previous comments about Trio attention to detail!

For ease of operation, the TS120V is unsurpassed; simply select the band required, tune the VFO to the frequency you want and there you are; no preselector or PA tuning to worry about, and a distinct safety feature for the mobile operator.

THE ALL-NEW VHF/UHF RIG

TS770

DUAL-BAND, ALL-MODE 2m–70cm

For personal attention on the SOUTH COAST contact JOHN, G3JYG; for equally helpful advice in SCOTLAND contact SIM, GM3SAN. We now stock the PET 2001 series computer at new low prices. SIM, GM3SAN is particularly clever in this area, so why not contact him if you're in SCOTLAND. He'll be glad to help.

HEAD OFFICE AND SERVICE CENTRE

119 CAVENDISH ROAD, MATLOCK, DERBYS. TEL: 0629-2817 or 2430. TELEX 377482. OPEN 9-5.30 TUES-SAT. PHONE IN 9am-9pm.

Agents: John, G3JYG, 16 Harvard Road, Ringmer, Lewes, Sussex, Ringmer 812071. Sim, GM3SAN, 19 Ellismuir Road, Baillieston, Nr Glasgow. 041-771 0364

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TRIO MODEL OF THE MONTH – THE BEST IN HAM RADIO TRIO

The Ultimate Receiver

R820

All Trio equipment is available from the following authorised Trio dealers

LOWE ELECTRONICS LTD, 119 Cavendish Road, Matlock, Derbys. Tel: 0629-2430 or 2817

Note: The R300 receiver is also available from Partridge Electronics

LANCASHIRE STEPHENS-JAMES LTD 47 Warrington Road LEIGH Telephone No. 0942 676790	**YORKSHIRE** LEEDS AMATEUR RADIO 27 Cookridge Street LEEDS LE2 3AG Telephone No. 0532 452657	**WILTSHIRE** PACE ELECTRONICS 9 Lime Kiln Wootton Bassett, Nr. SWINDON Tel. No. (0793) 850056	**WALES** M.R.S. COMMUNICATIONS LTD 76 Park Road Whitchurch, CARDIFF Tel: No. 0222 616936
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	**BIRMINGHAM** WARD ELECTRONICS Soho House, 362-364 Soho Road BIRMINGHAM B21 9QL Telephone No. 021 554 0708	APPROVED TRIO DEALER

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LOOK! 12½kHz or 25kHz +25 watts

FDK MULTI-700E

£229 inc. VAT & delivery

What can one say about a transceiver that has proved to be so perfect in design. Truly a concept that looks to the future as well as the present. Its powerful 25 watts ensures better coverage than its competitors and its 25kHz stepped frequency synthesizer means no more xtals to buy. And to match its powerful output two receiver RF stages are provided that typically give about ·3uv or better for 20db NQ. Reliable repeater operation is ensured by a crystal controlled tone burst and a pre-wired 600kHz shift. Listening on the input of the repeater or reverse repeater operation is obtainable at the flick of a single switch and the 25 watts output is continually variable down to 1 watt. A remarkable transceiver at a remarkable price—little wonder more and more people are saying, "I'm using a Multi-700E at this end, O.M." And one final point, it also tunes in 12½kHz steps and with the specially designed receiver filter 12½kHz operations is immediately possible. **IN STOCK NOW—ORDER TODAY.**

NEW MULTI-3000 2m ALL MODE TRANSCEIVER

The Multi-3000 is the new 2 metre all mode transceiver to leave the FDK factory. It features 15 watts of FM/SSB/CW with a host of features that keeps it in the forefront of value-for-money VHF transceivers.

The design retains the switch selected synthesizer which can be used for FM to select any channel quickly and accurately. The synthesizer tunes in 10kHz steps and a separate control inserts the 5kHz digit as necessary. Complete coverage from 144 to 148MHz is provided and the three separate knobs for 1MHz, 100kHz and 10kHz digits make QSYing extremely rapid.

FDK's dual vfo facility is retained employing a separate flywheel drive with direct digital readout. Thus the switched synthesizer may be left on ones favourite FM channel and the vfo used to tune around the band. In the FM mode two tuning rates can be selected. The "rate of tuning" switch gives either 10kHz or 1kHz steps. The former for rapid QSYing and the latter for final tuning to the desired frequency exactly on any 1kHz multiple. On SSB and CW the same tuning control gives steps of either 1kHz or 100Hz. In this mode the digital display reads accurately to the nearest 100Hz. Tuning has never been easier! And that's not all. A memory button enables one to lock the last frequency (even down to 100Hz on SSB) and then carry on tuning around the band. At any time the memory button can be pressed to return to the original stored frequency and pressing it again returns you to the frequency you had just QSY'd from. In all, 3 frequencies can be stored, one on the switched synthesizer and 2 on the manual digital dial. Furthermore the memory is not lost when the equipment is disconnected from the supply cord.

Repeater operation is taken care of by a pre-wired 600kHz shift and this also operates an automatic crystal controlled tone burst.

All the usual features you are likely to need are also included: tone-burst defeat, VOX, Mic gain, AF and RF gain, noise blanker, receiver incremental tuning, fast and slow AGC, High/Lower power switch, squelch, also internal pre-sets for VOX gain, delay and anti-vox. The power supply is designed for 240 volts AC or 12 volts DC operation and projected price is **£519** inclusive of VAT. Another superb piece of engineering at a very reasonable price—FDK of course.
£519 inc. VAT & delivery—available end of June.

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FDK PALMSIZER

50x25KHz CHANNEL 2M FM HAND-HELD

If ever there was a bargain this has to be it. A complete 2 metre FM station in one hand-held package. 1½ watts of signal power beautifully modulated by the built-in condenser microphone. Any FM channel can be selected between 145 and 146MHz either simplex or repeater. The package includes ni-cads, AC charger and helical whip. Additional accessories include external speaker/microphone, carrying case and external HP7 battery pouch for prolonged use. Dual front panel frequency selectors combine to give 100kHz and 25kHz increments throughout the band, and a top mounted BNC connector permits the use of an external antenna. Just the job for putting in one's briefcase with the assurance that no matter where you are you'll always have the local channel on board.

For a limited period only, complete with accessories:

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(inc VAT at 12½%)

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COMPARE ITS FEATURES

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- ★ Simplex or ±600kHz switch
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MIZUHO—2M SSB/CW Hand-Held

Fitted 144·2–144·4 **Only £165 inc VAT!**
Fastest selling portable Transceiver

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10–80m 1200W LINEAR
LOW COST, SMALL SIZE, BUT . . .
. . . BIG VOICE **£289 inc VAT**
DELIVERY FREE IN UK

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.5⅞" × 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 **£289** delivered.

DenTron NEW HF–200A

DELIVERY JULY
80–10m 200W TRANSCEIVER

Prov. Price £399 Inc. VAT & del.

MATCHING AC PSU AVAILABLE

A natural development from DenTron had to be the birth of a transceiver. Small, compact and powerful—it's simply that! Measuring only 4" high × 10" wide it makes both ideal fixed or portable stations with its 200 watts input capability. Simplicity coupled with performance was the formula—that's why you won't find a single tuning control on the front panel, apart from the VFO. Simply select the band and operate. Its nominal 13·6 V DC supply requirement draws 750 m/a on receive with full audio output and 20 amps on voice peaks or CW. A matching AC power supply is also available for both 234 volts and 117 volts and a remote VFO is also being produced. So if you're the kind of operator who wants less in the way of gadgetry and more in the way of performance per £ take a closer look at the HF200A—we have a feeling you'll like what you see!

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YAESU

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FT301 160-10m Solid state	£579 (N/C)
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FT7B 80-10m 50w transceiver	£421.75 (N/C)
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YM24 Ext. mic/speaker	£16.25 (N/C)
FT227Rx 2m 10w transceiver	£239.50 (N/C)
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FL2100B 1200 watt 80-10m linear	£349.00 (N/C)
FT101Z 160-10m transceiver	£562.00 (N/C)
FT101ZD 160-10m transceiver	£646.00 (N/C)

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SRX30 0·5-30MHz AM/SSB/CW	£175 (N/C)

ICOM (NOTE NEW PRICES!)

IC215E 2mFM 3 watt 12 chs	£159.00 (N/C)
IC202S 2m SSB 3 watt portable	£199.00 (N/C)
IC240 2m 22 ch's 10 watts	£179.00 (N/C)
IC280E 2m FM 80 ch's 10 watts	£245.00 (N/C)
IC211E 2m All mode transceiver	£559.00 (N/C)

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MMT 432/28-S transverter	£133.80 (N/C)
MMT 432/144-R transverter	£169.80 (N/C)
MMT 144/28 transverter	£88.80 (N/C)
MMC 144/2-4; 4-6 or 28-30 IF	£20.25 (N/C)
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CPS10 AC PSU	£56.25 (1.00)
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70cms converters	£22.50 (N/C)
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Multi 700E 2m 25 watts	£229.00 (N/C)
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Multi U11 70cms Autoscan	£299.00 (N/C)
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AR

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462-70cms colinear	£7.95 (1.00)
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HQ-1 20-15-10m mini-quad	£94.50 (2.50)
C4 20-15-10m vertical	£41.50 (2.00)
Mosley 20-15-10m mini-beam 600w	£89.00 (2.00)
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TA32 600 watts 20-15-10m	£72.00 (2.00)
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FT101ZD Series High Performance Transceiver

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Full band coverage is provided on the FT-101ZD: 160 through 10 meters, plus WWV/JJY reception on 5MHz. Teamed with the FTV-901R transverter, operation can be extended to 72, 144, and 430MHz from your desk top.

CLEAN OUTPUT SIGNAL
With today's crowded bands, we all have the responsibility to keep our transmitted signal free of spurious radiation. YAESU engineers have included RF negative feedback, for a clean output signal.

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The all-new noise blanker is extraordinarily helpful in reducing the level of impulse noise. The blanking level may be adjusted from the front panel.

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A high-performance RF speech processor is built into every FT-101ZD, providing an increase in your average talk power of approximately 6dB. The processor level can be adjusted from the front panel, for optimum signal enhancement.

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The FT-101ZD has provision for operation from a variety of AC voltages, from 100 to 234 volts. When you're travelling, you'll never need a heavy, bulky transformer for operation with your FT-101ZD. A DC-DC converter is an available option, for mobile operation. The FT-101ZD is small enough to qualify as carry-on baggage on most airlines, and is equipped with a strong, side-mounted handle for ease of carrying.

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Using two 8-pole crystal filters with superior shape factors, the FT-101ZD variable bandwidth system is a valuable tool on today's crowded bands. With the turn of a dial, high-pitched SSB "buckshot," or unwanted CW signals, can be eliminated from the IF passband.
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INTERFACE WITH 901 SERIES COMPONENTS
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HOW TO REACH US (EASY PRIVATE PARKING ON OUR 70ft. FORECOURT)

FROM SOUTH AND EAST. We are located approximately two miles from Junction 5 of the M6 from which follow signposts to Birmingham. Within ½ mile turn right at Clock Garage and proceed towards city. After one mile look for traffic lights at Fox & Goose and immediately over the lights take minor left fork into Alum Rock Road. We are located one mile from this point.
FROM NORTH. Leave M6 at Junction 6 (Spaghetti) and follow left fork down to traffic island beneath motorway complex. Take third turning off to Lichfield. One mile further on follow A4040 to the right and within 100 yds. veer again to the right, approximately one mile further on brings you to the Fox & Goose. Turn right and see preceding directions.
FROM THE WEST AND SOUTH/WEST. Follow M5 then M6 to Spaghetti Junction (see above). Alternatively, leave M5 at junction 4 or 3 and proceed to inner ring road. Turn South on ring road and leave on A47 (East). We are located three miles from this point.

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Headload	175lbs at 60mph 125lbs at 75mph	80lbs (no speed specified)
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CONCLUSION	WESTOWER is dearer by 9%—BUT . . . WESTOWER is OVER TWICE AS STRONG!	
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Carriage Costs*	INCLUDED	NOT INCLUDED—but estimated at least £25
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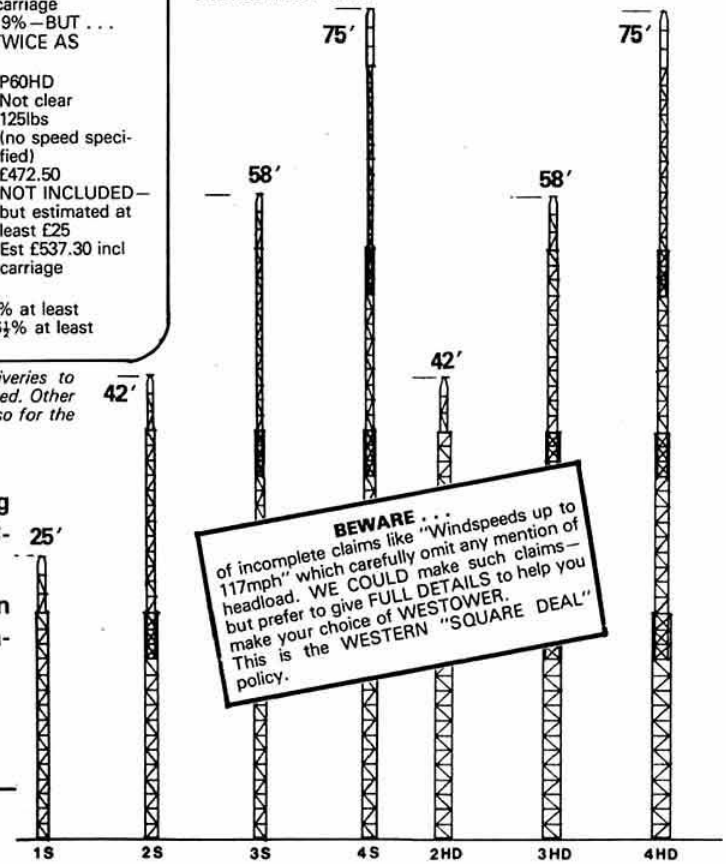
All above are guyed masts
Prices Inc. VAT



BEWARE . . .
of incomplete claims like "Windspeeds up to 117mph" which carefully omit any mention of headload. WE COULD make such claims—but prefer to give FULL DETAILS to help you make your choice of WESTOWER. This is the WESTERN "SQUARE DEAL" policy.

Electronics (UK) ltd

GENERAL COVERAGE from YAESU

Shown above—Yaesu's fine pair of General Coverage Receivers.
FRG-7000 250kHz–30MHz Digital display.....£349
FRG-7 500kHz–30MHz Mains/battery.....£199

TRANSCEIVERS from TRIO

TRIO TS-820S £819

The pacesetting 10–160m Transceiver for the amateur who wants to keep up-to-the-minute! Loaded with features to make your operating even more enjoyable; among these are:

- ★ Advanced PLL circuitry and ultra-stable VFO for accurate and spurious-free frequency control
- ★ Factory-fitted digital readout of TRUE frequency—NOT just a "VFO counter" like some others
- ★ Speech processor gives true RF compression; front panel controlled and fully metered
- ★ IF shift to combat QRM on a busy band

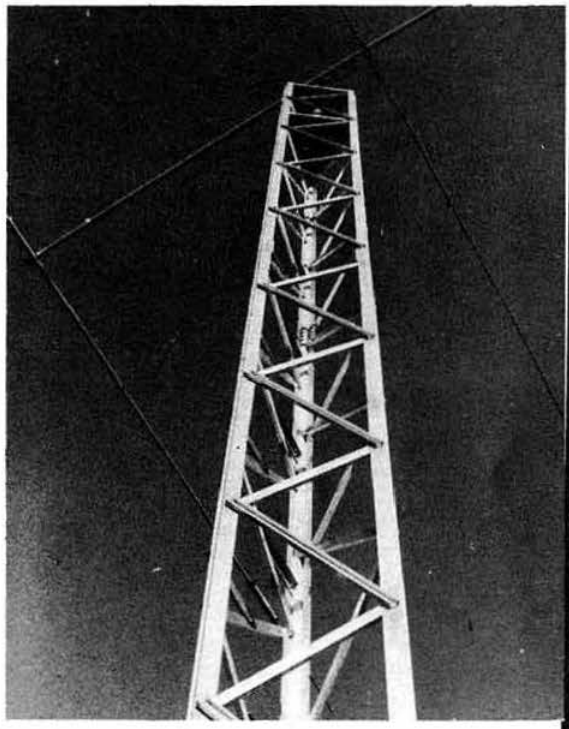
TRIO TS-520S £529

Yet another Trio bargain from WESTERN! The latest version of this fine HF Transceiver with all the up-to-date features needed by todays amateur but at a realistic price. No frills, just good all-round performance and excellent value at the price.

- ★ Full coverage 10–160 metres, CW/SSB
- ★ All solid-state except driver (12BY7A) and PA which uses rugged and proven 6146B (S-2001A) valves
- ★ Improved speech processor to help in those pile-ups
- ★ Highly efficient noise blanker

Carriage paid—2 Year Warranty.
All prices shown include VAT at 12½%.

The UNIQUE ALUMAST LIGHTWEIGHT ALUMINIUM MAST



- ★ Lightweight ★ Easily assembled by one person
- ★ No special tools needed ★ Self-supporting to 30ft
- ★ Guyed models to 250ft ★ Built-in climbing rungs
- ★ Corrosion resistant high strength alloy
- ★ "Nyloc" locking nuts for security

PRICES—INCLUDING CARRIAGE* and 8% VAT

375/PSS/3 30ft ALUMAST	£172.80	RMP 1 Rotor mounting plate	£7.02
375/PSS/1 10ft sections	£58.86	HB-1 Hinged base	£29.16
TP-1 Top plate	£8.10	GB-1 Guy brackets (set of 3)	£10.80

* Carriage extra on accessories not bought with mast

★ **Please note: We are CLOSED for HOLIDAYS—**
21 JULY to 5 AUGUST INCLUSIVE ★

Western Electronics (UK) ltd

HEAD OFFICE (All Mail/Enquiries)
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Our Agents
Southern: Alan Paxton, G4BIZ, Southampton, Hants (0703) 582182
Scotland: Alan Cameron, GM3OGJ, Alloa (0259) 214653
N. Ireland: Les Lyske, GI3CDF, Newtownards (0247) 812449

Opening hours:
LOUTH: 9–12; 1–5pm Mon–Fri. By appointment Sat 9–12.
LEICESTER: May's Hi-Fi, Churchgate (Tel: 0533-58662). Mon–Sat 9–6pm; closed Thurs.

Radio Shack Ltd

188 BROADHURST GARDENS
LONDON NW6 3AY
Telephone: 01-624 7174

PRICE LIST, MARCH 1979 (prices include VAT)

R. L. DRAKE PRODUCTS

COMMUNICATIONS RECEIVERS & ACCESSORIES

R-4C Receiver – SSB, AM, SW, RTTY	£495.00
FL-250 Filter for R-4C (250Hz)	£39.60
FL-500 Filter for R-4C (500Hz)	£39.60
FL-1500 Filter for R-4C (1500Hz)	£39.60
FL-4000 Filter for R-4C (4000Hz)	£39.60
FL-6000 Filter for R-4C (6000Hz)	£39.60
4-NB Noise Blanker for R-4C	£54.00
MS-4 Matching Speaker R-4C, SPR-4, TR-4CW	£24.75
Crystals – Accessory Crystals for R-4C	£4.95
SPR-4 Receiver – General Purpose	£450.00
DC-PC DC Power Cord for SPR-4	£4.05
Crystals – Accessory Crystals for SPR-4	£4.95
DSR-2 VLF/HF Digital Synthesized Receiver	£2250.00
SSR-1 Receiver-General Purpose	£175.00

TRANSCEIVERS & ACCESSORIES

TR-7/DR-7 Transceiver with gen. cov. & Digital	£864.00
PS-7 120/240V Power Supply for TR-7	£135.00
RV-7 Remote VFO for TR-7	£139.50
MS-7 Matching Speaker for TR-7	£24.75
NB-7 Noise Blanker for TR-7	£64.80
FA-7 Fan for TR-7 & PS-7	£18.00
AUX-7 Range programme board & 1 Receive module	£31.50
RRM-7 Range receive modules (500kHz) for AUX-7	£5.40
RTM-7 Range transceive modules (500kHz) for AUX-7	£5.40
SL-300 CW Filter (300Hz) for TR-7	£39.60
SL-500 CW Filter (500Hz) for TR-7	£39.60
SL-1800 SSB/RTTY Filter (1800Hz) for TR-7	£39.60
SL-6000 AM Filter (6000Hz) for TR-7	£39.60
MMK-7 Mobile mounting kit (case, filters, cable) TR-7	£33.75
MN-7 ATU/RF wattmeter 160-10m. 250W	£123.75
MN-2700 ATU/RF wattmeter 160-10m. 2kw	£199.80
WH-7 HF wattmeter/VSWR bridge	£59.40
385-0004 Service Manual for TR-7	£16.50
TR-4CW (RIT) Transceiver AM/SSB/CW with R.I.T.	£504.00
AC-4 120/240V Power supply for TR-4 CW/T-4XC	£108.00
34-PNB Plug in Noise Blanker for TR-4CW	£72.00
DC-4 DC Power supply for TR-4CW, T-4XC & R-4C	£139.50
RV-4C Remote VFO for TR-4CW	£108.00
FF-1 Crystal Control for TR-4CW	£38.25
UV-3E 144/432 MHz FM Transceiver	£495.00
PS-3 AC Power supply for UV-3E (13.6V @ 9A)	£69.75
UMK-3 Remote Trunk kit for UV-3E	£54.00

LINEAR AMPLIFIER

L-7 Linear Amplifier 160-10m	£765.00

TRANSMITTER

T-4XC Transmitter AM/SSB/CW	£495.00

ADDITIONAL ACCESSORIES

TV-42 LP Low Pass Filter 100w	£10.13
TV-3300 LP Low Pass Filter 2kw	£18.00
RP-500 Receiver Protector	£72.00
7072 Hand mic. for TR-4CW/T-4XC	£13.50
7073 Hand mic. for TR-7/UV-3E	£13.50
7077 Desk mic. for TR-7/UV-3E	£24.75
DL-300 Dummy Load, 300 watts	£15.75
DL-1000 Dummy Load, 1000 watts	£29.70
RCS-4 Remote Control Antenna switch	£83.25
B-1000 Balun 4:1 for MN-7/MN-2700/MN-4C only	£18.00
1525-EM Encoder mic.	£36.00

The R. L. Drake Company are no longer making the following items; however, we still have a few of each – please check our stock position before ordering:

AA-10 1w in-10w out 2m Amplifier	£45.00
WV-4 RF wattmeter 20-200MHz	£64.80

HY-GAIN ANTENNAS

18HT 6-80m Vertical Tower	£253.12
12AVQ 10-20m Trapped Vertical	£42.18
14AVQ/WB 10-40m Trapped Vertical	£59.06
18AVT/WB 10-80m Trapped Vertical	£85.50
18V 10-80m Vertical	£31.28
TH6DXX 6 element beam for 10/15/20	£230.62
TH3MK3 3 element beam for 10/15/20	£176.62
TH3JR 3 element beam for 10/15/20	£127.68
TH2MK3 2 element beam for 10/15/20	£123.46
HY-QUAD 2 element quad for 10/15/20	£190.12
DB 10-15A 10 and 15 beam	£129.38
204BA 4 element 20m beam	£174.38
203BA 3 element 20m beam	£132.19
153BA 3 element 15m beam	£70.58
103BA 3 element 10m beam	£57.38
402BA 2 element 40m beam	£177.75
511 Heavy duty spring	POA
499 Flush body mount	£11.59
417 De luxe spring	£8.83
492 Miniature spring	£4.50
LA-1 Lightning arrestor	£22.84
LA-2 In-Line Lightning arrestor	£3.71
BN-86 Ferrite balun	£15.19

YAESU

FT-202R 2m 1w Hand held Tcvr fitted 3 ch	£119.81

TEN-TEC

509 Argonaut 5w SSB/CW Tcvr 3·5-30	£247.50
540 Triton 1V 200w SSB/CW Tcvr 3·5-30	£495.00
544 Digital Triton 1V 200w SSB/CW Tcvr 3·5-30	£618.75
545 Omni-A Analogue Transceiver	£652.50
546 Omni-D Digital Transceiver	£765.00
570 Century 21. 70w CW Tcvr 3·5-29MHz	£220.50
574 Digital Century D	£281.25
405 Linear Amp. 100w. 3·5-30MHz	£112.50
210/E (1A) 115/230vac/13vdc psu for Argonaut	£27.00
251/E (9A) 115/230vac/13vdc psu for Argonaut/405	£67.50
262G/E (18A) 115/230vac/13vdc psu for Tritons	£108.00
247 Tuner	£49.50
277 Tuner/SWR	£58.50
212 Crystal 29·0-29·5MHz for Tritons	£4.50
213 Crystal 29·5-30·0MHz for Tritons	£4.50
240 Converter 160m for Tritons	£72.00
241 Crystal Oscillator for Tritons	£22.50
242 Remote VFO for Tritons	£119.25
245 CW filter for Tritons	£19.80
249 Noise Blanker for Tritons	£19.80
276 Crystal Calibrator for Century 21	£19.80
KR-1A Dual paddle assembly	£27.00
KR-5A Single-paddle keyer, 6-14vdc	£31.50
KR-50 Ultramatic keyer dual paddle 117vac/6-14dc	£85.50

BARLOW-WADLEY

XCR-30 General coverage receiver	£149.85
XCR-30 General coverage receiver with FM unit	£170.00

STANDARD

C-146A 2m FM Tcvr. 2w 5 channels (hand held) with leather case/tone burst/S20/22	£140.62
AT-19 Flexible antenna	£5.56
HP-7 Set of 10 rechargeable ni-cads	£9.56
Battery charger	£5.06
Hand microphone	£15.18
Basemaster	£24.75
Extra crystals S21/23/24 R3/4/5/6/7	£3.89

TELEX COMMUNICATIONS INC.

LIGHTWEIGHT HEADPHONES 3·2-20ohms

HFC-91 Underchin 1·5oz with foam ear-pads	£6.08
HMC-2 Underchin 1·5oz with plastic ear-tips	£9.00
HTC-2 1·6oz Twin Receiver headphone	£14.40

DUAL MUFF HEADPHONES

C-610 3·2-20ohms Dual Receiver Magnetic	£6.75
SWL-610 2000ohms Dual Receiver Magnetic	£7.99
C-1210 3·2-20ohms Dynamic foam padded	£18.45
C-1320 3·2-20ohms TELEX'S finest	£25.65

BOOM MICROPHONE HEADSETS (headphones as above)

CM-610 As C-610 with high Z Ceramic microphone	£29.70
CM-1210 As C-1210 with high Z Ceramic microphone	£38.25
CM-1320 As C-1320 with high Z Ceramic microphone	£47.25
CM-1320S As CM-1320 with single headphone	£36.90

(all the above headsets fitted ptt switch)

MICROPHONES (hand held battery powered)

ProCom 1 Electret High Output	£11.70
ProCom 11 Electret Variable Gain	£17.55
CB-73R Dynamic Noise-cancelling (relay switch)	£23.40
CB-73S As above with 6-wire universal lead	£24.75

HAL COMMUNICATIONS CORP.

ELECTRONIC TTY SYSTEM

DS-3000 KSR version 3.X (ASC11/Baudot/Morse)	£1134.00
DS-3000 KSR version 2.X (ASC11/Baudot	£885.36
ST-6000 Demodulator/Keyer with 'scope	£432.00
ST-5000 Demodulator/Keyer	£194.40
RVD-1005 Visual Display Unit (Baudot)	£285.12
DKB-2010 Dual mode keyboard with 128 key buffer memory	£345.60

TRIO EQUIPMENT

TS 820S 160-10m Tcvr. 200w PEP (with DG-1)	£814.00
TS 520S 1-8-28MHz SSB Tcvr. 200w PEP	£530.00
SM 220 Monitorscope	£231.00
TS 700S 2m all mode dig. Tcvr.	£537.00
TR 7010 2m CW/SSB Tcvr. 10w output	£189.00
TR7600 2m FM mobile/fixed Tcvr. synthesized	£265.00
TR 7400A 2m FM mobile Tcvr. 800ch	£336.00
TR 7500 2m FM mobile Tcvr. 10w. PLL 80 FM ch	£235.00
TR 2300 2m FM portable Tcvr. PLL 80 FM ch	£195.00
TR 8300 70cm FM mobile 10w Tcvr. fitted 4ch	£245.00
TR-3200 70cm Tcvr. fitted 3ch.	£186.00
R-300 General coverage Receiver	£185.00

The above are **some** of the main Trio units—we also stock the accessories, oscilloscopes, etc.

CDE ROTATORS

AR-20	£38.81
AR-22L	£48.38
AR-30	£46.13
AR-40	£53.44
CD-44	£106.88
HAM-3	£156.38
BIG-TALK	£89.44
TAIL-TWISTER	£241.88

COAXIAL CABLE

UR-67 52ohms per metre	£0.60
UR-76 52ohms per metre	£0.20
T3234 52ohms per metre	£0.55
UR-70 75ohms per metre	£0.20
RG-174U per metre	£0.30
300ohm ribbon per metre	£0.10
14swg enamelled copper wire per metre	£0.12
4-core rotor control cable per metre	£0.20
5-core rotor control cable per metre	£0.25
8-core rotor control cable per metre	£0.35

THE FABULOUS BEARCATS ARE IN STOCK AGAIN!

WE CAN NOW OFFER 2 MODELS

Bearcat 210	£199.80
Bearcat 250	£249.75

BARKER & WILLIAMSON

331A Little Dipper 2-230MHz grid-dip meter	£81.00
334A Dummy load/Wattmeter. 1kW	£135.00
371-1 Wide-range Attenuator	£33.75
375 Protax antenna switch	£16.88
377 Coax relay	£15.30
551A Antenna switch 6-way	£15.30
595 Antenna switch 6-way	£16.20

THE AMAZING AR-240 £195.00

Synthesized, 800 channel, hand held TCVR. Complete with ni-cads and charger unit.

AMECO

EQUIPMENT

OCMK Code practice oscillator kit	£12.38
OCMW Code practice oscillator wired	£16.20
PLF-2 FET Receiver preamp	£47.25
PT-2 FET Transceiver preamp. 10-160m	£67.50

MORSE CODE COURSES

101-33 Senior Code Course. 33rpm Record	£5.40
101-T Senior Code Course. Cassette	£6.48
103-33 Advanced Code Course. 33rpm Record	£2.80
103-T Advanced Code Course. Cassette	£3.78
105-33 Gen. class supplementary course 33rpm Record	£2.80

PUBLICATIONS

3-01 Radio Electronics Made Simple	£2.00
102-01 Amateur Radio Theory Course	£3.50
23-01 Novice Class Theory Course	£2.50

ASTATIC MICROPHONES

T-UG9-D104 Golden Eagle gold-plated transistorised	£69.75
T-UPG-D104 Silver Eagle chrome-plated transistorised	£49.50
UG8-D104 The famous Crystal D104	£31.50
T-UG9-D104 Transistorised amplified D104 grip-t-t	£40.50
T-UP9-D104 Transistorised amplified p.t.t. (grey or black)	£45.00
525 DL6 Dynamic Hand Microphone. 400 Z	£12.15
400 Dynamic Hand Microphone. 'Buckeye'	£5.85
565 M6 Hand Microphone FET amplified. 'Mariner'	£31.50
D104-M Hand Microphone D104 FET amp 4-wire	£24.30
D104-M6 Hand Microphone D104 FET amp. 6-wire	£28.35
555 4-wire Hand Mic. noise-cancelling 'Trucker'	£21.60
557 6-wire Hand Mic. noise-cancelling 'Trucker'	£26.10
531 Hand Mic. mobile. High Z	£7.65
539 Hand Mic. mobile, noise-cancelling	£7.65
1104C Desk Mic. FET amplified	£36.00

SHURE MICROPHONES

201 Hand held ceramic	£14.18
202 Hand held noise-cancelling ceramic	£14.85
401A Hand held magnetic	£16.20
404C Hand held	£24.98
444 Desk model	£31.72
526T Desk model with preamp	£38.48

JAYBEAM ANTENNAS

4Y/4M 4 element folded dipole yagi	£14.85
C5/2M 5dB glass fibre colinear	£35.42
5Y/2M 5 element folded dipole yagi	£8.67
8Y/2M 8 element folded dipole yagi	£11.25
10Y/2M 10 element folded dipole yagi	£24.58
PBM 10/2M 10 element Parabeam	£29.72
PBM 14/2M 14 element Parabeam	£36.12
8XY/2M Crossed 8 element yagi	£22.50
10XY/2M Crossed 10 element yagi	£30.28
PMH/2C 2-way phasing harness	£5.95
Q4/2M 4 element quad yagi	£18.98
Q6/2M 6 element quad yagi	£24.75
D5/2M Double 5 slot-fed yagi	£15.77
D8/2M Double 8 slot-fed yagi	£21.02
SVMK/2M Mounting kit	£5.62
UGP/2M Unipole & ground plane	£8.12
HM/2M Mobile halo with mast	£4.45
PMH2/2M 2-way phasing harness for two 2m ants.	£7.82
PMH4/2M 4-way phasing harness	£18.62
D8/70cm Double 8 slot-fed yagi	£17.71
PBM 18/70cm 18 element Parabeam	£21.38
MBM 48/70cm 48 element Multibeam	£24.92
MBM 88/70cm 88 element Multibeam	£33.15

THE FOLLOWING ITEMS ARE FOR CALLERS ONLY

TAS 2m 5/8 mobile whip	£13.59
U5 70cm Colinear 5·6dB	£20.25
DL Double lashing chimney kit	£8.92
W6 6" wall bracket	£2.83
W21 21" wall stand-off bracket	£11.09
W24 HD 24" wall stand-off bracket heavy duty	£15.77
SPM 16' × 1" Portable Mast	£11.31
PME 4' extension for double arrays	£1.91
A4 4' 6" × 1½" mast	£2.89
A5 5' × 1" mast	£2.16
A9 9' × 1½" mast	£5.82
A10 10' × 2" mast	£10.06
CP1 Cross-over plate 2" × 2"	£2.50
JBL 59/6 6" jointing sleeve for 2" masts only	£2.12
JBL 59/15 15" jointing sleeve for 2" masts only	£5.00
JBL 29 Universal clamp 1½" boom to 1"-2" mast	£1.20
JBL 30 Universal clamp 1" boom to 1"-2" mast	£1.20
JBL 53 Universal clamp 1" boom to 1"-2" mast	£1.20
JBL 58 3-hook guy wire clamp non-rotating	£1.31
JBL 63 Universal clamp 1-1½" boom to 1-2" mast	£0.98
JBL 64 Die-cast clamp 1" boom to 1" mast	£0.93
JBL 65 Die-cast clamp 1" boom to 1"-2" mast	£0.98
JBL 73 Heavy-duty universal clamp	£1.64
MBP Mast base plate for 2" diam. mast	£2.72

PHILIPS

AAC-4000 Language-trainer, comprising Casette Recorder and headphone with microphone attached	£129.60
AAC Language courses for use with the AAC-4000 trainer above. Courses are available in FRENCH/GERMAN RUSSIAN/SPANISH/ITALIAN/PORTUGUESE and ENGLISH. There are four parts to a full course.	
Parts 1, 2, 3 (each part)	£36.72
Part 4	£41.04

(Send LARGE sae for brochure please)

FASTFIT CONNECTORS

CPF1259-10 PL-259 type for UR-43/UR-76	£0.65
CPF1249-15 Female line-connectors for UR-43/76	£1.00
CPF1259-7 PL-259 quick-dis. male for UR-43/76	£1.08
CPF15858 Cable splice, twist-on for UR-43/76	£0.97
CPF1259-13 PL-259 for RG-8/UR-67	£0.87

WE ARE SITUATED just around the corner from WEST HAMPSTEAD UNDERGROUND STATION which is on the BAKERLOO LINE. A few minutes walk away is WEST HAMPSTEAD MIDLAND REGION STATION and WEST END LANE on the BROAD STREET LINE. We are on the following BUS ROUTES: 28, 59, 159, C11

WE ARE OPEN 9-5 MONDAY to FRIDAY, 9-12.30 SATURDAYS.
We are closed for lunch between 1 p.m. and 2 p.m.

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DEPEND UPON

ASCOT ANTENNAS

This is a complete range of mobile antennae and accessories developed and manufactured in the United Kingdom.

All antennae are extremely rugged, designed to withstand extremes of weather using: fine stainless steel whips, A100 nylon bases, chrome-plated brass ferrules, heat-treated silver-plated beryllium copper contacts and polished stainless steel shock springs.

PICK THE TYPE ($\frac{1}{4}\lambda$ 0dB $\frac{5}{8}+\frac{1}{2}\lambda$ 3dB)

$\frac{1}{4}\lambda$	340	STANDARD BASE : 60–550MHz	£2.10
	310	SWIVEL BASE : 60–500MHz	£3.50
	344	SPRUNG BASE : 60–120MHz	£5.55
$\frac{5}{8}\lambda$	440	STANDARD BASE 145MHz	£3.50
	330	SWIVEL BASE 145MHz	£4.45
	341	SPRUNG BASE 145MHz	£6.65
$\frac{1}{2}\lambda$		STANDARD BASE 145MHz	£4.80
	350	FINE TUNE BASE 145MHz	£7.15
	351	SPRUNG 350 BASE 145MHz	£8.25

SELECT THE WHIP (Stainless steel)

057	127cm TAPERED: $\frac{1}{2}$, $\frac{5}{8}$, $+\frac{1}{4}$ 70MHz	£1.95
056	63·5cm PARALLEL: $\frac{1}{4}\lambda$ 144–432MHz	£0.95

CHOOSE THE MOUNT

(Mag. Mount & Assemblies c/w 4·5m Coax)

$\frac{1}{4}$ or $\frac{5}{8}$	085	STANDARD CABLE ASSEMBLY MOUNT	£2.80
	095	FIBREGLASS MOUNT TO SO239	£2.10
	092	MAGNETIC MOUNT	£8.95
$\frac{1}{2}\lambda$	084	STANDARD CABLE ASSEMBLY MOUNT	£4.15
	088	COWL MOUNT TO SO239	£4.95
	091	MAGNETIC MOUNT	£9.80

ADD AN ACCESSORY

(Mounts fit all standard cable assemblies)

098	GUTTER CLIP MOUNT	£4.75
093	BOOT LIP MOUNT	£2.90
031	BLANK OFF COVER $\frac{1}{4}\lambda$ and $\frac{5}{8}\lambda$	£0.80
044	BLANK OFF COVER $\frac{1}{2}\lambda$ only	£0.45

LIKE THE PRICES? THEN:

ADD VAT 12½% + CARRIAGE (Long ants. 95p, Accs. etc. 50p)

Ascot antennas are available; mail order from SMC HQ in Totton, personal callers to any branch (Leeds, Chesterfield, Woodhall Spa), SMC agent or reputable amateur radio dealers throughout Britain.

SOUTH MIDLANDS COMMUNICATIONS LTD

OSBORNE ROAD, TOTTON
SOUTHAMPTON SO4 4DN

Telex: 477351 SMCOMM G
Tel: Totton (0703) 867333 (3 lines)

THE ORIGINAL

VERSATOWERS

TELESCOPIC + TILTOVER

NO OTHER TOWER COMPARES —THE MARKET LEADER

12 years development, over 50 models available with heights between 25–120ft. Post, base plate, wall or fixed base mounting. Designed to latest BSS and for windspeeds up to 117 mph. Before purchasing a tower, we strongly recommend consulting one of our engineers for advice regarding the most suitable combination for a particular installation.

THE STRONGEST YET LESS EXPENSIVE

P40ft £276.75 +VAT 8%

P60ft £335.90 +VAT 8%

STANDARD SERIES POST MOUNTING

P40HD £416.20 +VAT 8%

P60HD £472.50 +VAT 8%

HEAVY DUTY SERIES POST MOUNTING

MOBILE RANGE ALSO AVAILABLE

NEW 30FT · 10ft SECTIONS

P30 £249
BP30 £269

+ VAT 8%
+ Carriage

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

SOUTH MIDLANDS COMMUNICATIONS LTD

OSBORNE ROAD, TOTTON
SOUTHAMPTON SO4 4DN

Telex: 477351 SMCOMM G
Tel: Totton (0703) 867333 (3 lines)

KYOKUTO

KYOKUTO DENSHI COMPANY LIMITED

KDK FM2016E 2m FM DIGITAL SYNTHESIZED TRANSCEIVER

The KDK FM-2016E is a 12V DC two meter FM transceiver for mobile and base station use. Using the latest CMOS IC digital PLL circuitry. It has been compactly designed with emphasis on maintenance and ease of use.

Rx 144·000–148·995MHz and Tx 144·000– 145·995MHz.

Direct readout of operating frequencies by large size LEDs.

The most commonly used, 100kHz and 10kHz, switches are mounted coaxially. These will not go below the 0 or above 9 position facilitating frequency changing by feel only, for "eyes-on-the-road" motoring and use by those with impaired sight.

An electronic memory using CMOS RAMs (Random access memory ICs drawing only 25nA!) allows any four out of the 1,000 channels to be written-in (stored) at a flick of a switch. An auto-charging back up NICAD battery maintains the RAMs contents after disconnection from the power.

+·6 and −·6 positions of the mode switch provide for normal repeater operation. In position 1T-2R the set Tx's on the frequency in memory channel 1 and Rx's on memory channel 2 (likewise the 3T-4R position). This provides for non-standard shifts, and is also convenient for use in conjunction with up-converters.

The memory may be scanned in the "closed" mode, (the scanner will stop at the first channel in use) or in the 'open' mode, (stopping at the first empty channel). Scan-hold allows transmission immediately the scanner stops.

Dual-gate MOS-FETs are used for the RF and mixer to provide superior inter-modulation characteristics with sensitivity, held constant across the wide frequency range covered, by automatic electronic tuning.

A monolithic crystal in the first IF and a commercial quality 15-pole ceramic filter in the 2nd IF provides extremely sharp selectivity. The 2nd IF is built with discrete components to keep stray coupling to a minimum and a ceramic discriminator has been adopted for excellent temperature stability and long-term alignment.

The RIT (Receiver incremental tuning) and centre zero meter are useful for contacts with off-frequency or drifting stations.

The single conversion transmitter uses a balanced mixer, five stages of electronic tuning, and a four-stage low pass filter for a clean, spurious-free signal.

The ultra-modern silicon transistor in the final will survive even an infinite VSWR.

Power: HIGH (15 Watts) and LOW (1 Watt), is selectable by a front panel switch (useful with a linear).

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FT101ZD

Digital & Analogue Readout

FT101Z

Analogue Readout Version

Any new piece of equipment from Yaesu is worthy of note, one good enough to be called a '101' in line with the world's most popular amateur transceiver, is an event of the decade. The 'Z' series is a base station design at its best, a no compromise, go anywhere (AC PSU included, DC invertor option) unit of the highest quality. The FT101ZD is an all new design using today's technology backed by a proud tradition.

For further details of this exciting new unit please contact any of our authorised sales outlets, for a free colour brochure.

- ★ Variable IF bandwidth 2·4kHz down to 300Hz
- ★ Digital plus analogue frequency display
- ★ RF speech processor—adjustable level
- ★ Wide receiver dynamic range, with sensitivity
- ★ Superb noise blanker—adjustable threshold
- ★ Vox built-in and front panel adjustable
- ★ Semi-break in with sidetone for slick CW
- ★ 6146B pa's with negative feedback. 180WPIP
- ★ 160-10 metres plus WWV plus auxiliary band
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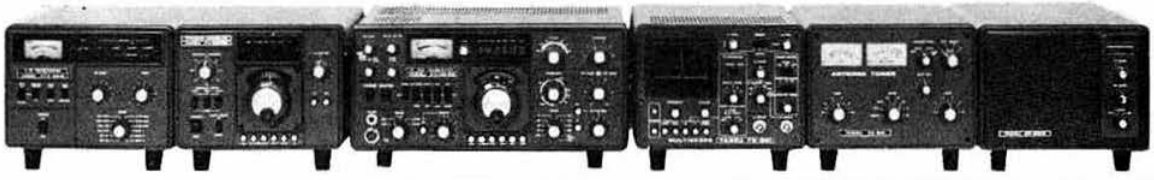
- ★ Clarifier (RIT) switchable on Tx, Rx or both
- ★ Selectable CW fixed bandwidths CW-W or CW-N

A full list of matching accessories is available to complement the FT101ZD. In the illustration below (looking from left to right) we have: the FTV901 transvertor (covering 4m, 2 and 70, with repeater shift etc. etc.) the FV901DM External VFO, (with 40 memory channels ±50Hz stability AWU!!!) auto and manual scanning, the FT101ZD itself, the YO901 monitor scope, which in addition to AF, IF, and RF monitoring offers panoramic (spectrum analyser) facilities. The FC901 Antenna Tuner/Power/SWR meter, and the SP901P external speaker with phone patch (Normal speaker SP901 available).



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Correspondence to RRs and honorary officers should be addressed directly to them (QTHR).

Tape/film library
Contact membership services officer at RSGB HQ

RADIO SOCIETY OF GREAT BRITAIN

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Telephone 01-837 8688

Founded 1913
Incorporated 1926

Member society, International Amateur Radio Union

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

The national society representing all UK radio amateurs

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

GENERAL MANAGER AND SECRETARY
D. A. Evans, G3OUF

EDITOR
A. W. Hutchinson

ANNUAL SUBSCRIPTION RATES

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

Associates under 18: £4. — **Students aged 18 to 21: £6**
(Student applications should give the member's age at last renewal date and include evidence of student status)

Affiliated societies: £10 (including *Radio Communication);*
£6 (excluding *Radio Communication).*

RSGB NEWS BULLETIN SERVICE

The RSGB news bulletin, callsign GB2RS, is broadcast every Sunday morning on hf and vhf, giving almost complete coverage of the British Isles. Its main purpose is to provide an outlet for amateur radio news items and announcements which, by virtue of their topicality or urgency, cannot wait for the next issue of *Radio Communication.*

The bulletin is prepared early on Thursday morning, and news items, marked "GB2RS news" should reach RSGB HQ by first post that day (telephoned items can also be accepted until 10am). No guarantee can be given of inclusion in part or whole of any item submitted and, once broadcast, items are not usually repeated.

SCHEDULE

Time	MHz	Location and coverage (hf) or beam heading (vhf) of station
0930	3·65	G2MI, Bromley, Kent (SE England)
1000	3·65	G8ML, Cheltenham (SW England)
	144·50	G3FZL, London
1015	3·65	GI3GAL, Belfast (N Ireland)
1030	3·65	G2CVV, Derby (N Midlands)
	144·50	GM8FFX, Aberdeen (NE Scotland)
	144·50	G3PWJ, Brierley Hill (NW)
1045	144·50	G8LIC, Middlesbrough (NW)
	144·50	G3FZL, London
	144·50	G3SMT, Stockport (NNW)
1100	3·65	G5VO, Bridlington (NE England)
1115	3·65	G3LEQ, Knutsford (NW England)
	144·50	GI3TLT, Bangor, Co Down (N)
1130	3·65	GM3TCW, Wishaw, Lanarkshire (S Scotland)
1145	3·65	GM3HGA, Aberdeen (NE Scotland)

An rtty news bulletin, callsign GB2ATG, is also transmitted every Sunday at 1200 and 1900 on 3·590MHz and at 1230 and 1245 on 144·6MHz. This bulletin carries items of interest to rtty enthusiasts.

RSGB QSL BUREAU

E. G. Allen, G3DRN,
30 Bodnant Gardens, London SW20 0UD

QTC
amateur radio news

RSGB Amateur Radio Exhibition

The editor regrets that the report and photographs of this year's exhibition, scheduled to be published in this issue of the journal, were not received in time for inclusion. He apologises to those members who were looking forward to reading the report in this issue and hopes that it will still be of interest next month.

Over 5,000 people attended the exhibition, and the enlarged RSGB stand was a focus of attention throughout the two-day event. In connection with the exhibition, the BBC featured items on amateur radio on the BBC1 "Nationwide" programme—in which Brian Rix and other members took part; and on the Radio 1 "Newsbeat" programme and Overseas Service "World Radio Club" in which interviews with the Society's general manager were included.

Region 17 representation

The result of the ballot for a Region 17 representative was:

H. G. Cunningham, G8FG.....44 votes
G. Brown, GJ8ORH..... 9 votes
P. J. Sterry, G3CBU..... 9 votes

There was one invalid vote, and the total number of votes cast was 63 out of 1,346 members in the region who were eligible to vote.

Mr H. G. Cunningham was therefore elected as Region 17 representative.

7MHz Contests date changes

When the new dates for the Society's 7MHz Contests were published last month, the HF Contests Committee believed that they would not clash with the ARRL DX Contest. However, dates for the ARRL contest have now been made known and they are not on the same weekends as previously.

As a result it has been found necessary to move the **7MHz CW Contest** to the weekend of **23–24 February 1980.** The **7MHz Phone Contest** remains on **2–3 February 1980,** as published on page 553 of last month's issue of *Radio Communication.*

Working GB special callsigns

Special event callsigns are granted to individuals or groups who are demonstrating amateur radio to the public. Members working a GB callsign are asked to remember that there may be members of the general public listening to them. On ssb they should speak a little slower than usual and as precisely as possible, as members of the general public often find the restricted audio bandwidth of ssb difficult to understand.

By putting themselves in the shoes of the general public who may be listening to the first amateur radio station they have ever heard, operators will be helping the group to put on a good demonstration.

Come to the seaside

REGION 2 ORM

Held in conjunction with the Scarborough Mobile Rally

Sunday 29 July 1979

Scarborough Technical College
Scalby Road

Rally commences 11am. ORM commences 2.30pm

Mammoth bring and buy sale, RSGB bookstall, many trade stands, raffle, competitions and other attractions.
Full refreshment service.

For talk-in call G4BP on S22

Awards

The following awards were issued by the Society's hf awards manager, Chas Emary, G5GH, between May 1978 and April 1979:

IARU Region 1 Award	—446
WBC	—183
BCRTA	— 38
BCRRA	— 7
CDXC	— 7
DXLCA	— 21
WAC	— 44

STOP PRESS

VAT INCREASES

Attention is drawn to the notices appearing on pages 668 and 682 regarding the Budget increases in VAT.

The prices listed on the inside back cover are also subject to VAT increase, and an up-to-date list will be published next month.

RSGB HQ STAFF VACANCY

Membership Services Officer

There is a vacancy for a full-time member of staff at the Society's headquarters in central London. He or she will be expected to assist with the organization and co-ordination of the expanding range of services which the Society provides for its members, and to be a link between the Society's headquarters, the various bodies making up the Society, and the membership at large.

The person selected must be able to deal with the general public and will probably be a licensed radio amateur with an ability to express ideas, both verbally and in writing, at all levels. A feature of the headquarters' administration is its exploitation of modern data processing techniques to provide up-to-date information on the Society's activities, and a capacity to take advantage of these facilities would be of value.

Applications should be addressed to: The General Manager, RSGB, 35 Doughty Street, London WC1N 2AE, (marked confidential), and should give details of relevant experience, and emphasize those areas where applicants feel especially qualified.

RSGB NATIONAL MOBILE RALLY

Woburn Abbey, Bedfordshire
(Coach Park Site)

Sunday 5 August 1979

From 10am

Attractions will include a large trade exhibition, RSGB bookstall and enquiries stand, grand raffle, Raynet stand, BARTG stand, and a bring-and-buy stand. All will be under cover.

Bring-and-buy this year will be charged at **£1 per table per hour**, which will enable members to sell direct. Tables will be offered on a first-come first-served basis.

The RSGB makes no charge for entrance to the rally but all vistors must pay for entrance to Woburn Park, in which the rally takes place, at **50p** per car irrespective of the number of passengers.

All the normal Woburn attractions will be available at small extra charges. Various bars and cafés are available nearby.

How to get there:

Via the M1—Leave the M1 from north or south at intersection 13, **not 12 as signposted**. Turn left off motorway and follow signposts through Husborne Crawley to Woburn Abbey.

From the south via the A5—Turn right at Hockliffe and follow the A50 to Woburn.

From the north via the A5—Turn left at A418, five miles south of Fenny Stratford, and follow to Woburn.

From other directions make for the points indicated above and proceed as indicated.

Avoid routes signposted to "The Wild Animal Kingdom" or "Game Reserve". The rally takes place in Woburn Park and correct routes are signposted to "Woburn Park" or "The Abbey". Also watch for RSGB signs.

Usual **talk-in** facilities will be in operation by Dunstable Downs RC on 1·8, 70, 144 and 432MHz.

BARTG Convention

The annual BARTG Convention will be held at the Harpenden Public Hall, Harpenden, Herts, from 11am to 5pm on 21 July 1979. The venue is conveniently located for road and rail travellers, and has good car parking and refreshment facilities.

There will be trade stalls, bring and buy, a picture tape factory, demonstrations and lectures. Members and non-members of the British Amateur Radio Teleprinter Group will be welcome.

RAIBC

The Radio Amateur Invalid & Bedfast Club has changed its name to Radio Amateur Invalid & Blind Club. The headquarters of RAIBC is at 9 Rannoch Court, Adelaide Road, Surbiton, Surrey KT6 4TE, and the secretary is Mrs F. Woolley.

The RAIBC recently received a bequest of the entire amateur station of the late Eric Cockayne, G3DAA, and acknowledges with gratitude this generous gift.

Can you help?

The 2520 Squadron Air Training Corps in Kent requires a radio instructor to teach boys how to operate radio equipment on the vhf and hf radiotelephony networks. Any radio amateur who can help is asked to contact Flt Lt D. Lynch, tel Tonbridge 353399.

Other ATC squadrons in Kent also require radio instructors, and details of these may be obtained from Mr B. M. Stone, G3JFC, QTHR.

Esperantist radio amateurs

In the latest bulletin of ILERA, the International League of Esperantist Radio Amateurs, the only British members listed are G3ESP and G4MR. Several years ago there were many more, and G4MR asks those former members and any other amateurs who ever learned Esperanto to contact him so that he may compile statistics on the use of Esperanto by amateurs.

Scottish Amateur Radio Convention

Kingsway Technical College
Dundee

Saturday 22 September 1979

11am to 5.30pm

Usual trade stands and RSGB bookstall

PROGRAMME

1 to 5pm	Convention and RSGB forum
11am to 2pm	Snack catering
Noon to 1pm	Lunches
7.30pm	Dinner at Invercarse Hotel, Perth Road, Dundee

TICKETS

Exhibition and convention.....£1.25
Exhibition, convention and dinner.....£5.50

Dinner tickets only in advance from I. Strachan, GM4FLP, Upper Flat, East Claver House, Dundee, Scotland. SAE, please, with enquiries and bookings.

Woburn Abbey Rally

Details of this annual event, which this year takes place on 5 August, appear on this page.

Enquiries regarding trade stands at the rally should be sent to Mr N. Miller, G3MVV, "Avon", Gardiners Lane, Crays Hill, Billericay, Essex CM11 2XA.

A solid-state 1·8 and 3·5MHz exciter

by R. S. HEWES, TEng(CEI), FSERT, G3TDR*

THIS exciter, which covers the 1·8 and 3·5MHz bands, is intended primarily to be used in conjunction with the receiver previously described [1]. Carrier and local oscillator injection is derived from the receiver, thus allowing for "transceiver" type of operation, as the tuning control is common to both the receiver and transmitter. The exciter will provide three modes of output, a.m., cw and ssb at an average level of 1V rms (before the onset of a distorted waveform).

Features include the use of dynamic range compression on the microphone amplifier, a balanced modulator and double-balanced mixer, and a mosfet Class A amplifier. Additionally, sidetone is generated when the exciter is switched to the cw mode, to allow keying to be monitored in the receiver.

The controls consist of a MODE switch, RF PEAK and DRIVE LEVEL control. The receiver mode selection switch (S8 and 9) is transferred to the exciter switch (S3c and d). The exciter employs a TDA1054M ic in the microphone amplifier to provide drc, or "speech processing" as it is more commonly known. This ic was developed primarily to provide a high level of recorded medium on a cassette tape, thereby improving the signal-to-noise ratio on portable cassette recorders. A few simple changes to the values of peripheral components allows the ic to be used as a speech processor.

In the a.m. and ssb output modes, IC1c, an operational amplifier, provides sufficient audio gain to drive IC2, the balanced modulator. IC1d consists of a peak-to-peak detector, driving push-pull transistors providing an alc voltage proportionate to the output of IC1c. The alc controls the gain of IC1c, so that variations in input level from the microphone (up to 100 times) appear at a constant level at the output across R17/18. C14 provides the necessary compensation for IC1c controlling the hf roll-off. IC1d introduces less than 0·5 per cent thd into the output of IC1c, the controlled level being 1V rms. C12 and R14 provide the alc delay time constant of approximately 5s. IC1b provides filtering of any hum and noise voltages present on the ht supply to IC1a, c and d, to prevent unwanted incidental carrier modulation.

In the cw mode, S2d returns the audio input port (pin 4) of IC2a to ac ground to prevent incidental cw modulation. IC1a is arranged as a phase-shift oscillator providing a 1kHz sidetone which is routed to the receiver af amplifier via RLA1. RV1 adjusts the required level of sidetone at the speaker or phones; the receiver af gain control is unaffected.

In the a.m. and cw modes, IC2 is unbalanced, allowing carrier to appear at pin 12, modulated for a.m. and unmodulated for cw. S3a selects the audio signal level from IC1c, giving 90 per cent a.m. (modulation index = 0·9) and providing maximum ssb output versus carrier suppression. IC2 is balanced for the ssb mode, with carrier suppression being optimized by RV2 (better than or equal to 50dB).

IC2 is unbalanced by the microphone ptt switch and the key contacts for a.m. and cw operation, respectively, via D1 R31/32 and S1/3b. Additionally C20 is open-circuited by S2c, allowing fast rise and decay time of the cw waveform as the key is operated. At the same time IC1a becomes operational as R1—part of the oscillator phase shift network—is grounded by S2c. C42 and R53 are brought into circuit via S2b, providing a 1s delay before RLB returns to the "receive" state; thereby allowing cw break-in and key operation down to 6wpm. D2 prevents this delay affecting RLA, which provides the sidetone in exact synchronism with the keying. D1 prevents the RLB2 solenoid operating voltage reaching pin 1 of IC2 in the "key-up" position. Carrier injection at 60mV rms is injected into pin 10 of IC2. The audio input levels are 300mV and 180mV on ssb and a.m. respectively.

The signals appearing at pin 12 of IC2 are developed across IFT1/2, a 455kHz filter incorporating a ceramic element (Toko MFH 41T and matching transformer) [2]. See receiver description [1] for full details of this filter. Provision is made on the exciter for the frequency shift necessary for correct relationship between the suppressed carrier and its sidebands on ssb. Additionally a small frequency offset is provided for cw operation. A varicap diode (BB204) is connected across L7, the cio coil in the receiver. The diode's cathode is maintained positive by applying the stabilized V_{cd} rail, via S1a and RV5, or S2a and RV6 and the filter (47nF and 100kΩ).

On a.m. the cio is switched on via RLB on "transmit", providing a carrier at exactly 455kHz; this frequency being set up by the 22pF trimmer. On ssb RV6 shifts the cio to 453·5kHz, producing usb. On cw RV5 shifts the cio to 454kHz, producing a 1kHz beat note. The pitch of the beat note can be set to the operator's preference. (On ssb and cw the exciter mode switch applies ht to the cio.) Once RV5 and RV6 are set, this ensures correct "receive" and "transmit" states.

I.F. signals appearing across IFT2 secondary (100mV rms) are tapped down by R33, R37 to pin 4 of IC3, the double balanced mixer (20mV rms). The vco is injected into pin 10 at 100mV rms. The resultant output at pin 12 appears across RFT1 primary. RFT1 selects the difference frequency from the mixer, resulting in lsb output due to sideband inversion in the ssb mode. RFT1 is tuned between 1·8 and 3·8MHz by C44, the correct vco frequency being selected by the receiver bandswitch. This technique eliminates additional bandswitching on the receiver.

Signals appearing at RFT1 secondary are routed to G1 of TR1 via C34. Amplified signals at the drain of TR1 appear across RFT2 primary and thus across the secondary output winding. C45 tunes RFT2 in a similar manner to C44 tuning RFT1. RV4 varies G2 voltage from 6 to −2V relative to S, thus varying the mosfet's forward transconductance and, hence, its gain. This control functions as the "rf-drive", varying the output to subsequent stages of the transmitter.

A two-tone oscillator may be used in place of the microphone for overall linearity versus power output measurements. The input signal may vary to IC1c, between 10mV and 1V rms for constant audio output level to IC2. As with microphone operation on a.m. and ssb, there is no requirement to provide an input gain control due to the drc developed by IC1d keeping the output level constant.

* 24 Brightside Avenue, Laleham, Staines, Middlesex.

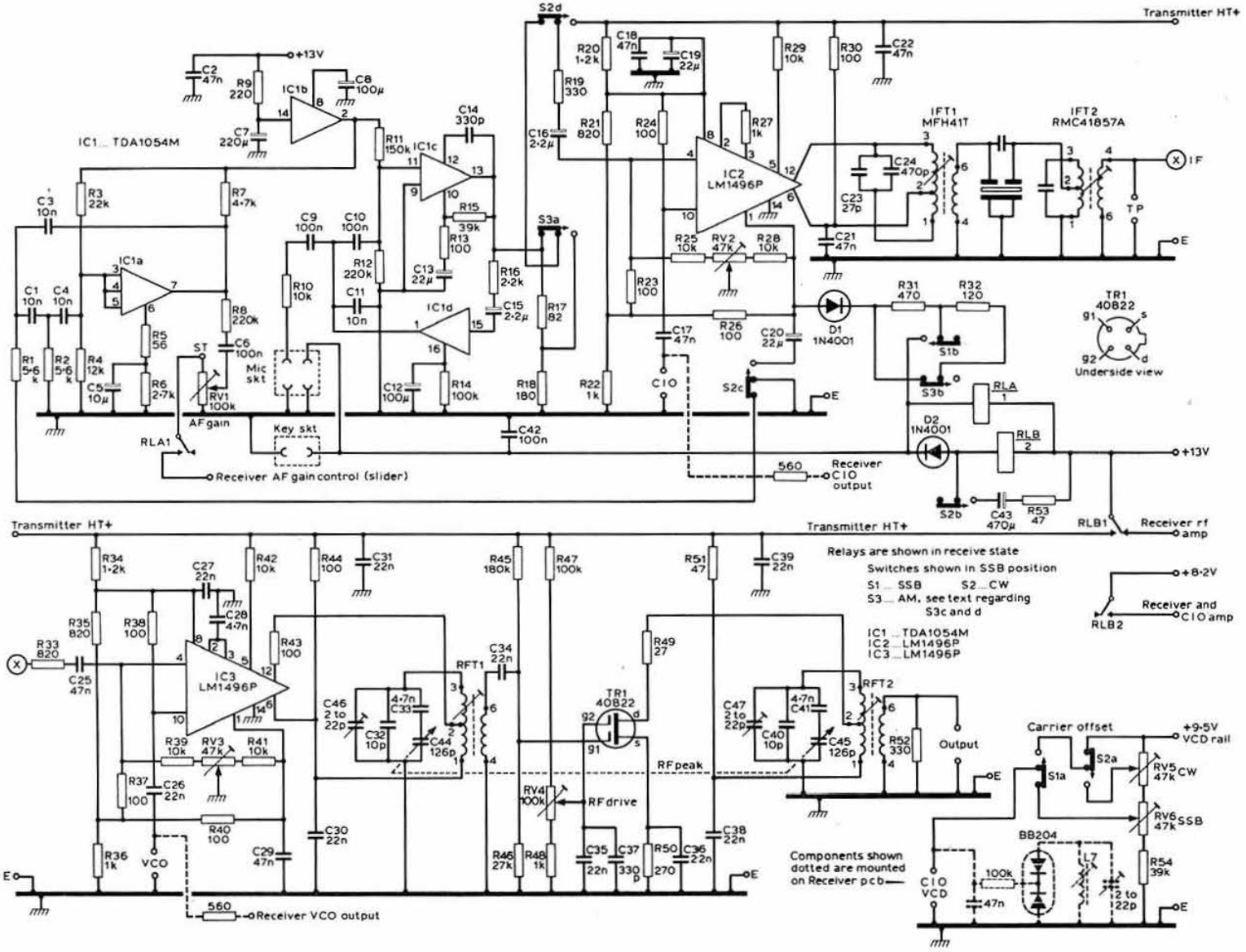


Fig 1. Circuit diagram

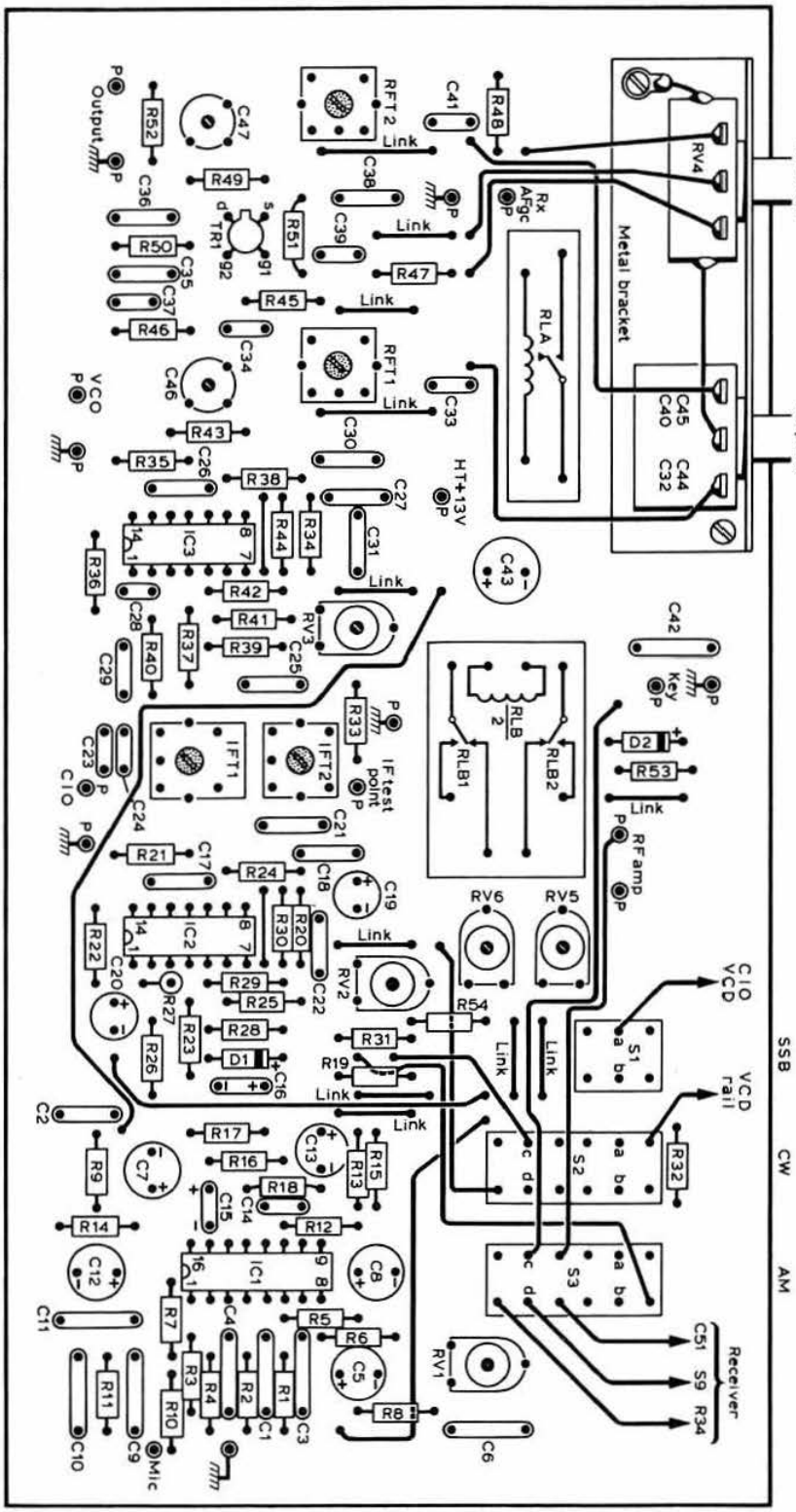


Fig 2. PCB components, top view

Components list

R1, 2	5·6kΩ
R3	22kΩ
R4	12kΩ
R5	56Ω
R6	2·7kΩ
R7	4·7kΩ
R8	220kΩ
R9, 12	220Ω
R10, 25, 28, 29, 39, 41, 42	10kΩ
R11	150kΩ
R13, 23, 24, 26, 30, 37, 38, 40, 43, 44	100Ω
R14, 47	100kΩ
R15, 54	39kΩ
R16	2·2kΩ
R17	82Ω
R18	180Ω
R19, 52	330Ω
R20, 34	1·2kΩ
R21, 33, 35	820Ω
R22, 27, 36, 48	1kΩ
R31	470Ω
R32	120Ω
R45	180kΩ
R46	27kΩ
R49	27Ω
R50	270Ω
R51, 53	47Ω

All resistors 1/3W carbon film ±5%

RV1	100kΩ linear skeleton
RV2, 3, 5, 6	47kΩ linear skeleton
RV4	100kΩ linear rotary
C1, 3, 4, 11	10nF polyester film
C2, 17, 18, 21, 22, 25, 29	47nF disc ceramic
C5	10μF electrolytic
C6, 9, 10, 42	100nF polyester film
C7	220μF electrolytic
C8, 12	100μF electrolytic
C13, 19, 20	22μF electrolytic
C14, 37	330pF disc ceramic
C15, 16	2·2μF tantalum
C23	27pF disc ceramic
C24	470pF disc ceramic
C26, 27, 30, 31, 34, 35, 36, 38, 39	22nF disc ceramic
C28, 33, 41	4·7nF disc ceramic
C32	Part of C44 (10pF)
C40	Part of C45 (10pF)
C44, 45†	126pF swing twin-gang capacitor (Toko 2A-20BT)
C43	470μF electrolytic
C46, 47	2·22pF solid film trimmers
IC1	TDA1054m SGS ATES
IC2, 3	LM 1496P National Semiconductors
TR1	40822 RCA or equivalent
D1, 2	1N4001 ITT or equivalent
RLA	Reed 348-986‡
RLB	Low profile 349-658‡
IFT1	MFH41T Toko†
IFT2	RMC41857A Toko†
RFT1, 2	10EZ Toko 10 × 10mm*
S1	2-pole ⌈ Lisastatt 3-module
S2, 3	4-pole ⌊ interlatch
SRBP	Single-sided etched foil electroless tinplate coated*

† Available from Ambit International
‡ Available from RS Components
* Available from the author.

Table 1. Voltage measurements

		Volts														
Semiconductor	Pin	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
IC1		0·6	7·5	(–	2·6	–)	2·0	4·0	8·0	0	4·4 /	3·8	7·0	4·5	8·2	0·6	1·2
IC2		3·4	2·6	2·6	3·4	1·2	11	—	6·5	—	6·5	—	11	—	0	—	—
IC3		3·4	2·4	2·4	3·4	1·2	11	—	6·5	—	6·5	—	11	—	0	—	—

	Source	Gate 1	Gate 2	Drain
TR1	2·2V	1·2V	6·0V*	11·0

*RF drive control set to maximum

Additional components for receiver

Resistors	560Ω	(2) carbon film
Capacitors	47nF	(1) ceramic disc
Diodes	BB204	(1) ITT
Capacitors	2–22pF	(1) solid film trimmer

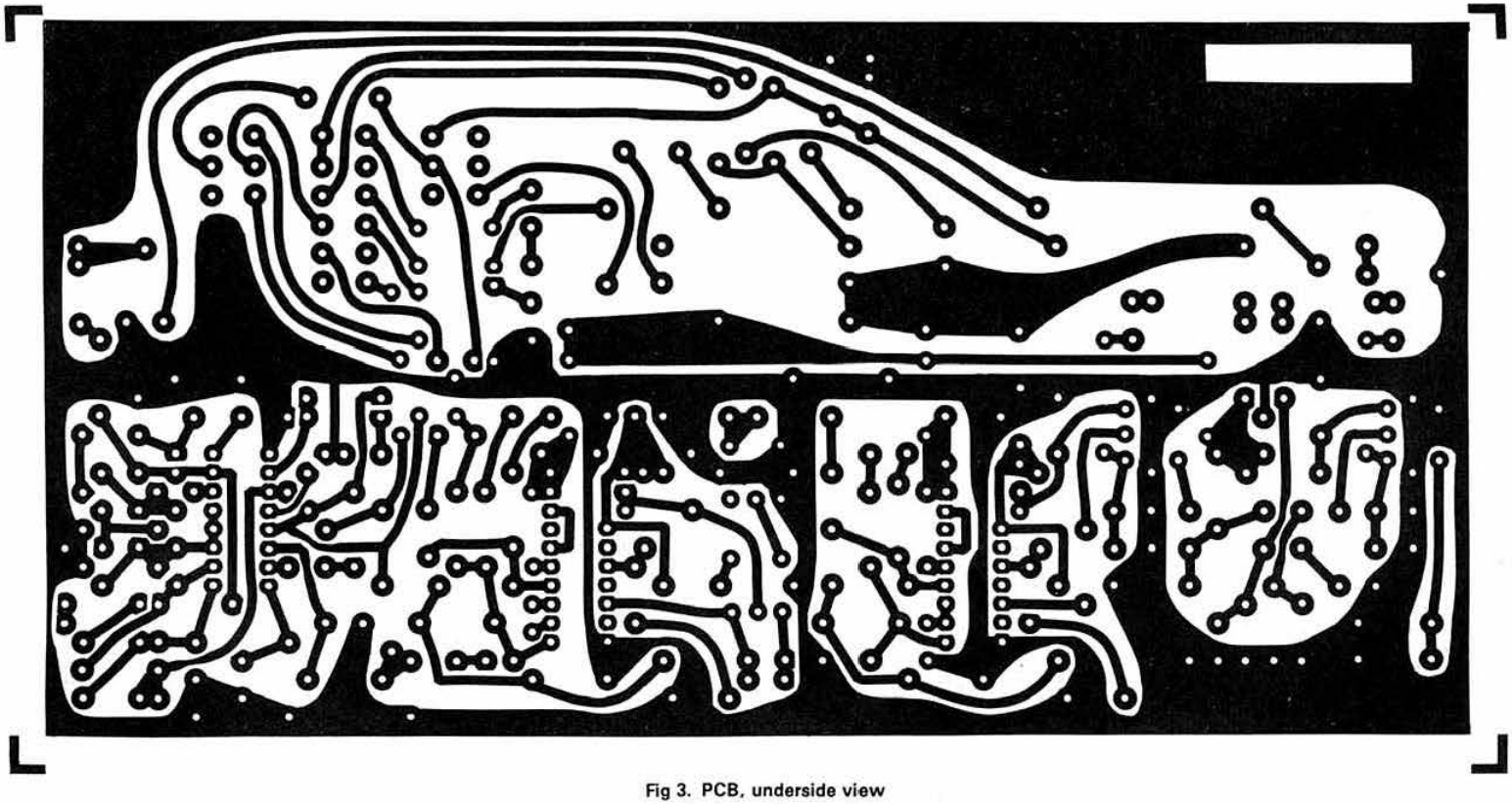


Fig 3. PCB, underside view

Interconnection sequence to 1·8–3·5MHz receiver

Before the exciter can be tested it is necessary to add the components indicated in the parts list to the receiver pcb. The interconnections between it and the exciter pcb are outlined below:

(1). Using a 1mm drill add holes 0·4in apart at rear of the receiver board adjacent to T4. Fit a 560Ω resistor, connecting one end to the junction of TR4 secondary and R46, and the other end to a pin located near the resistor. Use a 1·4mm drill to locate this and a second pin 0·3in apart in the adjacent pcb board ground foil. These pins form the output connection from the cio.

(2). Add an additional pin in the ground foil adjacent to C56 in line with the pin hole already provided (drill out the holes to 1·4mm). Fit the pin to ground foil. Solder two outer leads of BB204 vcd to these pins (effectively across L7) together with a 2·2pF trimmer. Cut leads on a 47nF capacitor and a 100kΩ resistor to 0·2in. Connect the resistor to the middle lead of BB204 and to the capacitor. Connect the other end of the capacitor to the pin in the ground foil. Connect flexible wire to the junction of the resistor/capacitor ready for connection to S1a on the transmitter exciter.

(3). Add 1mm holes, 0·4in apart, adjacent to R5/R6 at the rear of the receiver board. Fit a 560Ω resistor, connecting one end to the junction of R5/R6, and the other end to a pin located near to the resistor. Add additional pins 0·3in apart as in **(1).**

(4). Break the ht connection between IC1 and TR3 on the receiver board. Connect a flexible lead to TR3 ht ready for connection to the rf amplifier ht pin adjacent to RLB on the transmitter board.

(5). Connect a flexible lead to the input of the af amplifier (slider of RV3) ready for connection to the pin adjacent to RLA1 (sidetone) on the transmitter board.

(6). Connect a flexible lead to the junction of RV4 and RV7 ready for connection to S2a on the transmitter board.

(7). Remove the flexible leads from ht stab 8V2 and R62 etc, to S9b on the receiver, and reconnect to 8V2 and cio input pins on the transmitter board.

(8). Connect flexible leads to ht+ (adjacent to C77) and to ht− (adjacent to C74) ready for connection to ht+/− pins on the transmitter board.

(9). Complete connections as indicated in **(4)** and **(8)**, to the transmitter board.

(10). Prepare suitable lengths of coaxial cable for connection to additional pins provided in **(1)** and **(3)** on the receiver board. Connect other ends of the cable to cio and vco inputs respectively.

(11). Remove the connections from C51 and R34 to S9a on the receiver. Reconnect these leads from C51 and R34 to S3d on the transmitter board as indicated. Prepare and connect a lead between S9a pole on the receiver and S3d on the transmitter boards, as indicated.

(12). Break the foil between S9a and S9b poles. S9a and S9b may now be used as an on-off switch for the receiver and transmitter exciter by connecting necessary links and wires between the receiver and transmitter exciter boards and S9. The underside pins of S3c and S3d are cropped to clear the pcb. The receiver mode selection switch (S9a/b) is transferred to the transmitter exciter switch (S3c/d) to eliminate the need to operate two mode switches.

All inter-connections should now be completed. A thorough check should be made to ensure that there are no short-circuits, especially from ht+ to ground. Depress S2 button. Having completed checks, apply ht+ 13V to the receiver and transmitter exciter. Monitor dc current to the exciter. In the receive state the current should be about 18mA ± 1mA. Apply a short-circuit to the key socket to obtain transmit state, when current consumption should be approximately 55mA with RV4 at its maximum value.

The construction sequence of the transmitter exciter can follow the order given for the receiver. R27 is fitted vertically. The notes (supplied with the receiver) on the fitting of the switch must be followed. The rf transformer colour coding must be noted; however, the code marked on the side of the can should be ignored. Provided that the current checks prove satisfactory the transmitter exciter may be aligned and tested for output power and linearity on the three modes. An oscilloscope is an ideal instrument for monitoring waveforms at i.f. and rf, but, if none is available, a vvm with a 0–300mV and a 1V range will be necessary to facilitate alignment and testing.

Before commencing alignment, the sidetone phase shift oscillator can be checked for correct operation. With S2 depressed re-apply a short-circuit to the key socket. A 1kHz tone should be heard in the receiver loudspeaker or headphones. The sidetone amplitude can be adjusted to the desired level by RV1. Connect the oscilloscope and/or vvm to the i.f. test point (adjacent to IFT2). Set the vvm to 300mV range and the 'scope of 50mV/cm. Set RV5 to top (max vcd volts). Set C46/47 to half capacitance. Adjust L7 on the receiver for an approximate zero-beat by monitoring audibly on loadspeaker or headphones. Adjust the trimmer for exact zero beat. This sets the cio exactly to 455MHz. Adjust IFT2 and IFT1 (carefully, in that order) for maximum output of approximately 100mV rms.

After correct settings of IFT2 and IFT1 are obtained remove the short-circuit on the key socket. Temporarily connect a lead between the junction of C6 and RV1 to the microphone socket. Temporarily connect the bottom of R1 to ground (using S2c switch pins). This ensures that the sidetone oscillator is functioning in order to provide audio input to IC2 for a.m. and ssb tests.

Re-apply a short-circuit on the key socket. Monitoring the i.f. output should reveal a typical a.m. waveform; the modulation index should be 0·9.

Set RV2 to top. Depress S1. Monitoring the output should reveal a typical dsb waveform with suppressed carrier. Temporarily short-circuit the microphone socket. Adjust RV2 for minimum residual carrier level using 10mV/cm range on the 'scope. Remove the short-circuit on the microphone socket.

Transfer the 'scope and vvm to rf output pins. Set the 'scope range to 200mV/cm, and the vvm to 0·1V range. Switch the receiver to the 1·8MHz band. Tune to 1·8MHz. Set C44/45 on the transmitter exciter to maximum capacitance (counter-clockwise). Set RV4 to maximum (clockwise). Set C46/47 to half capacitance. Adjust the cores of RFT2 and RFT1 (in that order) for maximum output. Switch the receiver to the 3·5MHz band and tune to 3·8MHz. Set C44/45 on the transmitter exciter to minimum capacitance (clockwise). Adjust C47 and C46 (in that order) for maximum output. Repeat this process until maximum output is available at each frequency. Re-apply a short-circuit to the microphone socket. Adjust RV3 for minimum residual output ('scope set to 10mV/cm). Remove the short-circuit on the microphone socket. Check that the output is 1V or better.

Return to "receive" state by removing the short-circuit on the key socket. Depress S1. Tune in an ssb station on 3·5MHz. Adjust RV6 for optimum clarity (carrier off-set will now be 1·5kHz). Depress S2. Tune in a cw station on 3·5MHz. Adjust RV5 for 1kHz pitch note. These settings ensure correct "transmit" conditions.

Finally, remove the temporary short-circuit on S2c and the connection between the microphone socket and RV1. Connect the microphone and the key to their appropriate sockets. The exciter is now ready for use with, of course, a linear amplifier for the required power output.

Note. The setting of C44/45 should be indicated by a 1·8 and 3·5MHz calibration "band" marked on the front panel, or on the plate which locates C44/45. The "tuning" knob should line up with this band, ensuring that C44/45 is not mistuned to the sum signal rather than the wanted difference signal. A gap should be left on the calibration "band" where the sum signal is present.

References

[1] "A solid-state 1·8-3·5MHz receiver", R. S. Hewes, G3TDR. *Radio Communication* October 1977, page 774.

[2] *Radio Communication Handbook*, 5th edn, Vol 1, page 4.17, Fig 4.26.f.

Acknowledgements

The author would like to thank Bob McCowatt, G3WPK; Fred Taylor, G4DUO; swl Fred Deacon; members of the Echelford Amateur Radio Society; Peter Skolar, G4EYV, and Ray Barmby, G2BMR, for their valuable assistance in evaluating, building and testing the prototype exciters. □

NEW PRODUCT

Sinclair PFM200 frequency meter

A high-specification low-cost frequency meter from Sinclair is the first of the company's new instrument products to be announced in 1979.

The bright, sharp eight-digit display with variable accumulation period gives high resolution coverage from low audio frequencies right up to vhf without the need for complex range changing, and with exceptional sensitivity of 10mV. Guaranteed range is 20Hz to 200MHz, typically higher, with a frequency resolution down to 0·1Hz.

Useful in every field of electronics, as a precise monitor for the adjustment of test or operating equipment, the PFM200 is also suitable for a broad range of applications—transmitter, audio, digital, rf circuit checks for example. On video equipment, applications include monitoring scanning frequencies and video bandwidths and checking sync circuits.

TECHNICAL SPECIFICATIONS

Frequency range	20Hz-10MHz; 5MHz-200MHz
Accuracy	± count + time base error
Input characteristic	1MΩ/50pF nominal
Attenuater	−20dB nominal
Time base characteristics:	
Initial adjustment	± 2ppm at 22°C
Setability	± 1ppm
Temp stability	better than 0·3ppm/°C
Ageing rate	better than 10ppm/year

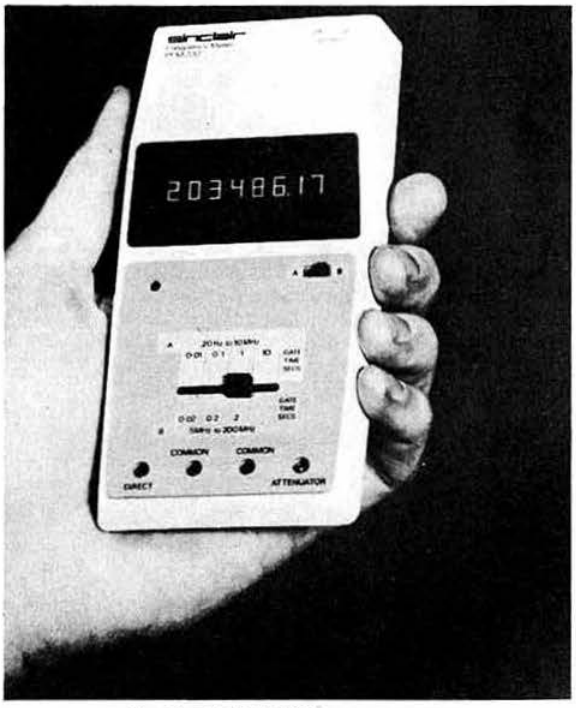
Display characteristics
Eight monolithic seven segment leds with leading zero blanking.
Display in kilohertz with automatic decimal point placement.
Low battery indication.

Power requirements
Disposable 9V transistor radio battery or approved ac adapter.
Operating voltage range: 6V-15V.
Consumption: 20mA-60mA.

Mechanical details
Dimensions: 6·2 by 3 by 1·25in (157 by 76 by 32mm).
Weight: 6oz (170gm).

Supplied complete with test leads and prods, protective wallet and operator's manual, the price is £49.80 plus VAT. Optional extras are ac adaptors for 117V, 220V or 240V; deluxe padded carrying case with lead storage compartment; and a connector pack comprising bnc, coaxial, DIN and phono adapters, plus telescopic antenna for direct signal pick-up from a nearby transmitter.

A technical information leaflet on the PFM200 is available from Instrument Sales, Sinclair Radionics Ltd, London Road, St Ives, Huntingdon, Cambs PE17 4HJ. Tel 0480 64646.



The Sinclair PFM200 frequency meter

Some experiments with audio filters

by J. STEBBINGS, G4BTV*

Introduction

When studying published circuits of audio filters for ssb and fm transmitters, and for direct conversion receivers, it was found that none complied exactly with the author's ideas. The requirements were:

(*a*) the filter should be simple, preferably not requiring active components;

(*b*) the cut-off curve should meet the IARU recommendation that the response at 4kHz should be 26dB down on that at 1kHz [1]. This is also a Home Office requirement for frequency modulation [2].

The published circuits (or those readily available) were either active filters, containing a large number of RC amplifier and buffer stages, or simple passive filters with unstated characteristics. It was therefore decided to carry out some experiments at home to see what could be achieved with limited equipment and just a few components. The approach was entirely that of an amateur whose knowledge (?) of electronics has been acquired only through his hobby. Professionally he is more at home with flows of water than flows of electrons!

The first snag encountered was that of measuring small voltages; 40 to 50dB down means that the signal generator output must be several volts if the filter output is not to require a sensitive instrument. A simple oscilloscope is no help since, with a trace height of 40mm, the best one can do (with a good deal of faith) is about 25dB.

The home-built equipment available consisted of:

(*i*) a signal generator with an output of 2V p-p;

(*ii*) an uncalibrated oscilloscope with 40mm grid;

(*iii*) an RC measuring bridge with provision for an external standard.

What enabled the work to proceed was the possession of a commercial digital multimeter capable of measuring millivolts. This was rated up to only 3kHz, but a test with the oscilloscope showed that the response was only 1dB down at 10kHz. Fig 1 shows the set-up. The cro was useful as a rough guide, and it was satisfying to have a graphical indication of the effect of rapidly sweeping the frequency across the bandwidth.

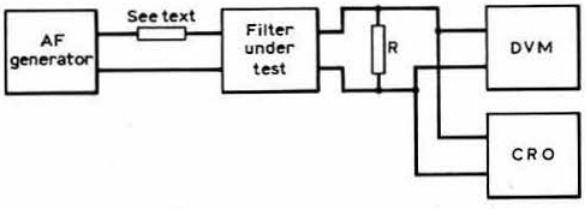
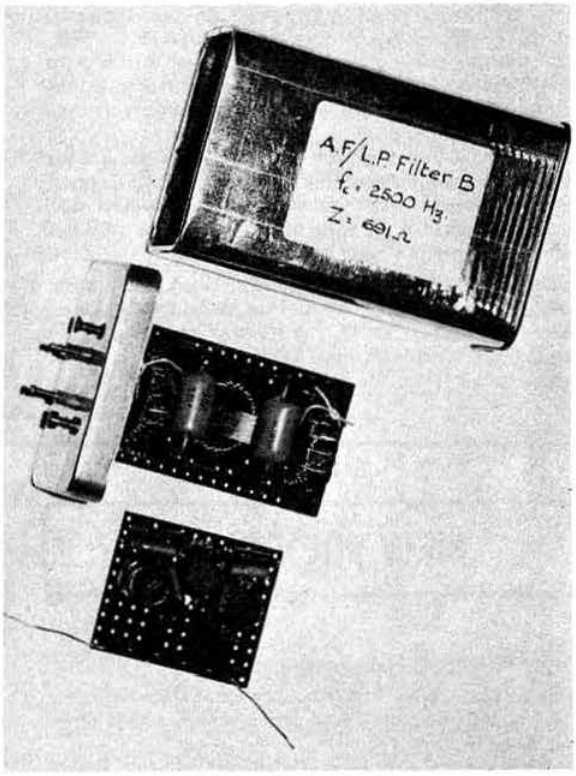


Fig 1. The test arrangement



Toroidal filter B with case removed (above) and, at the bottom, cup-core filter D

Filter types

Constant "k" filters [1, 3] and elliptical filters [3, 4] were investigated. Close tolerance components are usually specified, but it was found that considerable liberties could be taken with the calculated values while still obtaining an acceptable response. Capacitors were selected using the RC bridge. A rough indication as to whether a component was above or below the preferred value could be obtained. The first set of measurements was made on filters using advertised† 88mH toroids. An unmodified inductor was connected to the external standard terminals of the bridge, and another inductor was unwound until the required inductance was obtained. Anyone without the extra switch position on the bridge could temporarily replace one of the standard resistors with an inductor of known inductance.

It is important that the input and output impedances should be equal to the calculated value of R (the filter impedance) in each case. The output devices were of very high impedance, so a resistor equal to R was shunted across the output. The signal generator impedance was 620Ω, and a resistor equal to (R-620)Ω was connected in series with the input. A generator with a high impedance would require a shunt resistor so that the resulting impedance was equal to R. However, this might load the generator too much and bring down the output voltage.

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†Spacemark Ltd

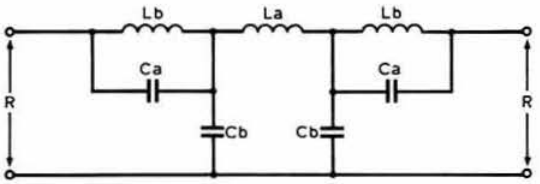


Fig 2. Circuit of the constant "k" filters. See Table 1 for component values

In the calculations the value of "m" was taken as 0·60. It is convenient to fix the value of one of the inductances at the value of the purchased inductors so that only one (or two) others will have to be altered. The value of R can then be found from this inductance and the cut-off frequency. If the value of R is fixed at the outset then all the inductors will have odd values.

Filters A, B and C

Each of these filters had inductors based on the 88mH toroids. Fig 2 shows the constant "k" circuit of A and B, while Fig 3 shows the elliptical filter C. The values shown in Table 1 were those calculated, and capacitors were selected by means of the RC bridge. Where necessary two were connected in parallel to obtain the required value.

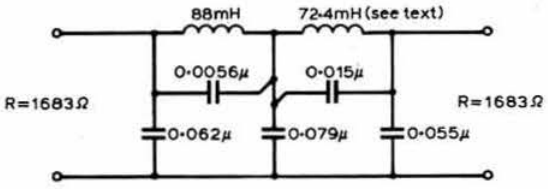


Fig 3. Elliptical filter C—3,000kHz cut-off frequency, using toroidal inductors

Filter A was designed with a cut-off frequency of 3kHz, and the response curve is shown in Fig 4. The result was very gratifying, in that at the first attempt some 40dB attenuation was obtained at 4kHz. The effect of altering the cut-off frequency to 2·5kHz as in ssb gear is shown by the response of filter B in the same figure. The same sharp cut-off was obtained and, quite fortuitously, the capacitors had standard values in each case.

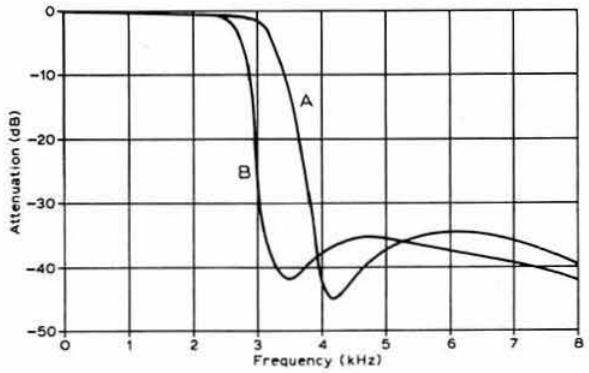


Fig 4. Response curves of toroidal filters A and B

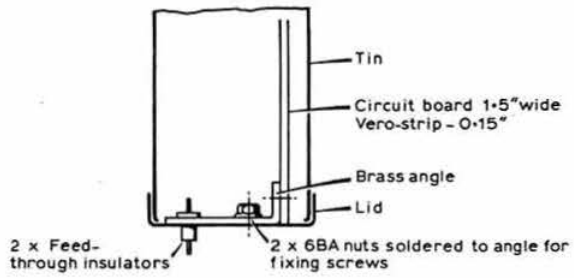


Fig 5. Method of mounting the filters

Encouraged by these results, a method of encasing the filters was devised using a well-known brand of mustard tin. Although the shielding may be unnecessary it gave the filter quite a professional appearance. The method of mounting is shown in Fig 5. The brass angle bracket for securing the circuit board was soldered to the lid of the tin. This provided sufficient thickness for the feedthrough insulator terminals. The earth connections can be soldered to the tin or to solder tags under the fixing screws.

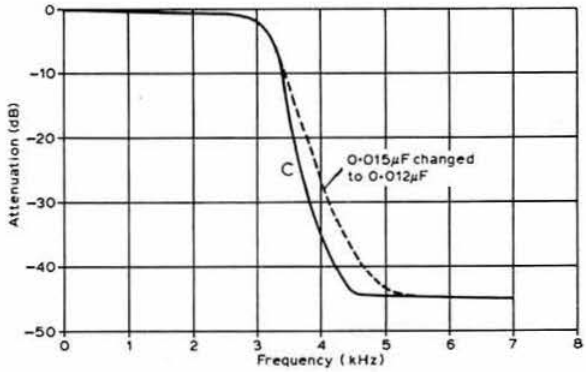


Fig 6. Response curve of elliptical filter C

The elliptical filter C uses one less inductor but an extra capacitor. The calculated values were not as convenient. The second toroid, for which 72·4mH are required, was not unwound but left at 88mH. The response is shown in Fig 6. The cut-off is not as sharp as in A and B: also the notch at the "frequency of maximum attenuation" is absent. However, the high frequency tail of the graph continues level at a greater attenuation than in A and B. The resonant frequency of 72·4mH and the 0·015μF capacitor was determined, and the capacitor was then reduced to 0·012μF so that the same resonant frequency was obtained with 88mH. This, however, did not result in any improvement. In fact, as the figure shows, the slope of the curve was reduced.

Filters D and E

The 88mH toroids are fairly expensive, costing about £1 each, and are also rather bulky. It was discovered after completing the above work that much cheaper and smaller adjustable cup-core inductors could be obtained from Ambit International. These are believed to be intended for Dolby tape noise-reduction circuits, but they are necessarily made with much finer wire and have considerable resistance compared with the

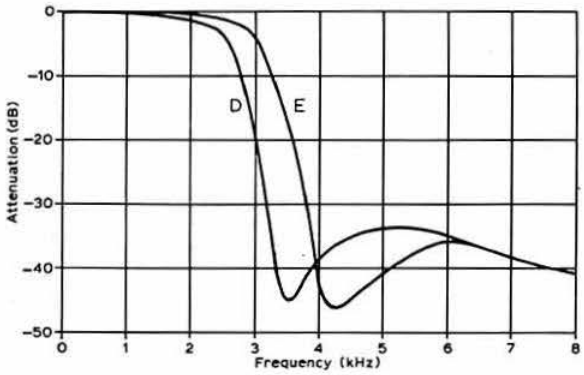


Fig 7. Response curves of cup-core filters D and E

toroids. Also listed by Ambit was a 100mH five per cent fixed-value inductor which formed the basis of filters D and E. The same circuit of Fig 2 was used, and Table 1 shows the component values. The 100mH coil is Type 1ORB and the 30mH inductors are designated CLN30569. While using the 100mH as a standard, the 30569 was easily reduced from its maximum of 36mH by moving the core.

Capacitances were again non-standard, and parallel pairs were used. The results are shown in Fig 7. With filters A and B the attenuation at the cut-off frequency was about 1dB. It was surprising, therefore, to find that the cut-off frequency of filter D (2·5kHz) was 3·6dB down, and the response at 3kHz was 18·8dB down. It is not known whether this is due to the added resistance or to errors in capacitance. Filter E was therefore designed with a cut-off at 3kHz, shifting the curve to the right and producing a more satisfactory response.

Conclusions

Considering the results with a view to practical applications, it will be seen that all the filters meet requirement (*b*) by giving greater than 26dB attenuation from 1 to 4kHz. However, better quality speech will be obtained by providing a level response up to 2·5 or 3kHz, particularly for frequency modulation. It is suggested, therefore, that filter B would be the most suitable for ssb phasing rigs, and either A or E for fm and direct conversion receivers.

Construction

Little need be said about such a simple unit. Verostrip is particularly convenient, as it is a printed circuit group board with four-hole strips on opposite sides. A tag board could be used at the expense of compactness. The toroids were secured to the board with waxed thread. Wire lashings must not be used since they would constitute shorted turns. The containers are free if the constructor normally uses the contents. The cup-core filter is not photographed in a smaller tin, which is available, since the author is still trying to consume the mustard!

References

[1] *Radio Communication Handbook*, 5th edn, Vol 1, RSGB, p9. 24.
[2] *Radio Data Reference Book*, 4th edn, RSGB, p133
[3] *Radio Data Reference Book* 4th edn, RSGB, pp51–58
[4] *Radio Communication*, August 1971, p532.

Appendix

The following shortened worked examples may help those who might wish to design their own filters. The necessary formulas for constant "k" filters are quoted, but for elliptical filters [3] or [4] must be consulted for the tables of normalized values. The conventional notation has been used in the examples.

1. Constant "k" filter B

Cut-off frequency $= f_c = 2{,}500$Hz Take $m = 0{\cdot}6$

(a) Centre section—Fig 8.

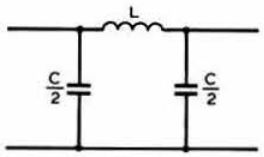


Fig 8.

Make L = 88mH. (La in Fig 2) $L = \frac{R}{\pi . f_c}$H

Then $R = \pi . L . f_c = \frac{\pi . 88 . 2{,}500}{1{,}000} = \underline{691\Omega}$

$\frac{C}{2} = \frac{10^6}{2\pi . R . f_c}\ \mu F = \frac{10^6}{2\pi . 691 . 2{,}500} = 0{\cdot}092\mu F$

(b) End sections—Fig 9.

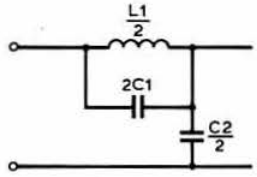


Fig 9.

$\frac{L1}{2} = m.\frac{L}{2} = \frac{0{\cdot}60 . 88}{2} = \underline{26{\cdot}4mH}$ (Lb in Fig 2)

$2C1 = \frac{(1-m^2)}{m} . \frac{C}{2} = \frac{0{\cdot}64}{0{\cdot}60} \times 0{\cdot}092 = \underline{0{\cdot}0981\mu F}$ (Ca in Fig 2)

$\frac{C2}{2} = m.\frac{C}{2} = 0{\cdot}60 . 0{\cdot}092 = 0{\cdot}0552\mu F$

Cb (in Fig 2) $= \frac{C}{2} + \frac{C2}{2} = \underline{0{\cdot}147\mu F}$

2. Elliptical filter C

Using table 1 to 6 of references [1, 2, 3, 4], attenuation 55dB at

$$\frac{f_s}{f_c} = 1{\cdot}528$$

$f_c = 3{,}000$Hz. Values of C1 L1 etc from the table. These must be multiplied by 10^{-3}.

In Fig 10. $L'2 = \frac{L2 \times R}{f_c}$. Make L'2 = 88mH . L2 = 0·1569 H

Table 1. Component values

Filter	Cut-off freq (Hz)	R (Ω)	Type of inductor	La (mH)	Lb (mH)	Ca (μF)	Cb (μF)
A	3,000	830	Toroid	26·4	88·0	0·068	0·102
B	2,500	691	Toroid	26·4	88·0	0·098	0·147
D	2,500	785	Cup-core	30·0	100·0	0·086	0·130
E	3,000	942	Cup-core	30·0	100·0	0·060	0·092

Then $R = \frac{88 \times 3{,}000}{1{,}000 \times 0{\cdot}1569} = \underline{1{,}683\Omega.}$

Calculate: $\left(\frac{1}{R.f_c}\right) = 0{\cdot}198 \times 10^{-6}$

and $\left(\frac{R}{f_c}\right) = \frac{1{,}683}{3{,}000} = 0{\cdot}561$

$C'1 = C1 \times \left(\frac{1}{R.f_c}\right) = 0{\cdot}314 \times 0{\cdot}198 \times 10^{-6}\,F = 0{\cdot}314 \times 0{\cdot}198\mu F$

$= \underline{0{\cdot}0622\mu F}$

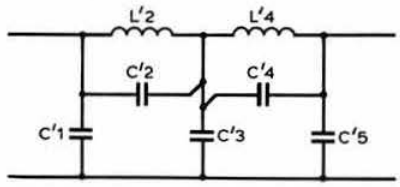


Fig 10.

Similarly $C'3 = 0{\cdot}401 \times 0{\cdot}198 = \underline{0{\cdot}0794\mu F}$

$C'5 = 0{\cdot}276 \times 0{\cdot}198 = \underline{0{\cdot}0546\mu F}$

$C'2 = 0{\cdot}0283 \times 0{\cdot}198 = \underline{0{\cdot}0056\mu F}$

$C'4 = 0{\cdot}0775 \times 0{\cdot}198 = \underline{0{\cdot}0153\mu F}$

$L'4 = L4 \times \left(\frac{R}{f_c}\right) = 0{\cdot}1291 \times 0{\cdot}561 \times 1{,}000 = \underline{72{\cdot}4mH}$ □

A simple multi-purpose memory

by S. H. PHILLIPS, G4EYR*

Introduction

Although primarily intended for cw use, the memory to be described is very versatile in that it can be used for a variety of modes, such as cw and rtty. It is invaluable in contests for making routine CQ calls, but could also find uses in meteor scatter work where very high speed cw is called for, or as a periodic callsign generator for an fm transmitter. It has the advantage that information written into it can be read out at a faster or slower rate, depending on the setting of the speed control.

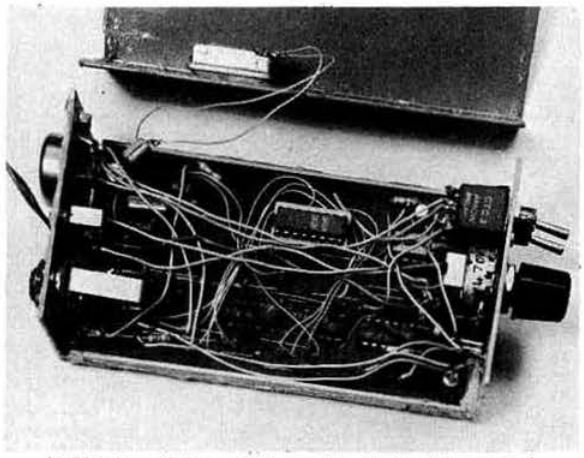
Description

The memory uses standard, commonly available ttl integrated circuits, and therefore requires a 5V supply, which can be easily provided by a three-terminal regulator such as the LM309K. Circuit operation is as follows:

IC1 forms a clock oscillator, the frequency of which is governed by RV1 and C1 and is selected to be as low as possible at the slowest speed setting of RV1 consistent with accurate cw reproduction, ie if the speed is too slow, the beginnings and ends of morse characters may be clipped off as the clock is not synchronized to the input signal. IC1 is used to clock the three 4-bit binary counters IC2, IC3 and IC4 to provide the 10-bit address codes to IC5, a Signetics 1024 by 1-bit ram. IC4 is connected with D1 and R2 to reset at the count of 3, as the C and D outputs are not required. When S1 is switched to logic "1", the counters are reset and held at zero. Switching S1 to 0V allows the counter to run as normal.

The key input is inverted by IC6 (a) so that when it is held down, logic "1"s are written into the memory. C5 helps to eliminate the effects of key contact bounce and to exclude rf from the unit. The output of the ram is used to drive TR1 via R6 which limits the base current to a safe value. TR1 drives RLA which keys the output to the transmitter, D2 protecting TR1 against voltage spikes generated by RLA.

IC6 (c) and (d) form a multivibrator, frequency controlled by R4, R5, C2 and C3 (approximately 2kHz). The output of the ram is also used to gate this tone output in IC6 (b), the signal then being fed via C4 to a small earpiece mounted inside the unit.



Inside view of the prototype unit with the lid removed

* 16 Stuart Drive, Wymondley Road Estate, Hitchin, Herts SG4 9QB.

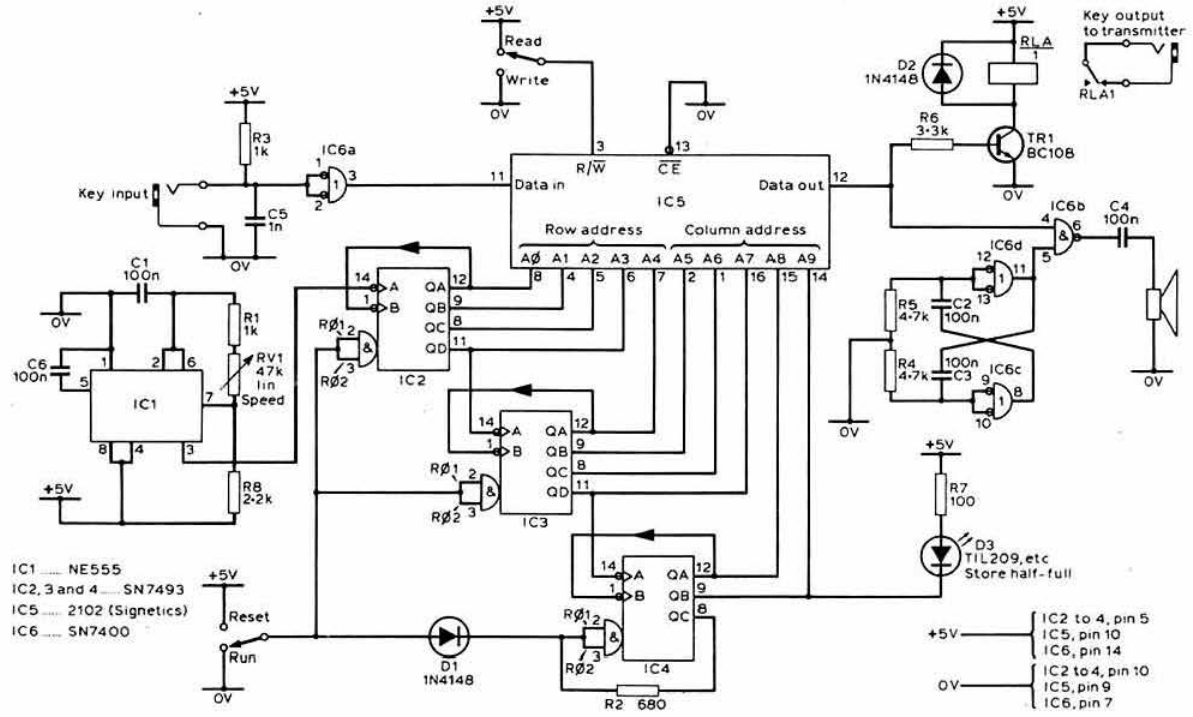


Fig 1. Circuit diagram of the memory. Read/Write switch is S1 and Reset/Run switch is S2

Construction

The layout of the unit is not critical, the original being built on a piece of 0·1in matrix Veroboard measuring 6 by 10cm (see photo). Several decoupling capacitors should be connected across the supply rails at various points, especially if the unit is used in conjunction with a high power hf transmitter, 0·1μF being a suitable value. RLA must be selected to have contacts of suitable voltage and current ratings for the transmitter being keyed.

Operation

To write into the memory, S2 is switched to WRITE and S1 is switched to RUN. The message can then be keyed in, and the output tone and relay should follow the keying. LED D3 is used to indicate how far the address count has reached. It will illuminate when the count is half-way through and will extinguish again when the count has reset to the beginning.

To read the message held in the memory, S2 is switched to READ and S1 is switched to RUN. The memory will continue to repeat its content until S1 is switched to reset again. S1 can be used to reset the memory to the beginning at any point during the count. The information will remain in the memory until new information is written in, or the memory is switched off. It should be noted that when the memory is first switched on, random data will be stored in the ram, which can be deleted by allowing the memory to run once through the cycle in the WRITE mode, although new information can still be keyed in.

Acknowledgements

The author wishes to thank G8HHO for his invaluable help with the technical drawing in this article. □

Components list

R1,3	1kΩ	**C1,2,3,4,6**	100nF polyester
R2	680Ω	**C5**	1nF disc ceramic
R4,5	4·7kΩ	**IC1**	NE555
R6	3·3kΩ	**IC2,3,4**	SN7493
R7	100Ω	**IC5**	2102 (Signetics)
R8	2·2kΩ	**IC6**	SN7400
RV1	47kΩ linear	**RLA**	DIL reed relay (RS Components)
D1,2	IN4148		
D3	TIL209 etc		

TECHNICAL ARTICLES

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Some refinements for the G3PLX vdu

by N. M. SPENCELEY, G8JUG*

THIS article describes the addition to the G3PLX vdu [1] of roll, line clear on new line, and a flashing cursor. A version of roll and line clear was described in [2], but the modification to be described uses a different principle for the scrolling, with fewer ics, which are 74 or 74LS series ttl, rather than cmos with its handling and interfacing requirements. A further advantage is that the line clear circuitry does not cause a loss of figure shift when starting a new line. At this point it would perhaps be best to describe the "format" of the original design: for further information on the circuit, and a detailed description of the vdu operation see [1].

The vdu is organized as a page of 40 characters by 24 lines. As text is received, the screen is filled up as if writing in a grid 40 by 24, starting in the top left-hand corner. When the bottom right-hand corner is reached it returns to the top left-hand corner and starts filling up the page again. This is known as "page" operation and the disadvantage is obvious. At any given time it will be writing the newest text immediately beside the oldest text. This is exactly the same as cutting this page in two horizontally and changing top and bottom over and then trying to read it. On the other hand, when in "roll" operation, once the bottom right-hand corner is reached for the first time, the text is shifted up one line, losing one line of the oldest text, and the vdu continues to write on the bottom line again. This has the effect of rolling or scrolling the text over the screen, just as if reading from a scroll and winding the paper off the bottom roll and on to the top roll.

The other change is to clear a new line before writing over it again. If this is not done, regardless of the format (page or roll), when the screen has been filled once it will start writing over the oldest text, which makes it difficult to read the current text. A flashing cursor is also added to act as a pointer to where the next character will be written.

Circuit operation

Interconnections are identified using ic numbers relating to the original article. Connections to the input board ics are given for the original circuit and for the modified input board, also by G3PLX, on which the Catronics set of pcbs for the design is based. Where these connections differ, the original circuit connections are shown in brackets.

The principle behind "roll" is as follows. Assume that one page of text is filled and the cursor is at the bottom right-hand corner. The display is 24 lines starting at line 0 and finishing at line 23. When another character is received the cursor will go back to column 0, line 0, which is the location for the next character to be written into. Line 0 must therefore be made to appear at the bottom of the screen. This is achieved by preloading the row address counter during frame-sync. In this example it would now be preloaded to 1 before each displayed frame. Lines 1 to 23 followed by line 0 would then be displayed. When another new line is started, the preload count is incremented again to 2 and the display will then be lines 2 to 23, lines 0 and 1.

IC34b and IC45, formerly the row address counter, are now used as the preload counter. The row address counter is a preloadable 4-bit binary counter followed by a flip-flop with preset and clear, ICs L and Jb respectively. To operate on "page" the preload counter is held reset so that the row address counter is preloaded with count 0. Frame-sync is used to preload ICL, and ICKa and ICKb either preset or clear ICJb depending on the state of IC34b using "frame-sync". ICKc inhibits count 12 on ICL so that it counts from 0 through to 23 in conjunction with ICJb. ICFd carries out a similar function on the preload counter. ICFa and ICFb control the mode of operation and reset. The remainder of this part of the circuit decides when the preload counter should be incremented.

Before the start of the roll, IC11aP3 is set, ICMaP1 receives a high pulse every time there is a new line. ICJaP15 is reset and ICJaP14 is set. ICJaP3 is taken low to reset the system. When a page has been filled up for the first time and a new line started, ICMaP1 will go high, indicating a new line, but will be ignored. As ICMaP1 goes low, IC11aP3 will go low, indicating a new page. This will clock ICJa, setting P15 and resetting P14, on the negative edge. The pulse from IC11aP3 will take ICMdP11 high, and because of the delay in R1C1, ICMcP8 will go low and ICMbP6 will go high. Once C1 has discharged through R1, ICMcP8 will go high and ICMbP6 will go low, clocking the preload count. On all subsequent pulses on ICMaP1, ICMaP3 will pulse low and ICMbP6 will pulse high to increment the preload count. All subsequent low pulses indicating a new page from IC11aP3 will be ignored, as ICMcP9 will be low.

The operation of the cursor is part of the line clear circuitry. The cursor is activated when the row and column address counters are at the same count as the line feed and column counters. This condition is signalled by an output from the four 4-bit magnitude comparators, ics A-D. The line comparison ICCP6 goes to the line clear circuitry and to the column comparison. ICEP11 is approximately 12·5Hz and is compared against "0" in the column comparator, as is IC38dP11 to enable the cursor on the second line "0" from IC36. Note that IC38dP12 is disconnected from IC36P11 and connected to IC36P12, 1. The cursor output, ICAP6, controls the enable on the character generator IC17. When the character generator is disabled, all its outputs float high, resulting in a bar, one character cell long, being displayed just under the point where the next character is going to be written.

When a new line is started it is necessary to clear it. This is done during the next frame. Therefore, it takes one complete frame time before another character can be received if it is not to be cleared and hence lost. This limits the speed to 300 Bauds, but this does not matter when receiving Baudot. The line can be cleared immediately, but this means rewiring in the address multiplexers. After a new line, and a frame-sync, the circuit waits for a line comparison. When this output occurs, the clear control on the input board is taken low, but only for the duration of this one line. The line will now be clear, but in the process the shift flip-flop has been set to letters. To prevent a loss of figure shift, the flip-flop is interrogated during the first frame-sync and another flip-flop is set if the shift is figures. During the next frame-sync, figures is set if necessary.

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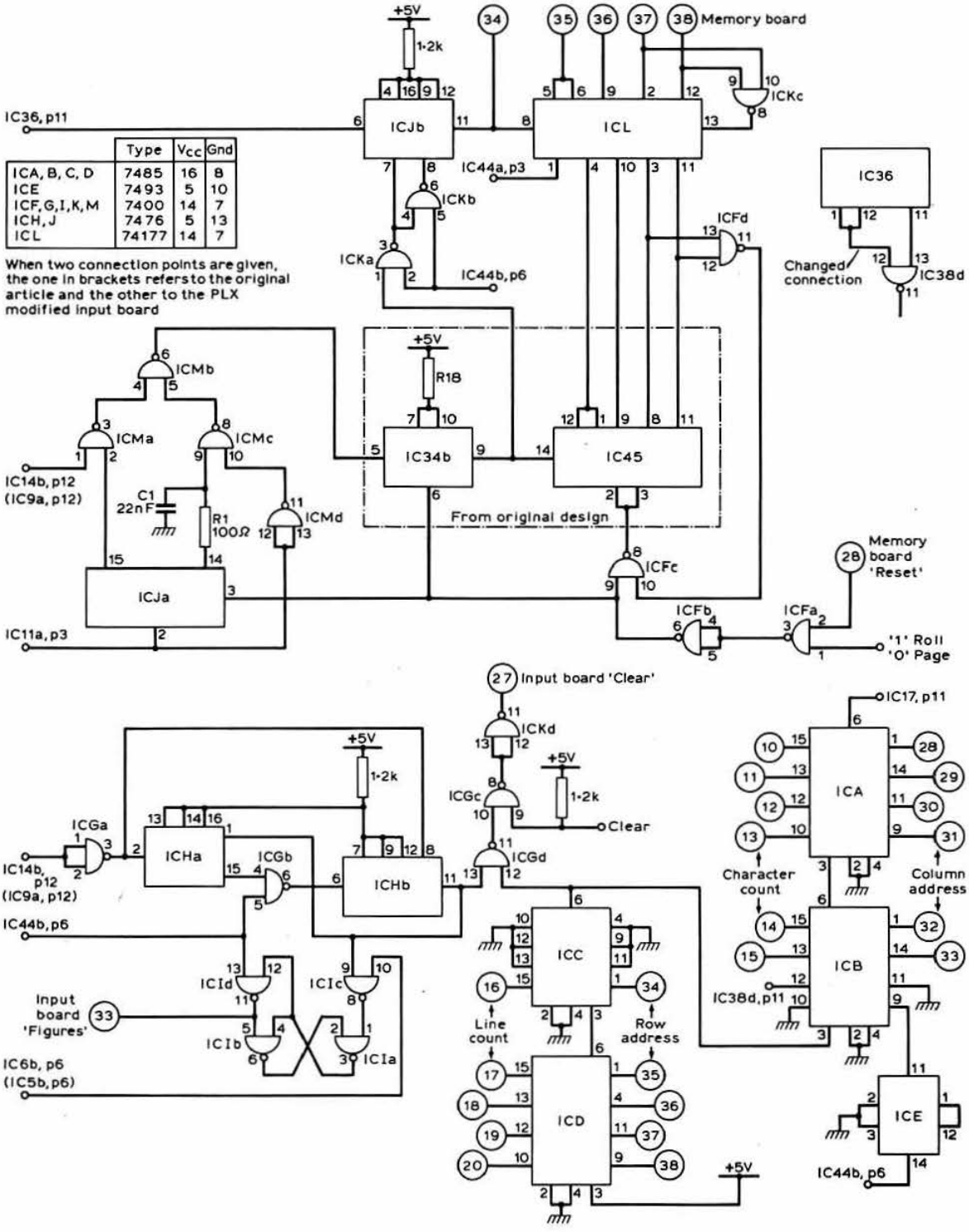

Fig 1. Circuit diagram of the modifications

On receiving a new line pulse from IC14bP12, ICHa is set and ICHb is reset (ICHb should already be reset, this input is included so that the correct states are reached at "power-up"). On the next frame-sync, ICHb is clocked through ICGb, putting ICGdP13 at "1", enabling the clear control on the input board when the line comparison ICCP6 goes high via ICGd, ICGc and ICKd. Page clear is when ICGcP9 is taken low. If figure shift is present during the first frame-sync, ICIcP10 will be high. ICIcP8 will then go high, setting the flip-flop, ICNa, Nb, putting ICIaP3 high. After the line has been cleared on the next frame-sync, ICHb will again be clocked. As ICHbP11 goes low it will clock ICHa, resetting it. Also during this frame-sync, assuming that ICIaP3 has been set high, ICIdP11 will go low switching the shift flip-flop to figures.

Modifying the vdu

To modify a vdu already built, IC34b and IC45 must be electrically isolated from the rest of the vdu but, especially where the vdu has been built on pcbs, they are left in the same physical position.

In this instance the modifications were built on a piece of Veroboard, and the interconnections made using polyurethane-coated self-fluxing wire. Where a vdu using the Catronics pcbs is concerned, one print-cut is made to disconnect IC45P2, 3 but the adjacent feedthrough must be left, as this connects IC43bP6 with IC36P2, 3. All other disconnections from IC34b and IC45 are by removing further feedthroughs. The interconnections between the timing and memory boards, Nos 34–38 inclusive, must be removed. Connections Nos 34–38 on the timing board then become the preload count outputs, and Nos 34–38 on the memory board are the row address inputs. The board carrying the modifications was mounted on top of the timing board pcb. Current consumption of the complete vdu is now about 1·1A at 5V.

The author also chose to replace the uart with either a General Instruments AY-3-1015 or an Intel IM-6402CPL, and the character generator by an RO-3-2513 from General Instruments. These devices require only a single +5V supply making TR1, ZD1 and R14 redundant. The current consumption could be reduced by using ls devices.

The information about the replacement chips is included for constructors who are starting from scratch, as it simplifies the psu requirements, and they are pin for pin compatible.

References

[1] "The G3PLX Mk2 rtty video display unit" by J. P. Martinez, G3PLX. *Radio Communication* April 1977.

[2] "Scrolling for the G3PLX video display unit" by B. W. Coverley, GW3OGG. *Radio Communication* October 1978.□

FM channel locator for TI58/59 calculators

by P. M. JESSOP, G8KGV*

MANY vhf fm transceivers now have fully synthesized frequency control, some having a read-out calibrated in channel numbers and others with direct frequency read-out. For the latter category, it can create some mental gymnastics to translate a simplex or repeater channel into terms of actual frequency. At the risk of seeming to use gross technological overkill, a program is presented here to run on the Texas Instruments programmable calculators TI58 and TI59. While the latter costs as much as a 144MHz "black box", many amateurs will have access to such a device. For other makes of calculator, the principles applied here will translate very easily into the language used by that unit.

S		SU	
R(T)	R(R)	RB(R)	RB(T)
		RU(T)	RU(R)
A	B	C	D

Fig 1. The layout for the user-defined keys. Note the inverted transmit and receive frequencies for Continental repeaters

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Table 1

```
2nd Lbl A ( CE × . 0 2 5 + 1 4 5 )
2nd Fix 3 INV SBR
2nd Lbl B A ( CE + . 6 ) INV SBR
2nd Lbl C ( CE × . 0 2 5 + 4 3 3 )
2nd Fix 3 INV SBR
2nd Lbl D C ( CE + 1 . 6 ) INV SBR
```

Table 2

Function	Example	Input	Key	Display
144MHz Simplex	S23	23	A	145·575
144MHz Repeater input	R5 in	5	A	145·125
144MHz Repeater output	R5 out	5	B	145·725
432MHz Simplex	SU18	18	C	433·450
432MHz Repeater input	RB14 in	14	D	434·950
432MHz Repeater output	RB14 out	14	C	433·350

The listing of the program is given in Table 1. The program can be entered anywhere in the calculator's memory, but this will normally be the top of the memory, ie starting at location 000. The instructions for use are given in Table 2 and these are really self-explanatory. The program was written for use with 25kHz channel spacings, but when 12·5kHz channels are introduced these can be accommodated. For instance, S20X can be entered as 20·5, but as the program stands it will display 145·513 instead of 145·5125 because the display has been fixed at three decimal places. If the "X" channels are used frequently, it may be desired to change the FIX 3 instructions to FIX 4, but the display will lose its direct correspondence with that of the transceiver. As will be seen, the program uses only a very small proportion of the available program space, and a possible use for the remainder is a similar program which calculates the transponder frequencies for the Oscar satellites. □

technical topics

Pat Hawker, G3VA

A comment that seems particularly relevant to amateur radio was noted recently in a book by Dorothy Rowe: "A scientist or an artist may advance the sum of human knowledge and experience by work which he does on his own, but he prepares for that work through discussion with others and the significance of his work becomes effective when he tells others of it."

The Armstrong super-regen

Not long ago an amateur wrote asking if I could tell him what a super-regenerative receiver was; he had come across the term but had no idea what it meant. My immediate reaction was to feel as though a whole chunk of my youth had suddenly disappeared: listening to 28MHz North American amateurs coming through on the loudspeaker of a two-valve receiver back in 1936-37; carting a "portable" 56MHz receiver around the hills and valleys of Exmoor; being intrigued by the 450MHz S-phones across the Waal and Maas while I was temporarily working with Airey Neave's IS9 people in Nijmegen in 1944. Has the work which earned the great but tragic Howard Armstrong more money than any of his other inventions so soon been forgotten, except perhaps as a dabbler's toy?

Armstrong stumbled into super-regeneration by accident; but whereas most of us would have been puzzled at a freakish effect and then passed on to other matters, it was typical of his genius that, once observed, he spent weeks puzzling it all out and turning an odd experience into a practical circuit configuration.

In 1921, while setting up an ordinary regenerative receiver, Armstrong suddenly heard a signal coming through at a volume far beyond normal. He had time only to identify it as a station in the Brooklyn Navy Yard, and to pull in several other stations at many times normal volume, when, just as suddenly as it had begun, the effect disappeared. His biographer has said that whereas five minutes earlier Armstrong would have sworn that he understood regeneration (of which he had had almost a decade's practical experience) only those minutes were needed to wipe out that complacent belief.

It took weeks of intensive work to pin down the principle of what Armstrong called "super-regeneration" as a new extension of the feedback principle. He demonstrated the additional amplification that is possible in a regenerative detector when the oscillatory action is interrupted (quenched) at supersonic frequencies of the order of 20–100kHz. Such a detector can provide an amplification of some 100,000 times in a single stage.

Soon super-regeneration was hailed as a "wonder drug" for medium-wave broadcast reception: the solution to all problems; the only known means by which a simple two-stage receiver could provide full loudspeaker volume reception of weak signals. In 1922 RCA bought the patent for $200,000 and 60,000 shares, making him the largest individual shareholder in the corporation. But almost immediately the increasing number of broadcasting stations brought into prominence one of the several problems that have always dogged the super-regen: its lack of selectivity and consequent inability to hold a weak signal in the presence of stronger signals. Soon the superhet drove the super-regen on to vhf, where it played a dominant role from about 1925 to 1935, and a subsidiary but still important role until about 1945.

There was a brief revival of commercial interest in the 'fifties when Europe's first vhf/fm broadcasting network was set up in West Germany (the super-regen copes well with wideband broadcast fm signals). Since then it has surfaced occasionally in 27MHz cb hand-held and radio control equipment and for the "beginner's" vhf sets that attract unfavourable publicity as potential hazards to aircraft communications because of excessive radiation (this can be overcome by using a diode across part of the tuned circuit and, in any case, can be made insignificant with small-signal semiconductor devices). Apart from the diode introduced by Bell Telephone Laboratories for radiation suppression, little serious work seems to have been done on improving the super-regen for over 30 years.

Taming the super-regen

Evidence that not everyone has abandoned interest in the super-regen is to be found in an impressive six-page article "Taming the superregenerative detector" by Nat Bradley, ZL3VN (*Break-in* November 1978, pp410-5). He presents the results of a great deal of practical experimentation with simple receivers up to about 1,000MHz (it would be interesting to harness the super-regen principle to 10GHz microwave receivers). His conclusion is that the super-regen is a fascinating and unnecessarily maligned device . . . "The application of modern techniques to its design and construction can give it added performance and versatility at low cost."

ZL3VN does not attempt to suggest that his work has suddenly turned an ugly duckling into a beautiful swan. To its credit he lists its use as a single-stage sensitive demodulator of a.m. and fm in the vhf and uhf ranges (typically half-microvolt sensitivity), agc action, and discrimination against impulse noise. In its basic form he notes the following disadvantages: lack of tuning selectivity, radiation of interference signals and "delivery of nerve-shattering white noise in the absence of an incoming signal". Although often claimed as useless for cw or nbfm reception, he does in fact show that it can be made to cope with both these modes. He also suggests that the exact way in which it works has never been adequately explained (even by Armstrong) and he puts forward some interesting suggestions. Apart from showing how the fet can be used in both self-quenched and separately-quenched detectors, and also as an untuned rf stage to provide additional isolation and reduce radiation, he comes up with a squelch gate arrangement to overcome the noise problem in the absence of signals. He comments: "Listeners to these receivers invariably think they are listening to more complex squelched superhets."

It is difficult adequately to summarize all the ideas and suggestions of this detailed article, but one that might well prove worthwhile following up is: "Lower frequency superregenerative receivers can utilize a crystal just as effectively as an *LC* resonant circuit, and very useful reductions in bandwidth can be gained for fixed frequency use". This might enable an emergency fixed-channel hf receiver or transceiver to be made very simply indeed; with the possibility of further selectivity being achieved by putting a signal-frequency crystal

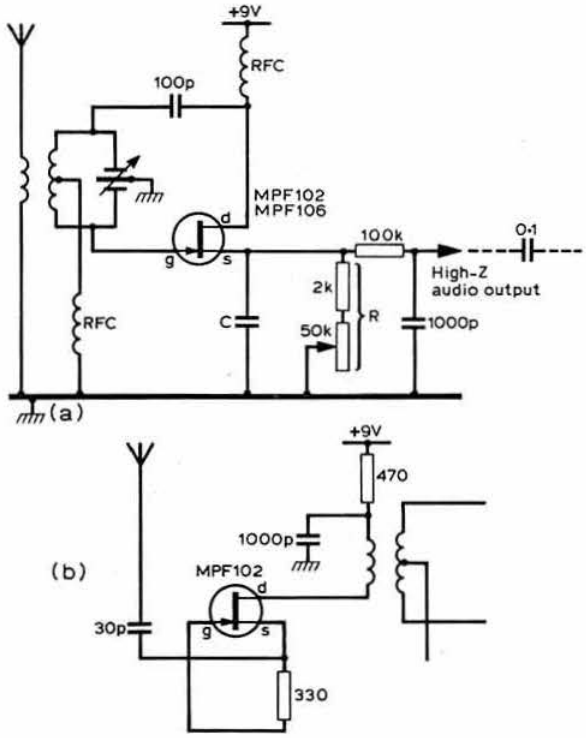

Fig 1. (a) Basic self-quenched fet super-regenerative detector as used by ZL3VN. (b) Untuned fet rf stage to reduce radiation, but subtracts a little from sensitivity. C and R determine frequency and reliability of quenching and are best determined by experiment (C, say, 1,000 to 1,500pF but use minimum value consistent with reliable quenching). Adjust R for best reception (can be changed to fixed value for a given frequency range). Resonances in rfcs may change feedback across the range and this may call for altering the chokes or earthing points

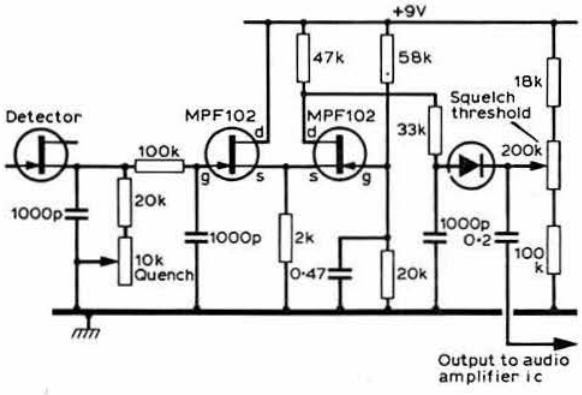

Fig 2. Squelch gate to follow super-regenerative detector. With signal present, dc voltage at detector source increases by about 25mV, and a stage of dc amplification is needed to raise this to about 250mV which should be sufficient for reliable gate operation. Diode gate is any small silicon diode with high back resistance and sharp knee

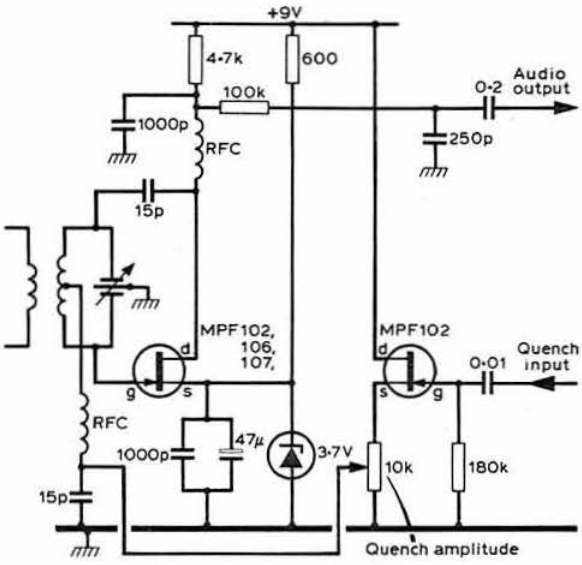

Fig 3. Separately quenched detector which can provide significantly improved results

filter in the input circuit. He achieves reception of nbfm signals by injecting a stable carrier at carrier frequency, remarking: "If this is done at the correct level, detection of nbfm is as good as by any other means, presumably by phase locking the detector oscillation and comparing it with the incoming signal." The injection frequency can be derived from the harmonics of a lower frequency oscillator, and this technique eliminates the need for squelching. One wonders if this technique might not also be applicable to the demodulation of ssb signals (ZL3VN is silent on this point). For reception of cw he uses the same gating devices to provide the squelch action and to key an af oscillator.

He is a strong advocate of separate quenching, since this allows frequency, waveform, amplitude and duration of quench to be brought under tight control, and says: "The

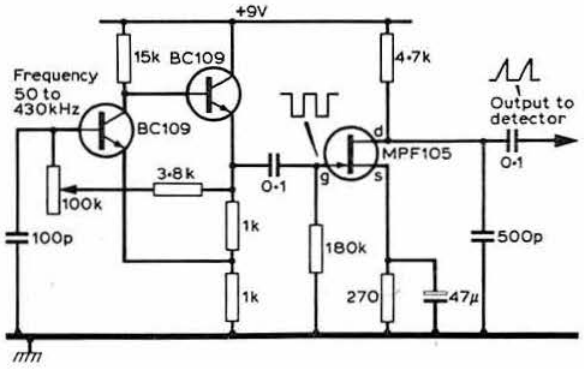

Fig 4. One form of quench generator. Above about 150kHz "second mode" operation tends to decrease quench hiss, but also af output. Usually results can be optimized at around 150kHz, but ZL3VN reports using quench frequencies up to 1MHz for 21MHz reception of broadcasting stations

effects of tuned circuit loading can be largely overcome, sensitivity improved, cross modulation and interaction between adjacent signals minimized, and output hiss reduced to pleasant proportions or even killed without squelching—performance can be tailored to the circumstances."

He mentions the feature that was so attractive in the 'thirties: the ease with which the super-regen can be made into a complete transceiver (and presumably if a crystal oscillator is used one could overcome the old stability problem).

Altogether ZL3VN makes a strong case for giving this old technique a dusting off and a good polish with modern components. Before deciding that there is no future for the super-regen, remember what has been done in the 'seventies with another idea born in the 'twenties and then virtually forgotten: the direct-conversion receiver with synchronous detection.

Heavy current power supplies

The May *TT* contained a brief reference to the requirement imposed by modern solid-state transmitters and add-on power amplifiers for bench power units capable of delivering up to several hundred watts of power at 13·5 to 14V. This included my rather querulous comment that well-regulated 20A supplies can be quite costly. Several readers have taken up this challenge, or have drawn attention to designs published elsewhere, and a round-up of some of these ideas seems called for. In general most of the supplies concentrate on using a number of 2N3055 power transistors in parallel to provide the shunt-regulator, but attention has also been drawn to heavy current (5A) three-terminal ic regulators which, although costly, eliminate the need for many of the external components used in supplies based on the 2N3055.

J. Greenwood, G3KRZ, is convinced that there is no real difficulty in constructing such units at a reasonable price, and that the idea that this is the case is only another excuse for not attempting home construction. When he needed a high-power supply he unearthed a design by C. C. Lo, WA6PEC, "500-watt regulated power supply" in *Ham Radio* December 1977, pp30-2. Although he found this unsatisfactory in some respects, he was able to modify the design to perform the task in hand. His modified circuit is shown in Fig 5. For normal intermittent applications it will provide 25A.

Furthermore a stripped-down version is possible, since protection circuits (overcurrent, overvoltage and undervoltage) can sometimes be dispensed with. "Who would provide them when using a battery on trickle charge?" he comments (but remember that the battery itself would normally act as an effective stabilizer, and see G3LLL's comments below). The metering, with attendant thermal compensation and even many of the suppression components, may represent little more than a frill: his economy arrangement is shown in Fig 6.

The remaining components are standard (with the exception perhaps of the transformer) and can often be obtained at minimal cost from trade stands at rallies, etc, he adds. Even if bought at standard rates they are relatively cheap. He admits that in his diagram a number of component values are odd, since they were those available from the junk box; preferred values could be substituted.

While suitable transformers are available, G3KRZ concedes that they are not always at a price an amateur would want to pay. However, he points out that isolation transformers etc, of suitable power rating, can often be rewound (low-voltage secondaries require few turns and are often accessible) and advice on this can be found in the *Radio Communication Handbook*. Since icas ratings can be applied, a 25A supply can

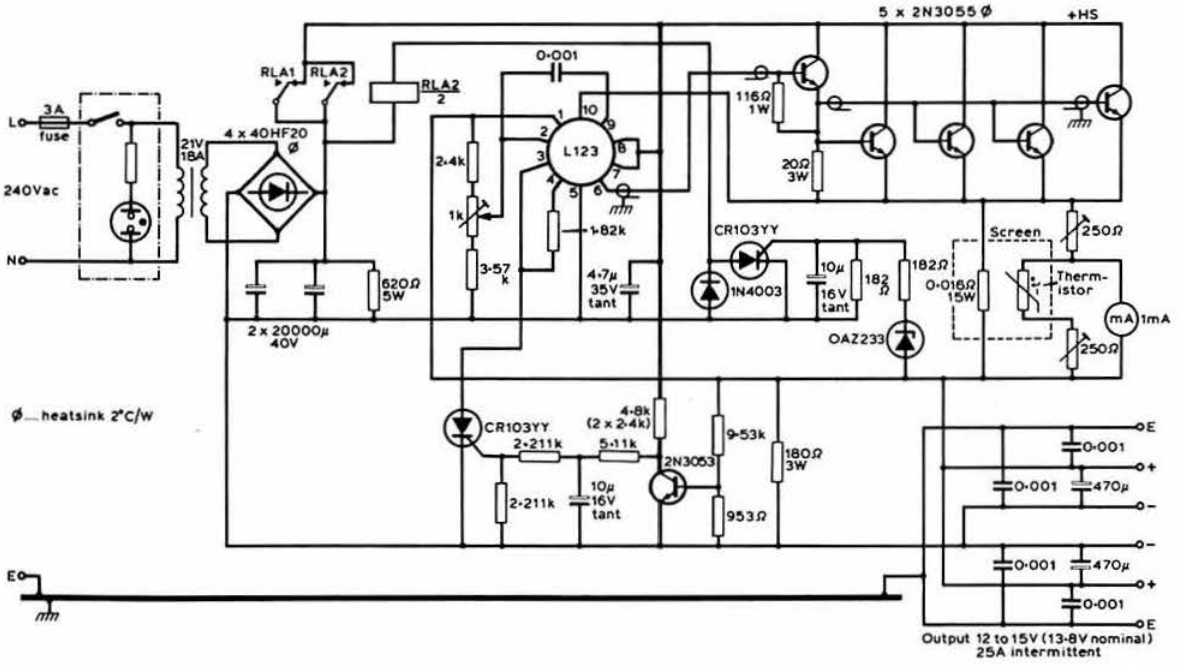

Fig 5. G3KRZ's stabilized power supply with full protection and capable of providing 25A intermittent output at 13·8V nominal

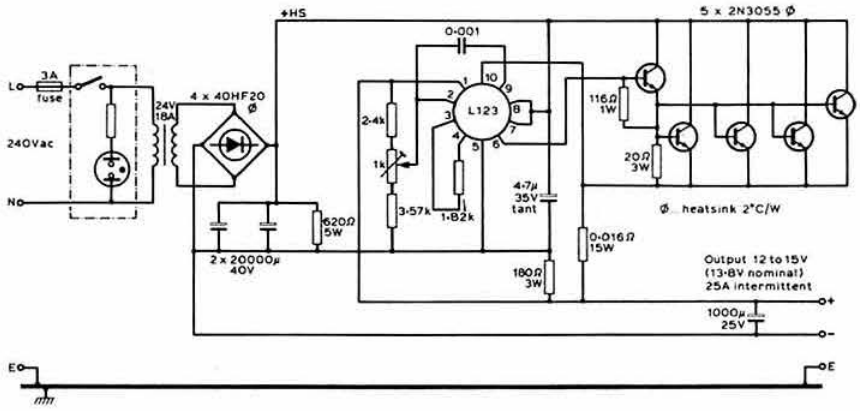

Fig 6. Economy version of G3KRZ's high-current power unit

use a secondary winding rated for 17A continuous. As a final comment, he adds that he would like to see in *Radio Communication* a practical article on the construction of switched-mode power supplies.

Colin McEwen, G3VKQ, built a 14V 5A supply to enable him to bench operate an AM10B Cambridge unit, and points out that this could be up-rated to 10A by duplicating TR1 and R1, although he has not tried this in practice. His approach (Fig 7) is to take a 1A 7812 three-terminal ic regulator, insert a red led in the reference lead to give approximately 14V output (roughly the on-charge voltage of a 12V lead-acid battery). The led lights quite well on the 8mA or so flowing in this lead. He then adds a TIP42A by-pass transistor to give him a 5A rating. Advantage is taken of the foldback current limiting and thermal shutdown of the 7812 to give reasonable protection; he admits that if he was using the supply for a £200 transceiver an scr crowbar arrangement would provide peace of mind.

At low currents the drop across R2 is insufficient to turn on TR1, but at about 600mA it switches on and supplies most of the additional load up to about 5A. At full load the 7812 goes into current limit and, because of R1, no further current is supplied by TR1. TR1 is mounted on the same heatsink as the 7812 so that the thermal shut-down of the 7812 protects both regulator and bypass transistor. Similar circuits (although usually without R1, which gives a degree of short-circuit protection) can be found in manufacturers' data sheets.

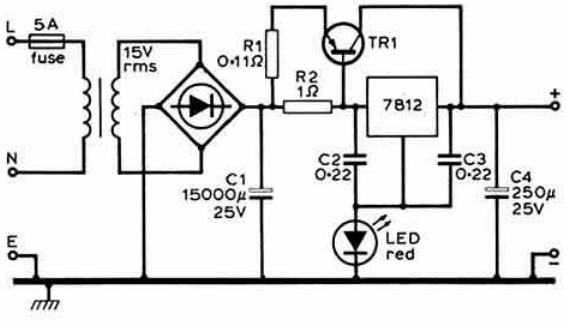

Fig 7. G3VKQ's 5A supply (capable of about 10A with additional shunt regulator transistor). TR1 TIP42A, R1 two 0·22Ω in parallel. 12A bridge rectifier and large (door stop) surplus transformer. R1 provides some short-circuit protection

The bypass transistor can be eliminated (up to 5A) by using a heavy-current ic regulator, and an advocate of this approach is Garry Toncre, WA4FYZ, in *73 magazine* April 1979. Fig 8 shows how this simplifies the circuitry; these regulators incorporate internal current limiting (5A threshold) and thermal shut-down. The Fairchild 78H12 12V unit is supplemented by 5V (78H05) and 15V (78H15) devices. The cost in the USA is about $9 each, but the elimination of the discrete components helps to compensate for this.

Harry Leeming, G3LLL, notes that a number of amateurs are finding that economy 13V supplies can, in the outcome, prove expensive owing to their habit (in both commercial and homebrew psus) of developing a short-circuited regulator transistor, resulting in some 20V or so appearing across the output and wreaking havoc on the equipment they are meant to serve. He points out that a simple way of preventing such disasters is to fit a 15V power zener directly across the output (Holdings are now doing this in all their economy units). When the unit is functioning correctly the zener diode just sits there doing nothing; but if a regulator transistor short-circuits, the zener blows the fuse. This amounts to another good reason for correctly fusing power supplies and not replacing a blown fuse with silver paper, copper wire etc.

It may be rather like stating the obvious, but it seems worth reminding readers that for heavy-current circuits, heavy-gauge conductors (and high-value capacitors) are essential. At 10A, the voltage drop across even 0·1Ω is 1V, or some eight per cent of the supply voltage. As we have noted before, in transistor power amplifiers a collector tank coil may be carrying both dc

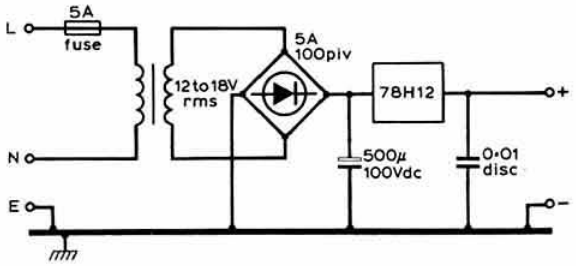

Fig 8. WA4FYZ's simple 5A supply based on the Fairchild heavy-current ic regulator type 78H12

and rf currents, and needs special attention; if shunt feed is used watch the wire size in the rf choke. Heavy peak currents will show up any shortcomings in power supply cabling, plugs, sockets etc. Traditionally, most radio equipment has been primarily light-current engineering, and it needs a rather different mental approach when thinking in terms of 13V at 5, 10 or 25A.

Vinyl panel sheets

Clive Collins, GW3WEQ, draws attention to the use of vinyl self-adhesive coloured sheets as an alternative to spray painting of front panels. After having rejected the costs quoted by several spray-painting firms, but still anxious to provide presentable front panels on home-built equipment, GW3WEQ discovered a range of vinyl sheets in various colours and in simulated "brushed" metal finishes. He believes that in several respects these sheets represent an improvement over other than the higher grades of spray painting, while typically the cost is between roughly £2.50 and £4 per square metre, compared with, say, £8 for spray painting a 19in by 10in panel. The vinyl coatings adhere firmly to metals such as aluminium.

The company marketing these vinyl sheets is Fleet Markings, Silk Screen Printers, Queensway Industrial Estate, Queensway, Wrexham, Clwyd, North Wales. The firm is prepared to quote reasonable prices for small quantities to amateurs provided a callsign is stated in any enquiries (sae should be included). This range would certainly appear to meet the needs of constructors wanting to give a distinctive appearance to their equipment (or possibly to refurbish old equipment).

INCONs for rfi filters?

A. C. Doty, K8CFU, and Dr Alan B. Macnee, ex-W1JIR, introduce in *QST* February 1979 the concept of the "INCON" (INductor-CONdenser) as a component for filters. In effect each INCON uses a dual or triple combination of interwound coils to form series or parallel tuned resonant circuits; since each component acts as both inductor and capacitor it is claimed to be possible to reduce by half the number of parts needed for filters. Fig 9 shows the principle of INCON 1 and INCON 2, their equivalent circuits and the outline of a typical 27/28MHz band-stop filter such as might be used to protect tv receivers from local amateur or cb transmissions. The technique has been patented and the *QST* article provides a good deal of design data, although I remain far from being fully convinced that the idea will be widely taken up.

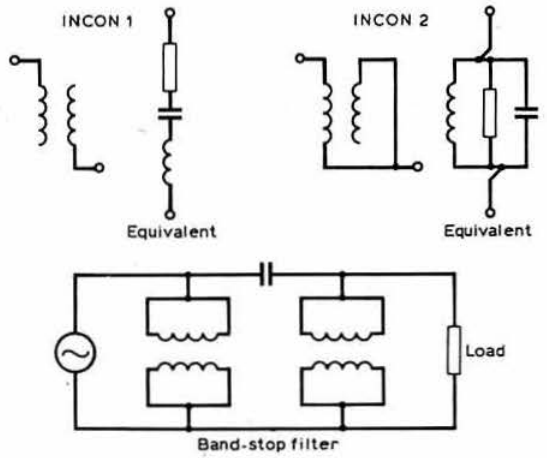

Fig 9. "INCON" combined inductor/capacitor devices as used for rfi filters and described in *QST* February 1979

Safe, safer, safest

The item in the May *TT* about the mains input wiring practices found in a lot of imported equipment has prompted F. A. Fear, G8CVR, to comment in some detail about electrical safety matters. He feels, rightfully, that this subject does not always receive the attention it warrants and that many amateurs are not aware of the significant differences in electrical practices in different countries (or even between different suppliers in the USA).

Electrical safety was covered in some depth in *TT* October 1976, with subsequent additional comments from John Haydon, G3BLP, in January 1977. There is no doubt that a lot of imported equipment and probably the electrical side of most amateur installations fall appreciably short of the recommendations in the current British Standard BS415, and a number of the points made by G8CVR deserve further consideration.

(1) He notes the absence of three-wire leads and mains earths (as well as the fusing/switch situation) on much equipment. In his experience, however, there is no reason to refrain from making modifications from fear of reducing re-sale values. Dealers taking equipment in part exchange normally welcome this type of modification if properly carried out.

(2) The reference by G4EGH to balanced 55-0-55V 110V supplies normally applies only to portable tools in the UK fed from step-down transformers. In the USA normally three wires are brought into a house: a common earth-neutral combined wire and two phases 180° apart, each having a potential of 110–120V to earth. While 110V is used for most domestic purposes, high-wattage appliances such as cookers, transmitters and linear amplifiers may be fed the full 220–240V (Heathkit in the USA supply double-pole fused unpolarized plugs for such equipment).

(3) In the UK the common use of 100A BS88 mains fuses makes it necessary to use plug or socket fuses of the appropriate rating. A BS1362 13A fuse will carry 25A long enough to heat the insulation and cause the clips to become hot enough to burn the skin and to anneal the metal contacts. (In *Television* magazine May 1979, it is noted that 13A plugs and sockets, when expected to carry a continuous load of, say, 12A, tend to heat up and "start cooking", suggesting that the British Standards specification needs tightening).

(4) UK supplies are nominally 240V ±6 per cent, and in practice the variation may be greater; for example, in rural areas with small pole-mounted transformers and no auto-tap-changing equipment, supplies may exceed 250V, apart from the even higher transients. There are variations in different parts of the world which are not always reflected in official publications, and it is not uncommon to find misleading "faceplates" fitted to some appliances and transformers.

(5) G8CVR also notes the use of instruments and tools (eg cro, soldering iron etc) with the earth wires deliberately removed in an effort to make earth-free areas.

While I fully agree with G8CVR about the importance of this subject, and particularly of amateurs being aware of the

potential dangers, I admit to not being above reproach in my own activities. In 1966 I confessed in *TT* to having been responsible for a family cat suffering severe electrical shock (not due to amateur equipment). At my place of work I am issued with a formidable 66-page book of "Safety Regulations" and have to certify that I have read it, even though my working tools comprise a battery-operated tape recorder and an electric typewriter (to be fair the regulations apply equally to colleagues who have to delve into 40kW transmitters or climb 1,000ft masts). I know that if I were to attempt to apply these rules in every respect at home, G3VA would be permanently off the air. Possibly the best we, as amateurs, can do is to try to make sure that personal hazards are kept to a reasonable and acceptable minimum; that they do not put other people or pets in danger; that they are not caused or concealed by ignorance or unthinking carelessness; and that equipment suppliers are left in no doubt that we expect the equipment they sell us to meet official safety recommendations. In the case of the single-pole on-off switch, remember that it is possible to remove most of the shock and fire hazard very simply by routing the mains supply to *all* equipment through a heavy-duty double-pole switch and then always using this as the station on-off switch.

Above all remember that there is no such thing as a "safe" mains supply: even the 32V mains supplies in some American farm areas have been known to prove lethal. It is all a question of contact area, skin resistance and whether the current flows through the heart, etc.

Resistor-type spark plugs

The note from Alex Gordon, G8FYO, about spark plugs with built-in suppressors (*TT* March 1979, p237) has attracted several follow-up comments. Leyson Groucott, GW3YTJ, for instance confirms that his dealer initially advised him against their use on a 1965 BMC 1100, and it was only when GW3YTJ, forewarned by G8FYO's comments, queried this advice that the mechanic was consulted and confirmed that no problems were likely to arise. Since fitting RN9Y5 plugs the interference has been considerably reduced.

B. M. Flack, ON8UK/G4AMP, writing from Champion Spark Plug Europe SA in Belgium, confirms that resistor-type plugs are available in all the popular heat ranges and that there really should be very little difficulty in obtaining them, although there is probably a better chance of finding them through vehicle dealerships than through accessory shops. He notes that quite a few manufacturers are currently fitting them as original equipment to meet the growing popularity of vhf/fm car radios; in some countries, notably the USA, their use is mandatory due to local suppression standards defined either by industrial agreement or law.

He adds: "Resistor plugs are more expensive to manufacture than conventional types, and their fitment will only be standard where it is economically justified by technical requirements. On the other hand it is not true that 'curiously little effort is made to get such plugs into vehicles'. If vehicle makers require them, they will be supplied. It would not be economical to manufacture them for resale only.

"From the technical point of view, the main benefit is that the suppression device is placed as close as possible to the source of the interference (viz the spark gap) so avoiding radiation from that part of the centre electrode which is above the screening of the metal shell.

"For conventional ignition systems the resistive suppressor is usually very effective, but some of the more advanced electronic and high energy capacitor-discharge systems require different treatment. With these systems the resistive element will tend to absorb much of the desired spark energy and negate the benefits of the rapid ignition pulse rise time.

"Recently some special plugs have been introduced for some specific marine outboard applications using very powerful ignition systems, and these have a low resistance inductive suppressor mounted inside the insulator. In the Champion range, spark plugs containing a resistive element have an 'R' prefix, such as RN-9Y, while those having an inductive suppressor are identified by a 'Q' prefix, such as the QL-77J4.

"An interesting booklet covering vehicle interference suppression, *Giving Two-Way Radio its Voice,* is published by Champion, and a copy may be obtained by writing to: Champion Spark Plug Co Ltd, Technical Service Department, PO Box 7, Great South West Road, Feltham, Middlesex TW14 0PN, or from world-wide Champion offices."

The booklet includes information on noise-suppression fundamentals, preliminary procedures, methods of locating the sources of interference, and techniques for solving noise problems, including tips for good marine reception.

Ferrite-clad mini-antennas

In *TT,* back in September 1974 (pp602-3) attention was drawn to work then being carried out at the Royal Military College of Science on dielectric loading of antennas using ceramic (ferrite) powders. The aim was to reduce substantially the height of quarter-wave hf and vhf whips and monopoles.

Dick Biddulph, G8DPS, has now drawn attention to a recent *Interlab* bulletin (No 29) issued by the Department of Industry and based on this patented work by Professor J. R. James and Dr A. Henderson. This confirms that a thin cladding of ferrite material can be as effective as a thicker cladding of pure dielectric material in reducing the height of such antennas and offers the additional advantage of increased input impedance. It is indicated that with suitable ferrites a height reduction of no less than 7 or 8 times can be achieved. The ferrite cladding can be a coating formed *in situ* on the antenna tubing or can be achieved by sliding ferrite beads on to the conductor. One end of the antenna can be left bare to permit final trimming to a desired resonant frequency; additional support and protection can be provided by a sheath of insulating material.

Input impedances are appreciably higher than those generally associated with dielectric-clad antennas, and this can be further increased by feeding the monopole at an intermediate point along its length rather than its base, facilitating the design of matching arrangements.

Practical considerations put limits of 5 to 100MHz on the use of this technique, but the idea of an effective 7MHz vertical monopole only about 4 to 5ft in length is clearly attractive; less clear at the moment is what would be the cost and whether there would be a power limitation imposed by the ferrite material. These points are not made clear in the bulletin, which is intended to bring this work to the notice of manufacturers with a view to their taking out licences from NRDC.

It is pointed out that "Although the major application of ferrite cladding is expected to be in monopole whip antennas, it may well prove useful in other antenna configurations such as dipoles, Yagi arrays or wire-grid wideband structures, perhaps with different elements clad in different materials". □

4-2-70

Graham Knight, GM8FFX*

Transequatorial studies

Readers of *4-2-70* will by now have become familiar with the name TESSA and associate it with the TransEquatorial Study Group of South Africa; *4-2-70* (May 1979) having already detailed the success of the Dave Larsen, ZS6DN, and Fred Anderson, ZS6PW, experiments on the 144MHz band. These tests have demonstrated that 144MHz signals are, on occasions, propagated between stations located north and south of the Equator and approximately on the same longitude. Contacts have been established between stations over 7,000km apart and almost equidistant from the geomagnetic equator. The Tessa propagation study group is at present continuing its investigation of this phenomenon with the following goals in mind:

(1). To determine whether there is an optimum area in the north for each location in the south and vice versa.

(2). Should (1) prove to be correct, to determine how departure from these optimum areas affects signal strength, duration of the openings, and times and dates of occurrences.

(3). To endeavour to obtain a model of the ray path followed by the 144MHz signal, compared with that followed by a 28MHz signal which is, presumably, being propagated along the more well-known ionospheric hop systems.

In order to implement the third objective it is necessary to find the length of the propagation path on 144MHz compared with that on 28MHz. For this purpose an experiment has been started in which the 28MHz and 144MHz transmissions from the beacon ZS6DN are keyed (A1) by a pulse series, the pulses of rf produced by the two transmitters being arranged to have the same shape, duration and repetition frequency and to occur precisely at the same moment. The outputs of the 28MHz receiver and the 144MHz receiver in the northern hemisphere will then be displayed simultaneously on an oscilloscope in order to determine whether the time delay on 144MHz differs from the time delay on 28MHz over this 7,000km propagation path.

In view of the recent reception of the signals of ZE2JV in Salisbury, who was transmitting on 432MHz, by SV1DH in Athens (see *4-2-70* June 1979), it has been decided to carry the experiment described above one step further and to couple a third transmitter on the 432MHz band to the pulsing system.

It should be noted that the beacon callsign ZS6DN is keyed automatically once every 18s, the pulsing then follows for 10s. This cycle is repeated indefinitely during the operational periods, which are from 0600gmt to 1100gmt and from 1600 until 2100gmt every day. The pulses are suitably shaped to ensure that no clicks are radiated, and therefore the minimum bandwidth is occupied by this experimental beacon transmission.

By arrangement with the observers in the north, the following frequencies are being used: 28·315, 144·130 and 432·460MHz, all with the callsign ZS6DN. The rf power output of each transmitter is approximately 100W. All the antennas are directed due north, with horizontal polarization, and have gains with respect to a dipole of 10dB on 28MHz, 19dB on 144MHz, and 23dB on 432MHz.

A great deal of scientific interest has been expressed throughout the world in the results of amateur transequatorial experiments. The very detailed reports which have been published in these pages are due to amateurs like ZS6PW, ZS6DN, YV5ZZ and 5B4WR taking time to send the results of their experiments to *4-2-70*. Judging from correspondence, these te reports have interested many professionals and amateurs; one scientific observer in Yokohama, Japan, has written to say that *Radio Communication* has recorded more dates on which te propagation occurred than any other journal—this is praise indeed, but the thanks are due to the above correspondents. We wish Fred Anderson, ZS6PW, and Dave Larsen, ZS6DN, success with their new experiments and look forward to detailing the results in future issues of *Radio Communication*.

New—*International VHF-FM Guide*

The new enlarged 1979 edition of the *International VHF*-FM Guide is now available, and the publishers, Julian Baldwin, G3UHK, and Kris Partridge, G8AUU, have kindly sent a copy to *4-2-70*. This edition is 25 per cent larger than the previous one, which sold several thousand copies. Compiling this guide is very much a labour of love for G3UHK and G8AUU, and they are to be congratulated for their painstaking research which has produced the only booklet in Europe which is comparable with the ARRL *Repeater Directory*. The American book lists the 3,000 plus repeaters in that country, but wisely the British guide leaves them out. The G8AUU/G3UHK guide gives the details of more than 800 repeaters in the following countries: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Holland, Italy, New Zealand, Norway, Portugal, South Africa, Spain, Sweden, Switzerland and the UK. For each country there is a map showing the location of the repeaters, and this is followed by a table of that country's repeaters listed by callsign, and giving channel number, QTH locator, height above sea level, power output and time-out details. Notes are also included about each country's popular simplex frequencies, reciprocal licensing arrangements, and any special customs formalities to be observed by someone taking a rig with them on a holiday or dxpedition.

Thirty-four pages are devoted to the UK repeaters, and each of the operational vhf repeaters has a whole page of information about it. A coverage map is provided for each unit, and the very comprehensive information details, site, power, antennas, logic control and, probably the most important, the address to which users can send contributions to assist in the cost of keeping the repeater on the air. All the UK 433MHz repeaters are listed, and it is interesting to note that 22 units have no time-out and that two time-out in 30min!

The book is an absolute mine of information for the fm operator, and your scribe is full of praise for the standard of checking which has obviously gone into the preparation of the 1979 edition. Where else, for example, could one learn that the German repeater DB0VU is located at Nordhelle in QTH square DL69d, is a linear device which accepts input signals around 432·600MHz and translates them to 145·400MHz plus and minus 16kHz.

While searching for the highest repeater listed (at Busto Arsizio—4,500m asl), it was noted that 87 European repeaters are tabulated as operating on channels R8 and R9. These include IR1J on R8 at 3,500m asl and HB9RW on R9 at 2,850m asl, just two of the many Continental repeaters still operating

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in the top 200kHz which are reserved for the satellite service. Several Continental administrations are known to be taking their repeaters off R8 and R9 in accordance with the international agreement made in Hungary last year.

The guide also explains the various fm channels used in the UK, and includes the input and output frequencies for Continental repeaters which have the seemingly perplexing numbers like R87 and RU9. G3UHK and G8AUU acknowledge the help and information given to them by the RSGB and the vhf managers of various countries. No fm operator should be without a copy, obtainable from Julian Baldwin, G3UHK, 41 Castle Drive, Maidenhead, Berkshire SL6 6DB, England. The guide is produced on a non-profit-making basis and costs £1.15 by post to UK addresses, 12 ircs or $2.50 to addresses in Europe, and 16 ircs or $3.50 for airmail post to any other country.

70MHz expedition—schedules wanted

Malcolm Hamilton, G3TAL, made an unannounced trial expedition to Scotland last year and found a good site on the west coast in XP square from which he was able to work as far as Wiltshire under flat band conditions. Hampered by gales and very wet weather conditions, he was unable to make many 70MHz contacts, but this year he is determined to try to work a large number of stations. He will be active from XP square on 29–31 July and 1–3 August 1979 on a frequency of 70·180MHz on cw and ssb. A listening watch will also be kept on 70·2MHz, and both a four-element Yagi and a fixed V-beam will be used at the site. G3TAL is willing to run schedules with any operator interested in working XP square, and he can be contacted by writing to 17 Golden Hind, Hythe, Southampton.

Marc de Munk, ON5FF, still has the 70MHz Magnum 2 transverter he used so successfully last year from Belgium. Now that his group is going to the Isles of Scilly for the meteor scatter contest on 11 August, there is a possibility of 70MHz operation from that area.

The Telford & DARS will be going on a six-county expedition to South Wales during the last week of July. Operation will be on 70·23MHz with the call GW3UKV/P, on 144·330MHz with the call GW8JZH/P, and on 432·230MHz with the call GW8FSV/P. The expedition will be on the air from 1800gmt on each day, or earlier by prior arrangement, and the sequence for the counties is as follows: 26 July, Gwent; 27 July, South Glamorgan; 28 July, Mid Glamorgan; 29 July, West Glamorgan; 30 July, Dyfed; and on 31 July the expedition will close with operation from Powys. Schedules can be arranged by writing to Martyn Vincent, G3UKV, 9 Sleapford, Long Lane, Telford, Shropshire TF6 6HQ, enclosing sae. At the time this issue is received, an expedition led by Gordon Meddings to the Isle of Man should be in full swing. As this takes place during the island's millenium celebrations the callsigns GT4DGM and GT3TTF will be used and operation will be on 144·245MHz and 432·225MHz. The operators will also be on 7·053MHz and 14·130MHz during the day, and schedules for 144 or 432MHz contacts can be made on the lower bands.

Australia to Japan on 144MHz fm

Last month's late news recorded that VK8EW had worked JR6LHX on 144MHz. News has now come in direct from Lynn Woodward, VK8EW, who also has the UK callsign G4ETT, that she worked the station in Japan on 145·160MHz fm. Lynn's husband, VK8HW, UK callsign G4EGT, also worked JR6LHX on fm and S9 reports were exchanged both ways. At around the same time VK8GB and VK8VV worked from near Darwin to Japan, but it is believed to be the first time a yl operator has made a contact outside Australia on the 144MHz band. Although contacts between Australia and Japan have been fairly common on 50MHz, these very long distance contacts on 144MHz are unusual, and international vhf fm contacts are certainly exceptional. Lynn wonders if it is the longest yl 144MHz contact ever?

Oil rig active on 144MHz

To commemorate the production of the first oil from the world's biggest oil producing platform, the Ninian Central Field, the Home Office granted a special licence with the call GB2NCP. The field is positioned at 60·51·26N and 01·28·08E, approximately 150 miles east of the Shetland Islands—certainly in a QTH square which has not been activated before!

Two of the Ninian's radio operators are licensed amateurs, and Tony Rigby, G8MPT, has taken fm equipment out to the platform and arranged the erection of a four-element antenna 200ft asl. The other operator, Les Anderson, GM3ZXH, borrowed GM8FFX's Magnum 2 transverter to use with his own FT101 transceiver.

Oil rig not active on 144MHz

Following the item on oil field operation in *4-2-70* (May 1979), Gordon Mitchell, G4AIQ, a radio technician on the Conoco Viking gas platform which is located in the BN QTH square, reported that he recently enquired at the Home Office whether he should sign /A or /MM. He made the enquiry because his platform is theoretically a ship and is issued with a four-letter callsign in the normal marine series.

However, the reply from the Home Office stated that they only issued authority for amateur operation in special circumstances—the operation by GB2BP from Forties and by GB2NCP from Ninian are examples. The letter goes on to state that the British authorities do not intend to allow offshore platforms to set up amateur stations on a permanent basis. G4AIQ had hoped the Home Office would allow him to use a low-power 3W Icom IC202 ssb/cw transceiver from the platform. He hopes that the powers-that-be may reconsider their decision following the operation by GB2NCP. As there is no where else to go during time off, G4AIQ pursues his interest in vhf radio by logging Band 1 and 3 television stations from all over Europe. He also hopes to take a 144MHz receive converter out to the platform, and he will be sending reports of stations he hears to *4-2-70*.

GB3VHF on the air again

Brian Bower, G3COJ, the beacon keeper at GB3VHF, has put the beacon on the air again, but on the new frequency of 144·925MHz. The beacon has an erp of 50W, and UR1 coaxial cable feeds the five-element Yagi which beams north-west from QTH square AL52j. GB3VHF is now using the G4BAU-built, Z80 based, microprocessor keyer, details of which were published in *4-2-70* (February 1979).

The frequency of GB3GI, the Northern Ireland beacon, is due to change from 144·1375MHz to 144·945MHz in the near future. This is to comply with the agreement made in Hungary to move beacons out of the lower end of the 144MHz band.

50MHz openings

Brian Bower, G3COJ, and the other 50MHz watchers found May to be a disappointing month for beacon signals. GM5CSY, at Inverbervie, has put up a 50MHz antenna in anticipation of crossband contacts to 28MHz in the autumn, and has meantime been using his Microwave Modules converter to monitor Swedish television signals during auroral openings.

Conditions have been quite different in other parts of the world, with many contacts taking place between Japan and Australia.

Well-known 50MHz operator and RSGB member Ken Price, XE1TIS, has kindly sent a long telex with news of band conditions in Mexico. Ken reports that the 50MHz band has been really fantastic for the last few weeks, with signals coming in from the USA on a daily basis. Other long-distance contacts include LU8DIN in Argentina, and several contacts with stations in Chile. Conditions have been so good in Mexico that contacts between XE and W have been continuing until after 0200 local time. It will be most interesting to see whether EI2W can work XE1TIS later this year; he last worked Mexico on 50MHz in 1958.

Benbecula activity on fm and ssb

Last month's *4-2-70* gave details of Nigel Sedgwick's trips to St Kilda when he activated the extremely rare QTH square of VR18g. GM4HDL's visits are to continue throughout the summer, and already a growing number of 144MHz operators have added VR to their QTH squares totals. Barry Titmarsh, G8SAU, has been causing similar excitement among the squares hunters, as he is now active from Benbecula in the Outer Hebrides in QTH locator WR44b. GM8SAU runs 180W to an 8-over-8-el slot-fed Yagi, often operating around 144·260MHz with frequent checks on 144·300MHz—the ssb calling frequency. GM8SAU also has a separate rig monitoring 145·500MHz (S20) and he reports that he has already worked a surprising number of amateurs who holiday in the area. GM8SAU is willing to keep schedules with stations who want to work WR square, and he can be contacted by writing to Barry Titmarsh, Sergeants' Mess, RAF Range, Benbecula, Outer Hebrides, Scotland.

Calling frequency for a.m.

The VHF Committee's recent proposal to have an a.m. calling frequency on 144·550MHz seems to have met with initial popular support. In order to make a more accurate assessment of the wishes of those interested in amplitude modulation operation, comments would be appreciated by letter to the VHF Committee chairman, Tom Douglas, G3BA, 141 Russell Bank Road, Four Oaks, Sutton Coldfield.

Tropo openings

There were a number of good 144MHz tropospheric openings from the UK to the Continent during May. The best openings occurred over the period 11 to 14 May during which time stations in Devon, Cornwall and South Wales were able to contact many Spanish stations. Reg Wooley, RS39137, in South Glamorgan, heard EA1CV, EA1QJ and EA1TA in far away QTH square VD58b. RS39137 also copied strong signals from F1LL/P in IE square and F1CRP/P in XH. Mike Lee, G3VYF, at Basildon in Essex, worked many stations in the same lift, the best being F1BUD (ZE18j), F1ADT (ZE40a), F1BUU (ZE08a), F9FL (AD71b), F1ETM/P (BE11a), F1EBL/P (AF34h) and F1KBF/P (BF21j), all of whom are located in the south of France, and HB9AMH/P in DH66c. This burst of activity on 144MHz brings G3VYF's score to 16 countries and 62 QTH squares since 1 January 1979.

Members who had long-distance contacts during the above period are asked to submit copies of their logs to the Propagation Studies Committee at RSGB HQ. By coincidence, very extensive meteorological data have been made available to the committee for this interesting dx period, and the data combined with the logs would give the committee the opportunity to study this opening in considerable detail. A quick look at the meteorological data shows that the boundary layer was just under 1km above the ground and extended from the west coast of Ireland right across the Continent.

There were several other less extensive openings, usually associated with high pressure systems to the east of the UK, during May. During these lifts many Continental repeaters were heard, and stations in Scotland who cannot work each other through GB3GN, due to the terrain, were able to have contacts via the Norwegian repeater LA5SR. During the exceptional lift conditions GB3CF and GB3MP were received near Aberdeen.

Sporadic-E reports

The first European sporadic-E opening of 1979 occurred in April when stations in France were able to work 9H1CD, but the first Es opening to affect conditions in the UK did not come until 11 May. On that day Geoff Brown, GJ4ICD, worked 9H1CD in Malta on ssb, and GM4DSZ in Aberdeen watched Spanish television on Ch2. A much more extensive Es opening occurred on 21 May between 1700gmt and 1830gmt, and during this time many UK stations heard, and some contacted, stations as far away as Greece. Geoff Brown, GJ4ICD, contacted 20 stations, including 16 in Yugoslavia and two in the south of France. Jeremy Butt, G8OYW, in Stowmarket, used just 6W of ssb from his location in AM65l square to work YU5XEX (WB59l).

Undoubtedly the star of this opening was SV2JT, who is located in north-west Greece in square LA26c. Many stations report hearing and calling this station, with Mike Lee, G3VYF, and John Quarmby, G3XDY, being among the lucky operators who managed to complete a two-way QSO with Greece. G3VYF also worked YU5XEX, YU4VIP (JD12c), YU6NGS (JC47g) on ssb, and on cw he contacted LZ1AG in MC64e—not too far from Istanbul!

SWL Kevin Jackson from Leeds reports that he was listening to EA3ADW on the 14·340MHz vhf net when he mentioned that stations in the Canary Islands (EA8) had reported hearing G stations during last year's Es openings. They were using low power then but are now active with higher power and are to be on the lookout for UK stations during this 1979 sporadic-E season.

Improvements to GB3WHA

The West Kent Beacon, GB3WHA, which is located in AL71d, has had another 8-over-8 Yagi added to the system. The first antenna is still beaming to the north-west, and the additional Yagi beams the beacon signals to the Continent. It is intended mainly for reception by stations on the Continent, and it will give them a most useful indicator of good uhf conditions. GB3WHA's keying is F1 and it operates on 432·810MHz. GB3SX is the callsign of the co-sited 70·685MHz beacon.

IARU Region 1 vhf records

Folke Rasvall, SM5AGM, the IARU Region 1 dx record co-ordinator has sent *4-2-70* the following official list of vhf records as they stood at 31 December 1978.

Propagation mode	Stations and QTH squares	Mode	Date	Km
	144MHz			
Tropo	9H1CD (HV03e)—4X1OJW (RR07f)	FM	27/5/77	1,964
Aurora	G3CHN (YK61b)—UP2BBC (LP07d)	CW	26/3/76	1,915
MS	GW4CQT (YL25d)—UW6MA (TH69c)	CW	12/8/77	3,099
Spor-E	DL7LJ/P (GI18d)—UD6AFO (XA)	A.M.	20/4/69	2,722
TE	SV1AB (LY79d)—ZE2JV	CW/FSK	12/4/78	6,227
EME	SM7BAE (GP26d)—ZL1AZR	CW	4/3/69	17,525
	432MHz			
Tropo	F8MM (AI10e)—SM5LE (JT51j)	SSB	28/10/75	1,563
and	GD8EXI (XO)—OE3HJW (HH17f)	SSB	15/10/77	1,563
Aurora	SM5CUI (IT09b)—UA3ACY (SP28j)	CW	9/11/75	1,260
MS	SK6AB (FR30c)—SM2AID (LZ32h)	CW	12/8/77	1,033
EME	G3LTF (AL)—VK2AMW	CW/SSB	26/3/77	16,983

SM5AGM requests that readers of *4-2-70* check the above information and send any corrections or details of records made in 1979 to Jack Hum, G5UM, who collates the Society's records and forwards updates to IARU. Before a record can be claimed it is essential that QSL cards have been exchanged.

Moonbounce

There has been a tremendous upsurge in activity in the bottom 10kHz of both the 144MHz and 432MHz bands. The number of eme stations in Europe is growing rapidly, and a number of stations are interested enough to put up experimental arrays for moonbounce reception. Antennas for eme vary from four 432MHz Yagis in the average-sized council house garden to larger arrays like F0MD's recently installed system with 16 of the Tonna nine-element 144MHz Yagis. Viewers of the recent BBC TV "Nationwide" programme on amateur radio will have seen pictures of the huge home-built moonbounce antenna system of Dave Price, GW4CQT, and after seeing it readers will not be surprised to know that he did very well during the recent eme contest.

In the last few weeks GW4CQT has worked the following by eme: K1WHS, WA1JXN, WA4GPM, K5GW, K5BMG, W6PO, W7FN, W7FU, K9KFR, W0SD, DK5LA, DK1FGA, I2MBC, SM7BAE, VE7BQH and G4DZU. The contact with Canada was a new country for GW4CQT, and he was very surprised to hear VE7BQH replying to a CQ call as he thought that there was no eme activity on 144MHz from Canada.

Douglas Parker, G4DZU, near Leeds has a 144MHz array of four 14-el Jaybeam Parabeams mounted on a 60ft tower with an azimuth and elevation mount, all fed with a feeder cable which has a loss of only 0·5dB for the complete run from the shack to the antenna. Contacts on 144MHz eme during the last few weeks include JA6DR, SM7BAE, K1WHS, W7FN, DK5LA, WA7BJU, N0JA, K4GL, W0SD, K4PKV, WA4MVI and W6PO. G4DZU's most recent achievement was to exchange 5 and 4 reports with VK5MC in Australia. This contact took place at 0400gmt on 21 May 1979, and is only the second eme 144MHz contact between the UK and Australia—the only previous QSO being the one which completed GW4CQT's WAC Award.

A group of six Oxford amateurs (G8RHI, G8LYB, G4GFX, G4EZN, G3YGF and G3WDG) took advantage of the ARRL eme contest to erect and test an array consisting of four Tonna 16-el Yagis fed by FHJ4 coaxial cable. They heard DK1FGA, SM7BAE, K1WHS, K2UYH and K3NSS, using this antenna with an SD306 preamplifier. The group was quite pleased with the array and was able to measure 6dB of sun noise with the system. G3WDG and G3YGF, who have considerable experience of eme reception on 432MHz, were surprised by the completely different sound of the signals on 144MHz.

They noticed that the libration fading is much less noticeable on the lower band, and the audio filter seemed less necessary as the signals, although weak, were more readable than on 432MHz. The group hopes to erect the antenna again later in the year and carry out further reception tests.

Charles Suckling, G3WDG, and Julian Gannaway, G3YGF, also made several contacts during the eme contest on the 432MHz band using the dish antenna system previously described in *4-2-70*. Their best contacts were with DL9KR, YU2RGC and ZE5JJ, whom they also worked during the previous half of the ARRL contest. New stations worked were SM3AKW, YV5ZZ and UK2BAS. This was UK2BAS's second moonbounce QSO—his first had been with K2UYH about a week earlier. It is believed that this is the first G to USSR 432MHz QSO. G3WDG reports that UK2BAS had a good signal, up to 6dB above noise in a receiver with 500Hz bandwidth. UK2BAS is running 1kW into an antenna system of 72 four-element Yagis, and has a receiver with a 1·8dB noise figure. He is located in LP07j, and is certainly the first station in the USSR on eme, and he collaborates with UP2BBC who built most of the equipment. UK2BAS did extremely well during the ARRL contest, ending up with a total of eight contacts on 432MHz.

Television dx

Many vhf operators are also avid television dxers, and a number of letters have been sent to *4-2-70* recently detailing how amateurs use long-distance television signals as a guide to vhf conditions. Some, like John Branegan, GM8OXQ, at Saline in Fife, use a modified television set and a vhf coverage Eddystone 770R receiver, in conjunction with a rotatable log periodic antenna, to monitor the muf. By careful checking of the various transmissions above 30MHz it is possible to get warnings of the days on which the 50MHz band will be open to the west or to the south. GM8OXQ finds the period 0830 to 1430gmt best for the R1 (49·75MHz) Asiatic Russia television channel. During the days in February when UK stations were working to America crossband on 50MHz, GM8OXQ was receiving television signals from Icelandic television on ChE2 (48·25MHz).

Kevin Jackson, in Leeds, is another reader who combines television dxing with listening on the 144MHz band. His log for the February period when the 50MHz band was open in the afternoons to W signals is most interesting. On the mornings of the days that G3COJ and the others were working American 50MHz stations, Kevin was receiving television signals on 49·25MHz from a Russian station located at Baku near the Caspian Sea. On 11 February Russian television signals were logged up to ChR2 which is 59·25MHz. These signals from Russia were logged on many days in February, and the distance into Russia can be judged by the time difference—five to seven hours ahead of gmt.

Gordon Smith, GM4DSZ, uses the RTVE signals from Spain on 49·75MHz as a guide to sporadic-E conditions. He had about one hour's warning of the Es opening on 21 May, and noticed another opening to Spain on the following evening between 2000gmt and 2300gmt. GM4DSZ and GM8NCM both noticed Russian television signals around noon on 18 May, and they frequently use the Swedish television signals as auroral indicators. As the auroral reports indicate, Kevin Jackson

also uses the Northern television signals as a guide to auroral reception.

Roger Bunney, RS41463, of Romsey in Hampshire, who is well known as the *DX-TV* columnist in *Television* magazine, has written to *4-2-70* following remarks made in these pages about the possibility of television reception in Australia. Roger confirms that Anthony Mann, in Perth, Australia, received signals from the UK on 13 and 14 October 1978. Sound and video were received, and French television sound on 41·25MHz was also heard. Roger Bunney also sent information that television signals from Malaya, and even China, have been reported to him recently.

From the above reports it is seen that television signals can be reliable indicators of various forms of vhf propagation anomalies. With hindsight, it looks as if crossband enthusiasts could have worked into the Far East by listening on the 50MHz band at 0800gmt. After all, the Canadian and American stations were working east to Europe at 0800 local, and perhaps we could hear 50MHz amateur signals to the east in the mornings.

Auroral reports

The most recent radio auroras occurred on 1, 2, 3, 4, 5, 7, 22, 25, 28 and 29 April and on 3, 11, 12, 19, 20, 21, 22 and 25 May 1979. Most of the auroras in May were fairly weak events, with some only being noticed on the Norwegian and Swedish television carriers on the 50MHz band. Listeners to GB2RS who heard the warning, five days in advance, were ready for the best event of the month, which started at 1700gmt on 25 May and lasted until 1850gmt. This aurora started strangely, with several Scottish stations getting quite strong signals from the German beacon DL0PR on 144·910MHz when they beamed north-west at about 350°. No auroral signals could be heard on any heading east of north, and it was noted that no signals were

A vhf visit to VK-land

by JACK HUM, G5UM*

WHEN a cablegram arrived from Melbourne inviting the author to address the annual Federal Convention of the Wireless Institute of Australia, if he should be in the vicinity of Melbourne, the swift reply was an emphatic "Yes! I feel honoured to be asked". Attending the WIA Convention was the highlight of an 11-week vacation in VK and ZL that offered many opportunities to hear and see (quite literally, for an amateur tv contact was laid on during one visit) the Antipodean vhf scene at first hand.

Upon arrival in Melbourne his first duty was to get in touch with Bob Arnold, VK3ZBB, to be briefed on what would be required of him. Bob, a former Leicester man, and a visitor to the ARRA exhibitions and meetings of the Leicestershire VHF Group when his visits to the UK coincide, is well versed in the current vhf scene in Australasia. From him it was learned that of the 10,000 amateur licensees in Australia some 6,500 belong to the WIA; very much in line with the situation in other countries of the world, where about one-third of the amateur population seems to be inactive but after a while joins up with the national society.

The Wireless Institute of Australia (incidentally one of the oldest amateur radio organizations in the world) is structured on federal lines, with its headquarters in Melbourne, to which accessibility from all the other state capitals is good. Peter Dodd, VK3CIF, is in charge of the WIA federal office, and divisional centres in each of the state capitals report to it. Some of the divisions sponsor amateur stations in city centres in prominent public viewing localities, eg the station in Sydney's Museum of Applied Arts and Sciences, and Melbourne's amateur radio station in the city centre Science Museum.

No visitor to VK-land can ignore the existence of citizens' band operation. Not only is there a lush colour magazine devoted to it, but advertisements in the public press openly offer cb rigs for sale to the general public. A large proportion of the 120,000 cb licensees (the licence costs 25 dollars a year) operate in the 27MHz band, cause tvi, and as a result of unruly behaviour on the air have given rise to public objections to an apparent lack of policing of cb activity—a situation not unknown in other countries. With the adoption of 40 channels around 480MHz there are hopes that the cb image will improve. One positive reaction from the cb movement has been an increase in the membership growth rate of the WIA: many cb operators have, as it were, seen the light and become *real* radio transmitting amateurs.

Membership, plus a hundred and one other matters, are discussed at the annual Federal Convention of the WIA, held this year in Melbourne over a period of three days. Attended by delegates from each division (prefix area), some of whom travel more than 1,000 miles to get there, it approximates to an RSGB Council meeting held once a year. The agenda, built from submissions and resolutions from the divisions, is substantial: the author counted over 70 documents in it. Hence the need for a three day meeting-session, not forgetting the dinner on the Sunday evening, when the MPT minister was the guest of honour.

The agenda contained submissions from many specialist groups, and it was the vhf/uhf one of these that interested the author in particular. Because WARC matters quite naturally preoccupied the delegates for most of the Saturday session, it was not until late afternoon that the report of the VHF Advisory Committee reached the top of the agenda.

After this had been considered the author was invited to paint a brief picture of the vhf scene in the UK. This afforded him the opportunity to tell how the various vhf/uhf awards schemes worked in the UK; how the repeater chain was proliferating, how band planning had metamorphised from a geographical concept to a planning-by-mode one, and what a pity it was that the UK did not have the 144 to 148 and 52MHz areas enjoyed by the VK men.

What appeared to be of special interest to the WIA delegates was the description of the manner in which television broadcasting in the UK had swung almost completely to uhf, a situation which has not yet occurred in the Antipodes, to the regret of the amateur fraternity. They feel there are sound social and engineering reasons why video in Australia should be on an internationally accepted uhf tv allocation rather than in its present vhf area: here a fully developed colour tv service is in operation uncomfortably close to the 144 and 52MHz bands.

Australian vhf practice offers many parallels with the UK, such as an excellent repeater chain using callsigns that are self-evident and always include the letter "R", eg VK3RGL for the repeater at Geelong (on 432MHz, send and receive are 5MHz apart, with output high, quite different from UK practice). In respect of licensing procedure the nearest equivalent to the British Class B licence is the Technician class, vhf only using three-letter callsigns in the Z and Y range, such as VK3ZBB. Most holders are people technically well versed to develop the vhf, uhf and microwave spectra to the maximum extent.

There is, in addition, a Novice licence with a distinctive "N" in its three-letter callsign structure, eg VK6NAA. Restricted operation in the lower frequency bands is permitted, and there is a 5w/min morse requirement. Many Novice licensees aspire to the full ticket asap.

When surveying the Australian vhf scene, one always comes up against "the tyranny of distance", as one author has put it. Beyond the great conurbations the population is sparse, amateurs thin on the ground, and one's nearest likely contact so distant as to suggest the use of hf rather than vhf with which to talk to him. It is in each metropolis that things are different: Greater Melbourne, with its thriving industry and lush hinterland, supports a population of around 2·5 million, thousands of transmitting amateurs and numerous radio clubs. The Eastern & Mountain Club, at which the author was invited to speak, has over 400 members and a typical Friday night attendance of 150.

Although the black-box ethic has caught on in Australia just as it has everywhere else, it does not seem to have dimmed the enquiring spirit of the typical Australian vhf/uhf enthusiast, successor to those radio pioneers of half a century ago. They said then, "Let's have a go", and they opened up worldwide communication. The same spirit is there today. □

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heard from the OY beacon. By 1715gmt auroral signals could be heard on a due north beam heading, and contacts took place between Scottish stations. A few minutes later the heading changed to 20° from Aberdeen, and G8IMC (Nottingham), G8LYD (Manchester) and G8OCN (Bognor Regis) were all outstanding auroral signals on ssb. On cw LA3WU was heard working other Scandinavian stations, but apart from GM4CXP there seemed to be little UK activity on the key. By 1800gmt your scribe could only work GM8DMZ in Ayrshire and, although 5 and 9 reports were exchanged, no other stations could be contacted via the aurora. Beacon signals from DL0PR continued until 1850gmt but, significantly, GB3LER and SK4MPI were not copied during the entire opening.

Gordon Smith, GM4DSZ, monitored another north-westerly aurora on 21 May and copied DL0PR on a 330° heading, from 2000gmt onwards, but again copied no amateur signals. This aurora continued on this heading until after midnight, with no contacts being made by GM4DSZ or the other Scottish stations who were monitoring the event. Kevin Jackson, the television dx enthusiast, received Icelandic television on this evening from 2346 to 0122gmt; these Band 1 television signals were being received by auroral *Es*. Kevin reports that the signals were very strong, with rapid fading but without the hum bar effect normally associated with tv reception via aurora. The pictures were received like a normal *Es* signal except for the speed of the fading and the extreme multiple images present. He reports that frequency modulated sound signals on ChE4 (67·75MHz) were received with very little distortion. Peter Coull, GM8FLU, at Peterhead, reports hearing auroral signals from fm stations in the standard 90MHz broadcast band on the same evening. Further reports on these unusual openings would be welcomed by the IARU auroral co-ordinator, Charlie Newton, G2FKZ, 61 Merriman Road, Blackheath, London.

Late news

There have been several more spectacular sporadic-E openings on the 144MHz band. On 21 May G4ASR in YM77g copied YU6NGS in JC47g and YU4VIP in JD12c during a 30min opening around 1740gmt. On 28 May G4ASR worked I6WJB in HC42j at 1620gmt, G3VZW in London worked IT9ZHA (GX49e) and 9H1BT in HVO3f, with this opening lasting from 1550 to 1625gmt. On 29 May G4HAZ put out a call on the fm calling frequency of 145·500MHz using 10W of fm, and due to another *Es* opening he was answered by I0PQ in Rome (GB13j). The most spectacular 144MHz *Es* dx was worked during yet another opening on 2 June when GM8BVD, using a TS700 barefoot and a Tonna 16-el antenna, worked SV1DH in Greece. Signals were very strong with 5 and 9 reports being exchanged over the 2,836km distance. GM8BVD was really surprised to have a Greek station replying to him as he had not previously worked outside the UK. On the morning of 28 May, the Oxford University eme group completed a QSO with VK5MC on 432MHz to give them Oceania and thus completing WAC; full story next month. At the recent GB3ED AGM Tom Melvin, GM8MJV, offered to collect names of amateurs interested in a repeater for the border area on the east side of Scotland. Much progress with the GB3HI, GB3SS and GB3AS vhf repeater proposals was reported at the June Zone G representatives meeting. Last-minute news—Tim Hordley, GW8BXT, reports hearing a YK1 station on 144·200MHz ssb at 1736gmt on 2 June during an *Es* opening, do any other stations have further details? □

NEW PRODUCT

Farnell type 935 lcd multimeter

Designed primarily for field use, the 935 is a full-function, 3½ digit dmm with 0·1 per cent basic accuracy. It has 29 ranges for dc or ac voltage, and current and resistance measurements, including both high and low resistance excitation. Ranges, functions and ohms ranges are selected by using push-button switches designed to permit single-handed operation using left or right hand, leaving the other hand free for probe use. Measurements, including appropriate polarity sign and decimal points, and a warning indicator for low battery voltage, are displayed on a high-contrast 0·5in-high liquid crystal display.

Specification of the 935 is superior to other comparable field models and to some bench instruments costing much more, claim Farnell. Calibration is guaranteed for one year. Full protection for over-voltage, over-current and high voltage transients is provided. One thousand volts can be applied to any dc voltage range, and 700V rms to any ac range. All dc ranges can withstand greater than 5kV pulses of 1μs duration. All resistance ranges will tolerate 500V rms or dc without damage or loss of accuracy. Current ranges are fuse protected against inadvertent inputs greater than 2A.

A standard 9V alkaline battery (PP9 or equivalent) will power the 935 for over 200 hours continuous use. Battery and over-current fuses are accessible by removing a coin-operated captive screw, and a spare fuse has been provided. An optional ac mains adaptor is available to allow mains operation on the bench. Other optional accessories extend measurement capability to 1,000A, 40kV, rf at 700MHz, and temperature from −60 to +150°C. Its small size, only 3·5 by 6·75 by 1·5in, and light weight, 9·5oz including battery, makes it a "carry anywhere" personal multimeter.

It is priced at £99 excl VAT UK mainland delivered, including test leads, battery, instruction manual, one year guarantee, certificate of conformance to NBS standards and USA factory final QC test report. Further information is available from Farnell International Instruments Ltd, Sandbeck Way, Wetherby, West Yorkshire LS22 4DH.

obituaries

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

Mr F. W. Broomfield, G2FMR
Frank Broomfield died on 23 April, aged 80. He was a keen 3·5MHz operator who, although he had not been very active recently, had many friends on the band.

Mr L. R. Brown, BRS41240
Leonard Brown, who died on 12 March, was a new member of the RSGB. He was a very keen swl, and spent many hours listening around the bands.

Mr J. Meys, PA0AAE
Jacques Meys died on 14 January 1979 at the age of 80. In the late 'twenties and early 'thirties he operated as XU2JM while in China as a missionary. After a long period of inactivity he again went on the air in 1973, while in semi-retirement in Nicaragua, as YN9JMP. In 1977 he returned to the Netherlands and obtained his PA0 callsign.

microwaves

Charles Suckling, G3WDG *

Expedition to GW on 10GHz

The Telford & D ARS is mounting a multiband expedition to Wales at the end of July, and will be taking along equipment for 10GHz. The equipment will be for standard wideband fm on 10,065MHz, and 144·33MHz ssb will be used for talkback. See *4-2-70*, this issue, for dates, times and schedule requests.

G3UKV also hopes to be operational for all the 10GHz Cumulative Contest activity periods, from Brown Clee in Shropshire, using wideband fm equipment.

10GHz activity in the Channel Islands

There is now some 10GHz activity in Jersey, in the form of GJ8KNV and GJ8EZA. GJ8KNV has supplied details of the first GJ-GJ 10GHz contact, which took place recently over a 7km path. Equipment currently in use consists of: 1 and 10mW Gunn transmitters, 1N23 mixer and 20dB horn at GJ8EZA; and a 10mW transmitter into a 20dB horn, and a 1N23 receiver with an 18in dish, at GJ8KNV.

Both stations plan to be active during the summer, and are very keen for contacts with G and F. Schedules can be arranged via GJ8KNV, QTHR.

Beacon news

G3UDA reports that the GB3CLE 1·3GHz beacon is now in operation, but not yet at full power. The beacon is located 1,790ft asl at 14km north-east of Ludlow (YM48H), and is running about 2W output on 1,296·91MHz into two 15/15 slot Yagis beaming at 0° and 135°. Keying is F1. The antennas are well-sited, being 90ft agl, and are fed with FHJ-2 heliax cable. The constructors of this beacon, G3UQH and G8DIR, would be very pleased to receive reception reports.

Following the good news about the progress of the GB3NEW 2·3GHz beacon reported last month, the Microwave Committee was very pleased to receive another 2·3GHz proposal, for a beacon to be located at M.E.L. in Crawley, Sussex. This beacon has been provisionally allocated the callsign GB3MEL, and will consist of a 12W erp transmitter located 100ft agl.

With the increasing activity on 2·3GHz, both in the UK and on the Continent, the emergence of beacons for this band is very welcome indeed. The Microwave Committee is always delighted to receive proposals for new beacons, and in view of the fairly long time it takes to arrange the licensing, it is advisable to submit a proposal as early as possible. Forms can be obtained from the writer, or from G3COJ.

More on the G3JVL loop-Yagi

Following the recent item in this column concerning the possible loss in gain of the G3JVL loop-Yagi antenna with weathering, the writer has received a number of similar reports. One theory put forward is that corrosion between the overlapping ends of the loop elements could cause serious losses, since this is at a current point.

If this were the cause of the problem, a possible cure, suggested by G4DGU, would be to rotate all loops through 90°, so that the joining point of the open ends would be at a voltage point. The loops would then be secured to the boom with a second nut and bolt, through continuous metal. Thus the current points would be uninterrupted, and any poor contact at the overlap would have less effect. Another possibility would be to construct all loops out of brass or copper, for example, which could be soldered at the overlapping point. Electrolytic corrosion between the elements and boom would almost certainly occur, although careful weatherproofing would reduce this. However, such corrosion ought not to affect the gain.

System checking using sun noise

There are several ways in which the performance of a receiving system can be checked out without recourse to professional test equipment. The measurement of receiver noise figure using ground noise was discussed in *Microwaves* (July 1977), but this method tells nothing about the performance of the antenna. Fortunately a very convenient way of checking the overall performance of a system does exist, which is the measurement of sun noise.

The procedure is very simple. The receiving equipment is set up as it would normally be used, and the antenna is pointed at the sun and moved in elevation and azimuth for maximum receiver noise output. The sun should be in a clear region of sky, well clear of buildings, trees etc. The receiver noise output is then noted, and the antenna moved off the sun to point at a clear region of sky. The noise level is then noted again, and the ratio of noise power with the antenna on and off the sun determined.

The receiver noise output power when the antenna is pointing at the sky is proportional to the system noise temperature, T_{sys}, which is the sum of the receiver's own noise, proportional to its noise temperature, T_{rx}, and noise picked up by the antenna, proportional to the effective antenna temperature, T_{ant}. For those not familiar with the concepts of noise temperature, the main point to grasp is that noise temperatures are just a way of expressing noise powers. The receiver noise temperature is related to its noise figure by the formula:

$$\text{Noise figure (dB)} = 10 \log_{10} \frac{T_{rx}}{290} + 1$$

The effective antenna temperature, as stated above, is just a way of expressing the noise power coming out of the antenna. The main contributions to this are pick-up of noise from the "hot" ground behind the antenna, due to spillover from the feed and sidelobes, and the noise coming in from outer space from various sources. It is not possible to estimate exact values for T_{ant}, unfortunately, since it depends on the type of antenna in use and on the particular region of sky being observed. However, if the antenna is moved around to find the quietest region of sky, it will probably be in the range 20° to 60°K. Note that in most cases, T_{ant} is a very small quantity compared with the noise temperature of the receiver, which means that the

Table 1. Values of solar flux for the bands 432MHz to 24GHz, in flux units. 1 flux unit = 10^{-22} Wm^{-2} Hz^{-1}

Frequency	Solar flux	Frequency	Solar flux
432MHz	31	5·6GHz	130
1·3GHz	51	10GHz	270
2·3GHz	65	24GHz	1,000
3·4GHz	80		

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

receiver sensitivity is governed by the receiver itself, external noise not being an important consideration. On the lower microwave bands, however, where receiver noise figures of 1 to 2dB are now possible, the effective antenna temperature may well exceed the receiver's own noise, particularly in terrestrial systems where antennas pointing at the horizon pick up a lot of ground noise.

When the antenna is pointed at the sun, the receiver noise output is then proportional to the sum of two factors, T_{sys}, the total system noise, and T_{sun}, which represents the extra noise due to the presence of the sun in the antenna beam.

The quantity T_{sun} can be determined from the formula:

$$T_{sun} = \frac{F.G.\ \lambda^2}{3{\cdot}468}$$

where F is the solar flux, G is the gain of the antenna in real numbers, and λ is the wavelength in metres.

F varies with frequency, and its values for the amateur bands 432MHz to 24GHz are given in Table 1. The equation is also shown, solved graphically, in Fig 1. This shows T_{sun} as a function of dish diameter for the above bands. The gain of the dish was calculated using the usual formula:

$$G = \frac{4\pi A.\ \eta}{\lambda^2}$$

where A is the area of the aperture of the dish, and η, the efficiency, is taken as 0·5.

As an example, let us calculate the amount of sun noise which one would expect to see on 10GHz using a 10dB noise figure receiver and a 4ft dish. First we need to determine T_{rx}. Using the first formula, this comes out as 2,611°K. Add 30°K as an estimate of T_{ant} to this and we obtain a value of 2,641°K for T_{sys}.

Using Fig 1, T_{sun} for a 4ft dish at 10GHz is 570°K. Thus the noise power from the receiver when pointing at the sky is proportional to 2,641°K, and when pointing at the sun to 2,641 + 570 = 3,211°K. Thus the ratio of the two powers is given by:

$$\text{Power ratio} = \frac{3{,}211}{2{,}641} = 1{\cdot}215, \text{ or } 0{\cdot}85\text{dB}.$$

A point to bear in mind at this stage is that this figure is only correct for a single channel receiver, ie one with a response only to the signal frequency. Very frequently with microwave receivers, there will be responses both at the signal and image frequencies, and twice as much power will be detected from the sun, as it emits broadband noise. In other words, T_{sun} will be twice as great as with a single channel receiver. In the above case, T_{sun} would be equal to 2 × 570 = 1,140°K for a wide-open receiver, giving a sun/sky ratio of:

$$\frac{2{,}641 + 1{,}140}{2{,}641} = 1{\cdot}43, \text{ or } 1{\cdot}55\text{dB}.$$

As is usually the case, the performance of the equipment will not be as good as expected, and a lower figure than that calculated would be observed. The fault could lie in the receiver or antenna, or probably both. This method of measurement will not give an indication of what is wrong, so both parts of the system have to be investigated. An estimate of the receiver noise figure could be made using ground noise, leaving the antenna gain as the only variable. Nevertheless, the factor of interest *is* the overall performance, since it is this which determines how well signals will be received. Any improvements made to the system will immediately show up in increased sun noise.

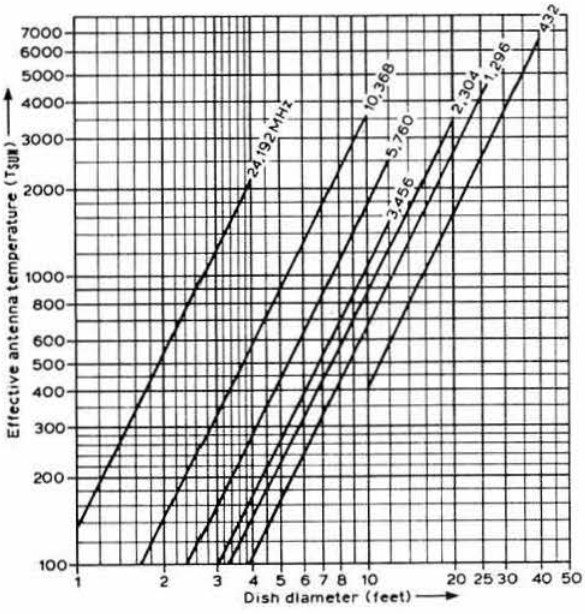


Fig 1. T_{sun} as a function of dish diameter, for the bands 432MHz to 24GHz

One important point to be considered concerns the accuracy of the measurements. The value of the sun/sky noise ratio is very sensitive at low values to the noise figure and antenna gain. Small errors in measurement could lead to large discrepancies in the measured performance of the equipment. Small ratios are best measured using an audio noise meter, such as that described in *Microwaves* (July 1977). The power ratio is then:

$$\text{Power ratio} = 20 \log_{10} \left(\frac{\text{noise voltage with antenna at sun}}{\text{noise voltage with antenna at sky}} \right)$$

Large ratios are better measured by inserting known values of attenuation at i.f. or af when pointing at the sun, to bring the noise level down to the sky value, as monitored on the S-meter or audio noise meter. The value of attenuation needed is then the required ratio (in decibels). The attenuator should ideally be a calibrated variable type, but a range of fixed attenuators could be made according to the design data presented in *Microwaves* (March 1979). If an audio noise meter is being used, ensure that the agc is not acting and that the bfo is on in an a.m. or ssb receiver, or that the receiver is well below limiting in the case of an fm receiver. This ensures operation under reasonably linear conditions.

In the above discussion it has been assumed that the sun emits a constant level of noise. In practice this is not the case, and typically a higher level is observed than that quoted. Except on very rare occasions, the error will not exceed more than a few decibels, the likelihood of the error being large, being less at the higher frequencies. Ideally several measurements should be made on different days, to eliminate the chance of a spurious result. The level is unlikely to change significantly over a period of a few hours, allowing relative measurements to be made with a high degree of confidence. □

the month on the air

John Allaway, G3FKM *

HF oriented readers will already have seen the advance notices of the Society's HF Convention which will take place in Birmingham on 15 September. However, they will not know from these announcements that, besides having the opportunity to take part in a tvi forum, see just how a difficult dxpedition can be mounted, and listen to and question one of Britain's and two of America's leading hf equipment designers, they will also have the privilege at the evening dinner of meeting and listening to the president of IARU, Noel Eaton, VE3CJ, and the general manager of ARRL, Dick Baldwin, W1RU, who will be en route to join the rest of the IARU observer team for its 14-week attendance in Geneva at WARC 1979. Noel will be leading the team, and he and Dick will be giving those present the very latest news on developments affecting the amateur radio service. The convention will, of course, also afford an opportunity to meet old friends and make new ones from others who share the same interests.

G2AGR has passed along the sad news of the passing of VK7JB—a well-known Australian amateur who had many friends in Britain.

DX news

Dontcho and Djulia Papazov have previously operated as LZ0P/MM during four expeditions in the past nine years. They are now starting out on their Plankton-5 expedition on their new Polish-built boat *Dju VI* and hope to go around the world studying the ability of man to survive under extreme conditions.

VE3GCO and other members of the Palmerston & District ARC are using the VC prefix for the whole of 1979 to mark the centennial of Mount Forest, Ontario. Garry has previously used the callsigns 3C3GCO, CG3GCO, XJ3GCO, VF3GCO, CY3GCO, GH3GCO and CF3GCO, and has worked DXCC with each.

An experienced operator is about to start a five-year period of duty on Franz Josef Land, and UK1PAA should be active on 7 and 14MHz cw when he has time to get on the air. The present equipment will only cover these two bands, but it is hoped to be able to operate on other bands and to use ssb later, as well as to improve on the present dipole antenna.

Those looking for *CQ* Zone 23 contacts for WAZ may be interested to know that UA0YT hopes to be on 7 and 3·5MHz soon.

VK4LX was due to go to Saudi Arabia in mid-May, and has asked those who still need QSLs for contacts with him from his various earlier dx locations (which include FW8DY, KH6GLU, KX6BK, VR3DY, VS5AA and 5W1AF) to contact him at the address in "QTH Corner".

As from 30 September there will be no more KZ5 stations in the Panama Canal Zone. It is understood that existing KZ5s will need to take out HP licences.

A9ZEX was the special callsign used at the Middle East Communications Fair, and QSLs should be sent via the Bahrain QSL bureau. The Arabian Christian Net is to be found on or near 14,305kHz from 1600, with 18YCP often in charge. The net attracts a number of rare stations, including A7XAH.

Several new 9N1 calls have been heard recently—besides 9N1BMK (who was JA8BMK), 9N1YU has also been worked and is thought to be a Yugoslav associated with the recent YU mountaineering team which has been climbing Mt Everest.

Many readers will have heard or contacted KH6IJ and will be sorry to hear that he has recently been taken ill. He has lost the use of his right hand and his speech, and it may be some time before his well-known very high performance cw is heard on the bands again.

6O1FG points out that the station using that call on 14MHz cw during March was a pirate. Giampino used ssb only on 14MHz and made all his cw contacts on 21MHz.

CE0AE, on Easter Is, should have a much better signal by now, as the Northern California DX Foundation has provided him with a linear amplifier.

XT2AW is a new operator on the air in the Voltaic Republic. He is reported as being heard on 14,250kHz after 2130. Another new signal from Africa is that belonging to 9U5AN, a Danish doctor who is in Burundi for a year. He has a TH6DXX beam and linear and should have a good signal.

TH8JM has been heard on 14MHz ssb—TH8 is a prefix issued to the Central African Empire (TL8). The operator is called John and he says that he will be there for two years.

JA7JT/JD1 commenced activity from Minami Torishima on 8 May and will remain on the island until August before returning to Ogasawara. He has a TS820 with TA33 beam and dipoles and is to be found on all bands 3·5 to 28MHz.

Torres, CR9AJ, leaves Macao this month and will be returning to Portugal. His new call will be CT1ADP. Another dxer returning to less exotic climes is Bob Geary, 5Z4NH, who is returning to the USA via Greece.

It is believed that QSLs for contacts with K4YT/5R8 are not being accepted for DXCC credit as the activity was not fully authorized.

West Coast DX Bulletin quotes UV3GM as saying that there is a new class of licence available in the USSR. It is morse-code free and its owners will be identified by their EZ prefixes—they will be using low power a.m. Soviet stations are now allowed to use 1·8MHz—power input is not to exceed 10W and the band extends from 1,850–1,875kHz for cw only, with the section 1,875–1,900kHz available to both cw and ssb; 1,900 to 1,950kHz is allowed for cw, ssb and a.m. use.

Erland Belrup, SM7COS, has written to draw readers' attention to the fact that information concerning Morokulien (see May *MOTA*) can be obtained by sending 20p in stamps and a return address label to him at Hjortshog 4540, S-260 34 Morarp, Sweden. Erland asks that ircs should not be sent as he has difficulty in exchanging them. SM7COS has been a member of RSGB for 12 years or so.

The sending out of QSLs for those who worked KP4AM/Desecheo was due to start late last month. ARRL will accept them for DXCC credit after 1 September, and only contacts with Desecheo Is made since 1 March 1979 will be valid for DXCC.

YV5HAM and YV5HQE are both located on Aves Is, YV0,

*10 Knightlow Road, Birmingham B17 8QB.

During the recent Middle East Communications Exhibition, the Amateur Radio Association of Bahrain installed and operated A9ZEK. The station attracted a great deal of attention from the several thousand visitors to MECOM

and are often to be found below 14,200kHz on ssb and conducting their contacts in Spanish.

John Van Lear, VE7IR, is living in Singapore. He will be travelling in SE Asia and may be heard as YB7AAA, HS1AIR, VE7IR/DU1, or possibly from other localities. His home call is 9V1OQ.

CRAG has notified IARU that the callsign TG7AA has never been issued and that the station using that callsign during the CQ WW DX (CW) Contest was a pirate—this during the period 24 to 29 November 1978. TG9AC is also in the same category, and this one had been active for about a year. The real TG9AC does not use cw and is at present abroad.

D'X press notes that PA0CPS, who is being given by A6XCS as his QSL manager, is unknown in the Netherlands. There has been some doubt concerning the legality of A6XCS.

Paul Evans, G4BKI, also known as G4BKI/VP9, and more recently VP9KF, asks for QSLs for his /VP9 contacts to be sent via G4EWU (c/o University of Warwick Amateur Radio Society, Students' Union, Coventry) until 30 June 1979. After that date they should go via G4AMJ, QTHR. Paul's VP9KF cards should be sent to the address in "QTH Corner", where they will be answered by his father, VP9GG (G3DLH).

Stations in Edmonton, Alberta, have been authorized to use the prefix CZ6 during 1979 to mark the city's 75th anniversary.

Duncan Fisken, G3WZD, will be in Singapore from mid-September, and hopes to obtain a 9V call. He has a Swan 700CX, and will use a trap dipole initially but hopes to have a beam later. Anyone wishing to make skeds is invited to write to Duncan before the end of August. His address is QTHR.

International Amateur Radio Beacon Project

The IBP organizer, Alan Taylor, G3DME, has kindly supplied up-to-date information on the 28MHz beacon scene. In the operational Group 1 are the following stations:

28,175kHz	VE3TEN, Ottawa, Canada.
28,200kHz	Common frequency.
28,205kHz	DL0IGI (Mt Predightstuhl near Salzburg). Moves to 28,200kHz between hour and hour +5 min and hour +30 and +35.
28,207·5kHz	N4RD. Englewood, Fla. Non-operational?
28,210kHz	3B8MS. Signal Mount, Mauritius.
28,215kHz	GB3SX. Crowborough.
28,217·5kHz	VK2WI. Sydney, Australia.
28,220kHz	5B4CY. Limassol, Cyprus.
28,225kHz	(Reserved for VE3TEN).
28,230kHz	ZL2MHF. Mt Climie, New Zealand.
28,235kHz	VP9BA. Southampton Parish, Bermuda.
28,245kHz	A9XC. Hamala, Bahrain.
28,247·5kHz	EA2OIZ. (Unofficial beacon).
28,257·5kHz	DK0TE. Konstanz, FR Germany.

In Group 2 (under construction) are the following:

28,212·5kHz	ZD9GI. Gough Is.
28,222·5kHz	HG5. Hungary.
28,237·5kHz	LA5TEN. Oslo, Norway.
28,242·5kHz	ZS1CTB. Cape Town.

In Group 3 (planning stage) are the following:

28,227·5kHz	FX....
28,232·5kHz	VP8....
28,240kHz	PY1....
28,267·5kHz	HB....
28,272·5kHz	TU....
28,275kHz	VE7TEN. Vancouver.
28,277·5kHz	DL.... Hamburg.

Richard Lappin, BRS41172, uses this neat set-up to listen to the dx—mostly on 14, 21 and 28MHz. He has an FRG7, and a 14MHz dipole at 30ft

Dxpeditions

WD6GHZ, on board his sloop *Wild Spirit*, was due to be at Palmyra Is in early July for about one week. He has an Atlas 350XL and trapped-vertical, and should be found around 7,050, 21,110 and 28,110kHz. He will most likely be using the callsign WD6GHZ/KH5.

3D2MD, who has been on Tuvalu as T2T, was due to go to Tonga in mid-May and then continue to the British Phoenix Is.

A group of Canadian amateurs is believed to be planning a visit to Sable Is during July or August.

Colin Thomas, G3PSM, will be in Gibraltar for the two weeks commencing 13 August, using the callsign ZB2BS. Look for his signals 20 to 25kHz inside band margins.

WD6CDU plans to operate from Wake Is, KH9, from 10 to 18 July. He has a TS520S and will have a triband beam as well as a doublet for 7 and 3·5MHz. Frequencies mentioned are 14,280, 21,440 and 28,510kHz, and operation will most likely (and unfortunately) be transceive.

Jacky, F6BBJ, should have been on the air from Rodriguez Is, 3B9, during June. He will be in the Indian Ocean area for some time and is planning a 3B6, St Brandon Is, operation in September.

One of G3DME's recent contacts was with VE7CER on 28MHz. At the time of the contact VE7CER was using a converted cb transmitter running 8W input to a 3-element beam

Welcome

The following overseas amateurs joined the Society during April and May: DA1MJ, DJ6KU, EA3BLQ, EI6CV, HI8FCN, I2RR, JA0PX, JY5US, K3UTQ, LA1TN, OK3YMT, OZ1BWR, OZ7LX, SM4FXR, SM6DUK, VE7ISO, VK2BMD, VK2VDH, WA1JUP, WA1QFY, WA2LQM, WB8VNP, WD9ASU, WD9HDU, ZL1AAT, ZL1TAO, ZL3TFF, 3D6AZ, 5B4BY, 5B4KP, 9M2BS and 9Y4TP.

Contests

Results of the 1978 WAB Contests have been received. In the LF Phone Contest, single-operator, multi-band, G4FQO scored 319,640 points, with G4DRS (285,355) and G3WWX (164,700) following. ON6JG (97,995) and GM4DZX (38,280) also won certificates. In the single-band section G3ABG (3,510) was on 1·8MHz, G4BWP (35,880) on 3·5MHz, and G3EJF (8,405) on 7MHz. Top listeners were BRS34230 (201,880), D. L. Hill (120,080) and BRS38225 (113,240). G4CAR/P won the multi-operator class with 75,640 points. In the LF CW Contest G3ABG (18,880) came first in the multi-band category, with G3EJF (9,800) and G3UQT (5,610). PA0LCE won a certificate with 120 points, and G3TWX with 1,260 in a single-band entry. Readers are reminded that all proceeds from WAB activities (including the sale of WAB books) are donated to RAIBC. Books are available from G4FQO, QTHR, price £2, plus 60p postage (inland) or 80p postage (overseas). Please make cheques payable to the WAB Award account.

The Colombian Contest

0001 14 July to 2359 15 July.

All bands 3·5 to 28MHz. Phone and cw. Single-operator single- or multi-band, and multi-operator multi-band (single transmitter) sections. Exchange RS/T followed by QSO number (starting at 001). Contacts with Colombia count five points, with other American stations three points, with other countries two, and with own country one point. The multiplier is the sum of DXCC countries worked on each band. Certificates will be awarded to the top scorer in each country provided that at least 50 QSOs have been made. Use separate logs for each band and indicate new multipliers. Enclose a summary sheet and signed declaration and post before 30 September 1979 to LCRA Concurso Independencia, Apartado Postal 584, Bogota, Colombia.

Ten-Ten QSO Party

1900 14 July to 1900 15 July.

28MHz only and open to all amateurs, but only members of the Ten-Ten International Net are eligible for awards. Exchanges should consist of call, name, location, and 10-10 number (if any).

The AGCW—DL QRP Contest

1500 21 July to 1500 22 July.

1·8 to 28MHz, cw only. Five classes—(A) Single-operator, less than 3·5W input, (B) Single-operator less than 10W input, (C) Multi-operator less than 10W input, (D) QRO (more than 10W input) and (E) Listeners. Multi-operator stations may operate throughout but others must take a nine-hour break. Exchange consists of RST, QSO number and power input—add "X" if crystal-controlled or "QRO" if appropriate. Contacts with own country count one point, with own continent two points, and with dx outside own continent three points. With crystal-controlled stations points are doubled. The multiplier is one for

Syd Jones, VE6MJ

each country worked and one for each dx contact. Final score is total QSO points on each band multiplied by the sum of the multiplier on that band and then added to the totals from each of the other bands. Note that call areas in JA, PY, VE, VK, W and ZS are counted as multipliers. Special log sheets are available from the contest manager (sae plus two ircs, please). Post entries no later than six weeks after the contest to: S. Harl, Spessertstrasse 80- D-6453 Sellgenstadt, Federal Republic of Germany.

Results of the **1978 SAC Contest** (cw section) show UK scores as follows: **GW3HCL** (25,800 points), **G3SGQ** (16,330), G3XTT (15,972), GW3MPB (7,695), G2GM (6,820), G8DI (5,265) **GM3YBQ** (3,256) and G4FDC (2,336). In the phone class **G4FAM** (30,070), **GM5AXY** (7,564), **GW4DSD/A** (7,200), GM4DZX (7,128), G4CVZ (6,750), G4AEM (5,665), GM4FSA (3,811), GM3YBQ (2,784) and G3NT (1,134) were listed. All were single-operator entries.

Awards

Details of new rules for WIA operating awards have been received. They came into effect on 1 January 1979 and are as follows:

Worked All VK Call Areas Award (WAVKCA)
Heard All VK Call Areas Award (HAVKCA)

Issued to licensed amateurs and listeners who are members of an IARU affiliated national society. Applicants must have proof of confirmation of contact with or reception of a total of 22 VK stations since 1 January 1946. The 22 should be made up as follows: one VK0, one VK1, three VK2s, three VK3s, three VK4s, three VK5s, three VK6s, three VK7s, one VK8 and one VK9. A list of contacts (certified by the awards manager of an IARU member society) plus sufficient ircs for the postage on the certificate, should be sent to the Federal Awards Manager, WIA, Postbox 150, Toorak, Victoria, 3142, Australia.

Romer Diplom International

A special issue of this diploma is being awarded by DARC to celebrate the three 1979 exhibitions—Ham-Radio (in Friedrichshafen), Internationale Funkausstellung IFA (in Berlin), and Telecom 79 (in Geneva). Applicants need to contact one of the special stations DK0FN, DK0IFA or 4U1ITU actually during the time of the exhibition, plus five other stations located in Berlin or Frankfurt. A certified list of contacts plus DM10 or US$6 should be sent to Karl-Heinz Hubain, Burgstrasse 20, D-6000 Frankfurt/Main, W Germany, before 15 October 1979. Note that this award is also available to listeners.

CQ DX Award

No official notice has been received from *CQ* but it is understood that applications for this award should now be sent to N4UF, Bill Williams, 911 Rio St Johns Drive, Jacksonville, Fla, 32211. The fee for all *CQ* dx awards has now been raised to US$5 or equivalent.

QTH CORNER

ex-CR9AJ	H. Torres, PO Box 2676, Lisbon, 1100 Portugal.
DA1WJ	via QSL Bureau or G4EUQ.
FP0OO	VE1ASJ, 2318 Rothesay Rd, E Riverside, St John, NB, E2H 2KS, Canada.
GI4EUQ	via QSL Bureau or G4EUQ.
JT0DJT	PO Box 639, Ulan Bator, Mongolia.
ON8IT	via G4EUQ.
PY0MAG	P. Rabelo, Rua Albino Pereira 355, 24250 Niteroi, RJ, Brazil.
K5VT/SV5	Dr V. C. Thompson, 2109 SW 79th, Oklahoma City, Okla, 73159, USA.
T2AAA	c/o Weather Station, Funafuti, Tuvalu.
TY9ER	via W2TK, R. A. Renz, 366 Rutherford Av, Lyndhurst, NJ, 07071, USA.
ex-VK4LX	Ed De Young, Communications Inspector, c/o Arabian Bechtol Corp Ltd, PO Box 4103, Riyadh, Saudi Arabia.
VK0XU	via K4CF, W. J. Preston, 10-A Pipe Lane Drive, Whispering Pines, NC, 28389, USA.
VP9KF	via Radio Society of Bermuda, Box 275, Hamilton, Bermuda.
VS5CW	C. J. Whiteley, PO Box 398, Bandar Seri Begawan, Brunei.
ZB2BS	C. J. Thomas, 36 Chelwood Crescent, Leeds LS8 2AQ.
ZS2MI	via WA2IZN, 225 Route 17, Upper Saddle Brook, NJ, 07458, USA.
5W1BU	via WA6YIE, J. E. King, 176 S Winton, La Puente, Calif, 91744, USA.

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

Band reports

G8KG's latest assessment of the present situation reads as follows: The steady fall in mean solar flux which began in mid-February was still in progress at the end of May, the average of the last seven days in May being only 150 sfu, compared with 230 sfu for the period 18-24 February. At the time of writing it was not clear how long this fall would continue but a reversal during June seemed likely.

The provisional Zurich sunspot number for April was only 102·8 so that the three-month mean centred on March for plotting on Fig 2 (*Radio Communication* March 1979, p224) was 126, compared with 147 for February. It seems likely that when the May and June figures are available a subsidiary trough in the three-month mean curve will prove to have occurred either in April or May and to have had a value of around 120. The latest forecast by NOAA, Boulder, based on data up to March, gives the most probable value of the maximum smoothed monthly number as 156 (plus or minus 33).

All in all then, a rather disappointing period, but a study of logs received shows much rare dx and the present "poor" conditions would have been looked on as being first-class only a couple of years ago!

Congratulations and thanks to the following who managed to beat the deadline: G2HKU, G3HB, G5JL, G6GH, G3s AAE, IMW, KSH, LOL and LPS, GM3LYY, G4s BLH and EHQ, BRSs 17567, 31301, 33915 and 38934.

Stations listed in italics were using cw.

3·5MHz. 2100 UB5UAT, UI8LBC, UJ8SAO, UL7EAJ (all on 3,640kHz looking for W European contacts).
7MHz. 0000 *TU2FO.* **0100** UI8LAG, *W7GIW/MM* (off Peru). **0500** K7CA/HC1, YV0AA, *ZL.* **2100** *SV0AA/5.* **2300** *VK6HD.*

Lyn Blake, VP8OV, at the operating position in her home at North Arm, Falkland Is. Lyn and her husband Tony, VP8OI, have an FT101B and an FRG7 as well as vhf equipment

14MHz. 0000 *SU1ER.* **0600** AH2D, C21IB, CR9AJ, FH8OM, FO8FC, KX6PP, VP2KC. **0700** A35RB, H44CB, KC6GF, *KH6NO,* WD6CDU/KH9, T2AAA, VR6TC, YJ8OT. **0800** A35s BD, *SM,* WL, KH6JHJ/KH4, WA6EWI/TI9, VK2AGT (Lord Howe Is), VK0PK, VR1AF, ZK1DN. **0900** A35CR, FK8CR, VS5TX, VR1AY, WH4AAA. **1000** A51PN, FO0BCC, KC4USV, 3D2BM. **1100** VQ9JJ, YJ8JH. **1300** W6s, 5W1BU. **1400** AP2AU, *UK1PAA,* W6s, W7s. **1500** AP5HQ, KL7JAR, S79WHW. **1700** FH8CL, VK9XW. **1800** OE6XG/A, HZ1TA, 3D6BW, *9V1OK.* **1900** FH8OM, FK8CR, JY1, KC6GF, W7ZGA/KH2, *KH6HC,* U0CR (76N 138E), VP8s SO, SU, XT2AV, ZLs, 9N1BMK. **2000** KC4AAB, KC6GF, PY0APS, TY9ER. **2100** C6ANU, *HM1DH,* VP8s, HA, SB. **2200** J7DAO, *KL7PJ, UA0YAH,* VP8PU.

21MHz. *3B8.* **0600** *FW0WW, KH6CC,* W6s. **0800** *KL7s, VK0XU* (Macquarie Is, QSL to K4CF), *PY0APS,* 5N0NAS. **0900** J28AY, *NP2AE,* VKs, ZLs, 5W1AB. **1000** FG7XA. **1100** *J7DD,* VS6HG. **1300** HM0S, SU1PM, TY9ER. **1400** EA9FE. **1500** FR7BV, WA2TTI/P/OX. **1600** AP5HQ, JA, 7X5KSF, 9M2BZ. **1700** *CR9AJ, HM1JJ, HS1ABD,* 5N0SID, 5N0AAS. **1800** KH6CF, OE6XG/A, VQ9JJ, W6s, W7s, XT2AW (QSL to KN1DPS). **1900** *PY0MAG,* VP8SB. **2000** WD5AJE/SU. **2100** J3AAE, ZD7HH. **2300** HH2V, ZF1MT.

28MHz. 0600 HM1EJ, HM0S. **0700** HS1ABD. **0800** H44PT, JAs, JT1AN, P29PN, VKs, 6T1YP. **0900** JAs, VKs, ZLs. **1000** H44WH, VK9NW, VR1BE. **1100** OK3TAB/D2A, HV2VO, *FR7BN,* P29MF. **1200** KG6JIP, P29JS, 4S7EA. **1300** FG7AR/FS, KH2AD. **1400** *FY7ITU, PY0MAG.* **1500** ST2FF, VS5CW, YB0CW. **1600** *UA0s,* XT2AW, 9M2DW. **1700** FR7BJ, WA6EWI/TI9, *VQ9MR.* **1800** HS1BG, PY0APS, 9V1DX. **1900** OE6XG/A, S79MC, VP8RZ, *VU2GO.* **2000** VP8NO. **2100** HH2V.

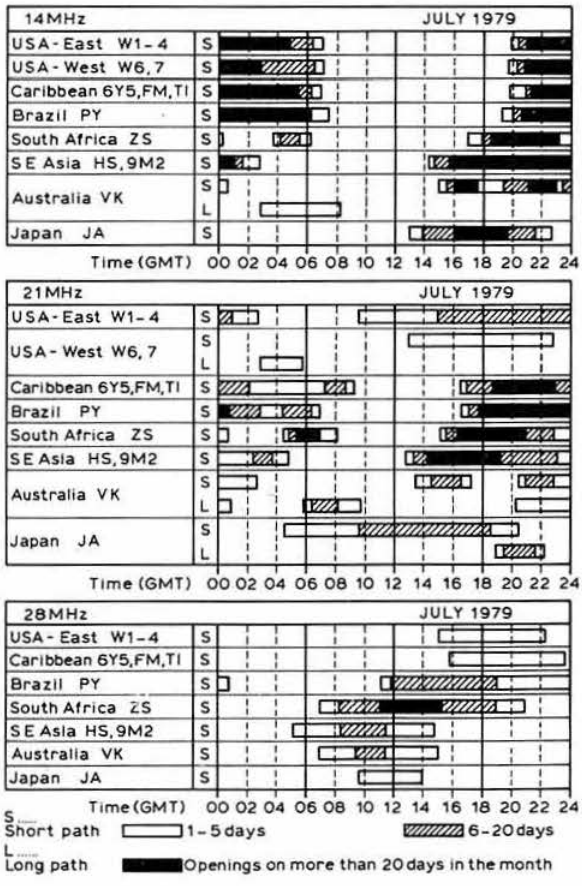
Thanks are also due to the authors of the following for information extracted: *CQ Magazine* **(W1WY),** the *Ex-G Radio Club Magazine* **(W3HQO),** *DX News Sheet* **(Geoff Watts),** *Long Skip* **(VE3FRA),** the *West Coast DX Bulletin* **(WA6AUD),** and *DX'press* **(PA0TO).** Please send all items for **September** issue **to reach G3FKM by 10 August,** and for **October** issue by **7 September.**

Propagation predictions

The high summer month of July is always bad for dx conditions, as the day-time frequencies are much lower than during the winter. This means that most paths on the hf bands (especially 28MHz) will not be open for dx. This is so even during this period of high solar activity. The sporadic and unpredictable short-skip conditions will compensate slightly for this.

On **28MHz** the USA will seldom be heard, but the remaining continents should be heard on favourable days. Traffic is certain with Africa and the rest of America. The seasonal worsening of dx is not quite as noticeable on **21MHz.** During day-time the traffic on this band will fade out because of high absorption. DX conditions on **14MHz** should be good from late afternoon (East Asia, Australia) until two hours before sunrise, but static noise will be noticed on this band. The **7MHz** band will be less favourable for night-time dx because of static, but it will be good in day-time for traffic with continental Europe. The **3·5MHz** band will be better at night for local traffic. There will be no interruption by the dead zone.

The provisional sunspot number for April 1979 from the Swiss Federal Observatory was 102·8. High daily values were observed during the first and last weeks of the month. The predicted smoothed numbers for August, September and October are 157, 159 and 160 respectively.



swl news

Bob Treacher, BRS32525 *

AS *SWL news* was prevented from appearing in the May issue by postal delay, no copy date for the current issue was published; as a result, comments are a little sparse this time.

Cray Valley RS Listeners' Contest

Details have been received from Owen Cross, G4DFI, of this society's ninth contest aimed entirely at the swl. In the past this has produced some bumper entries. The rules are reproduced in full below.

1. Eligible entrants. Open to any swl in the British Isles and throughout the rest of the world.
2. Period. 1800gmt 15 September 1979 to 1800gmt 16 September 1979.
3. Sections. 1·8-28MHz ssb or cw. Single- or multi-operator category. Up to 18 hours operation by single-operator stations. Multi-operator stations may be active during whole 24-hour period. Rest period must be clearly shown. Entries must be all ssb or all cw. No mixed modes.
4. Scoring. One point for each station heard on each band, *multiplied* by the number of different countries heard on each band added together. A list of multipliers must be enclosed and a separate log submitted for each band. Maximum of 100 points will be added by adjudicators for neat logs. Illegible logs will not be accepted.
5. General rules.
(a) The practice of logging a series of contacts made by one station is deprecated. Log entries must not include the same callsign in the "station worked" column more than 20 times on each band.
(b) the call areas of the USA, Canada and Australia will each count as a separate country, ie W 1234567890, VO 12, VE 12345678, VY1 and VK 12345678. All other countries will be determined by the official RSGB Countries List.
(c) No CQ, QRZ or similar call will be allowed to count for points. AM or MM stations are not to be included in the entries.
(d) If points are claimed for both stations the callsign of each must appear in the station heard column.
6. Entries.
(a) Entries should be sent to the contest manager, Mr Owen Cross, at the address below, to arrive not later than 1 November 1979.
(b) Log sheets are available from Owen Cross, G4DFI, 28 Garden Avenue, Bexleyheath, Kent DA7 4LF, to whom a large sae should be sent. It is desirable that entrants use official log sheets, but entries on RSGB or home-made log sheets will be accepted if the following information is given: date, time gmt, band, station heard, station being worked, report at swl's QTH. Points may only be claimed for stations actually heard, and the callsign must be shown in full.
7. Certificates of merit will be awarded at the discretion of the committee of the Cray Valley Radio Society, and its decision will be final.

The month in review

Conditions do not seem to have been as good as reported last month. The 28MHz band was strangely quiet and 14 and 21MHz seemed quiet between 1000 and 1600. The 3·5 and 7MHz bands still provided the occasional good logging, but it was a case of staying at the rig until the very early hours or setting the alarm for around 0330. Both alternatives defeat the vast majority, but Keith Kerr, BRS35943, mentioned XT2AV and VP2AR to take his 1979 3·5MHz score into three figures. Robert Small mentioned TU2HH on 3·5MHz, and TU2FH, CX4DI, FM7WS and 9G1GY on 7MHz. The cw section of the CQ WPX Contest may have provided some rarities on 1·8MHz, but no reports yet.

On the expedition scene, OE6XG/A must have provided many with a rare one. Although the callsign may have seemed fairly ordinary, the station was actually located on the Red Sea island of Abu Ail. The station was heard on 14-28MHz but was not equipped for lower frequency operation. Mid-May also produced signals from Cocos Is, in the shape of WA6EWI/TI9. Signals were weak but several managed this fairly rare one off the coast of Costa Rica. K4YT (Carl) also appeared from the Benin Republic signing TY9ER. Your scribe managed this one on 14MHz late one evening while in the company of G3ZAY and G4FAM, who made a hasty departure from his QTH to find a transmitter! At the time of writing, Carl was signing K4YT/6W8 operating from the QTH of 6W8DY.

Also active was PY0APS from Fernando de Norohna, who had been reported on 14 and 21MHz. DK8CB and DF4RD were also putting good signals into G-land from HB0 on 7, 14 and 21MHz.

Some notable dx has also been reported, TH8JM perhaps being the pick of the bunch—this station is actually operating from TL8. The Pacific has been showing on 21MHz during early morning hours—VR3AR, 5W1AU, CR9AJ and many KH6s were mentioned, but 14MHz continued to produce the majority of Pacific dx. Rumours say ZK2VE is active from Niue Is, T2AAA is on from Tuvalu, WH4AAA is giving many a contact from Midway Is, and ZK1DN is active from Cook Is. Of the less rare stations, YJ8OT, FO8, FK8, KX6, KC6 and 5W1 have all been reported on 14MHz around 0700 .

Reporters suggest 28MHz has produced some activity. Keith Kerr reports TN8BL plus A2CBX, HS1ABD, H44s, ZD8RG and 9M2s.

ZL1ADI was rumoured to be at Manahiki (ZK1) in early June, but at present the scene is set for a calm summer dx period with no outstanding expeditionaries scheduled to produce high temperatures on 14,195, 21,295 etc. We must sit back and see what the autumn period of traditional dx trips brings; VX9 and VY0 would be pleasant, and perhaps LU3ZY will appear at a more hospitable time! Only time will tell.

HF countries table
(Updates only)

Station	28	21	14	7	3·5	1·8	Total	Mode
BRS35943	151	173	211	101	103	7	746	ssb
ARS8841	144	136	218	71	74	0	643	ssb/cw
ARS39784	77	57	83	26	23	2	268	ssb
BRS20185	71	47	93	14	23	1	249	ssb
ARS41554	29	53	65	18	36	3	204	ssb
BRS41136	35	29	30	4	5	0	103	ssb/cw

1978 VK/ZL Contest results

NZART has sent your scribe, who won the G listener category, results of this event: BRS32525, 8,750 points; Dave Whitaker, BRS25429, 2,300; and BRS39782, 1,936. Judging by the contest manager's comments, some made strong representations about the non-receipt of 1977 results and certificates from the WIA, but the NZART, which organizes the contest in "even" years, has despatched the certificates very quickly indeed. Perhaps WIA will meet this standard next year.

Other mail

Ken Sketheway, BRS20185, provides details of his listening, mainly on 14MHz this time. His listening habits have been restricted of late due to business commitments.

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

Phil Waltho, BRS41136, who writes for the first time, has lived in West Germany for the past eight years. He joined the Society last October and now has a Sony ICF-5900W multi-band receiver. Although he is not able to spend as much time listening as he would like, he hopes to produce a respectable countries table score by the end of the year.

Adrian Camm, ARS39784, has been busy with school work, but his FRG7 is in use whenever possible. He has managed some interesting stations and he too hopes to produce a good score before 31 December.

John Timms, BRS39099, listened to the UK-M Contest in May which seemed to make the 14MHz band very busy indeed. John remarks on the excellent quality of signals from CN8CW and ZB2FA/MM.

Finale

Hopefully, readers have found something of interest in this somewhat potted piece. Your scribe thanks those who actually remarked that they missed the non-appearance of *SWL news* in the May issue.

For all those who would like to contribute to the September issue, their reports should reach your scribe by **26 July.** □

HF propagation study

Predicted hpfs (MHz × 10) for July 1979

GMT =	00	02	04	06	08	10	12	14	16	18	20	22	24
Aden	252	237	279	327	329	351	359	357	365	335	284	279	252
Ascension	213	211	206	200	319	327	351	364	371	375	326	248	213
Bahrain	274	265	272	315	324	333	332	333	335	321	301	286	274
Bangkok	234	235	257	285	307	308	296	298	301	301	280	260	234
Barbados	276	263	246	228	263	291	305	304	307	313	321	304	276
Bermuda	260	251	224	210	230	274	286	272	280	286	300	300	260
Bogota	274	263	237	224	262	286	300	300	293	307	313	296	274
Buenos Aires	284	285	265	251	209	258	327	342	337	340	328	300	284
Cape Town	183	130	130	313	329	337	365	378	392	362	291	237	183
Colombo	262	256	272	314	326	329	323	326	328	303	291	279	262
Cyprus	257	243	243	288	295	300	308	308	307	299	286	271	257
Dakar	304	313	279	263	317	327	351	364	371	374	328	303	304
Denver	221	209	182	176	157	168	214	227	234	232	247	246	221
Fairbanks	180	172	180	200	213	213	205	205	199	199	205	205	180
Falklands	237	210	182	149	140	214	329	350	343	350	329	298	237
Gibraltar	185	171	164	174	195	202	214	214	214	216	210	186	185
Hong Kong	230	228	248	268	281	289	282	280	286	293	272	248	230
Honolulu	180	173	181	200	221	233	237	216	233	233	219	206	180
Iceland	161	143	136	155	173	183	187	187	191	196	192	173	161
Jamaica	270	253	223	211	239	270	286	281	281	288	304	295	270
Lagos	291	279	238	294	326	336	365	370	387	374	328	299	291
Las Palmas	257	247	239	232	271	282	300	307	303	304	295	265	257
Lima	277	271	252	237	275	255	310	313	314	323	324	304	277
Los Angeles	208	181	182	195	177	157	182	234	247	239	247	233	208
Malta	215	199	197	221	235	243	252	251	249	249	242	221	215
Mauritius	213	171	276	327	329	337	359	365	365	335	318	301	213
Mexico	261	229	196	196	221	210	260	260	266	272	274	272	261
Montreal	247	225	190	176	192	221	243	242	255	260	256	265	247
Moscow	206	188	200	223	232	246	239	235	241	252	235	214	206
Nairobi	242	211	270	321	328	342	364	362	366	313	234	237	242
New Delhi	238	239	261	296	315	319	305	310	310	305	282	263	238
New York	261	234	202	183	183	225	251	243	258	262	261	277	261
Osaka	219	213	230	248	255	267	260	257	265	257	246	229	219
Perth	262	253	271	313	324	328	321	256	211	185	169	158	262
Rio de Janeiro	288	289	258	220	197	312	329	347	343	350	329	299	288
Salisbury	309	242	183	319	331	346	368	368	389	348	323	309	309
Seychelles	290	230	276	323	332	338	359	356	332	318	318	300	290
Singapore	238	239	261	296	315	314	305	310	310	305	282	263	238
Suva (s)	180	192	194	220	233	241	247	233	241	239	219	206	180
Suva (l)	312	319	277	288	258	224	197	176	169	149	327	305	312
Sydney (s)	229	227	248	268	279	289	248	215	196	167	176	248	229
Sydney (l)	280	274	255	237	258	205	177	162	159	144	183	299	280
Teheran	262	256	272	314	326	329	323	326	328	314	290	277	262
Vancouver	194	173	174	194	202	209	208	206	221	227	225	206	194
Wellington (s)	214	208	220	247	247	261	237	195	188	155	247	221	214
Wellington (l)	290	290	277	251	213	178	158	143	136	143	290	296	290

Bands recommended are those between hpf and half hpf.

sstv scene

P. Burnett, G4BLL*

ONE letter, from quite a large amount of correspondence received recently, accuses your sstv reporter of "plugging" the long persistence tube type of monitor in preference to the scan converter/fast-scan monitor approach. This is only because, at this time, the P7 tube monitor is still the simplest and cheapest approach for the newcomer to sstv. A P7 monitor can be built for less than £25 all in—if a scan converter can be built for anything even aproaching this figure *SSTV scene* would be very pleased to hear about it.

However, the scan converter will inevitably take over, particularly as pcps (Japanese designed, see *SSTV scene* March 1979) are now available in this country, which makes home construction an immediate and practical possibility. If anyone is interested in further information regarding availability, price etc please write to G4BLL (with sae please).

G3OQD sent details of his video processing and dither modifications for the Robot 400 scan converter (and home-built copies). The circuits and connection details are given in Figs 1 and 2. To summarize G3OQD's description of the circuit functions: a more acceptable 256-line picture is obtained by inserting the digital average of adjacent lines instead of simply repeating each line twice. The four quad 32-bit shift registers (IC1-IC4—General Instruments SL-6-4032) delay each line so that lines 1 and 2, for example, are available at the same time. Suitable alternative devices are Signetics 2518, Texas TMS 3112 and Fairchild 3348 (all Hex 32-bit, not pin compatible to the SL-6-4032).

The clocking signals are taken from U65 which supplies the multiplexing signal for the 400. Demultiplexing of the SL-6-4032s is provided by IC5 and IC6. The undelayed signal from IC10 and the delayed-by-one line signal from IC9 are added in IC11 (four-bit binary adder) to form the averaged signal. The output of IC11 is delayed by half a pixel by IC12 (four-bit latch) and is again added with the undelayed signal in IC13. This process improves the apparent resolution along the line by introducing "averaged" half pixels. IC14 is used simply to switch the processor in and out of circuit, and may be omitted if this facility is not required.

Slow- and fast-scan dither are provided by IC15, and the unused section of U48 in the Robot circuit is used to switch between fast and slow so that the a/d converter receives the appropriate signal.

A full frame of sstv must be received with the dither switched in if the full effect is to be observed. If dither is switched in after a frame has been received and frozen in the memory, a pattern will be noticeable on the screen as only output dither is then present. G3OQD comments: "The dither switch could easily be omitted as pictures always seem to look better with dither in." Having now incorporated both circuits into his "Chinese" copy 400, this is a statement with which the writer would certainly agree. The most noticeable improvement is the dramatic reduction in digital contouring.

* 12 Standroyd Drive, Colne, Lancashire BB8 7BG.

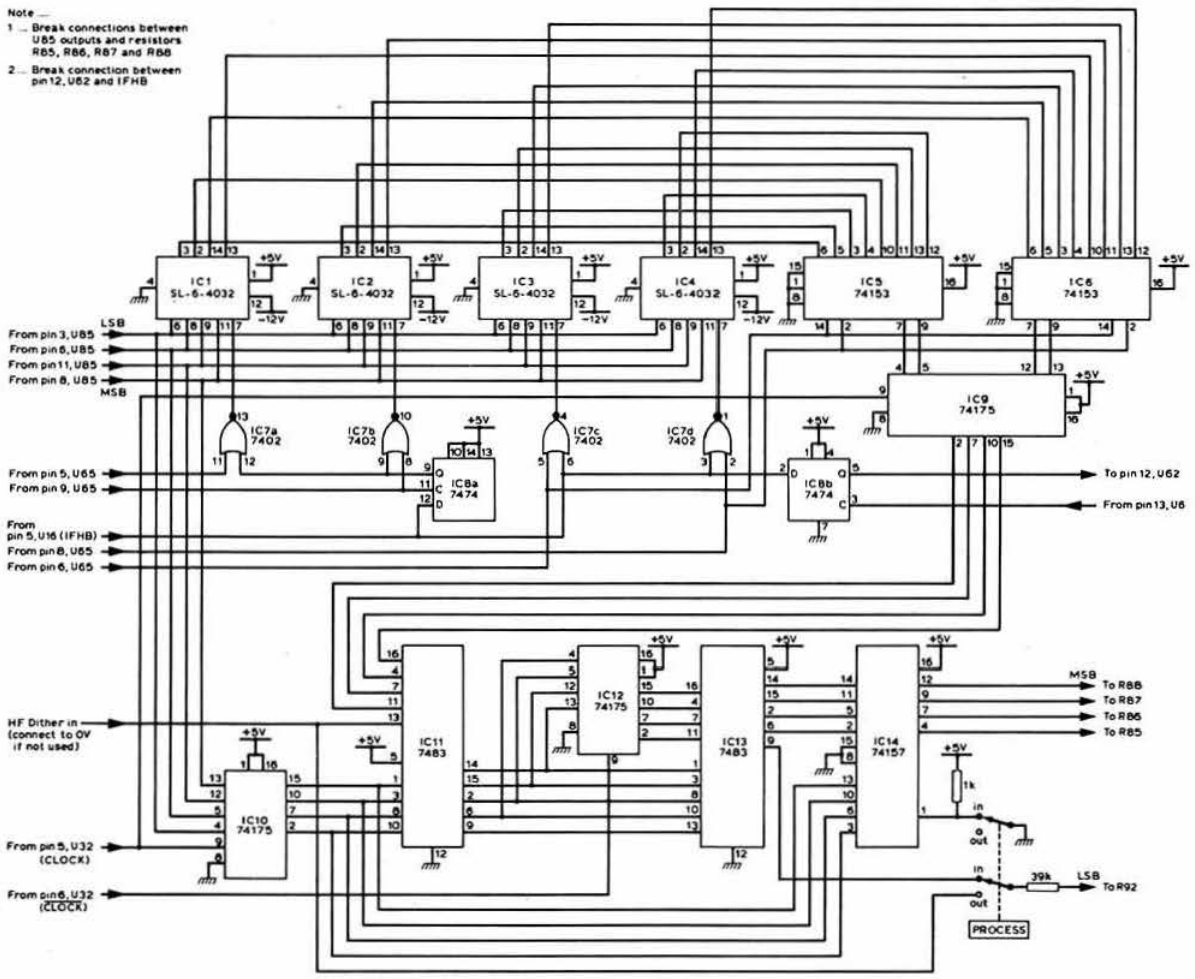


Fig 1. G3OQD image processor for Robot 400

Although G3OQD's circuits are well worth incorporating into the 400, please note that modifications of any kind will probably invalidate the guarantee. Readers interested in using G3OQD's circuits and experiencing difficulty in obtaining the four shift-registers—please enquire (again, sae please).

To return to the P7 tube monitors, a number of queries have been received regarding the noise-immunity circuit for the W6MXV monitor. The rtl devices used are now obsolete and difficult, if not impossible, to obtain. An alternative and simpler circuit using standard ttl devices is shown in Fig 3. The 74121s provide the noise immunity, being monostable multivibrators providing output pulses which, once triggered, cannot be re-triggered by any further pulses (noise) on the input. The 74123 provides the correct line and frame sync pulses. A +5V supply is required, which can be obtained from the +12V via a zener or small voltage regulator, eg 78L05 (+5V 100mA). G3ZNK has incorporated the circuit into his home-built W6MXV monitor and reports very successful results.

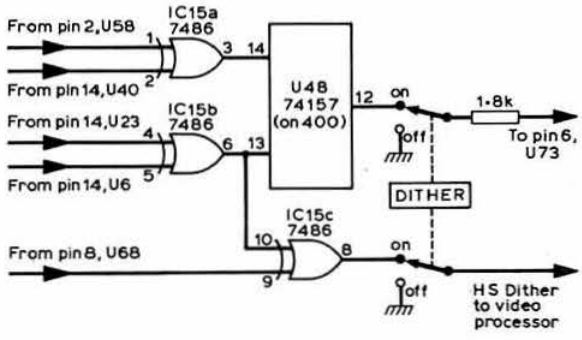


Fig 2. G3OQD dither circuit for Robot 400. Note: (a) remove C18 and C19; (b) if video processor not used, connect hs dither to R92 via 39kΩ resistor. For further details of dither and video processing, see *QST* November 1976, pp13–16

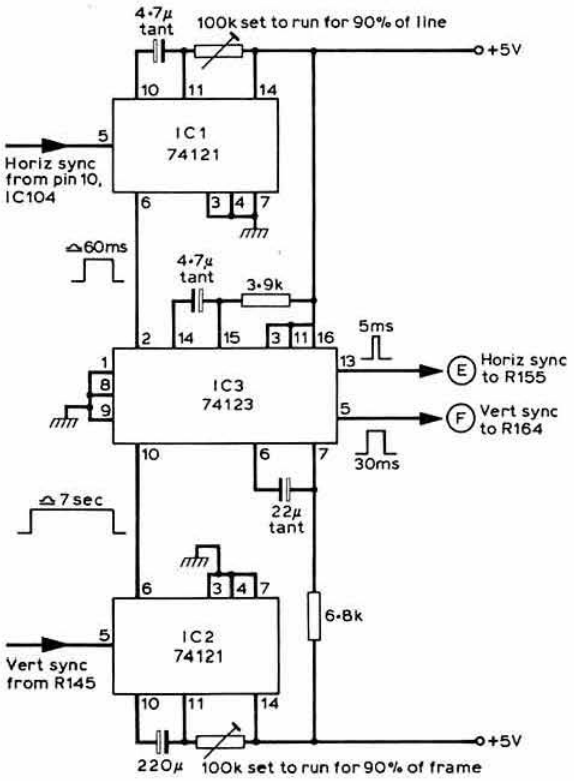


Fig 3. Noise immunity circuit for W6MXV monitor. The 220μF capacitor across pins 10 and 11 of IC2 may need to be increased to approximately 300μF if full immunity on frame cannot be obtained

"Hello G3OQD—your image processing circuits give a surprisingly effective improvement in picture quality!"

SSTV scene would like to welcome G4GIZ to the slow-scan ranks, also with a W6MXV monitor which incorporates 128/256-line display, 50Hz/60Hz switching for correct picture width, oscilloscope type display switching for signal monitoring, and signal level output control.

G4GEW is in the process of building the W6MXV fast-to-slow converter, and would like to hear from anyone who has successfully built this model. He queries particularly the use of four non-preferred value resistors: 4,020, 8,060, 1,620 and 806Ω specified as 1 or 2 per cent tolerance. He would also like to know of suitable fast-scan cameras for use with the design.

In conclusion, for the dx enthusiasts, Nelson Dyett, ZL2FR/G4FGZ, informs us that Pitcairn and Norfolk Islands should now be activated with sstv from a Robot 400, RCA camera etc, donated by the Northern LA Radio Club (USA). *SSTV scene* would like to hear from anyone working or "seeing" the station. □

BOOK REVIEW

Saga of the Vacuum Tube, by Gerald F. J. Tyne, ex(W)8KN. Published by Howard Sams & Co Inc (USA), 494 pages, paperback. Available from RSGB Publications (Sales), price £8.65, including post and packing.

This book, first published in 1977, and prepared under grants from the Antique Wireless Association and the Smithsonian Institution, records the history of the thermionic valve up to 1930. It covers both American and international developments from the earliest glimmerings, more than 250 years ago, the surprisingly early (1890s) cathode-ray tubes (Braun, etc) for oscillographs, up to an era of multi-electrode structures and mass production. It has an extensive index to valve types plus a good general index, and is well illustrated.

The book, unquestionably thorough and with a mass of detail, may at first sight put the reader in mind of the little girl who returned a book on zebras to the library saying "It tells me more about zebras than I want to know." On the contrary, at least for the history buffs, the final impression may be disappointment for what it does not contain. This is primarily due to the 1930 cut-off point, but also the absence of specialized experimental types such as split-anode magnetrons that even before 1930 were pointing the way to the microwaves. While many pioneering names appear (H. J. Round, John Scott-Taggart and S. R. Mullard among the British contingent) it is surprising to find only one brief glancing mention of Howard Armstrong, whose circuits so strongly influenced valve developments. Again, while the Dutchman, Hanso Idzerda, is mentioned in connection with the early Philips Ideezet valves, it would not have been out of place to have linked him also with the series of Hague Concerts which from 1919 pioneered regular broadcasting (Idzerda died tragically in 1944, shot as a spy when caught retrieving V2 fragments in occupied Holland). Patent actions that occupied much time and effort in the early days and the influence of the old British Valve Association are described, although the bitterness engendered is only hinted at.

Such criticisms are a form of praise, reflecting the interest aroused by a fascinating and unique book even though it may form only the first part of a saga that continued at least until the 1960s. For the younger reader a glimpse of a now fast receding era; for others nostalgia for the days when one could read by the light of those brightly glowing filaments—try doing that with a transistor!

G3VA

council proceedings

A brief report on the Council meeting held on 7 April 1979

Present: Mr J. Bazley (President, in the chair), Mr D. Adams, Dr E. J. Allaway, Messrs D. J. Andrews, J. Anthony, P. Balestrini, R. Bellerby, T. Douglas, Dr D. S. Evans, Messrs L. N. G. Hawkyard, G. Knight, W. F. McGonigle, C. H. Parsons, R. F. Stevens, G. M. C. Stone, C. J. Thomas (members of Council), D. A. Evans (general manager/secretary) and Mrs H. M. Allin (minutes secretary).

Apologies for absence were received from Messrs P. F. D. Cornish, B. O'Brien, and A. W. Hutchinson.

General manager's report

Mr Evans outlined ways in which the RSGB now assists affiliated clubs, societies and groups at public demonstrations of amateur radio by: (a) arranging special event callsigns; (b) issuing a pamphlet giving advice to organizers; (c) offering a new sale-or-return service for books (d) loaning a mini-display stand.

Problems in the posting of the *DX News Sheet* which were being experienced were discussed.

Mr Evans reported on a visit he had made to the QSL Bureau, when various minor changes to improve future efficiency were discussed.

In answer to a question about the results of the "Open Door" programme, Mr Evans estimated that about 1,000 enquiries had been dealt with.

Committee minutes

Education—3.3.79

Council approved the principle of holding the Science Museum lectures annually, during the Easter period, rather than in January on a biennial basis.

Finance & Staff—23.11.78, 1.3.79

A recommendation that Mr P. Balestrini, executive vice-President, be invited to serve on the committee was approved unanimously.

A recommendation to donate £150 to a charity of Brian Rix's choice, in recognition of the work done by Mr Rix in connection with the "Open Door" programme, was approved, and a cheque would be sent to Mr Rix for mentally-handicapped children.

Mr Parsons spoke of the work done by Mr D. Thomas, GW3RWX, who had been largely responsible for the "Open Door" programme.

HF Contests—31.1.79, 28.2.79

Mr Andrews said the committee was quite happy with the new arrangements for future engraving of trophies.

Interference—19.1.79

Mr Stevens spoke of an IARU Region 1 EMC meeting to be held in Rotterdam, which Mr C. L. Turner would attend and afterwards write a report on it. The cost involved was approved.

Membership & Representation—13.1.79

The holding of a Region 11 ORM was agreed in principle, but it was pointed out that September was a particularly busy month. It was decided to refer the matter back to the chairman of the committee.

Microwave Committee—17.2.79, 18.3.79

Dr Evans reported that the microwave lectures held at the VHF Convention were first-class, and that similar lectures were planned for 5 June at the IERE.

Mobile & Exhibition—13.2.79

Dr Evans spoke of a move to rationalize the exhibition situation.

Propagation Studies—9.2.79

Acknowledgement was made of the outstanding work done by Mr C. E. Newton, G2FKZ, in connection with information for GB2RS. The general manager would write to Mr Newton, expressing Council's gratitude.

Repeater Working Group—25.11.78

Mr Douglas reported that there had been no meeting held since November, due to the illness of the chairman.

Mr Knight asked for clarification of the electoral system outlined in the minutes. It was confirmed that groups eligible to vote were those having a licensed repeater.

Mr Douglas stressed the need to get the RWG into sensible proportions and to review the terms of reference during this year.

Technical & Publications—31.1.79

Dr Evans drew Council's attention to the fact that Mr Stevens had stepped down from the chairmanship of the committee after many years' service, and he paid tribute to the remarkable efforts made by Mr Stevens. The well-being of amateur radio depended on the generation and exchange of technical information and that the present strength of amateur radio throughout the world must, at least in part, be directly attributable to the efforts of RSGB in general and to Mr Stevens in particular.

Telecommunications Liaison—1.2.79

Mr Stevens reported that WARC papers had started to arrive from the ITU and that a full set of papers would comprise 7,000 pages.

Mr Balestrini reported that the Home Office had agreed that members of Raynet may, at the direct request of an emergency planning officer or a member of his staff, embark under conditions of operational oil pollution emergency, to provide communication to the shore, and up to two miles from the shore.

Mr Stevens reported that the Home Office had agreed in principle to reduce the price of a maritime mobile licence for non-commercial vessels to £6.40.

VHF—24.2.79

Mr Stone gave a brief report on the recent VHF Convention which had been held at the Winning Post and Whitton School. A provisional date of 8 March had been set for a similar convention for 1980.

Council approved the appointment of corresponding members representing AMSAT, BARTG, BATC, Raynet and RWG to the committee.

VHF Contests

A meteor scatter contest is to be held on 11/12 August.

Raynet

Mr Balestrini reported that two meetings had been held but that minutes had not yet been circulated, due to the work-load of the chairman. Various committee officials had been elected to ease the situation.

It was approved that Mr Cluer, G4AVV, and Mr Goodard, G4FRG, be invited to take the places of Messrs Law and Scarborough on the committee.

Membership and representation

Council noted that:

(i) reduced subscriptions had been granted to eight members;

(ii) the following area representatives had been appointed: A. Daykin, G8JCA, Castle Point area, Essex; P. M. Goodfellow, G8SHR, Bristol; R. M. Grant, GM4DQJ, Perthshire & Kinross-shire; J. W. Gravell, GW8NSR, Llanelli district; R. W. Howe, G3PLB, Basildon and district; E. James, G2FWA, Cheltenham; B. A. Jones, G8ASO, Worcester; R. J. B. Morgan, GD3KGC, Isle of Man; J. G. S. Symons, G3DSS, SE Somerset; R. E. J. Staples, G3MMD, Warrington and district; D. Stimson, G3THC, North Buckinghamshire; H. Watson, G3HTI, Grimsby.

Council granted affiliation to: Gould (Instrument Division) Radio Club, Hainault, Essex; Guildford Area Repeater Group; Jersey Amateur Electronics Club; Maidstone YMCA Amateur Radio Society; North Hants Repeater Group, and University of Sheffield Union of Students ARS.

Controlled repeaters

Mr Knight expressed his concern at the continued jamming of various repeaters and asked if those responsible for a repeater could be given a degree of control over it, particularly when well-known conventions etc were in progress. Mr Stevens replied that this question had been discussed in 1974, when it was felt that such a situation would result in a battle between jammer and controller and experience clearly showed this to be counter-productive.

Council agreed that no action be taken on this point.

Correspondence

Mr Bazley read a letter he had received from Dr Ian White, who regretted that, due to increasing pressures of work, he was unable to devote the necessary time and effort to his position as vhf manager. The President said that Dr White's resignation would mean a sad loss to the Society. The VHF Committee was investigating the question of a successor.

contest news

7MHz 1980 contests

The dates of these contests differ from those given in "Contests calendar" and "Contest news" in the June issue of *Radio Communication*. The correct dates are:

7MHz Phone —2-3 February
7MHz CW —23-24 February

See note under "QTC".

7MHz Contests 1978 results

Although the cw contest was well supported, and blessed with relatively good conditions, the phone section was marred by poor conditions, low activity, and QRM from JOTA and the DM contest. However, the next 7MHz Contests will be held on the first and fourth weekends of February 1980 (phone and cw respectively), as these dates should be clear of major events now that the ARRL DX Contests occupy only a single weekend for each mode. Hopefully, this change will increase participation, particularly in the phone section of the contest. If support for the phone section does not improve, the HF Contests Committee may feel that it is not worth running the event again for the benefit of such a small entry from G.

The leading phone station, G4APL, made 215 QSOs with a KW2000B and KW1000 linear, and a sloping dipole to the east. G3KBD, who amassed 490 QSOs in the cw section, wins the Thomas (G6QB) Memorial Trophy, and he used a 2-el Yagi and Drake T4XC/R4C equipment.

Comments from competitors

CW: "Great contest"—G4FAM; "My first 24h contest"—G4EDG; "More points for dx please"—G3IGW; "I need a better set of antennas!"—G4DDL; "The sweepstake contest in the USA was of no help"—G3JKY; "Good to work the lads back home"—EP2IA (G3SXW).
Phone: "Hard going with JOTA and the DM contest"—G4APL and others; "Slow going"—G4BWP; "There were not enough G stations on the band"—DL6AX.

Comments from contest committee

Generally the logs from British Isles stations were well presented and accurate, although one G4 station will find that his score has been reduced by a substantial amount—this was because his log contained a large number of unmarked duplicate contacts for which points had been claimed, and because his callsign was consistently mis-read by other stations. Many of the overseas logs had to be rescored, although in several cases this had already been done by national contest managers before the logs were forwarded to the RSGB—many thanks to them. In the receiving sections some entrants would do well to study Rule 5 (although it is likely to be simplified in future) and also to note that the general rules make it clear that a station may be logged for points once only in each section of the contest.

Finally, participants in the cw contest may well remember the outstanding signal from W2ER—he was using a two unit end fire rhombic array with 400ft legs at an average height of 110ft.

G3NKS

Call-areas worked by leading stations

Phone: G4APL—DJ, F, ON, UQ2, I, PA0, OH, OK, SP, SM, OZ, LA, EI, FC, YU, HB9, UA9, UL7, OE, DM, YO, LX, UC2, UA3, UB5, 9H1, CT3, EP2, HA, CN8, LZ; G4BWP— DJ, F, ON, SM, OH, SP, UA2, I, OZ, OK, UQ2, PA0, LA, EI, OE, UA9, UA3, UL7, YU, UC2, HB9, YO, UB5, LZ, CO, ZL1, YV, HC, LX.
CW: G3KDB—DJ, LA, OH, SM, HA, UQ2, PA0, YU, UA, UR2, F, OK, DM, HB9, UP2, EI, ON, SP, I, UA9, UB5, OZ, YO, EP, EA, UM8, UI8, JA, OE, UC2, LZ, UJ8, UL7, 4Z4, UD6, VK2, UA2, W2, 5Z4, W3, W1, W9, W4, PY, VE1, VE2, VE3, W0, 7X, SV, YV, W8, 8P6, 9K2, UF, J28, W7, CO, W5, VE7, W6, ZL1, LU, KL7, ZL3; G3MXJ—CM, DL, DM, EA, EI, EP2, F, HA, HB9, I, JA, J28, LA, LU, LZ, OH, OK, ON, OX, OZ, PA0, PY, SM SP, UA, UA2, UA9, UB5, UC2, UD6, UF6, UI8, UJ8, UL7, UM8, UO5, UP2, UQ2, UR2, TI, VE1, VE2, VE3, VE6, VE7, VK2, VO, W1, W2, W3, W4, W5, W6, W8, W9, W0, YO, YU, ZL1, ZL/C, 4X4, 5Z4, 8P6, 9H1, 9K2.

BRITISH ISLES CW TRANSMITTING

Posn	Callsign	Points	Posn	Callsign	Points
1	G3KDB	5,222	18	G3YMC	1,785
2	G3MXJ	5,126	19	G3TXF	1,720
3	G4FAM	4,490	20	G4CCQ	1,650
4	G3SJJ/A	4,363	21	G3NOM	1,530
5	G4EDG	4,336	22	G3KSH	1,500
6	G4BUO	3,460	23	G4FDC	1,400
7	G2QT	3,100	24	G3MWP	1,295
8	G3IGW	3,025	25	G3KZR	1,170
9	G4DUW	2,755	26	G3JKY	1,020
10	G3RTE	2,665	27	G2AJB	985
11	G4BWP	2,580	28	G4APL	855
12	G3ESF	2,265	29	GW3SB	678
13	G3DYY	2,160	30	G2PT	645
14	G4GML	2,148	31	G8QZ	540
15	G4GCG/A	2,110	32	G3AWR	215
16	G4DDL	2,035	33	G3ILO	25
17	GM3OXC	1,905			

BRITISH ISLES PHONE TRANSMITTING

Posn	Callsign	Points	Posn	Callsign	Points
1	G4APL	1,678	7	G4EZT	910
2	G4BWP	1,592	8	G4DUW	795
3	GM3PIP	1,448	9	GM4EHB	585
4	G4DBW	1,195	10	G4ECI	483
5	G2QT	1,121	11	G3NKS	400
6	GW4GXR	990	12	G3NOM	290

REST OF WORLD CW TRANSMITTING

Posn	Callsign	Points	Posn	Callsign	Points
1	W2ER	1,650	9	UJ8JAS	610
2	UW9AT	1,355	10	VE1ATJ	575
3	UL7MAR	1,240	11	UL7AAQ	550
4	UA9WDV	980	12	UD6DFK	445
5	UA9FGJ	935	13	UM8MBA	370
6	UA9CKD	855	14	UA9FGO	300
7	EP2IA	825	15	UA0WAS	245
8	AA4VV	815	16	VE3CEF	225

REST OF WORLD PHONE TRANSMITTING

Posn	Callsign	Points
1	UA9CBO	683
2	EP2TW	440
3	UW9SG	105

BRITISH ISLES PHONE RECEIVING

Posn	Station	Points
1	BRS32525	1,580
2	BRS34740	1,235
3	BRS34310	860
4	BRS25429	790
5	BRS38709	775
6	ARS40323	650

BRITISH ISLES CW RECEIVING

Posn	Station	Points
1	BRS15822	1,475

REST OF WORLD CW RECEIVING

Posn	Station	Points
1	UM8-036-61	415
2	UD6-001-220	205
3	BCRS195	165
4	JA7-6824/7	135

EUROPE CW RECEIVING

Posn	Station	Points
1	UC2006105	410
2	UO503927	390
3	UB5-060-333	365
4	UA1-169-185	345
5	ONL383	320
5	UR2-083-202	320
7	UN1-088-218	280
8	UA3-121-1518	230
8	UA3-147-151	230
10	DL237/12237	150

EUROPE PHONE RECEIVING

Posn	Station	Points
1	DL-H20-1490960	530
2	UP2-038-1555	460
3	ONL383	425
4	REF 22-725	385
5	OK2-18895	325
6	DL-237-12237	265
7	I2-67970	230
8	SP51554	170
9	UO503927	90

Check logs acknowledged, with grateful thanks, from: CW—OK2KVI, OK2SWD, OK3YK/P, OX3RA, SM6DOK, SP1JRG, SP5KMB, UA3TDP, UA3ECF, UA3TAM, UA4NDV, UA6ACP, UA9SEX, UA9TS, UA0LCI, UB5AAS, UB5JIQ, UB5ZBM, UP2BFH, 5Z4CW, DL1659861, OZ-DR844; Phone—G2AJB, OK1KCF, SM7FSV, UA6APP, OZ-DR844, ONL3647, DL-H33-1703271, DL1664317.

EUROPE CW TRANSMITTING

Posn	Callsign	Points
1	UA4HBW	721
2	UQ2GDW	656
3	OZ1W	653
4	DJ8IZ	640
5	ON4FI	605
6	OH6RC	565
	PA0UV	565
8	F9KP	555
	SM0JHF	555
10	OH6MK	550
11	UB5ZAT	540
12	UA6AKK	530
13	DK8BI	515
14	OK2SEO	510
15	OZ2UA	508
16	UW1YY	505
17	UA3AFQ	503
18	PA0LCE	500
19	OZ4HW	490
20	SM6ID	488
21	HA2KRZ	480
22	OH7NW	460
23	DF4QW	455
24	PA3AHJ	445
	UA3ESN	445
26	UB5ZAL	418
27	UB5UWG	413
28	UQ2PQ	408
29	DL1OO	400
	OK1PH	400
31	SL5AR	398
32	DF3QN	393
33	PA0LVB	390
34	DF4QP	385
	UR2FU	385
36	YO3JJ	375
37	OH3AA	370
38	YU1NGO	365
39	YO3BEJ	363
40	OZ5QU	360
	UQ2PP	360
42	UQ2REC	350
43	HB9DX	343
44	HA7PK	338
45	EA2HW	333
46	OK2BSG	330
47	DJ1QQ	329
48	HB9BBJ	327
49	OH2JQ	320
	UP2BDX	320
51	OK2PDL	313
52	UB5RS	305
53	UA3TDK	303
54	DF6YT	300
55	OK1AQR	293
56	DL9OT	290
	HA4YG	290
58	UA1NAZ	285
59	OK2SOD	283
60	IN3DUU	275
	YO3KSC	275
62	HA7SU	271
	OK1DOJ	271
64	OK1AYU	270
65	SP9AKD	269
66	UV3CE	268
67	UA2DC	265
68	UK4WAB	263
69	UA3AEZ	260
70	SM6AYM	245
	YO7BGA	245
72	OH8VU/SM2	240
73	UA6WF	233
74	YO2BEO	232
75	SM0IX	230
76	F6CXJ	220
77	SP8MJ	216
78	F6FTB	205
	HA7TQ	205
80	HA4XG	200
	UB5KBF	200
82	YU2CCJ	195
	SM7AIL	195
84	UO5ODA	190
85	HA4YH	185
	OK2PAW	185
	OH9TD	185
88	SM7CZC	183
89	PA0ATG	175
90	OZ6KS	170
91	UP2BAS	160
92	EA3PI	155
	UP2AW	155
	YO8CEZ	155
95	OH2BSA	153
96	UB5QBC	150
	YO3CR	150
	YO5BRZ	150
99	UA4CDC	148
100	EA2CR	145
101	UC2WBJ	143
102	SK7IJ	130
103	HA7PQ	125
104	LA7SI	110
	YO8BLZ	110
106	OH4TH	105
	OK1MBZ	105
108	OH1UR	100
	OK1DVK	100
110	HA3PT	93
111	OH9UW	90
	YO4BEW	90
	YU1SF	90
114	SP9HWN	88
115	SM5CSS	85
	YO6LV	85
117	YO3BYF	70

EUROPE PHONE TRANSMITTING

Posn	Callsign	Points
1	DL8JS	993
2	ON6JG	901
3	ON6RL	796
4	F9KP	690
5	DL6AX	660
6	DA2DC	530
7	UC2XW	400
8	OZ2UA	340
9	UQ2GFN	335
	UB5QAV	335
11	DF2KD	313
12	OZ3KE	310
13	UV3CE	265
14	OH6MK	251
15	DF2HL	245
16	F6API	240
	F8WE	240
18	PA0BFO	235
19	HA5KKO	225
20	OH2JQ	220
21	OH3PB	215
22	OK1KZ	205
	EI4CP	205
24	SM7AIO	200
25	OK2BGH	185
26	OH7NW	175
	OK3YK	175
28	OK1DKS	170
29	F6DRP	160
30	OZ6EI	151
31	OK2KJT	135
	OZ4LX	135
33	DK5KJ	125
34	SM5BDV	120
35	SP6ECA	115
36	HB9DX	105
37	OH3AA	53
	OH7SQ	53
39	OK1KIR	33

1979 Low Power Contest results

The UK Section of this contest, held on 8 April, was won by Chris Page, G4BUE, who used an Argonaut transceiver with inverted-V antennas, and made most of his contacts with 1W input. Runner-up George Burt, GM3OXX, operated /A from Edinburgh University using a home-built transceiver with long wire and ground plane. Derek Thom, G3NKS, in third place, used an outboard pa and G5RV antenna. G4BUE will receive the 1930 Committee Cup, and certificates will go to GM3OXX and G3NKS.

PA3AIC will receive a certificate as the winner of the Overseas Section, and PA0WX and PA3ABA, who tied for second place, will receive certificates together with DK6AJ.

The increase in the middle power category permitted in the 1979 rules was received favourably by some entrants who were able to use existing QRP commercial transceivers without modification.

There were comments from most entrants about the removal of the 7MHz bonus and the clash of dates with the DL/DIG 7MHz contest. In general the exclusion of the bonus produced more activity on 3·5MHz and this was welcomed by the majority of those who took part. The high levels of QRM from the QRO stations working in the DL contest caused problems, and there were requests for the dates of the 1980 contest to be shifted by one week to avoid this difficulty. The HF Contests Committee will consider this and other suggestions when the rules are next considered.

G6LX

UK SECTION

Posn	Callsign	Score	3·5MHz QSOs	3·5MHz Points	7MHz QSOs	7MHz Points	Power
1	G4BUE	9,150	25	3,650	40	5,500	1 & 5W
2	GM3OXX/A	7,625	12	1,925	43	5,700	1, 3 & 5W
3	G3NKS	7,100	31	2,700	50	4,400	3W
4	G3AZ	6,575	9	1,300	38	5,275	1W
5	G3DNF	6,325	10	1,700	31	4,625	1W
6	G4CZB	6,000	17	2,725	23	3,275	1W
7	G3IGU	5,725	15	2,200	29	3,525	1 & 3W
8	G3LHJ	5,100	—	—	36	5,100	1W
9	G3YWU	4,675	16	2,750	13	1,925	1W
10	G8IB	3,550	12	725	12	1,125	3W
11	G3OHM	2,675	8	750	17	1,950	3W
12	G4DVK	2,625	8	2,425	20	1,875	3W
13	G4EJN	2,350	—	—	16	2,350	1W
14	G3AWR	2,100	—	—	25	2,100	5W
15	G4FJF	1,100	16	950	2	150	3 & 5W
16	G3ILO	150	—	—	2	150	5W

OVERSEAS SECTION

Posn	Callsign	Score	3·5MHz QSOs	3·5MHz Points	7MHz QSOs	7MHz Points	Power
1	PA3AIC	1,550	—	—	13	1,550	3W
2	PA0WX	1,525	1	100	14	1,425	5W
	PA3ABA	1,525	—	—	13	1,525	1W
4	DK6AJ	1,025	—	—	10	1,025	3W
5	PA0TA	300	—	—	4	300	5W

Check log received from PA3AFF.

April 144MHz CW Contest results

This contest was enjoyed by all participants in spite of the poor to average conditions. There was, however, a weak aurora benefitting a few very northerly stations. Typical comments were: "Really enjoyed this contest"—G4FRE; "Enjoyed my first contest"—G4HZC; "Enjoyable contest"—G3BDQ; "Our group always enjoys a cw contest; long may it live"—G3SRT/A. ON5UN observed that G stations fail to send their QTH to continentals, and from an examination of the logs many Gs failed to record ON5UN's QTH, although he sent it in accordance with the rules. He wonders whether it would not be better for the RSGB to drop the QTH exchange requirement and come into line with IARU Region 1 practice.

The new division of entrants into single- and multi-operator sections received no adverse comment. Contestants are reminded that all operators had to be RSGB members (Council ruling) unless otherwise indicated in certain exceptional cases, so regretfully, therefore, PA3AIZ/P has been disqualified.

Congratulations and certificates go to ON5UN and G3SRT/A. Thanks to G2BQ, G2HLL and G4AHN for check logs. *G3FZL*

SINGLE-OPERATOR SECTION

Posn	Callsign	Points	QSOs	QRA	Best dx	Km
1	ON5UN	1,022	76	BK18f	GI4GVS	762
2	G3NNG	834	100	ZL23f	DF3IP	739
3	G3BDQ	715	80	AK04f	DF3IP	555
4	G4BWG	614	72	ZL50b	DL2OM	540
5	G3TZU/A	607	63	ZO69h	ON5UN	462
6	G3SPJ	468	75	AL41a	GM3ZXE/P	608
7	G4DLB/P	388	67	ZM73j	GM3ZXE/P	515
8	GM3WOJ	368	30	XP48e	LA8YB	1,008
9	G4DEZ	360	54	ZL34a	DC2OM	634
10	G4FRE	322	54	ZM33d	GM3ZXE/P	472

Posn	Callsign	Points	QSOs	QRA	Best dx	Km
11	G4APL	316	60	ZL60j	GM3WOJ	540
12	G4AHN	292	58	ZL56c	G4CJG	370
13	G4FBK	277	64	ZL39g	F6KCP	375
14	G4AYM/P	261	49	YL08d	ON5UN	430
15	G2DUP	239	25	XK35d	ON5UN	539
16	GM3ZXE/P	230	25	YQ24g	G3SPJ	608
17	G4HJC	204	28	ZO80h	ON5UN	440
18	G3XWZ	197	34	ZN64d	ON6CP	430
19	G2BLA	183	41	ZL20h	DL2OM	564
20	G3PBA	159	45	ZL38f	GW2HIY	343
21	G3UYM	155	25	ZL09c	GW2HIY	330
22	G2WS	154	30	YL56h	EI9Q	288
23	G4DDL	122	34	ZL47f	G3TZU/A	314
24	G3FIJ	101	11	AL05e	GM3WOJ	510
25	G3ILO	70	20	YL29g	G3DAH	240
26	G4HZC	44	10	ZM25e	G3TZU/A	138
27	G4HQX	13	7	YL29g	G3SRT/A	88

MULTI-OPERATOR SECTION

Posn	Callsign	Points	QSOs	QRA	Best dx	Km
1	G3SRT/A	672	86	YM48h	DJ0QZ	725
*	PA3AIZ/P	254	21	CM72g	G3SRT/A	464
2	G3LCH/P	242	34	AL66f	G2DUP	425

*Entry invalid as one operator not RSGB member.

432MHz and 1,296MHz Open Contests results

Most contestants described the propagation conditions for both events as poor, and the weather as being cold and wet; the remainder were in general agreement but expressed themselves more emphatically. A few well-sited stations found the occasional brief opening to the Continent but the majority had to be satisfied with the low level of inter-G activity. Three quotes from the 427s sum up the events succinctly: "Nearly called it all off. Got saturated"—G8AMD/P; "Signals were 20dB stronger when we cracked off the ice"—G3ONP/P; "God help the portables on a night like that"—G3TDG.

Nearly all the activity was in the South-East (AL, AM and ZL squares), and G5DF in ZO square deserves commendation for perseverance; only four stations heard throughout the whole of the 432MHz contest. G3FYX tried working 1,296MHz directly for the first two hours and found that stations were not checking the band before returning to 432MHz. He thought that the timing and length of the contests were satisfactory in spite of the conditions.

Although there were two appeals to bring back F and /P sections, the results tables would have shown remarkably few changes had the contests been divided into these categories.

The Martlesham Radio Society was the winner of both events in the multi-operator sections; signing G4BPO/P on 432MHz and G3XDY/P on 1,296MHz. Both the single-operator sections were won by G3TDG, who richly deserves to be congratulated on a fine performance from his home station.

G2HIF

APRIL 1979 1,296MHz CONTEST

MULTI-OPERATOR SECTION

Posn	Callsign	Points	QSOs	QRA	Best dx	Km
1	G3XDY/P	4,131	28	AM67	PA0EZ	268
2	G3PMH/A	2,899	36	AM71	PA0EZ	346
3	G3SBV/P	2,600	37	ZL60	PA0EZ	367
4	G3ONP/P	1,985	23	YM48	G3XDY/P	264
5	G3NNG	1,970	22	ZL23	G3XDY/P	199
6	G4HWA/P	1,644	24	ZL15	G3XDY/P	163
7	G4ARD/P	1,514	24	ZL18	G3ONP/P	157
8	G8AMD/P	704	12	ZM64	G3TDG	131
9	G3OHM	660	10	ZM41	G3FYX	104

SINGLE-OPERATOR SECTION

Posn	Callsign	Points	QSOs	QRA	Best dx	Km
1	G3TDG	1,519	28	AL51	G4FZN/P	131
2	G8DKK	1,322	24	ZL08	G3DAH	126
3	G3FZL	1,109	20	ZL50	G6XM	117
4	G8FMK	702	13	ZL26	G3SBV/P	82
5	G3FYX	659	7	YL38	G3AUS	136
6	G8ART	639	11	ZM45	G3ONP/P	104
7	G3VCT	344	8	ZL37	G3TDG	100
8	G8CTT	327	8	AL41	G3XDY/P	120
9	G8DLX	245	6	ZM54	G3ONP/P	92
10	G3XWZ	174	4	ZN64	G3KMS	98
11	G3YKI/A	156	8	ZL49	G3SBV/P	28

APRIL 1979 432MHz CONTEST

MULTI-OPERATOR SECTION

Posn	Callsign	Points	QSOs	QRA	Best dx	Km
1	G3BPO/P	917	112	AM67	F1EA	610
2	G3PMH/A	658	119	AM71	F8NH	538
3	G3NNG	527	81	ZL23	DJ9DL	600+
4	G8DGL	469	93	ZL47	F1CXW	411
5	G4ARD/P	434	108	ZL18	DJ9DL	525
6	G3UBX/P	389	81	YM48	G3LCH/P	288
7	G4FZN/P	264	65	ZN64	PA0FRE	393
8	G8OHM	117	33	ZM41	G3BW	263
9	G3LCH/P	121	29	AL66	G3UBX/P	288
10	G8LGL	82	22	YL46	G4BPO/P	289

SINGLE-OPERATOR SECTION

Posn	Callsign	Points	QSOs	QRA	Best dx	Km
1	G3TDG	329	78	AL51	G3BW	420
2	G3YTE	273	57	AL13	DJ9DL	455
3	G3VJG	195	61	ZL40	PA0ASH	339
4	G8DLX	92	26	ZM54	GI8EWM	395
5	G4ASR	90	20	YM77	G3BW	280
6	G8IFT	63	21	YM50	G4BPO/P	223
7	G8CTT	60	20	AL41	G3UBX/P	215
8	G8ITS	34	22	ZL40	G4BPO/P	115
9	G4HQX/P	15	7	YL29	G3JXN	150+
10	G5DF	13	1	ZO51	G3NNG	320

Check logs received from F1DXN and PE1CBL

APRIL 1979 432MHz CONTEST

LISTENERS SECTION

Posn	Station	Points	QSOs	Best dx	Km
1	BRS34740	94	30	G4BPO/P	200
2	BRS34310	92	32	PA0FRE	320
3	BRS15822	56	28	G3UXB/P	195
4	BRS32525	55	33	G4FZN/P	122

21MHz CW Contest 1979 rules

TRANSMITTING SECTION

1. The general rules for RSGB hf contests, published in the January 1979 issue of *Radio Communication,* will apply.

2. When. 0700gmt to 1900gmt on Sunday 21 October 1979.

3. Eligible entrants. Single-operator stations only in the following sections:

(a) British Isles section—RSGB members resident in the British Isles.

(b) QRP British Isles section—RSGB members resident in the British Isles using less than 5W rf output.

(c) Overseas section—Licensed amateurs in all parts of the world except British Isles.

(d) QRP overseas section—Licensed amateurs in all parts of the world except British Isles using less than 5W rf output.

4. Contacts between stations in the British Isles are not allowed. A cw contact shall consist of the RST report plus a progressive QSO number starting with 001.

5. Scoring, British Isles sections. Each completed contact shall score three points. The final score is the number of countries worked multiplied by the total number of points. For the purpose of scoring, the RSGB countries list will apply with the exception that VE, VK, A/W/K/N, ZL and ZS call areas will count as separate countries. *Note.* Different USA prefixes for the same district may not be counted more than once, eg W1, WA1, K1, N1 etc is a single call area for the purpose of scoring.

6. Scoring, Overseas sections. Each completed contact with a British Isles station will score three points. The final score is the number of British Isles prefixes multiplied by the total number of points. British Isles prefixes are G2, G3, G4, G5, G6, G8, GD2, GD3, GD4, GD5, GD6, GD8, GI2, GI3, GI4, GI5, GI6, GI8, GJ2, GJ3, GJ4, GJ5, GJ6, GJ8, GM2, GM3, GM4, GM5, GM6, GM8, GU2, GU3, GU4, GU5, GU6, GU8, GW2, GW3, GW4, GW5, GW6, GW8. Contacts with GB stations do not score points or count as multipliers.

7. Entries should be sent to J. Bazley, G3HCT, Brooklands, Ullenhall, Solihull, West Midlands B95 5NW, England. Entries must arrive no later than 31 December 1979 from overseas entrants, who are advised to submit their entries by air mail. British Isles entrants' logs must be received not later than 30 days following the date of the contest.

8. Logs should be submitted on standard RSGB log sheets or A4 paper with a completed declaration cover sheet indicating antennas, equipment and power used.

9. Awards. Certificates will be awarded for each section.

RECEIVING SECTION

1. The general rules of RSGB hf receiving contests will apply, with special reference to Rule 7.

2. When. 0700gmt to 1900gmt on Sunday 21 October 1979.

3. Eligible entrants. The contest is open to all swls throughout the world.

4. Scoring. British Isles listeners may only log overseas stations working British Isles stations in the contest. Overseas listeners may only log British Isles stations in contact with overseas stations in the contest. For the purpose of scoring the following applies:

(a) British Isles listeners. Each completed log entry will score three points. The final score is the number of countries heard multiplied by the total number of points. For the purpose of scoring, the RSGB countries list will apply, except that VE, VK, A/W/K/N, ZL and ZS call areas will count as separate countries.

(b) Overseas listeners. Each completed log entry will score three points. The final score is the number of British Isles prefixes heard and multiplied by the total number of points.

5. Entries. As Rule 7 of the transmitting section.

6. Awards. Certificates will be awarded to the leading stations in the British Isles and overseas sections.

DF Qualifying Event Salisbury

Date: 5 August 1979.
Map: OS Sheet 184 1:50,000 series, Salisbury & the Plain.
Assembly: 1300bst for start at 1320bst.
Location: 1·5 miles south of Odstock, ngr 142238.

Competitors requiring tea are asked to notify Mr A. Newman, 74 Victoria Road, Wilton, Salisbury, Wilts SP2 0DY, as soon as possible.

DF Qualifying Event Slade

Date: 19 August 1979.
Map: OS Sheet 127 1:50,000 series, Stafford & Telford.
Assembly: 1300bst for start at 1320bst.
Location: Kingswood Common, six miles NW of Wolverhampton on A41, ngr 835029.

Competitors requiring tea are asked to notify Mr J. E. Drakeley, 186 Conway Road, Fordbridge, Birmingham B37 5LD, by 10 August.

DF Qualifying Event Chelmsford results

The weather was very kind for the Chelmsford event; no rain fell until all competitors had sat down for tea. Nineteen teams took part but only four found both stations before 1630. Station A was located in Hatfield Forest in undergrowth both thorny and muddy (no impediment to df types!). Station B was on Lingwood Common near Danbury, in almost impenetrable vegetation needing only the steam and mosquitoes to warrant comparison with Borneo. Several competitors spent an hour within 50 yards of the transmitter but all were pleased with the challenge and not dismayed by the problems.

The tea was held in the "Star" public house at Good Easter, where 51 people were packed together, the organizer having underestimated the number by 25 per cent. The Mid-Essex Trophy was presented to Mike Hawkins who, together with Brian Bristow, qualified for the final (subject to confirmation).

			Time of arrival	
Posn	Name	Club	Station A	Station B
1	M. Hawkins	Chelmsford	1454	1554
2	B. Bristow	Mid-Thames	1440·5	1622
3	C. Merry	Dartford Heath	1512·5	1626
4	C. Plummer	Mid-Thames	1508	1626·5
5	A. Simmons	Mid-Thames	–	1443
6	M. Easterbrook	Dartford Heath	1513	–
7	T. Gage	Mid-Thames	–	1537
8	W. North	Mid-Thames	–	1538
9	P. Yates	Salisbury	–	1539
10	P. Homer	Dartford Heath	–	1539·5
11	D. Newman	Slade	–	1540
12	E. Mollart	Mid-Thames	–	1540·5
13	J. Everist	Dartford Heath	–	1541
14	G. Foster	Stratford	–	1541·5
15	I. Butson	Chelmsford	–	1544
16	B. West	Chelmsford	–	1545
17	P. Woollett	Dartford Heath	–	1554·5
18	P. Lisle	Mid-Thames	1630	–
19	P. Sharman	Dartford Heath	–	–

Contests calendar

7–8 July	VHF NFD *(Rules in April issue)*
14–15 July	IARU Radiosport *(Rules in June issue)*
14–15 July	The Colombian *(Rules in July issue)*
14–15 July	Ten-Ten QSO Party *(Rules in July issue)*
15 July	3·5MHz Field Day *(Rules in June issue)*
15 July	DF Qualifying Event Conventry *(Rules in June issue)*
21–22 July	MARTS SEANET WW DX CW *(Rules in June issue)*
21–22 July	AGCW-DL QRP *(Rules in July issue)*
29 July	144MHz QRP *(Rules in May issue)*
4–5 August	G-QRP Club QRP CW *(Rules in April issue)*
5 August	DF Qualifying Event Salisbury *(Rules in July issue)*
11–12 August	European Meteor Scatter *(Rules in May issue)*
18–19 August	MARTS SEANET WW DX Phone *(Rules in June issue)*
18–19 August	9th SARTG Worldwide RTTY
19 August	70MHz *(Rules in June issue)*
19 August	DF Qualifying Event Slade *(Rules in July issue)*
25–26 August	All Asia Phone *(Rules in June issue)*
1–2 September	IARU Region 1 VHF *(Rules in June issue)*
1–2 September	144MHz Open and SWL
1–2 September	SSB Field Day *(Rules in May issue)*
8 September	BARTG VHF RTTY
8–9 September	International ATV Activity *(Rules in April issue)*
16 September	BARTG VHF RTTY
16 September	RSGB Region 1 VHF *(Rules in July issue)*
16 September	DF Final Rugby
22 September	AGCW-DL VHF CW *(Rules in June issue)*
October–November	432/1,296MHz Cumulative
6 October	VK/ZL Oceania DX Phone
6–7 October	IARU Region 1 UHF/SHF *(Rules in June issue)*
6–7 October	G-QRP Club QRP CW *(Rules in April issue)*
6–7 October	432/1,296/2,304MHz
13 October	VK/ZL Oceania DX CW
14 October	21/28MHz *(Rules in May issue)*
21 October	70MHz Fixed
21 October	21MHz CW
3–4 November	144MHz CW
10–11 November	2nd 1·8MHz
10–11 November	Esperanto Contest (ILERA). *(Details from G4MR QTHR.)*
17 November	All Austria 1979
24–25 November	BATC SSTV
2 December	144MHz Fixed
1980	
2–3 February	7MHz Phone *(Rules in June and July issues)*
23–24 February	7MHz CW *(Rules in June and July issues)*

DF Qualifying Event South Manchester results

Twelve teams assembled at the start, six miles west of Manchester, near the Manchester Ship Canal. The weather was perfect, being a hot, sunny day. The previous week had been very wet, much to the delight of the organizers as one station was adjacent to a river and swamp. Good signals were received from both stations and the majority of competitors chose transmitter B as their first.

Transmitter A, G3FVA/P, was located on the banks of the river Bollin, approximately 17km from the start. An extremely long antenna, which trailed through a nearby swamp, caused some consternation as competitors arrived on the wrong side of the river, the nearest bridge being half-a-mile away. The transmitter crew was most gratified at seeing or hearing competitors floundering across the river. The station was at the bottom of an almost vertical drop, and the operators were amazed to see one competitor taking this route, and being seized bodily by treacherous bramble tentacles. First to arrive was Bill North at 1441.

G3UHF/P, transmitter B, was located at Sink Moss some 16km from the start. The station was hidden in a rhododendron jungle, and several antennas were employed in an effort to make receivers useless in the locality. The operators were amused to see competitors run away from the transmitter every time it was operated.

After the event competitors were "revived" by an excellent tea at the club headquarters. Bill North won the South Manchester DF Trophy.

and, along with Bob Vickers, qualified for the final (subject to confirmation).

Posn	Name	Club	Time of arrival Station A	Station B
1	W. J. North	Mid-Thames	1441	1542
2	J. R. Vickers	Slade	1601	1441
3	R. Parsons	Burton-on-Trent	1603	1433
4	R. J. Mahony	Rugby	1455	1610
5	T. C. Gage	Mid-Thames	1604	1418
6	D. E. Newman	Slade	1604·5	1448
7	C. Merry	Dartford Heath	1447	1607
8	P. Homer	Dartford Heath	1620	1418·5
9	C. Plummer	Coventry	1628	1445
10	G. Whenham	Coventry	1629	1443
11	C. McKenzie	S Manchester	–	1518

One competitor failed to locate either transmitter.

RSGB Region 1 VHF Contest rules

0900-1700gmt 16 September 1979

Bands. Any three from 70MHz, 144MHz, 432MHz or 1·3GHz.

Sections.

1. Multi-operator, fixed or /P. Separate callsign on each band, simultaneous operation.

2. Single-operator, fixed or /P. One to three bands from the above. /P ops may go up to 20 miles outside the region. **ALL** ops must say that they are in or from Region 1.

3. Operators in other regions are invited to enter logs, scoring **ONLY** Region 1 QSOs.

Rules. The following RSGB vhf rules, as published in the January 1979 issue of *Radio Communication*, will apply: 2, 3, 5a, 6a, 9a, 10a, 11-16, 18, 19, 21.

Scoring.

A. For 70, 144 and 432MHz, as above rules 7a; for 1·3GHz 1 point per km; followed by B, C and D in that order.

B. Multiply 70MHz score by 3 and 432MHz score by 4.

C. According to antenna height asl. Multiply band totals as follows: 0-200ft by 2, 200-400ft by 1·8, 400-600ft by 1·6, 600-800ft by 1·4, 800-1,000ft by 1·2, 1,000-1,200ft by 1·1, 1,200ft and over by 1.

D. Add 10 points bonus for each contact with a Region 1 station.

Logs. Separate sheets for each band. One cover sheet including ngr and antenna height asl.

Awards. 1, The G3SMM Shield; 2, The G2CIP Shield; both to be held for the year. Certificates of merit to band leaders, and for best log in Section 3.

Entries. Within 15 days to G2CUZ, 34 Sandbrook Road, Ainsdale, Southport PR8 3JE.

Mobile rallies calendar

22 July—Cornish ARC Mobile Rally, Cornwall Technical College, Pool, Camborne. Talk-in on S22. Attractions include trade stands, bring and buy, bookstall, raffles, refreshments, etc. Details from G8JML, tel Truro 78020.

29 July—Scarborough Mobile Rally and ORM, Scarborough Technical College. Details from G4EDR, QTHR.

29 July—Anglian Mobile Rally, Stanway School, Colchester, Essex. Open 1000 to 1700. Talk-in on 144MHz. Further details from G3YAJ, tel 0206 39 3938.

5 August—RSGB National Mobile Rally, Woburn Park, Beds. Details from G3MVV, QTHR.

12 August—Derby Mobile Rally. Details from Mike Darn, 22 Reservoir Road, Brockwell, Chesterfield, Derbys.

19 August—Preston Mobile Rally, Park Hall Leisure Centre, Charnock Richard, Nr Chorley (new venue—well signposted, just off A49, halfway between junctions 27 and 28 on M6). Doors open 11am. Talk-in on S22. Trade stands, bring and buy, bars, buffet, plenty of car parking. Details from G8KTM, QTHR.

26 August—Torbay Mobile Rally, STC/ITT Social Club, Brixham Road, Paignton. Talk-in on S22. Trade stands, bookstall etc. Details from Mrs Coker, 2 Causeway Cottages, East Street, Ipplepen, Devon, tel 0803 812117.

9 September—Telford Mobile Rally, Town Centre Malls, Telford, Salop (approached via A5 exit off M6, A442 from N and S, or M54 from W). Free admission and parking. Jointly organized by Telford DARS and Salop ARS. Attractions include trade stands, exhibitions, "flea market" for private sales, excellent catering and club stands. Free coach ride to Ironbridge Gorge Open Air Museum, the best of its kind in Europe. Further details from G8DIR, tel Shrewsbury 64273; or G3UKV, QTHR, tel Telford 55416.

16 September—Peterborough R&ES Mobile Rally, Walton School, Mountsteven Avenue, Peterborough. Talk-in S22 G3DQW and RB10 via GB3PB, operational callsign to be advised. Usual exhibits, bring and buy. Details from G3EEL, QTHR, tel 65423 or 62881.

30 September—Harlow & D ARS Mobile Rally, Netteswell Comprehensive School, Harlow. Details from G3KEF, 71 Lodge Hall, Harlow, Essex.

7 October—Great Lumley AR&ES Mobile Rally, Community Centre, Great Lumley, Nr Chester-le-Street, Co Durham. Talk-in on 144MHz. All usual attractions. Further details from G4DWM, QTHR.

Looking ahead

21 July—BARTG Convention, Public Hall, Harpenden, Herts.

9 September—IoW Get-together, Alverstone Manor, Shanklin, IoW.

15 September—RSGB HF Convention, Birmingham.

22 September—Scottish VHF Convention, Dundee Technical College, Dundee.

30 September—Sixth Welsh Amateur Radio Convention, Oakdale Community College, Blackwood, Gwent.

12-14 October—World Association of Christian Radio Amateurs and Listeners Conference, Willersley Castle, Derbyshire. Details from: WACRAL Secretary, 13 Ferry Road, Warme, Hull HU7 5XU.

13 October—EI/GI Convention, Ballymascanlon Hotel, Dundalk, Eire.

8-10 November—Amateur Radio Retailers Association National Amateur Radio Exhibition, Granby Halls, Leicester.

your opinion

"GOINGS ON"

The Editor
Radio Communication

Sir—Referring to the "apalling goings on" letter in your February 1979 issue, and having been a very active radio amateur for over 40 years myself, I would like to air my opinion, countering that of G3ALI. Granted, the HZ1BS/8Z4 event may have been a well-meant dxpedition, but it was a most irresponsible one to begin with, as the participants involved lacked more than only basic experience. They should have known that we are swamped by sheer numbers, too much power, and absolute obsessions to work the expedition no matter what. I would say that this particular dxpedition should never have been attempted by beginners in the first place. *That* is the very core of the unfortunate story!

Responsible radio amateurs just do not go to 8Z4-land without possessing the qualities, know-how and operator's training of a Gus Browning, a Don Miller, a Harold Harris, a Fred Laun and other high-class dxpeditioneers. Come on—since when do dxpeditions take "lists"?

I have no sympathy for OE6EEG, none at all. He may even be partly responsible for the terrible bedlam caused by an operator who should have trained himself for several years handling contest exchanges before risking to put *such* a rare spot on the air. The people involved would have rendered the fraternity a much greater service had they stayed home.

Harry M. Lilienthal, F6DYG-DL7AH-9Q5AB-7X0AH

RIGHT KIND OF PUBLICITY

The Editor
Radio Communication

Sir—After so much poor—and generally incorrect!—publicity about amateur radio in the media, it was refreshing to see and hear Brian Rix once again on the little screen, explaining our hobby to Angela Rippon after the six o'clock news on 10 May.

Congratulations to all who took part in this broadcast, which can do us nothing but good, for it would appear that the average man-in-the-street knows more about citizen's band than amateur radio—thanks to American films! So, please, can we have more explanations and demonstrations on television—with G2DQU as mc, of course!

Douglas Byrne, G3KPO

RSGB SLOW MORSE PRACTICE TRANSMISSIONS

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

Sundays

Clock time	Callsign	MHz	Mode	Town
0900	G3WNR	1·975	A1/A3J	South Shields, T & W
1015	G3CGD	1·875	A1/A3	Cheltenham, Glos
1030	G3OHM/A	144·180	A1/A3J	Birmingham
1100	G2FXA	1·910	A1/A3/A3J	Stockton-on-Tees
1100	G3XJJ	3·535	A1/A3J	Northampton
1130	G3BLS	1·960	A1/A3	Osney, Oxford
1200	G3HVI	144·750*	A2/A3	Stoke-on-Trent, Staffs
1800	G3WNR	144·725*	F2/F3	South Shields, T & W
1815	G4DVZ	1·915	A1/A3J	Leeds, Yorks
1830	GM4HIG	3·550	A1/A3J	Aberdeen
1930	G3LDW	144·160*	A1/A3J	Birmingham
2030	G3ZDW	144·220 horizontal, omni-direct	A1/A3J	Swinderby, Lincs

Mondays

Clock time	Callsign	MHz	Mode	Town
1045	G3RAF	3·550 144·025*	A2 A2	Locking, Avon
1830	G3NCZ	145·525	F2	Blackburn, Lancs
1830	G3ZQS	1·930	A1/A3J (usb)	Darwen, Lancs
1900	G3ZRZ	1·975	A1/A3	Blackpool, Lancs
1900	G4FKZ	3·575	A1/A3	Chedderton, Lancs
1900	G4BNV	144·175 horizontal	A1/A3J east/west	Ottery St Mary, Devon
1900	GM4HIG	144·250 horizontal to 145·550* vertical	A1/A3J south-west A1/A3J	Aberdeen
1930	G3RAF	3·550 144·025*	A2 A2	Locking, Avon
1930	GI3SXG	144·100	A1/A3J	Newtownards, Co Down
2000	GM4ELV	3·570		Arrochar, Strathclyde

Tuesdays

Clock time	Callsign	MHz	Mode	Town
1045	G3RAF	3·550 144·025*	A2 A2	Locking, Avon
1830	G4CWN	144·100	A1/A3J	Stoke-on-Trent, Staffs
1830	G3NCZ	145·525	F2	Blackburn, Lancs
1830	G3ZQS	1·930	A1/A3J (usb)	Darwen, Lancs
1900	G4RS	3·565 144·110 to NNE	A1/A3J A1/A3J	Catterick, N Yorks
1930	G3RAF	3·550 144·025*	A2 A2	Locking, Avon
1930	G3ZYY	145·550 vertical to east	F2/F3	Saltash, Cornwall
2030	G3IRM	1·975	A1/A3	Bury St Edmunds, Suffolk
2030	G4FFC	144·390 horizontal to south	A1/A3J	Pertenhall, Beds
2030	G3OHM/A	144·180	A1/A3J	Birmingham
2030	G3KGU	1·915	A1/A3	Theydon Bois, Essex
2200	G3AWL	144·110 to south	A1/A3J	Peterlee, Co Durham

Wednesdays

Clock time	Callsign	MHz	Mode	Town
1045	G3RAF	3·550 144·025*	A2 A2	Locking, Avon
1830	G3NCZ	145·525	F2	Blackburn, Lancs
1830	G3ZQS	1·930	A1/A3J (usb)	Darwen, Lancs
1900	G3ULY G4EXD	1·826	A1/A3J	Culgaith, Cumbria
1930	G3RAF	3·550 144·025*	A2 A2	Locking, Avon
1930	G3ZYY	145·550 vertical to east	F2/F3	Saltash, Cornwall
2000	G3SWP	144·180*	A2/A3J	Doncaster, South Yorks
2015	G3WVJ	1·845	A1/A3	Staines, Middlesex
2100	G3HVI	144·750*	A2/A3	Stoke-on-Trent, Staffs

* Omni-directional

Thursdays

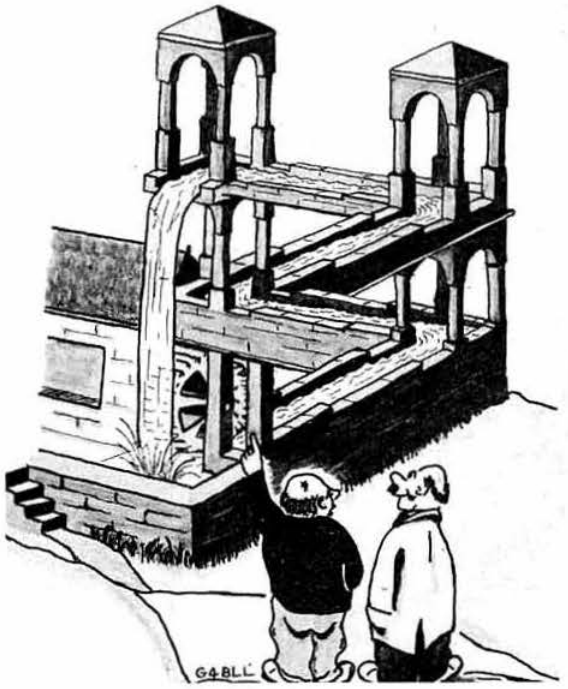
Clock time	Callsign	MHz	Mode	Town
1045	G3RAF	3·550 144·025*	A2 A2	Locking, Avon
1830	G3NCZ	145·525	F2	Blackburn, Lancs
1830	G3ZQS	1·930	A1/A3J (usb)	Darwen, Lancs
1900	G3BLS	1·960	A1/A3	Osney, Oxford
1900	G3ZRZ	1·975	A1/A3	Blackpool, Lancs
1900	G4RS	3·565 144·110 to NNE	A1/A3J A1/A3J	Catterick, N Yorks
1930	G3RAF	3·550 144·025*	A2 A2	Locking, Avon
1930	G3ZYY	145·550 vertical to east	F2/F3	Saltash, Cornwall
2030	G3ZDW	144·220 horizontal, omni-direct	A1/A3J	Swinderby, Lincs

Fridays

Clock time	Callsign	MHz	Mode	Town
1045	G3RAF	3·550 144·025*	A2 A2	Locking, Avon
1830	G4CRI	3·525	A1	Helston, Cornwall
1830	G3NCZ	145·525	F2	Blackburn, Lancs
1830	G3ZQS	1·930	A1/A3J (usb)	Darwen, Lancs
2000	G3WQK	144·750	F2/F3	Hailsham, Sussex
2030	G3ZDW	144·220 horizontal, omni-direct	A1/A3J	Swinderby, Lincs
2200	G3AWL	144·110 to south	A1/A3J	Peterlee, Co Durham

Saturdays

Clock time	Callsign	MHz	Mode	Town
0930	G2FNK	1·930	A1/A3	Staines, Middlesex
1045	G3RAF	3·550 144·025*	A2 A2	Locking, Avon



"I built it after the council refused planning permission for a wind generator!" ***(Based on "The Impossible Tribar" by R. Penrose, and "Waterfall" by M. C. Escher)***

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 26 July for the September 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; 5, 19 July, 2, 16, 30 August. Ainsdale Scout HQ. Full details from G2CUZ.

Blackburn (East Lancs ARC)—First Thursday in each month, 7.30pm. New venue: "The Globe" Bowling Club, Willows Lane, Accrington. Sec N. Jenkin, G4CGT, 5 Minster Crescent, Darwen.

Blackpool (B&DARS)—First Monday in each month. Phone G5ND (Blackpool 64508) for details of venue.

Bolton (B&DARS)—First Wednesday in each month (Main meeting). Horwich Leisure Centre, Victoria Road, Horwich, Bolton. Following the AGM in January, new sec is John Debney, G8RWY, 2 Coverdale Avenue, Heaton, Bolton.

Bolton (Edbro Radio Club)—New club! Details from the sec c/o Edbro Ltd, Lever Street, Bolton.

Bury (BRS)—Tuesdays, 7.30pm. Second Tuesday in each month (Lectures); 10 July (Fox hunt), 14 August (Radio and electronics brains trust). Mosses Community Centre, Cecil Street, Bury. Club publicity officer, Mike Bainbridge, G4GSY, 7 Rothbury Close, Ainsworth, Bury, 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", Worsley Road, Swinton. CW class each week. Sec Chris Harrison, G8KRG, tel 061-789 3538.

Leyland (LHARG)—Second Monday in each month, 7.30pm. "Rose & Crown", Ulnes Walton, Leyland. Details from G3XII.

Liverpool (L&DARS)—Tuesdays, 8pm. Conservative Association Rooms, Church Road, Wavertree. Sec G4EST.

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)—Meetings each lunchtime. Membership open to Polytechnic members and associated colleges. Shack in the Reilly Building, open anytime. Prospective members should contact Geoff Plucknett, G4FKA, UoL, 2 Bedford Street North, Liverpool L7 7BD.

Macclesfield (M&DRS)—Second Tuesday in each month, 8pm. "The Old Millstone", Waters Green, Macclesfield. For details of programme, etc, contact Julian Wanden, G8ATI, tel Macclesfield 20661.

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; 6 July ("Getting involved with microprocessors" by D. Wade, G8MQW), 13 July ("Review of RAE syllabus and new examination" by A. B. Langfield, G3IOA), 20 July ("Two-tone tests on a linear amplifier" by P. G. Torry, G3SMT), 27 July (Mini df), 3 August ("Electronics in scientific instrumentation" by Dr D. A. Yorke, G8RPQ), 10 August (Discussion evening and shack operation), 17 August ("A dissertation on diodes" by W. L. Seddon, G3VIW), 24 August (An evening for swls), 31 August ("Aviation", a film show by S. Aspinall, G3VSA), 8pm. Mondays (Informal), 8pm. Sale Moor Community Centre, Norris Road, Sale. Sec W. L. Seddon, G3VIW, 12 Barwell Road, Sale, tel 061-973 3355. 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—Informal meetings on the third Thursday in each month, 8pm. "Globe Club", Willows Lane, Accrington, Lancs. Details from sec. G3RXH.

Ormskirk (OARC)—Wednesdays, 8pm. Members' QTHs. For details please contact G3SZV; or sec G4GCB, tel Burscough 892416. Talk-in on 144MHz. Club interests include hf, vhf, uhf, rtty, atv, QRP and contests.

Preston (PARS)—Thursdays, fortnightly; 5, 19 July, 2, 16, 30 August. "Windsor Castle", St Paul's Square, Preston. 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 and fourth Wednesdays in each month, 8pm. Blossoms Hotel, Buxton Road, Stockport. Hon sec G3FYE. Club net Sundays, 11am, 3,692kHz. Visitors always welcome.

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. 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.

REGION 2—RR D. S. Smith, "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)—Wednesdays, 7.30pm. Pie Hall, Denby Dale. Sec G3FGH. Visitors always welcome.

Goole (G&DARS)—Fridays, 7.30pm (during school term only). Goole Grammar School. Details from chairman G3VBI.

Halifax (Northern Heights ARS)—Second and fourth Tuesdays in each month, 7.45pm. New venue, HQ Bradford Sub Aqua Club, Mountain, Nr Queensbury. Sec G3UI.

Hornsea (HARS)—Wednesdays, 8pm. Rear of "Victoria Hotel", Hornsea (facing Hornsea Mere). Note new sec Bob Murden, G4BHF, 93 Gillshill Road, Hull, Yorks HU8 0JL. Club net Tuesdays 8pm, S21 (145·525MHz fm).

Hull (H&DARS)—6 July (Preparation for VHF NFD), 7-8 July (VHF NFD), 13 July (Top band df hunt—G3RDM), 20 July (Open forum), 27 July ("Quad loop antennas" by G3PQY), 29 July (144MHz QRP Contest). 8pm. Community Centre, Fountain Road, Hull. New sec E. A. Durrant, 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. Planning permission for new 60ft tower and shack received. Sec G4DZI.

Leeds (LUUARS)—Tuesdays, 8pm. Union Annexe (second floor), Woodhouse Lane. All new students welcome. Sec G4CNG, QTHR, or at "E" block, Lupton Flats, Alma Road, Leeds 6, during term.

Otley (OR&ES)—Tuesdays, 8pm. 14 Back of Court House Street.

Otley. Advance notice of Northern Mobile Rally, 20 May 1979, Victoria Park Hall, Keighley, Yorks. Sec G8DFZ.
Scarborough (SARS)—Mondays, 7.30pm. New headquarters: 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. Note new sec G4APV, 321 Fulwood Road, Sheffield S10. Visitors and swls particularly welcome.
UK FM Group (Northern)—1 July, 5 August, 2 September, 7.30pm. Royal Hotel, Barnsley. Sec G8PLJ. Do you use GB3NA? Your subs or donations would help to support the service provided by this repeater.
Wakefield (W&DARS)—3 July (Pitch and putt tournament/social evening), 17 July ("RTTY on the air" by G3WWF), 31 July (Treasure hunt), 14 August (On the air), 28 August (To be arranged). 7.30pm. "Holmfield House", Thornes Park, Wakefield. New sec Andrew Walker, 7 Stannard Well Lane, Horbury, Wakefield, tel Horbury 274607.
York (YARS)—Fridays (except third in each month), 7.30pm. United Services Club, 61 Micklegate, York. Sec G3WVO, QTHR.

Congratulations to Jim Rankin, G4HKD, on his marriage to Carol on 23 June, from all his friends on Humberside.

RR2 hopes to meet as many members as possible at the ORM to be held at Scarborough Technical College on Sunday 29 August at 2.30pm.

REGION 3—RR H. S. Pinchin, G3VPE, 61 Cole Bank Road, Hall Green, Birmingham B28 8EZ. Tel 021-777 1320.
Birmingham (Midland ARS)—24 July (Working party), 21 August (Working party), 8pm. New premises—see sec. Sec G8BHE.
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. 1 August (Open night), 5 September ("The workings of RSGB and WARC" by Tom Douglas, G3BA), 8pm. "Hampstead House", Fairfax Road, West Heath, Birmingham B31 3QY. Sec G4GZI.
Birmingham (University of Birmingham ARS)—Tuesdays during term, RAE and morse class fortnightly, 7pm. Students' Union (above stage). Club stations G3IUB and G8IUB. Sec G8HTH.
Bromsgrove (B&DARC)—10 August (Natternight, members to bring any new electronic items), 1/2 September (SSB Field Day), 14 September (Surplus sale), 8pm. Avoncroft Art Centre, Bromsgrove. Sec G4HFP, tel Stourport (02993) 3818.
Burton-on-Trent (BonT&DARS)—Wednesdays, 8pm. Stapenhill Institute, Main Street, Stapenhill, Burton-on-Trent. Sec G3ACR.
Cannock Chase (CCARS)—2 August, 6 September, 8pm. "Lynwood", Old Penkridge Road, Cannock. Other Thursdays, 8pm. "Acorn" public house (rear room), Town Centre, Cannock. Sec G8FWZ. Visitors welcome.
Coventry (CARS)—20 July (Night on the air), 27 July (Open evening), 3 August (Open evening), 10 August (Outside event—see sec), 17 August (VHF night on the air), 24 August (Treasure hunt), 31 August (Night on the air), 7 September (Outside event—see sec), 14 September (Night on the air), 8pm. Baden Powell House, 121 St Nicholas Street, Radford, Coventry. Sec G8OMB. 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 18 July, 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.
Mid-Warwickshire (MWARS)—First and third Mondays in each month, 8pm. 61 Emscote Road, Warwick. Sec G8CXL.
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)—17 July ("The Canadian ARRL convention" by Mike Smith, G4BTE, and Gordon Meddings, G4DGM), 21 August ("Solihull and Chelmsley Wood Raynet Group" by Ken Harris, G8NAJ), 7.30pm. The Manor House, High Street, Solihull. Morse classes available. Sec G4BBT. 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)—First Tuesday in each month (Informal), 9.30pm. "Bird in Hand" public house, Hagley Road, Oldswinford, Stourbridge. 16 July, 6 August (Constructional evening), 20 August, 3 September (Constructional evening), 7.45pm. Library, Longlands School, Brook Street, Stourbridge. Sec G4IEB.
Stratford-upon-Avon (SuponA&DARC)—Every third Friday, commencing 27 July, 7.30pm. The Clubroom, Swimming Pool, Bridgefoot, Stratford. Sec G4EXR, tel Stratford (0789) 5638, weekends only. New members welcome.
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. Indoor Sports Centre, Corporation Street, Tamworth. Sec G4EUF. New members welcome.
Telford (T&DARS)—11 July (Visit to Ever Ready Ltd, Dawley), 18 July (Preparations for portable expedition to Wales), 25 July (Social evening), 1 August (Antenna test range—a gainful evening), 8 August (G3ZME on the air), 15 August (Informal), 22 August (Informal), 29 August (No meeting), 5 September (Rally preparations), 12 September (Report on portable expedition), 7.30pm. Phoenix Centre, Webb Crescent, Dawley. Sec G3UKY, tel Telford (0952) 55416. Visitors welcome.
Walsall (WARC)—Alternate Wednesdays, commencing 25 July, 8pm. Forest Community Centre, Forest School, Hawbush Road, Leamore, Walsall. Sec G4GKC, tel Walsall 31675.
Willenhall (W&DARS)—Alternate Wednesdays, commencing 18 July. Little London Community Centre, Bloxwich Road South, Willenhall. Sec M. P. Batchelor, 19 Newlands Close, Willenhall, West Midlands WV13 2DQ. New members welcome.
Wolverhampton (WARS)—30 July (Natternight), 6 August (Surplus sale), 13 August (Natternight), 20 August (Measurements, discussion), 3 September, 10 September, 8pm. Neachells Cottage, Danescourt Road, Stockwell End, Tettenhall, Wolverhampton WV9 9PH. Sec G8EDG.
Worcester (W&DARC)—6 August, 3 September ("Planning permission and the radio amateur" by Bob Price, G4BSO), 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 Fridays (Morse classes), 7pm. 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, 7.30pm. Sherwood Community Centre, Mansfield Road, Nottingham. Sec M. 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 new 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.
Following information is latest received.
Bedford (B&DARC)—Wednesdays, 8pm. Ravensden. Sec G4FFC.
Cambridge (C&DARC)—Fridays, 7.30pm. Air Training HQ, Newmarket Road. Sec G4BAO.
Cambridge (CUWS)—Mondays during full term (Speakers). Other Mondays (Informal), evenings. Queen's Bar. Full details from Adrian Langford, G8POP, 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. Sec G3HJF.
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)—First Friday in each month, 7.30pm. The General Foods Sports and Social Club, Spriceball Park, Banbury. Sec S. L. Terry, G8OCT, tel Banbury 4769.
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)—First Monday in each month, 8pm. Hedgerley Scout Hut, Hedgerley, Nr Slough, Bucks. Sec G8DAY. New members, visitors and swls welcome.
Harwell (Atomic Energy Research Establishment RC)—Fridays, lunchtime. The Shack, AERE Harwell, Didcot, Berks. For further meeting details contact sec G8DVK.
High Wycombe (Chiltern ARC)—8pm. John Hawkins Ltd, Victoria Street, off Oxford Road (A40), High Wycombe. Further details from sec G4FRL, tel Kingston Blount 52006.
Maidenhead (M&DARS)—5 July (Talk by visiting VK swl), 17 July (Demonstration of members' own gear). Red Cross Hall, The Crescent, Maidenhead. Sec P. J. Patick, 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 F. Walters, Staff Residence, Milton Keynes College of Education.
Oxford (O&DARS)—Second and fourth Wednesdays in each calendar month, 7.30pm. Civil Service Social Club, Marston Road, Oxford. Sec G4BHR.
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.
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 G3TDR, tel Staines 56513.
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 June ("AMSAT/Oscar" by G3AAJ), 5 July ("SSTV" by G3OQD), 2 August ("Microwaves" by G8CIU and G8CTT), 6 September (Surplus sale extravaganza), 7.30 for 8pm. Christchurch Centre, High Street, Eltham, London SE9. For details of morse classes run by the club contact sec. Sec G4FUG.
Croydon (Surrey Radio Contact Club)—First and third Wednesdays in each month, 7.30pm. TS Terra Nova, 34 The Waldrons, Croydon. Sec G4FFY.
Crystal Palace (CP&DRS)—Third Saturday in each month, 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, 8pm.

Members and friends at the thirty-first annual dinner and ladies festival of the Sutton & Cheam Radio Society, at which Mr John Bazley, G3HCT, RSGB President, was guest of honour. L to r: (standing) K. Ellis, G5KW; M. Pharaoh, G3LCH; J. Korndorffer, G2DMR; R. McDonald, G3DCZ; R. Clews, G3CDK; John Bazley, G3HCT, RSGB President; Bob Tillin, G3MES, S&CRS president; John Allaway, G3FKM, RSGB past-President; John Graham, G3TR, RSGB past-President; D. Atter, G3GRO; L. Seaton, G3HSK; (seated) R. Hewes, G3TDR; R. Harvey, G2FSA; G. Haynes, G3CWL

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. Berrylands Scouts and Guides HQ, Stirling Walk, Raeburn Avenue, Surbiton. Sec G4APG, tel 01-399 8113. The society is seeking a smaller and more convenient meeting place.

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&CARS)—Wednesdays, 7.30pm. Ray's Social Club, London Road, North Cheam. Sec G2DMR.

Thames Ditton (Thames Valley ARTS)—Giggs Hill Green Library, Giggs Hill Road, Thames Ditton. For meeting details contact sec G3ZNW.

Tolworth (Decca ARG)—New club! 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.

REGION 8—RR D. N. T. Williams, G3MDO, "Seletar", New House Lane, Thanington, Canterbury, Kent.

Brighton (B&DRS)—8pm prompt. Catholic Church Hall, Bristol Road, Brighton. Details from N. Hewitt, G8JFT.

Burgess Hill (Mid-Sussex ARS)—7.45pm. Marle Place, Burgess Hill. Details of future events from G3PEQ.

Canterbury (East Kent RS)—5 July (Barbecue at QTH of G3MDO). Details of future events from G8GHH or G3MDO.

Chichester (C&DARC)—Details of future events from J. Chinn, 5 Shrubbs Drive, Middleton-on-Sea, Bognor Regis PO22 7SQ, tel 2335.

Crawley (CARC)—Details of future events from G3MGL, tel 0293 20986.

Dartford (DHDFC)—Second Friday in each month. Scout House, Broomfield, Dartford. Details from Jeanette Maggs, 25 Leybridge Court, Eltham Road, Lee, London SE12.

Dover (South East Kent YMCA ARC)—Wednesdays, 7.30pm. Further details from G8PZA or G8KEN.

Eastbourne (Southdown ARS)—First Monday in each month. Details from G8KQN, or pro G3LFZ.

Gravesend (GRS)—Mondays, 7.30pm. "Windmill Tavern", Shrubbery Road, Gravesend. Details of future events from G4GML.

Hastings (HE&RC)—Fridays. 479 Bexhill Road, St Leonards-on-Sea, Sussex. Third Wednesday in each month, 7.30pm. ITT Social Club, Crown House, 57 Marina, St Leonards-on-Sea, Sussex. 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—Details of membership 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. 6 July (Editor of *Radio Communication*), 20 July ("Schomogglepop" and planning for summer foxhunt). 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.

Camborne (Cornish RAC)—First Thursday in each month; 5 July ("Radio interference" by G3VWK and G3XFL), 7.30pm. SWEB Clubroom, Pool, Camborne. 22 July (Cornish rally). Camborne. Full details from G3VGO, tel Devoran 864255. Cornish net each weekday 10am on 3·715MHz, and on Sundays 11am on 3·682MHz. Visitors most 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, Exwick, 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. Full details from Dave Hanson, 67 Carter Avenue, Exmouth, tel 75482.

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 and fourth Wednesdays in each month. New chairman is G3YGJ. For full details of meeting places contact G4CG, tel Barnstaple 3636.

Plymouth (PRC)—Alternate Mondays, 7.30pm. Whitleigh Methodist Church, Budshead Road, Whitleigh, Plymouth. New chairman Lauraine Court, G4GSZ. Further details from new sec John Butcher, G4GWJ.

Saltash (S&DARC)—First and third Fridays in each month, 7.30pm. Burraton Toc-H Hall, Saltash. New sec D. Bunce, 47 Hobbs Crescent, Saltash, tel 2839.

Torbay (TARS)—Fridays, with special meeting on last Saturday in each month, 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 10.30am on 3·756MHz, and Saturdays 9.30am. 144MHz net Mondays 8pm on S22. Visitors always 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. New venue: Weycook Cross, Five Miles Lane, Barry. Details from new sec 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.

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 (SARC)—Tuesdays fortnightly, 8pm. West Cross Hotel, West Cross, Swansea. Details from sec GW8CMA.

Swansea (SARS)—Tuesdays fortnightly, 8pm. Sketty Park Sports and Social Club. Anewin Way, Sketty Park. Swansea. Further details from GW4HAT. Intending visitors must contact sec before arrival.

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, "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; 12 July (Fox Hunt), 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 144·00MHz), 8pm. Newcomers and visitors welcome.

REGION 12—RR F. Hall, GM8BZX, 45 Priory Cottages, Lunanhead, Forfar, Angus DD8 3NR.
Aberdeen (ARS)—Fridays; 13 July to 24 August (Open for rag chews and operating only), 31 August (Demonstration of audio fed decoder for cw rtty ASCII visual presentation), 7 September (Surplus sale), 14 September ("Behind the scenes at the RSGB"), 7.30pm. 80 Guild Street, Aberdeen (next to "Station Hotel" immediately adjacent to railway station). Sec GM4BKV. The club now has a printed circuit board service, from own artwork.
Dundee (Kingsway Technical College ARC)—Closed until first Tuesday in September. Thereafter: Tuesdays; 6.30–7pm, morse practice; 7–8pm, arranged lectures; 8–8.15pm, coffee; 8.15–9pm, any other business and discussion. Dundee Technical College. Sec GM4FLP.
Elgin (Moray Firth RS)—Wednesdays, 7.30pm. Elgin Technical College. Sec GM8OVN. The club extends a warm welcome to all licensed amateurs and swls in the area who may be hesitant in coming along. Non-members will be asked to pay a donation of 50p per meeting, with a limit of two attendances before joining the club.
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)—Tuesdays, 7pm. Perth Technical College. Sec GM4DQJ. The Perth repeater, GB3PR, is now operational on channel R3—coverage reports would be welcome.
Shetland (Lerwick RC)—Wednesdays, 7.30pm. "Annsbrae House". Sec GM4BBL. The club has been awarded a grant, by the local authority, to purchase equipment, and intends to order an hf transceiver with linear amp, an hf beam antenna, an fm/ssb 144MHz transceiver and beam antenna, and a receiver for swls. Visitors always welcome.

Intending visitors to clubs should first check with secretaries, as a number of clubs may be closed during the summer months. Remember, when working mobile, especially during the busy summer months, **drive with care**; your life is more important than your hobby.

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.
Dunfermline (DARS)—Second Wednesday in each month, 7.30pm. CCTV Studio, Pittencrieff School, Maitland Street, Dunfermline. Details from sec GM3MGX, tel Limekilns 313.
Edinburgh (E&DARC)—Tuesdays, 7.30pm. City Observatory, Calton Hill, Edinburgh. Details from sec GM8MJV, tel 031-663 2033.
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)—Wednesdays, 2pm. Aerial Laboratory, Top Floor, Mountbatten Building, 31-35 Grassmarket, Edinburgh.
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)—Details of summer programme from GM4DIJ, tel 031-337 7311.
Glenrothes (G&DARC)—Third Sunday and every Wednesday in each month; 15 July (VHF NFD post mortem), 19 August, 16 September (AGM), 7.30pm. Old Nursery School Building, Provosts Land, Douglas Road, Leslie, Fife. Details from GM4EJI.
St Andrews (University of St Andrews R&ES)—Details from Physics Department, North Haugh, St Andrews.

REGION 14—RR I. L. McKechnie, GM8DOX, 42 Newton Crescent, Dunblane FF15 0DZ.
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 ARC)—Try GM4FDM for information.
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, 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.
Stirlingshire (SARG)—New group! Starting up initially to put a 70cm repeater on the air. Anyone welcome to join including members of the diminished Falkirk & District RC, to enlarge club activities. Details from sec GM3POK, or GM4CXF.

All secretaries please note the closing date for items for insertion in the next *Club news* at the beginning of this column.

Offer of the use of premises, comprising lecture room, committee room and shared use of a workshop, on any day except Thursday and Saturday. Any interested parties please contact ASTRA Ltd, 49 Almada Street, Hamilton. (Opposite Bell College and court building.)

All secretaries please note that RR14 has an Ansaphone available for their use. Tel Dunblane (0786) 822212.

REGION 15—RR I. J. Kyle, GI8AYZ, 2 Galgorm Gardens, Ballymena, Co Antrim BT42 1BA.
Following information is latest received.
Ballymena (BRC)—Tuesdays, (RAE and morse classes), 7.30pm. 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 (except July and August). 90 Belmont Road, Belfast 4. Details from GI3USS.
Belfast (CoBYMRC)—Tuesdays, 7pm; Saturdays, 2.30pm. Fourth Floor, YMCA, 12 Wellington Place, Belfast. Sec GI8MQR.
Belfast (Queen's University of Belfast RC)—Tuesdays during term, 8pm. Queen's University, 37 Fitzwilliam Street, Belfast 9.
Dromore (Lagan Valley ARS)—First Monday and third Tuesday in each month, 8pm. Scout Hall, Mossvale Road, Dromore, Co Down. Details from AR GI4GDV.
Mid-Ulster (MURSGBG)—First Sunday in each month. GI4BAC's QTH. Details from AR GI8RJW, tel Armagh 524453.

REGION 16—RR M.S. Appleby, G3ZNU, 45 Cedar Avenue, Kesgrave, Ipswich IP5 7HA.
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 R. Brocks, 30 Rowan Drive, Heybridge, Maldon.
Colchester (CRA)—Thursdays, fortnightly, 7.30pm. Main Block, Colchester Institute, Sheepen Road, Colchester. Details from Frank Howe, G3FIJ.
Felixstowe (FARC)—Tuesdays (Informal). 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.

On 4 May Dr A. C. Gee, G2UK, gave a lecture to the Lowestoft & D ARC on his association with amateur radio over the past 50 years. The photograph shows Dr Gee seated with some of the club members: l to r (standing), G5YK, G4BRZ, G4CPW and G8KOH; (seated) swls Simon Jones, Alex Huggins, Paul Burgess and Gordon Parker, G8KPI, G2UK, G4CVA, swl Fred Buckley and G3JMU. *Photo:* G8JBD

Harlow (H&DRS)—Tuesdays, 8pm. Mark Hall Barn, First Avenue, Harlow. Details from G3WUX.
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, 8pm. "Handford House", Ranelagh Road, Ipswich. Morse classes available. Details from sec Jack Tootill, G4IFF, 76 Fircroft Road, Ipswich.
Loughton (L&DARS)—Fridays, fortnightly, 8pm. "Loughton Hall", Rectory Lane, Loughton. Further details from sec John Ray, G8DZH, tel 01-508 3434, evenings.
Lowestoft (L&DARC)—Fridays; 13 July ("Surplus equipment and its modification to amateur use" members' evening), 27 July (Subject to be arranged), 10 August ("Homebrew equipment" members' evening), 24 August (144MHz fm dx hunt), 7 September ("Antennas" RSGB tape/slide lecture by G6CJ), 7.30pm. North Suffolk Teachers' Centre, Lovewell Road, Lowestoft. Details from Paul Godfrey, G8JBD.
Martlesham (MRS)—First Wednesday in each month, 7.30pm. Formal meetings to re-start in September. Visitors always welcome but must first contact Simon Garrett, G4EVN, PO Research Centre, Martlesham Heath, Ipswich.
Norwich (Norfolk ARC)—Wednesdays; 4 July (VHF NFD discussion), 11 July (Committee meeting), 25 July (Informal), 1 August ("Radar" by G3KVT of Marconi Co), 8 August (Informal), 15 August ("Modern air defence systems" by FO P. Griffiths of RAF Neatishead), 22 August (Committee meeting), 29 August ("Basic transmitters, with emphasis on young swls"), 7.45pm. Crome Community Centre, Telegraph Lane East, Norwich. 18 July (Visit to Coltishall for flight simulator); numbers are restricted to 10. Details from Peter Forster, G3VWQ.
Southend (S&DRS)—Fortnightly, 8pm. Church Hall, Sir Walter Rayleigh Drive, 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.
Basingstoke (BARC)—Third Wednesday in each month, 7.30pm. Chineham House, Popley Way, Basingstoke.
Basingstoke (UK FM Group Southern)—First Wednesday in each month. Chineham House, Popley, Basingstoke. Details from pro Chris Jackson, G8POB, 69 Buriton Road, Harestock, Winchester.
Bournemouth (BARS)—Dolphin Hotel, Holdenhurst Road, Bournemouth.
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, 8pm. Details from sec GU8ITE, PO Box 100, St Peter Port, Guernsey.
Horndean (H&DARC)—Second Thursday in each month, 7.30pm. Merchiston Hall, Horndean. Net Sundays, 6.30pm, 21·40MHz. Sec G4CHQ.
Jersey (JAEC)—11 July (Talks on television). Communicare Centre, St Brelade's. Further details from sec, tel 0534 23249.
Jersey (JARS)—Sundays, 10.30am, and 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 J. Worth, G3ZKA.
Portsdown Hill Repeater Group—Activity night on GB3PH (RB2), Mondays, 1930gmt. All stations welcome to the net. Details from G8GNB.
Portsmouth (P&DRC)—Wednesdays, 7.30pm. Portsmouth Community Centre, Malins Road, Buckland, Portsmouth. Sec G3CNO.
Salisbury (SR&ES)—Tuesdays, 7.30pm. Salisbury Activity Centre, Wilton Road. Sec G2FIX.
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 G4COM.
South Dorset (SDRS)—7.30pm. Lecture Hall, South Dorset Technical College, Newstead Road, Weymouth. Details from sec G3ZGP.

Swindon (SD&ARC)—Alternate Wednesdays, 7.45pm. Clubroom, Oasis Leisure Centre. Sec I. Browne, 59 Kitchener Street, Swindon.
Winchester (WARC)—First Friday and third Thursday in each month, 7.30pm. "Crown Hotel". Sec Chris Jackson, BRS39944, 69 Buriton Road, Harestock, Winchester.

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)—Alternate Wednesdays, 7.30pm. Great Lumley Community Centre. RAE and morse tuition if required. 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)—Thursdays (Informal). "Queens Head", Morpeth. Sec G8GVN.
Newcastle-upon-Tyne (Tyne & Wear Repeater Group)—5 September, 5 December, 7.30pm. 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)—Mondays (Constructional), Wednesdays (CCTV), Thursdays (Informal), 8pm. Tuesdays (Morse classes), 7.30pm. Hon sec A. Sammons, G8IZN. Members are asked to remember the special event in the club's year—the Dagenham Town Show, 14-15 July. All welcome.
Cheshunt (C&DRC)—Wednesdays. Church Room, Church Lane, Wormley, Herts. Hon sec G3OJI.
Chingford (Silverthorn RC)—Fridays, 7.30pm. Friday Hill House, Simmonds Lane, Chingford E4. Sec G4AJA, tel 01-529 2282. All visitors welcome.
Chiswick (Acton, Brentford & Chiswick RC)—17 July ("My return visit to ZL land" by G3YXB), 21 August ("WARC 79—UK proposals" by G4GD), 7.30pm. Chiswick Trades and Social Club, 66 High Road, Chiswick W4. Hon sec G3GEH, tel 01-992 3778.
Ealing (E&DARS)—Tuesdays, 8pm. Northfields Community Centre, Northfields Road, W13. Sec G8KPN, tel 01-997 5949. All welcome.
East London (ELRSGBG)—This group will re-open for lectures on the third Sunday afternoon in September. All enquiries and offers for lectures to J. R. Holmes, G3PKQ, tel 01-558 2928; or G3AMF.
Edgware (E&DRS)—Second and fourth Thursdays in each month, 8pm. Watling Community Centre, 145 Orange Hill Road, Burnt Oak, Edgware. 7-8 July (VHF NFD). Moat End Farm (provisionally). 12, 26 July (To be announced). Interested parties contact hon sec G3MNO, tel 01-907 1237. Monday net 2150 local on 1·875MHz.
Harrow (RSH)—Fridays, 8pm. Harrow Arts Centre, High Road, Harrow Weald. (Bar, car park—park neatly.) Hon sec G4AUF, tel 01-868 5002.
Havering (H&DARC)—Wednesdays, 8pm. Fairkytes Art Centre, Billet Lane, Hornchurch (opposite New Queens Theatre). Details from A. G. Negus, G8DQJ, tel Upminster 24059.
Holloway (Grafton RS)—Fridays, 8pm. Holloway Institute, Archway Annexe, Highgate Hill, London N19. Details from sec B. Bond, G3ZKE.
Ilford (IRSGBG)—All meetings are informal. 50 Mortlake Road, Ilford, Essex. Sec. G3LRE, tel 01-500 7196.
London EC2 (Post Office HQ ARG)—Wednesdays, 6pm. Room 413, "Lutyens House", Finsbury Circus, London EC2. Chairman G8EUQ, Room 28, Euston Tower, tel 01-388 1166 ext 323 (day).
Northolt (British Airways European Division ARS)—First Monday in each month. Trident Club, Western Avenue, Northolt, Middlesex. This club is open to non-BA employees by invitation. Contact G3TLG for details. Civil Aviation Sunday net 1100-1200gmt on 3·68MHz, listen for G3NAF or G3BEA. (RR19 has had no response to his request for this society's sec to contact him—see *Radio Communication* May 1979, p460).
St Albans (Verulam ARC)—Fourth Thursday in each month. Hon sec A. Clarke, G8MAE, This club is having difficulty in finding a meeting place; all interested parties should telephone hon sec on Hemel Hempstead 64751.
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)—Second Thursday in each month; 12 July ("Early days of ssb—how it was done" by S. Chrees, G3DZW), September ("The Oscar lecture" by G3RWL—one not to be missed), 7.45pm. The Scout Hut, Wilson Street, Winchmore Hill N21. 9 August (Open meeting), 7.45pm. St Monica's School, Cannon Road, Southgate N14. Sec J. Fitch, G8EWG, tel 01-440 7353. All welcome.
South Kensington (Baden Powell House Scout ARS)—Third Tuesday in each month, 8pm. Baden Powell House, Queensgate, South Kensington. (RR19 has had no response to his request for RSGB members in this society to contact him—see *Radio Communication* May 1979, p460).
South West Herts UHF Group—This group, currently running GB3HR, requires donations; to G3THQ please. The building of GB3BM and GB3SWM, the 10GHz beacon, is currently progressing. Talks can be arranged for interested clubs. Sec G8BBE.
Stevenage (S&DARS)—First and third Thursdays in each month; 5 July ("AMSAT Phase 3 satellite"—provisional), 12 July (DF hunt), 19 July (HF and vhf stations active), 2 August (Natternight, plus tea), 8pm. Morse 7.30pm. Plant B staff canteen, British Aerospace, Gunnels Wood Road, Stevenage. New hon sec Ted Godfrey, 94 Common View, Letchworth. FM net, Mondays 1930, 145·550MHz.
UK FM Group (London)—Second Tuesday in each month, 8pm. "The Green Man", near Great Portland Street underground (easy parking). New hon sec Tony Askew, G4BPC. This group requires an editor for *FM News*. All welcome.
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.

Not bad! Only 15 secs failed to report any activity this time—*RR19*.

REGION 20—RR G. Mather, G3GKA, 8 Hills Close, Keynsham, Bristol.

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)—7-9.30pm. Small Lecture Theatre, Queens Buildings, University Walk, Clifton, Bristol 8. Hon sec G4FRG.
Bristol (North Bristol ARC)—Fridays, 7pm. RAE instruction Wednesdays, 7pm. Lockleaze Community Association, Romney Avenue, Lockleaze, Bristol BS7. 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 1979. RAE and more 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)—First and third Thursdays in each month, 7.30pm. Chequers Bridge Centre, Painswich Road, Gloucester. Hon sec G3MA.
Weston-super-Mare (WsMARS)—Second Monday in each month (except August), 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. Building 101, Houndstone Camp, Yeovil (off A3088). Hon sec G3NOF. Club net 10.30am Sundays, 3·660MHz.

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 1979: **2 Aug, 30 Aug, 27 Sept, 25 Oct, 22 Nov, 27 Dec.** No guarantee of inclusion in a specific issue can be given, other than the first possible issue after receipt.

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

FL2500 linear, 160-80, £160. Ampere AP882A, 145MHz, 12V dc, 80W output, mobile, linear, £70. Microwave Modules 144MHz converter, £12. *Wanted:* pair QY4-400s, or similar. G3RCE. Tel Titchfield 42022.

FT501 digital hf high power tx/rx, 80-10m, psu and l/s unit, £325 ono. G8KGE, QTHR. Tel Bristol 613488.

Yaesu FTDX401, perfect cond, looks like new, also spare valves, £275 no offers. Hy-Gain 12AVQ, 25m UR67, three months old, £30. G4HLT. Tel Mike, Beaconsfield 6094.

Trio TR7500, £170. Cossor low band 303, handbook, £5. Creed 75 t/p for spares, £3. CV89 'scope unit, £3. 6S6M auto tx, very good cond, £6. Buyer to collect. Tel Bolton 52384.

Microwave Modules 432/28 transverter, as new, £75. G2DUP, QTHR. Tel St Merryn 520761.

Datong rf speech clipper unit, with lead, £25; class D wavemeter, manual, built-in mains psu, £7; all exc cond. Prefer buyer collects. G3PY, QTHR. Tel Glossop 61062.

KW2000B, fitted KW stability mod kits, incl matching psu, remote 4B vfo, Q-multiplier, good cond, £225. Prefer buyer collects, carr extra. G4AMD, 40 Beech Road, Clanfield, Hants. Tel Chris, 0705 591871, evenings; or 0705 486391 ext 308, days.

Drake 2B xtal cal, 115/240 trans, manual, set valves, exc rx, £80. 14MHz 2-el full-size beam, twin boom, alloy castings, needs gamma match, £20. Prop pitch motor, needs cleaning, £8. Q6/2 6-el quad, as new, £17. G3AIZ, QTHR. Tel Chelmsford 71790.

Heathkit SB301, SB401, SB200, perfect cond, all inter-connecting cables, swr meter, mic, etc, £450 ovno; will not split. Business forces reluctant sale. G3ZYV, QTHR. Tel Medway 54203, evenings.

Trio 2200G, fitted 7ch, nicads, charger, case, mobile mount, power lead, immac cond, in orig packing, £120. Heath HA-201A 10W 2m amp, needs slight attention, £10. G3PAX, QTHR. Tel 0903 40513.

Trio JR500S rx, good cond, noise limiter, £50. G4HWM. Tel 01-428 4972.

HW202, 144MHz, 10W, mobile, 6ch, toneburst, £60. FT101E, 350Hz 8-pole filter, little used, as new, £495. G3UEP. Tel Horndean (0705) 595978.

FT221R, full xtals, as new, £310. YC221, £45. FL2100B, little used, £230. Late property GW3XJD. GW3ZBB, "Llwyn Gwyn House", Abergavenny, Gwent. Tel 0873 82 267, after 6pm.

FS301 swr/pwr meter, 1·8-30MHz, 0-1,000W, switched ranges, three months old, as new, £20. BCC base stn, comp, 2m tx and rx, a.m., fm, S0, S20, S22, R7 fitted, only £8. I need the space. G4HLT. Tel Mike, Beaconsfield 6094.

Icom IC240 144MHz synthesized fm tx/rx, clean cond, no mods, orig packing, £150. Pocketfone xtals, 433·2MHz tx and rx, £2. G4HYG, G8FDL QTHR. Tel Westhoughton (0942) 812866.

Trio 2200G, comp with nicads, charger, fitted S0, S20-22, 144-48, R5, £99. Bradley, Flat 8, 21 Belle Vue Road, Poole, Dorset. Tel Poole 86700, days; or Parkstone 743076, evenings.

SR550 communications rx, amateur bands, 160-10m, good cond, comp with handbook, £40 ono. G. E. Cowell, 50 Rowan Road, Sedgley, W Midlands. Tel 72824.

FT401, QRO rig, cw filter, fan, mint cond, £285. *Wanted:* FT101E; or exch with cash adjustment. GM4DZX, QTHR. Tel 041-959 4455, after 6pm.

Trio/Kenwood twins R-599/T-599, absolutely mint cond throughout, rx boxed, 2m converter, all filters, manuals, cables, etc, £350 pair. QRO linear Hammarlund HXL-One, pair 572Bs, £170. Comp stn for £500. G3XPM, QTHR. Tel Harrogate (0423) 871723.

Yaesu FR101DD, matching spkr, as new, still under guarantee, £480. Drake SPR-4, 35 xtals, matching spkr, calibrator, as new, £400. Accoustical Quad, three units, vhf, mono, old but exc quality, £50. All carr free. Cameron, "Coombe Cottage", Pitchcombe, Stroud, Glos.

Yaesu FL50B tx, FR50B rx, as new, the pair, £135 ono. BC221, plus charts, £12.50. M. Keen, G3PBQ, QTHR. Tel 021-373 2282, evenings.

12V dc psu for KW2000A/B, lead-negative earth, £25. Hustler mobile ant, 80-40-20, spring base, £30. Murphy Radio A188C baffle console (1951), fully overhauled, £60. A122 table radio (circa 1947), good wkg order, £25. WW11, MCR1, all coils, ac/dc psu, £30. G3GGK, QTHR. Tel 0954 210374.

DX160 rx, mint cond, matching spkr, all in maker's packing, will deliver Merseyside, genuine reason for sale, £65. Egerton, BRS19945 (blind operator), 36 Meadow Walk, Heswall, Wirral, Merseyside. Tel 051-342 3238.

TS700, as new, £275. Microwave Modules 28-432 transverter, £55; would consider good ham band or gen cov rx in exch for above. GM8BOV. Tel 031-331 2755.

KW2000B, exc cond, psu, £190. G4HAU, QTHR (Wirral). Tel 051-645 5139.

2m fm rebuilt Murphy base stn tx, C1134 pa (QQVO3-20A) with mic, separate solid-state vfo, £30. 144MHz fet converter, 28-30MHz i.f., integral psu, £12. G3WEX, QTHR. Tel 021-354 4265.

Complete listener's stn, AR88D, spkr, phones, spare valves, manual; tele equipment, very large diversity parts, new; Creed 'scope; CR52 portable 'scope; two telescopic antennas; psus; reasonable offer for the lot. R. Bovingdon, Chalfont St Giles. Tel 65237, evenings.

FT401B, mint, used only as stand-by rig, comp with fan, ceramic Electrovoice mic, two spare finals, £340 ono. Adonis amplifier mic, unused, orig packing, advertised at £39, will accept £32. G5FH, QTHR. Tel 0425 25974.

Drake TR4, cw, all 10m, hand mic, 2kW, lp filter, ac psu, spkr, very good, £475. Going solid-state. Big torque rotator, 80ft cable, £65. Technical Associates audio comp, £20. G3REO, QTHR. Tel Coniston 329.

Baxter radio, domestic, a.m., fm, mb, 1 and 2 sw, 1 and 2 PB2, air WB, all right for ilr stns, exc cond, £15, no offers. R. Cuddington, "Milton Lodge", Milton Bryan, Milton Keynes.

QR666 gen cov rx, fitted fm tuner, bfo pitch, bandspread, all options, Eddystone ext spkr, manual, antenna, £115. P. Greaves, 1 Evendons Close, Wokingham, Berks. Tel Wokingham 785769.

Westminster, 4m, xtalled 70·26, mobile mount, spkr, mic, £45. PF2, xtalled 433·2, RB4, rx good, tx needs attn, comp with case, whip, mic, three spare batteries, £45 ono. Assorted whips, mag mounts, offers. G4GJM, QTHR. Tel 0767 82049, after 6pm.

Quartz 16 2m fm tx/rx, six repeater, five simplex channels fitted, three additional receive only channels, comp with 5/8 mag mount, £130 ono. HF Multimobile antenna, 80-10m, base, unused, £25. **Bricom** ssb tx/rx board, comp with high quality 9MHz filter, carrier xtals, wkg as 20m rx, £45. Wayne Kerr B601 bridge, £5. G3YIQ, QTHR. Tel Worthing 67232.

Liner 2, covers 144·145-144·385, very sensitive rx has 3N204 preamp, 3N204 rf stage and 3N201 mixer, tx has 2N6080 driver and 2N6082 pa, with all accessories, incl mobile mount, £120 ono. G8GHU, QTHR.

IC215E, fm, portable, R1-9, S20-24, 145 helical, no nicads, £140 ono; or swop for Microwave Modules 144/432 transverter, or Trio TR3200 portable 70cm tx/rx. G8LVX, QTHR (Wembley). Tel Dave 01-904 0878.

IC215, nine months old, vgc, S20–23, R0, R3–9, receive input R3, 5, 7, big nicads, charger, mobile power lead, two antennas, earphone, shoulder strap, current value around £200, asking £160. G8OOV. Tel Padstow (0841) 532070, evenings.

Transformer/rectifier, input 200–250V, output ht 220V dc at 110mA, lt 6·3V ac at 13A, £1. Very heavy, buyer collects. Tel Steyning (0903) 813826.

Datong rf clipper, mint, £35; Shure 201 mic, new, in box, £10; both fitted jack plugs for use with FT200 or similar rig. GM4FSB, QTHR. Tel 0382 543069.

Codar PR30 preamp, 1·5–30MHz, in three switchable bands, mains operation, £11; or exch for atu suitable for swl. Allsopp. Tel Longworth 820166 (Oxford area).

Yaesu rx FR100B, with h/b Q-mult, tx FL200B, operate transceive 80–10m, good wkg order, c/w leads, manuals, spkr, phones, bug-key, mic, swr meter, £150. Buyer collects. G3IMK, QTHR. Tel 01-397 6924, evenings.

Monitorscope, Yaesu YO100, exc cond, £120 ono. PMH2-70cm phase harness, £3.50. D. Blake, G3MWV, QTHR. Tel 0263 512872.

Codar AT5, ac power supply, £30. Xtals: HC6U, 8·06527 (R7 tx), 8·0555 (R0 tx), 8·075 (S14 tx), 45·025 (R7R), 11·25625 (R7R), 11·19166 (S0R), ok for Cambridge, etc, £1 ea. G4ENG, QTHR. Tel Cheslyn Hay 417477.

Equipment cabinet, 33in high, 22in wide, 14in deep, ac mains psu, to take 19in panels, £30. Buyer collects. Furzehill portable frequency standard type 1744, £15. Pye tx chassis, 70MHz, a.m., comp, £10. G4BAL, QTHR. Tel 01-302 4062.

Yaesu FLDX400, FRSDX400, matching spkr, MMT 144/28 transverter, 40W transistor 2m linear incl 12V 9A psu, tx rx recently re-aligned, new pa valves in tx, sold as comp stn, exc cond, gwo, £480. G8MGD, QTHR. Tel Tewkesbury 294082, after 7pm.

Brenell Series 5 tape deck, mono, in wooden case, Mullard record/play preamp, 5W monitor amplifier, £20. 10W audio amplifier, Quad control unit, two Goodmans twin axiom 8Ω spkrs, £10. G8PQG. Tel Oxford 67165.

Jaybeam C5/2M colinear, unused, offers. National four-track stereo tape recorder, mod no RS772, £100 ono. *Wanted:* more cw activity on 144MHz; a 50MHz allocation for UK amateurs; and a vlf band. G3ILO,QTHR.

Linear amp, Redifon GA406, £150 ono. Buyer collects. Write or phone for details. G3JUY, QTHR. Tel 0623 21183.

Trio 2200G, 5ch, charger, nicads, case, £100. 5/8 whip, mag mount, £5. 18AVT/WB, £40. G4CBE, QTHR. Tel St Albans 55542.

Western DX-5V vertical, £42; Datong model ASP speech processor, £60; both items as new. Tel 0463 41211.

2200GX, S20–24, R3–4, R6–7, orig packing, nicads, charger, spare power lead, ETI 10W pa with built-in preamp, rf switching, filter, auto toneburst, channel illumination, £140. G4DTR, QTHR. Tel 061-439 8422, evenings; or 061-439 5050 ext 522, day.

Wattmeter, 7 range, ·3 to 300W 50Ω, £35. BC221 charts p/p, £20. BC221, no case or charts, wkg, £6. Pye Vanguard high band, £28. Paging tx, 5W out, manual, £20. Monitorscope unit, £10. G4DVH. Tel Ulverston 54466.

Trio TR7010, sideband, as new, additional xtals, orig packing, nine months old, £165. Trio 2200GX, nicads, charger, helical and whip, automatic toneburst, illuminated dial, S0, S20–24, R2, R5–6, R5 input, exc cond, £145. Tel Chris, St Austell 5855.

Trio 2200GX, 2m fm tx/rx, comp with mounting bracket, charger, carrying case, 6ch, Modular Electronics 15W pa, all for £140. Trio JR310 communications rx, all hf bands, fitted n/b filter, £80. Buyers collect. G8MCS. QTHR. Tel 06286 62832.

Sectional mast, 35ft, RAF type, sections fit in car boot, comp with guys and slipping guy ring, ideal for portable operation, £25. G3WUW, 9 Boldrewood, Burghfield Common, Reading. Tel 073529 3694.

Ferrograph, mono, 4A, completely orig, stereo head, £55; or exch comm rx. Gates, 3b St Phillips Square, Battersea, London. Tel 01-720 5839, evenings.

CRTs: M50-120WA/R (2); M38-100W/R; M28-13W/S; offers. G3MEH, QTHR. Tel 0296 88239.

Liner 2, exc cond, PA3 preamp, manual, must sell, hence £85 ono. G8MCG. Tel Upminster (Essex) 25577.

Eddystone EC10 Mk1, mint, £75. CL22 atu, £10. SWL lost interest. Storno Viscount, S19–21, S0, SN, LO inputs, mobile and base stn, £45. Mobile psu, HW17, £5. Offers considered. G3XPC. Tel 0734 732481/732420, after 7pm.

Jaybeam Q4/2M, 4-el cubical quad, 2m, new, boxed, £15 ono. Tel Milton Keynes (0908) 316193.

2102 ram ics (1k × 1): 500nS low power, 90p; 650nS 75p; 1μS, 50p. G8ISI, QTHR. Tel Liphook (0428) 723168.

Quartz 16, fitted R0, R2–7, R6 rev, S0, S8, S20–23, 145·00, 145·8, £135 ono. Heathkit HW12A, SB600 spkr, h/b mains and 12V psus, £65. Buyer inspects and collects. G2DVA, QTHR. Tel Frodsham 33407.

FT101E, five months old, used about one hour, cond as brand-new, around £500. Going cw only. G3KDA. Tel Bishop's Cleeve 2414.

Standard C146A 2m hand-held tx/rx, fitted 5ch, incl base charger, batteries, telescopic whip, rubber duckie, £130. D. R. Evans, GW4AMJ, Physics Dept, University College of Wales, Penglais, Aberystwyth, Dyfed.

C828M 2m tx/rx, handbook, mobile mount, R0, R1, R3–7, S19–23, vgc; 1in monitorscope, requires 12V ac, 300V dc; CR100 rx, handbook, S-meter; carr might be arranged; offers. G3XLL, QTHR. Tel Mellis (Suffolk) 596; or Ipswich 57607, business.

FDK Multi 2700 2m multimode tx/rx, recently checked by main agents, £350. Buyer collects or arranges carr. Set MK Products sstv boards, as removed from monitor, £15. 5FP7 tube, scan coils, £7. G3WDI, QTHR. Tel Lowestoft (0502) 63216.

FRG7 rx, less than one year old, no mods, boxed, home computing forces sale, £170 ono. *Radio Communication Handbook* Vol 1, 5th edn (1978), £6. *VHF-UHF Manual*, 3rd edn (1978), £5. G8OGH, QTHR. Tel Byfleet (Surrey) 42581.

Multi U11, three months old, 10ch fitted, mint, c/w mobile 6dB colinear, £250. BC221 freq meter, *free* to RAIBC member (must collect). Four commercial computer psus, 120V ac primary, numerous dc taps (10A), loaded with components, sheets, £7 ea. G4FPK, QTHR.

SB401 tx, SB303 rx, separates, in superb cond, physically and electronically, together or separately, offers. G5AVA, QTHR. Tel 051-677 5409.

Heathkit Mohican rx, vgc, mains psu, £25. Kokusai a.m. mechanical filters, MF-455-30W, £5 ea. G8IXP, QTHR. Tel Maidstone (0622) 65635, evenings.

SSTV Robot monitor 70, and camera 80, little used, £370. Atlas 180, £225. FT7, new, £255. FL110, new, £102. Pair Atlas 180 output trans, new, £29. GW3DZJ. Tel 0745 570323, after 6pm only.

FRG7, Vernier tuning, mint cond; also kits of parts and instructions for installing digital display and narrow band ssb filter, unable to fit owing to failing eyesight; £180. Carr free. "Coombe Cottage", Pitchcombe, Strood, Glos.

FT7, 10W, 80–10m, ssb, cw, used little, in orig carton, G-whip mobile ant covering 80–10m, £285. G3XVL, QTHR. Tel Chesham 4883.

Drake TR7, DR7, serial no 503; PS7, serial no 648; MN7, serial no 105; four filters, SL300, SL500, SL1800, SL6000, three fitted; two FA7 fans, fitted; Drake 7072 mic; immac, the lot £1200, no offers. G8LTU, QTHR.

TR2200GX, all channels, all accessories, in orig packing, mint cond, £130. SEM auto preamp, £10. MMA 144 preamp, £8. Helical whip for TR2200GX, £3. Tel Prestwick (0292) 79641.

G2DAF Mk1 ssb/cw tx, matching mains psu, perfect, beautiful construction, circuits, etc, £60. 80m HC6U xtals, 3516·14kHz, 3521·35kHz, £3.75 pair. Quality Astrad rx, covers five sw bands, lw, mw, fm, vgc, £20. Eddystone 898 dial, new, boxed, £15. G4GTU, QTHR.

Eddystone 880/4 ssb rx, 30 bands, superb, mint cond, manual, spkr, £325. 51J4 rx, manual, £275. TF1041B V voltmeter, mint, manual, £35. Teletype tdms units, mint, £25. RDO rx, four-waveband unit, 38–1,000MHz, £75. Fletcher, 62 Moorbridge Lane, Stapleford, Nottingham. Tel 0602 397446.

KW2000E tx/rx, ac psu, exc cond, £275. AR88D rx, new cond, £45. Cossor oscilloscope 1035, £30. Mod 2 × 807 UM3 750V psu, £12. Avo meter, £10. Buyers must collect. G3GYW, QTHR. Tel Southend 32963.

2m FDK Multi 700E, three months old, £190. 70cm FDK Multi U11, two months old, £250. Gone multimode/transverter. Will deliver up to 50 miles. Write first. Boniface, G3ZXX, c/o 10 Shortridge Court, Hatfield Road, Witham, Essex CM8 1ET.

FT401B; one owner, perfect cond, one of best high power rigs made, £395. G4AEI. QTHR. Tel Reading 883508.

HW17A, perfect, unmodified, four xtals, manual, £30; Pye Boot Ranger, fm, 230V pu, 4ch fitted, £35; Hallicrafter SX111 cw/ssb amateur rx, was superb, needs attn, manual, £20; all ono. Space needed. Rendezvous Bristol area. G3MFL, QTHR. Tel 0275 833269, evenings.

Yaesu FT202R hand-held 2m tx/rx, fitted S20–22, R3, R5–6, nicads, base charger, as new cond, £95; or part exch for 2m ssb tx/rx, eg Liner 2, why? G3YJH, QTHR. Tel 021-358 3174.

Yaesu FRDX400S, vgc, £160. KW Viceroy, late model, £65. 20m monoband Yagi beam, £30. G4BGM, QTHR. Tel 0908 583278, evenings.

Ten-Tec 544 digital, accessories 262M/E, vox, 240, 245, 249, xtal 10m, mint cond, used six months, must sell, £600. Call after 6pm weekdays. G3ZTM, QTHR.

Yaesu FT2FB, fitted 12 S/R channels, auto tone, preamp 1/10W, vgc, £100 ono; Yaesu FP2, psu, spkr, charger unit, £35; or both, £125. G3WHQ, 27 Albert Road, Sandiacre, Nottingham NG10 5BU. Tel Sandiacre 394769.

XF9B filter and xtals; Eddystone 898 dial; pair QQVO6-40As; one 829B; all new, unused. BC221, charts. Drake MS4 spkr. Liner 2, fitted PA3 preamp, matching mains psu. Atlas 3in lathe. G3ONU, QTHR. Tel Garston 76344.

FR101D rx, all modes, all bands incl bc, 2 and 4m converters, proper nbfm filter, 12V or mains, every possible facility, £415. G8HJB (Suffolk). Tel 0787 280651.

KW2000A, ac psu, handbook, £170. Collect or carr extra. G3ROK, QTHR.

600W linear amp, using 7094 beam tetrode, 80-10m, Green and Davis LA600, £150 ono. Buyer to test and collect. G4EGB, QTHR.

FT75B, 100W, hf, mobile, dc supply, 11 xtal channels, provision for vfo, £170. TR7010, 10W, vhf, ssb, mobile, £170. Heath Scanalyzer SB620, £75. Delivery by post or 150 miles free, Securicor extra. G3XC, QTHR. Tel Fraddon 860485, evenings.

TCS12 rx, 1·5/12MHz, rough cond but wkg all ranges, requires 250 ht 12 lt, £10, collected. G3OAZ, QTHR.

432/144 tx/rx, just MM calibrated, 18PMB 77S beam antenna comp, circuits, test sheets, £110. Boris computer chess F8 system, talks, hard to beat, cost £200, £160 ono. Digit capacitor tester, £50; or swop for 2m h/h. P. Turner. Tel 0842 61648.

G3RVM keyer, *Radio Communication* May 1977, mains driven, £10; sae details. *Wanted:* DX100. G3RB, QTHR. Tel Whitley Bay 530504.

Yaesu FT75B tx/rx, 100W, FV50C vfo, 230V ac and 12V dc psus, mic, new 12GB7 pa valves and spares, mobile mountings, clean cond, £195 ono. GW3QN, 36 Blaen Cwm, Llandudno, Gwynedd.

Yaesu FL101, fitted rf processor, comp with mic, £350. Racal RA117 rx, lf converter, ssb adapter, rf selector protector, superb receiving stn, in genuine Racal rack cabinet, £700. G4GEN, QTHR. Tel 082571 2205.

KW2000A/B dc psu, £15. Uniden 2030 10W fm tx/rx, comp set xtals, £125. Jaybeam portable mast, 2m 8-el Yagi, vgc, pair, £10. G4BBI, QTHR. Tel 024 687 4202.

Multi 800D 144–148MHz tx and rx, up/down mic, scanning facility, 5/8 whip, mag mount, £245 ono. Tel Great Dunmow 810677, after 6pm.

Hammarlund HQ170A, 1·8 through 50MHz, handbook, £100. Collect or carr extra. G3ROK, QTHR.

Trio TS520, £350; Yaesu FRG7, £145; both used little, mint cond, orig packing. GW3MWH, QTHR. Tel Llananno (059 783) 294.

Trio R300 gen cov rx, mint cond, £138 ono. Heathkit 1680 amateur bands rx, £95 ono. Liner 2, re-designed balanced mixer and front-end, £95 ono. 13·8V regulated psu, £5. 5-el Jaybeam Yagi, £4. G8IPJ, QTHR. Tel 021-453 4748.

New mains nicad charger modules, variable 10–150mA, £3. Simpson 260 multimeter, 20,000Ω/V, transistorized protection, perfect, £22. Transistorized pa module, 2m, 1–10W, £12. Burndept 471 nicads, £3. M. L. Neville, 14 Julian Close, Great Wyrley, Walsall. Tel Cheslyn Hay 415374.

Eddystone S640, 1·8–31MHz bandspread, Codar preselector, £15. Xtal calibrator, £4. *Wanted:* ex-RAF R1116 rx. Strong, 58 Napier Road, Ashford, Middx. Tel Sunbury 87913.

AR88D, manual, spare valves, high impedance headset, exc cond, £50. Collect or arrange carr. Tel Ulverston (Cumbria) 54073.

National NCX5, psu, £125. NCX5 ext vfo, calibrator, £25. No offers. Tel Bracknell 20242 ext 2227, daytime.

Valves, all new, boxed: QQV03-10, £1; QQV03-20A, £1.50; QQV06-40A, £3.50; EC91, ECC82, ECC83, ECC88, 6BJ6, 6AT6, 6CB6A, 40p ea. 6in crt, incl base, £1. 10 assorted meters, £2.80. All plus p&p. Rotherham, 15 Chapel Fields, Swinford LE17 6BS.

Linear Trio TL911, manual, £180; Spare set 6LQ6s, £16; Japanese single paddle, by Dentsu, £5; Heathkit gdo, £10; or the lot, £205. Prefer buyer collects, or plus carr. G3KUF, QTHR. Tel 0272 296355, days; or 0275 813648, evenings and weekends.

Yaesu FT101E tx/rx, almost new, mint cond, ssb and cw filters, comp with mic, all leads, manual, exc comp stn, £480. Heathkit HW12A 80m tx/rx, HP23 psu, mic, handbook, £115. G3WY, QTHR. Tel Evesham 45497.

AR88LF, RL85, 28–84MHz rxs, operational; 810s, ACT6s, DET5s, DET25s, valves, unused; reasonable offers for all or separate items. G5RM, QTHR.

Europa B 2m transverter, comp with Europa CPS10 psu, both in exc cond, £75; or would exch for MMT 144/28 transverter. G3GHB, QTHR. Tel Inkberrow (0386) 792582.

TS520, cw filter, SP520, MC10, £415 ono. Datong rf clipper, £20. ASP 2m 5/8 mag mount, £10. PBM 18/70, £10. Latest version G3ZVC board, with XF9B, MD108, SL1600 series, not tested, £55. G4FMD, QTHR. Tel Malcolm, Great Dunmow (0371) 3119.

V/QRO valves: QY4-400A, two chimneys, valve costs £45+, £25; PL8295, listed in ARRL *Handbook*, 1,600W at 3kV, £25. Deluxe psu for 301D, £140. 'Scope, £140. Sony 10·5in nab half-track pro reel-to-reel, £200 ono. Write. Jenkins, 76 Hillfield Avenue, Hornsey, London N8.

IC202 2m ssb/cw tx/rx, 144·000–144·600, 144·800–145·000, mint, boxed, £140. Four brand-new KT66s, £8. Line output/scan panel for Philips G8 ctv, new, £15. G8NOD, QTHR (Herefords). Tel 054 47 403.

HQ215 Hammarlund rx, mint, £200. SB200 lin amp, exc cond, £250. Eddystone 898 dial, £10. Collins M filter, 455kHz, 500Hz bw, £10. G3LEZ, QTHR. Tel Southend-on-Sea 230489.

Datong: UC1, checked by Datong May '79, £85, carr paid; rf clipper, plus YD844, connectors for TS820S, FT101B, FT401, hardly used, £48, carr paid. 4CX250Bs, new, boxed, £17 ea; or £28.50 pair. GM4AGS, QTHR. Tel 0382 543113.

TH3Jr, used three months, 3-el, tribander, best offer over £75 secures. G3NDO, QTHR. Tel Hayling Island 5121.

TR2200GX, nicads, helical, 8ch, £130. FM10D Cambridge, manual, 6ch, £50. 9R59DE, SP5D, £35. QM70 Buccaneer 28–144MHz transverter, £50. TC7 i.f., G8AEV, £30. Hand-held 2m tx/rx, £15. *Wanted:* TS700G; LA106; linear amp R300; 14-el Parabeam. G8NQP, 27 Bulbridge Road, Wilton, Salisbury.

Solartron double-beam 'scope, 3MHz bandwidth, circuit, data, £25. Buyer collects. G4DQH, QTHR. Tel Dronfield 413500.

TR7010, 144·1–144·315, boxed, vgc, £135. TR2200G, fitted S0, S20–22, R5, R7, rev R7, nicads, charger, case, £100; or exch with cash adjustment for TS700G. Microwave Modules 70cm varactor tripler, £10 ono. G8MKX, QTHR. Tel 0342 26366.

KF430 70cm tx/rx, 3/10W, fm, six repeater, four simplex fitted, £160 ono; or will consider exch for recent MMT 432/144R transverter. G4CHG, QTHR. Tel Cheadle (Staffs) 3798.

STE ATAL228 tx, ARAC102 rx, comp with psu/spkr unit, £200 ono. Standard SR-C146A, incl xtals for R6–7, S20, S22, base unit/charger, nicads, £100 ono. 2m 5λ/8 ground plane ant, £10 ono. P. Marshall. Tel Bristol (0272) 37389, evenings.

Trio 7010 2m ssb rig, £125 cash. G8SFI/G8FIS, NOT QTHR. Tel York 411864, evenings.

Trio TS700G, as new, fitted SD306 preamp, £350. Buyer collects. G8HED, QTHR. Tel 0253 853632.

IC22A, toneburst, preamp, six repeater, five simplex channels, as new, £135. 30ft tower, hinged base, masts, £30. Homebrew 2m fm tx, built-in psu and vfo, £15. Buyer collects. G4CZN, QTHR. Tel Thurton (050 843) 367, evenings.

FT101E, 350Hz filter, immac, used few hours only, purchase forces sale, £500. Eddystone EC10 Mk2, £85. G4DAQ. Tel Luton 34053, evenings.

FR101DD, SP101B, d/cover, cov 21 band, plus 2, plus 6, MT conv, op manual, diagrams, £500. TC755 Sony st/deck, open reel-to-reel, sp 7·5in and 3·75in, used approx 20h, cost £400, £250. Buyer collects weekends; will demonstrate rx and deck. M. Sowry, 79 Broadway, Peterborough.

Yaesu FR101 rx, 160–2m, mint cond, £325. 14AVQ vertical trap antenna, C5/2M 2m colinear, both two months old. *Wanted:* tower, approx 58ft. Tel Russ, Leicester (0533) 899958.

Drake model R4B rx, £200. G. Goodyer, Flat 54 Wyndham Road, Petworth, Sussex GU28 0EQ. Tel Petworth 42315.

Drake R4A, manual, £160 ono. GW3YTL, QTHR. Tel Knighton (Powys) 528030, evenings.

Pye Vanguard, 6ch, a.m./fm, good wkg order, R6, S0, S22, S24, S32, incl two extra xtals—S0, S8, £55. G4ELH (Dorset). Tel Poole (02013) 78669, evenings.

Eddystone loudspkr, grey, die-cast alloy case, 3Ω, £5. Golden Wharfedale 10in spkr, 3Ω, 13,000 lines, £2.50. Two Westinghouse 807s, boxed, £2. TT15, £1. A2426, £1. 1625s VR150/30, 6080, 5933, OD3W, 5R4WGA, 50p ea. G3MBL, QTHR (North London). Tel 01-445 4321.

FT101E, SP101B comp with all cables and accessory plugs, YD846 mic, immac cond, two years old, never used mobile but dc supply operational, £450; no offers. Buyer inspects and collects. GM4CKP, QTHR. Tel Lennoxtown 310568, after 6pm.

NR56VFI 2m monitor rx, vfo, 144–146, xtalled S20–21, £40. Pye boards, rf, 10·7MHz i.f., second i.f., a.m., fm, second mix, xtal squelch assy. AM10B handbook, £5. A. Mayhew. Tel 01-642 6671, after 7pm.

IC210 2m fm tx/rx, rev rep, instruction manual, £190 ono. Labgear 160 twin, top band, a.m./cw, ac/dc psus, £25. Katsumi mic compressor MC701, instructions, £15. Foster M50 hand mic, 600/50Ω, £6. Buyer collects. G3KJU, QTHR. Tel 0502 63415, after 6pm.

FRG7, one year old, fine tuning, still with warranty, £150. Buyer collects or pays part carr. Jones, 223 Bankhead Road, Northallerton. Tel 0609 5155, after 7pm.

70cm tripler, QM70 Couger, runs from 2m fm rig, 70cm or 2m at flick of switch, £40. SSM Z-match, as new, £23. 70cm mobile ant, new, gutter mount, £8. G4FYA, NOT QTHR. Tel Fleetwood 4094, after 6pm.

Liner 2, psu, rf preamp, cov to 144·5MHz, will deliver London area, £110. Tel 01-607 4817.

Complete sale: radio gear, test equipment, components, books, mags; one sale of the lot, inspect and make an offer; only those with a substantial bank balance need apply. G8FAX, QTHR. Tel Ed, 01-524 2939, evenings.

Eddystone 640 rx, £15. Heathkit RG1 rx, manual, bfo needs attn, £12. Buyers collect. Smith, 19 Hyde Road, Kenilworth, Warks. Tel 54609.

Gardners transformer, new, 260V 55mA, 310V 210mA, 260V 55mA, 6·3V at 2·2A, 1·25A, 1A, 0·3A, £3. Gresham transformer, output 350–0–350 250mA, 6·3V 4A twice, 5V 3A, oil filled, choke to suit 20H 250mA, £5. G3MBL, QTHR (North London). Tel 01-445 4321.

Heath IM1202 digital multimeter, mains operated, exc cond, service manual, £40. Joystick vfa. Joymatch 111B atu, exc cond, £25. Coward, G4EYQ, QTHR.

Liner 2 144MHz ssb tx/rx, 10W output, 144·10–144·33, rx fitted with preamp, comp with mobile mount and Halo although never used mobile, £100. G8PDW, QTHR. Tel 01-570 9595.

TS820, as new, little used, £575 ono. AM10D, tunable rx, S-meter, hears fm very well, £33. Two uhf fm Cambridges, ok for 432, £33 ea. DC psu, suit SB101, HW32, KW2000 A/B or similar, £25. GM3BQA, QTHR. Tel 0620 2519.

Three cardboard boxes full of old valves, cond unknown, eg PT625, PM14, 43, VT90A, HL13C, prefer to sell in one lot, but offers considered. Buyer must inspect and collect. G4GSY (Manchester). Tel 061-761 5083, after 6pm.

KW Vespa Mk1, 6146 pa, psu, mic, handbook, £75. Must collect. Tel 01-648 5895, daytime.

2m fm gear: Trio 2200GX, 12ch, nicads, etc, £125; Icom IC22A, 22ch, £125; maybe haggle. Garry Orford. Tel Bristol 426851, office hours.

Ultrasonic flaw detector, Philips PA1010, vgc, wkg, 6V dc negative earth, crt worth £70 new, no battery, make ideal panoramic adapter, £95 ono. *Wanted:* HW12, or HW22 considered, must have ac or dc psu. G4GMO, QTHR. Tel 0432 75578, evenings.

Standard C146A, nicads, helical whip, 5ch, case, etc, £80 ono. G3YGB, 18 Chester Street, Coventry. Tel 57793.

14AVQ, £25; Airmec a.m./fm modulation meter, type 409, needs attn, £7.50; LO50A audio sig gen, £5; Woden multi-ratio mod transformer, umo, £1.50; Marconi sig gen TF801/D, £40; all with manuals. Prefer collect. G2BUW. QTHR. Tel Romford 43122.

For organ enthusiasts: Jennings model C valve organ, two 49-note manuals, full pedal-board, comp with stool, wkg but needs a little attn, £95. G3XKF, QTHR (Bucks). Tel Cheddington 661390.

TR7200G, S20–24, R0, R3–7, VFO30G, cov 2m, IC3PE psu, all in exc cond, ideal 2m stn, the lot, £180. Buyer collects or arranges transport. G8JAL, QTHR. Tel Eastchurch 501.

TS700, FT101B, mint, £310 ea. TS820, synthesized, fm, total 2m cov, 75W mobile rig, hardly used, mint, £195. *Wanted:* vhf/uhf sig gen, good; Pye Cambridge, Motafone, Bantam, F30AM, Europa or similar. Kates. Tel Caterham 47892.

Synthesized KDK 2015R, as new, in orig box, £200. G4EFY, QTHR. Tel Fleet (02514) 3814, evenings only.

Microwave Modules 2m converter, 2·4 i.f., £10. 2m preamp, dual output, £7. 70cm converter, 18–20 i.f., £8. New 23cm converter, 28–30 i.f., £20. 500MHz counter, £45. Two 2m 8-el Yagis, £4 ea. 2m 6-el quad, £14. 10-el crossed Yagi, £12. 4-way phasing harness, £12. 2-way phasing harness, £4. AR40 rotator, £35. Two Silvers Lab coaxial relays, £10 ea. G4DSC, QTHR. Tel 0765 2230.

IC215, fitted 15ch, £135. Standard C828, 10W, mobile, fitted 9ch, £95. Standard C146A, hand-held, fitted 2ch, helical, nicads, £95. New 6dB JVL colinear, fully adjustable, £25. New 12dB Antenna Specialists 70cm colinear, £65. Two new, unused, Pye Bantams, low band, fm, leather cases, nicads, mains charger, £140. IC202, ssb, portable, £130. New Drake DC4 psu, £55. Going hf. *Wanted:* hf linear and hf power atu. G4HYQ. Tel 01-904 2104.

Cedar clad sectional wooden hut, 8ft by 10ft, heavy-duty floor, lined, used until recently as radio shack, £100 ono. G3TSK, QTHR (Somerset). Tel Street 42207.

Storno CQP562, mint, fitted SU8, RB6, toneburst, helical, optional remote spkr/mic, two nicads, charging module without transformer, 100-page service manual, £80. STC SF1, fitted SU8, two nicads, mains charger, circuit and alignment data, £40. McGuinness, G4FDN. Tel 01-669 7210.

Multi U11, all repeaters, SU8, SU20, SU18, xtal toneburst, £200. Liner 2 2m ssb tx/rx, satellite segment 145·77–146, clean signal, £100. G8NGD, QTHR (Norfolk). Tel Buxton 205.

2m converter, 1·8–3·8; Advance SG66LF gen, manual; Codar AT5, psu; 19 set; 88 set; Labgear tv converter; R220 4m rx; 50W 807 amp; hundreds odd valves; Grundig TK400; Fidelity tape; 2m B/Storno; 4m AM10B. G3PKW, QTHR. Tel Andy, 051-489 9620.

Eddystone 880/2 high specification a.m./cw/ssb rx, 0·5–30MHz in 1MHz bands, scale length 11in, xtal filters, xtal calibrator, 23 valves, S-meter, variable agc, af filter, noise limiter, etc, handbook, £280. G3MCL, QTHR. Tel Winchester 65814.

HC6U xtals, 250, from 460kHz to 70MHz, £15. Five dural poles, 2in dia, clamps, suitable mast, £18.50. R1155, £8. 19 set, £5. Two vib p/s, ex-WS19, £9. Buyer collects. Tel 051-428 8371.

Last few: XQ1020 Plumbicon tv camera tubes, no burns. 2m 14-el Parabeam, new, £20. Two professional 6ft parabolic dishes. Some left: 2in video tape. GM3WTA.

SB220 linear, £315; FRDX400, £165; FLDX400, totally unused, £195; IKW atu, £55. Osker SWR200, £24; 2m Jaybeam, 6-over-6, £10; TAS 5/8 whip, £5; plus carr, or can deliver reasonable distance. G3NZT, QTHR (Cumbria). Tel 044 83 550.

WANTED

No 19 wireless sets; also interested in other surplus equipment and manuals/handbooks, any cond considered. Tel 01-949 2317.

Yaesu FT220, FT221, or Trio TS700, must be in good cond. G3WMM, QTHR. Tel 0206 42453, after 5pm.

Cambridge RFA/rx boards for 85MHz, will buy or exch for 140MHz boards. GU3KHV, QTHR. Tel 0481 47278, 6–7pm.

Pye Pocketfone PF1/C manual or circuit diagram, to buy or borrow. R. Thomas, 88 Parkway, Raynes Park, London SW20 9HG. Tel 01-542 4054.

BC348 rx. Also interested in other surplus sets and manuals. Tel 01-949 2317.

Keen collector seeks: pre-war wireless components; dull and bright emitter valves; xtal sets; Marconi V2 rx; headphones; horn spkrs; old books; catalogues; magazines; Scott Taggart ST300, ST400, ST600, rxs; good prices paid; offers. N. Richardson, 2 Edna Road, Maidstone, Kent ME14 2QJ.

Ultra Cub portable vhf tx/rx, 2m or h/b, with or without nicads, leather case, etc, please write stating price and cond. Slack, 16 Chestnut Drive, Broadstairs, Kent CT10 2LN.

B40 gen cov rx, reasonable cond and price, prefer with handbook. GW8FJS, QTHR. Tel 0222 890665.

HF tx/rx or FR/FL 50B separates, KW2000, etc, for aspiring G4. Newman, 3 Red House Lane, Leiston, Suffolk.

18AVT/WB 80–10 vertical. K. Middleton, G4EJH, 92 South Road, Portishead, Bristol. Tel Bristol 843897, evenings.

Oscilloscope, gen purpose, double-beam preferred but not essential, must be in good order. John Warburton, "Hilltop", Ombersley, Droitwich, Worcs WR9 0ES. Tel 0905 620631.

HF transformer for KW Vanguard modulator, must be specified type. G2AGO, QTHR. Tel 01-500 1178.

Rental house or flat for 1 September occupancy, Exeter College catchment area, fully furnished, two or three bedrooms, central heating, minimum six months lease. K. N. Watkins, VE3CAL/G3AIK, 27 Stinson Avenue, Ottawa, Canada K2H 6N2.

Narrow band filter for Trio TR310 rx. BRS12595, 4 Branksome Hill Road, Bournemouth.

FT301 type; offer exc FT101B in part exch, plus cash. G3MXO, QTHR.

Trio JR500SE, in exc cond, manual, circuit diagram; details please. *For sale:* JR310 rx, mint cond, narrow band filter, cash sale, buyer collects. G3FK, QTHR. Tel 07257 436.

Medium wave oscillator coil, L5/L6, part number CS64346, for Bush radio rx ETR90. Rudd, 6 Hall Croft, Beeston, Nottingham NG9 1EL.

ATC Squadron urgently requires vhf a.m. tx/rxs, able to work around 100MHz, fixed, mobile and portable. Lockwood, G3XLL, QTHR. Tel Mellis (Suffolk) 596.

Trio 2200GX 2m fm rig, accessories, up to £120. *For sale:* Avo Multi-Minor Mk4 multimeter, 18 ranges, 10,000Ω/V, £5 plus postage. Taylor. G4EBT, QTHR. Tel Rotherham 70021, after 6pm or weekends.

Eddystone EA12, late model; KW Vespa Mk2, must be in A1 cond, with handbooks, no mods. G3AIO, QTHR. Tel Pembury 2836.

For the Wireless Museum: very old rx, tx, components, valves, spkrs, books, magazines, catalogues, QSL cards, valve-tester, meters, test gear. Collection arranged. Details please to curator. G3KPO, QTHR. Tel Shanklin (098 386) 2586.

Connection data sheet for Elstone MR/15 output transformer, or address of Elstone Transformer Company. G3NMJ, QTHR. Tel Bexhill 215556.

HF bands commercial linear, KW1000, FL2100 SB series, etc. G3PLP, QTHR. Tel 021-744 3187.

Altimeter, state price and cond. GW3TMP, QTHR. Tel 035 287 846, day; or 035 287 324, evenings.

Mini quad or Minibeam, 10, 15, 20m, by Mini Products Incorporated, and pneumatic Hilomast plus compressor. G3FWA. Tel Bedford 854687.

Gen cov coils for HRO5T. Manual or circuit for LM14. G3LYU, QTHR (Leics). Tel 0533 876459.

Lowe monitor rx, type 1420C, with or without xtals, please state cond and price. G4ANW, 16 Chestnut Drive, Broadstairs, Kent CT10 2LN.

Items for B2, type 3 Mk2, tx/rx: suitcase; psu; orig manual; spares container; antenna with former; key; headphones; mains plug adapters, conversion pins; etc. Comp B2 Minor, type A Mk3, tx/rx. Taylor, G3UCT, QTHR. Tel Fleet (02514) 6998.

2m base or mobile, in good cond; to get G8MPS on the air, please help. Offers. Macdonald, "The Old Smithy", Old Cornsay, Durham. Tel Esh Winning (038 576) 422.

GEC BRT400 rx, in mint or good cond, no mods please, collection arranged reasonable distance. J. Rayner, 1 Beech Close, Byfleet, Surrey. Tel Byfleet 45899, home; or Sunbury-on-Thames 87348, office.

HF mobile whip, all bands. Spectrum analyser, vhf uhf ranges, HP, Texscan, etc. Power attenuators for use with HP bolometer. Mobile hf linear. G3XC, QTHR. Tel Fraddon 860485, evenings.

Bantam, multi channel, xtalled on 2m, must be in good cond, c/w nicads, etc. P. Wayer, 124 White Dirt Lane, Catherington, Portsmouth, Hants. Tel Horndean 592687, after 6pm.
KW2000B, good cond; Shure mic; KW E-Zee match; state cond and price. Walker, G4ICJ, 6 Arwela Road, Felixstowe, Suffolk IP11 8DG.
Hewlett Packard: uhf attenuators, type 355C/D direct or programmable, or similar; counter, plug-in type 5254B 0·2-3GHz. TRW 6-way coaxial switch, 24V dc. N-BNC adapters. Rustrack chart recorder. TF144H/4. REU to 1GHz. Fletcher, 62 Moorbridge Lane, Stapleford, Nottingham. Tel 0602 397446.
Linear amp, KW1000, FL2100B, or similar. Burlington, G4HXQ, "Winchcombe", Arkesden, Essex CB11 4EZ. Tel Clavering 433, evenings.
AR88, in first class elec/mech cond, no mods. G3WDN, QTHR.
HW8 QRP rig by Heathkit; collection may be possible. G4GSY, QTHR (Manchester). Tel 061-761 5083, after 6pm; or 061-764 6000 ext 120, day time.
Info, Courier CTR-1 tx/rx, hf, ssb, circuit, handbook, anything, copy and return or buy, all expenses. Tel 01-648 5895, day time.
3-el hf beam, TA33, TH3, etc; AR22/AR40 rotator; or why? University of Liverpool ARS, c/o G4ELJ. Tel 051-727 4029.
Pair 3-500Z bases; 150pF variable capacitor, 4/5kV rating; Eddystone ceramic coil former; prefer unused items. G3SEF, 11 Pool View, Great Wyrley, Walsall, Staffs. Tel 0922 415369.
Vibroplex type bug key. *Wireless World* January-May 1975 incl. *Radio Communication* March 1978. *Everyday Electronics* January 1979. *Practical Wireless* January-March 1978 incl. Scott, 91 School Road, Peterhead, Aberdeenshire. Tel 0779 6062.
PR40 Codar preselectors. R1155 rx. Large roller coaster inductor. Ceramic rotary switch. SB220 linear amplifier, incomp or wkg. GM3WTA, QTHR.

Special event stations

GB2IBG, 1-8 July
Telford & D ARS will be operating a special event station to celebrate the 200th anniversary of the construction of the world's first iron bridge, built by Abraham Darby and completed on 2 July 1779. The station will be operated from a site as near as possible to the iron bridge at Telford, W Salop, by G8INA and other members of the club, on 144MHz ssb and fm each evening 1-8 July, and all day on 2 July, with operation on hf 14 and 21MHz if possible.

Overprinted G3ZME (Telford & D ARS callsign) QSL cards will be issued, and these contain a paragraph of historical information about the bridge. Further details from D. W. Harris, G8INA, 16 Selkirk Drive, Sutton Heights, Telford, Salop.

GB3MAM, 6-22 July
A station will be in operation at Salisbury Hall, London Colney, Herts, for the open day of the Mosquito Aircraft Museum on 15 July, where second world war aircraft and radio equipment will be on display. Further information from G8MAE, QTHR.

GB2BRC, 7 July
Bromsgrove RC will be operating a special event station at Bromsgrove Sport for All, a gathering of local clubs and societies to demonstrate a wide variety of activities. The station will be located at Sanders Park, Kidderminster Road, Bromsgrove, Worcs. Further information from G4AAL, QTHR.

GB2MEX, 13-15 July
A special event station will be in operation at the Mexborough Hobbies and Leisure Activities Exhibition, at the College of Further Education, Park Road, Mexborough, S Yorks. Further details from G4AWU, QTHR.

GB2NCM, 16-18 July
The Norton Museum, Birmingham Road, Bromsgrove, is to be the location of a special event station set up to celebrate the official re-opening of the Norton Museum, whose collection includes pre-1939 radio equipment. Further details from G4AAL, QTHR.

GB3NFW, 20-22 July
A Scout exhibition station will be operated by New Forest West Scouts at Fordingbridge Showground, Fordingbridge, Nr Ringwood, Hants. It is hoped that contact can be made with Scouts operating at the International Jamboree being held in Canada at the same time. Further details from G3TBT, QTHR.

GB3LCS, 20-22 July
A special event station will be operated, in conjunction with the Lambeth Country Show, from Brockwell Park, Herne Hill, London SE24, to publicise amateur radio. Further information from R. Hathaway, G3JHI, QTHR, tel 01-670 5030.

GB2GS, 21 July
Greenhill School, Falinge Road, Rochdale, Lancs, is to be the location of a special event station operated as part of the school's summer fair to raise funds for charity. Further details from G4FQE, QTHR.

GB2AMI, 26 July-2 August
Mid-Warwickshire ARS will be operating a special event station at Priory Park, Warwick. Further details from G8CXL, QTHR.

GB2MAR, 28 July-4 August
A special event station will be in operation at Martlet 79, an international Scout camp, run by the East Sussex Scout Association. The station will be situated at Firle Place, Nr Lewes, E Sussex. Further details from G3WJB, 88 Old Shoreham Road, Hove, E Sussex.

GB2YMD, 28 July-5 August
SE Kent YMCA RC will be running a special event station at Dover YMCA, to celebrate the installation of HM Queen Elizabeth, The Queen Mother, as Lord Warden of the Cinque Ports, to take place on 1 August. Visitors to the station will be most welcome. Further details from G4EGQ, QTHR.

GB2FAA, 3-4 August
Yeovil ARC will be operating a special event station at the Royal Naval Air Station, Yeovilton, Somerset, to coincide with the International Air Days taking place at the air station near Ilchester, on the A37 and A303 roads. Operation will be on all bands 3·5 to 28MHz A1, A3j, 144MHz A1, A3j, F3, with talk-in on S21 if required. Visitors will be most welcome, and special QSLs will be issued, via RSGB QSL Bureau. Further details from G3NOF, QTHR.

GB2BSC, 12 August
A special event station will operate, from 0900-2000, at the British Steel Corporation Sports Ground, Groes, Margam, Port Talbot, for the BSC Port Talbot Works Gala Day. Further information from GW4ESV, QTHR.

GB2MSS, 17-19 August
The Mid Somerset Showground, Shepton Mallet, Somerset, is to be the location of a special event station, set up to coincide with the Mid Somerset Show. Further information from G3NOF, QTHR.

GB2TS, 18 August
York ARS will be operating a special event station at the Tollerton Horticultural Show, The Showfield, Tollerton, Yorks. Further details from G3WVO, QTHR.

GB2AT, 23-27 August
A special event station will be in operation prior to and during the National Town and Country Festival, at the Royal Agricultural Showground, Stoneleigh, Warks. The event is the largest leisure activities festival in Great Britain and will be held from 25-27 August. Keynes MK7 6AA.

GB3TCF, 24-27 August
A special event station will be in operation prior to and during the National Town and County Festival, at the Royal Agricultural Showground, Stoneleigh, Warks. The event is the largest leisure activities festival in Great Britain and will be held from 25-27 August. GB3TCF will be on the air from 1800gmt on Friday 24 August until 1700gmt on Monday 27 August, operating on 3·5, 14, 21 and 144MHz, using all modes including sstv and rtty. The station will feature a number of displays, illustrating home construction, atv techniques and Raynet. Further information from G4GEE, QTHR.

GB3VER, 26-27 August
Verulam ARC will be operating a special event station during the St Albans Carnival. A fixed demonstration station will be set up at Verulamium Park, St Albans, Herts, where the carnival procession ends and other activities are held. Further details from G8MAE, QTHR.

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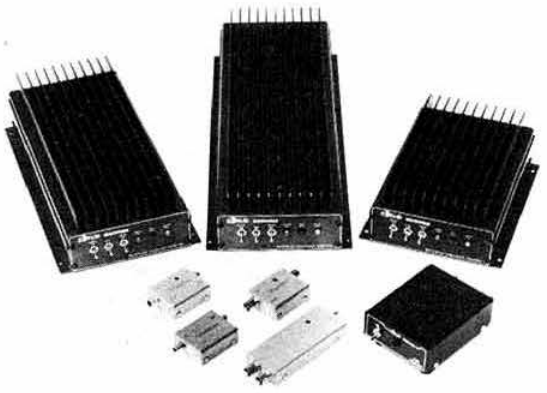

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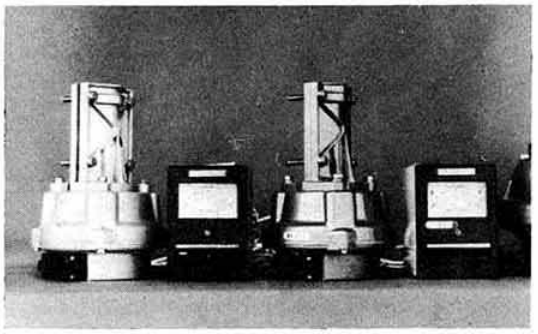
(See previous ads for further details)



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TS820S Transciever	£814.00
R820 Receiver	£773.00
SP820 Speaker	£38.00
TS520S Transceiver	£530.00
SP520	£17.50
SM220 Monitorscope	£231.00
AT200 Antenna Tuner	£93.00
TL922 Linear Amplifier	£780.00
TS120V Mobile Transceiver	£399.00
PS20 AC PSU for TS120V	£51.00
TS700S All mode VHF Transceiver	£537.00
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TR7101 SSB VHF Transceiver	£189.00
TR7400A 2m FM Transceiver	£336.00
TR500 2m FM Transceiver	£235.00
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AL8 10 watt Linear amplifier	£27.00
ARAC 102 2 band Receiver	£100.00
ARAC 170 70cm and 10m Receiver	£127.00

ROTATORS

AR40	£53.44	KPR400	£97.00
CD44	£106.87	AR22R	£48.38
HAM2	£145.12	DR7500	£105.75

G-Whip Mobile antenna range

Tribander helical 10-15-20m	£21.15
LF Coils for tribander	£6.17
Telescopic for coils	£2.70
Basemount standard	£3.82
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Flexiwhip basic 10m	£14.62
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ALDA 103

New model Solid State Transceiver.
250 watts PEP/250 watts CW with built in CW Monitor. 12v DC operation.
80-40-20 metres. 6 Pole crystal filter
Complete with Microphone and Mobile Bracket
Due to direct importation from USA we can now offer these at **£360.** 5-band model available shortly.

SXR30

New model solid state receiver
550KHz to 30MHz £175.00

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AR240—800 channel 2m FM Hand-held Transceiver £195.00

MICROWAVE MODULES

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MMT432/28-S	£133.88
MMT432/144-R	£169.88
MMT144/28	£88.88
MMC144 any IF	£20.25
MMC144/28 LO	£22.50
MMC70/any IF	£20.25
MMC70/28 LO	£22.50
MMA144 Preamp	£14.63
MMC432 any IF	£27.00
MMC1296 any IF	£28.00
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N.D.I.

HC1400 25 watt 2m Transceiver £255.00

JAYBEAM

C5 2M Glass-fibre coliner	£34.87
8Y/2M 8 element Yagi	£11.25
5Y/2M 5 Element Yagi	£8.66
PBM10/2m 10 element Parabeam	£28.75
PBM14/2m 14 element Parabeam	£35.55

Full range of antennas for 144MHz, 70cm available with full range of tubing, clamps, etc. SEND SAE for full details

Carriage **£2.50** on Antenna Range.

F.D.K.

TM568 VHF Monitor Receiver	£105.00
PALM II Hand Held Transceiver	£149.00
700E 2m Transceiver	£229.00

STATION ACCESSORIES (including postage)

Single Meter SWR Wall Type	£10.25
Single Meter SWR Desk Type	£10.45
Twin Meter Desk Type	£12.50
2 Way heavy duty Antenna switch	£11.95
2 Way Antenna switch	£4.50
4 Way Antenna switch	£6.00
3 Way Antenna switch	£8.00
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HyMound Morse Key	£10.00
Hansem FS301 through Line Wattmeter	£33.25
HP3A Low Pass Filter	£3.00
Plastic antenna insulators	23p
Nye King 003 Morse Key	£8.75
Standard type Morse Keys	£3.15

HY-GAIN

12AVQ Vertical 10-15-20m	£42.18
14AVQ/WB Vertical 10-15-20-40m	£59.06
18AVT/WB Vertical 10 through 80m	£85.50
Th3MK3 Triband Beam	£176.62

Carriage **£2.50** on antennas

SWAN.

10-MX Solid state Tx	£518.00
PSU-5 AC Power Supply	£140.00
350D Digital Transceiver	£550.00
350B Transceiver	£480.00

STABILISED POWER SUPPLIES (New Range)

Model 122 0-15V dc 2-5Amp	£13.75
Model 122S 12-6V 2-5Amp	£18.00
Model 125 12V 5Amp	£24.00
Model 153S Dual Meter 4-15V 4Amp	£26.73
Model 156S Twin Meter 4-15V 5Amp	£35.00
Model 1210S Twin Meter 4-20V 10Amp	£80.00

Max. rating quoted

TECHNICAL ASSOCIATES

RX Band Pass filter	£29.75
RX Peak and Notch filter	£29.75
Audio Compressor	£28.75
Preselector MK1 with relay	£29.75
Preselector MK2 for SWL	£26.55
Crystal Calibrator	£21.85
New Model—VHF tunable Pre-Amp	£22.50

These prices include VAT and postage

NEC

CQ.R700 Gen Coverage RX £220.00

MINI PRODUCTS

C4 10-15-20m vertical	£41.50
HQ1 Mini-Beam	£94.30

SWL TUNING UNITS

MK2 Covers 550Khz to 30MHz £25.00

Designed and manufactured by us. Fifty switchable tunable positions, will match any antenna to your receiver. Now in use in over 40 countries. Ideal for use with QRP transmitters. Price includes VAT and postage on this unit.

SECONDHAND EQUIPMENT

Due to the fact that our secondhand equipment stock changes daily and our adverts are in press weeks before publication we are not publishing a list. A.S.A.E. will bring you an up-to-date list or please phone. Good clean equipment wanted and spot cash will be paid. All secondhand equipment carries a three month guarantee.

Shop Hours: Mon to Fri 9.30am to 5.30pm
Saturday 9.30am to 4.30pm
ACCESS and Barclaycard facilities
HP terms arranged. Part exchanges always welcome. Good clean equipment bought for cash. Items sold on a commission basis.
We are located on the A574. Turn at the Greyhound Motel on the A580 (East Lancs Road) and we are about ½-mile on right. No parking problems at any time.

TMP ELECTRONIC SUPPLIES

Specialising in Amateur Radio Equipment, we can offer all Yaesu equipment from stock with 2 year warranty & free Securicor carriage if required; full range of Amidon Toroidal Cores and Balun Kits; W2AU Baluns & Quad Spiders; Nye-Viking Morse Keys & Low Pass Filters. All imported directly, plus all other items, coax, rotators, antenas, etc. Guaranteed personal attention of GW3TMP with every query or sale.
Telephone or write enclosing SAE for lists of prices of all items.

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TELESCOPIC ALUMINIUM TUBING

Smooth easy fixing. Diameter sizes 1⅛" – 1" – ⅞" – ¾" – ⅝" – ½" – all sleeving into each other.
Suitable for Multi Element Yagi Beams. Tube cut to well designed sizes.

10 Metre Half Wave Elements		15 Metre Half Wave Elements	
Dipole single element	£6.00	Dipole single element	£7.00
Dipole and reflector	£11.50	Dipole and reflector	£13.50
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Add £1.00 each element for Road Line despatch

2 Metre Elements Tubing ¾" Butt edge tube, sections 42" long supplied with Boom clamp, bolt and end stops. 5 sections/elements **£2.00.** *50p for P&P.*
All prices subject to VAT @ 12½%.

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FRG-7—DIGITAL DISPLAY

Yes. The world famous FRG-7 is now available with digital read-out fitted by Lee Electronics in place of kHz dial. ..... **Special price £227.00 + 12½% VAT**
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MICROWAVE MODULES DESPATCHED TO ANY PART OF THE WORLD POST FREE

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MMT 28/144 Transvertor	£79.00
MMT 432/28S Transvertor with Oscar shift	£119.00
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VARACTORS

MMV 1296 23cm Tripler	£30.00

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MMD 050/500Mhz Counter	£63.89
M500P 10 Prescaler	£25.00

LINEAR AMPS

MML 144 25W	£39.11
MML432 100W	£220.00
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CONVERTORS

MMC 432/28S for Oscar	£26.58
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MMC 70 4m convertor	£18.00
MMC 70 LO 4m convertor	£20.00
MMC 144 2m convertor	£18.00
MMC 144 LO 2m convertor	£20.00

ATV435/51 convertor	£26.58
MMC1296/144/28	£30.00
MMC156/28 Marine	£20.00
MMC28/144 up convertor	£18.00
MMA 144/28 Pre-amp	£13.00

All 2m converters can be supplied with IF outputs of 2-4-12-14-18-28MHz 70cm models with IF outputs of 28-14-18- or 144MHz.

ALL MICROWAVE MODELS SUBJECT TO VAT IN UK 8% ON FREQUENCY COUNTERS, ALL OTHER MODELS 12½%

A.S.P. MOBILE AND BASE STATION ANTENNAS

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Asp2009 ½ 3dB 2m mobile	£7.50	Asp no hole boot mount	£3.70	Asp E667 70cm 5dB mobile	£16.90
Asp629 ¼W 3dB 2m mobile	£7.60	Asp magnetic mount	£8.95	Asp A659 UK 70cm 5dB, base antenna	£22.00
Asp677 ½ 3dB 2m mobile	£13.50	Asp cutter with cable	£6.75		
Universal cutter clip	£4.50				

Post & Package; £1.00+VAT 8%

YAESU MUSEN (FULL RANGE AVAILABLE) FREE DELIVERY IN UK

FT901DM	£853.00	FT101E	£515.00	FL2100	£311.00	FRG7	£187.00
FT901D/DE	£737.00	FR101D	£525.00	CPU2500RK	£308.00	FRG7D1G	£227.00
FT101Z	£500.00	FL101	£453.00	FT225R	£487.50	FRG7000	£327.00
FT101ZD	£575.00	FT7	£244.45	FT225RD	£535.00	FT301	£515.00
FC901	£115.00	FT7B	£375.00	FT227R	£213.00	FT301D	£588.00
FTV901	£232.00	FL110	£130.00	FT227RB	£229.00	YH55	£8.75
FV901	£232.00	FP4	£36.00	FT227RX	£250.00	YD844	£19.50
YO901	£236.00	FP12	£67.00	FT202	£88.00	OTR24	£16.00

All prices subject to 12½% VAT

STANDARD C432 70cm TRANSCEIVER

THIS 6 CHANNEL 2·2 WATT TRANSCEIVER COMES COMPLETE WITH LEATHER CARRY CASE AND FITTED WITH 433·2 AND 433·5 MHz. **£169.95 + VAT**

THIS SOPHISTICATED UNIT HAS EXCELLENT SENSITIVITY, OUT PERFORMING MOST OTHER RIGS, JUST THE UNIT NOW 70cm REPEATERS ARE OPENING UP ALL OVER THE COUNTRY. A FULL RANGE OF ACCESSORIES ARE AVAILABLE FOR THIS MODEL.

ACCESSORIES

Extra channels	£4.50 + 8% VAT
CMPO8 External Microphone	£15.00 + 12½% VAT
SMP30 External Spk/Mic	£16.50 + 12½% VAT
C12 Wall Charger	£5.75 + 12½% VAT
BCA Base Charger	£22.50 + 12½% VAT
N-10 Set Ni-cad	£8.50 + 12½% VAT
Helical Antenna	£3.50 + 12½% VAT

ICOM RANGE

IC701 transceiver and power supply	£792.00
IC215 2M portable	£141.33
IC202S 2M SSB	£176.89
IC402 70cm SSB	£256.00
IC240 2M Transceiver	£168.00
IC245 2M FM/SSB	£354.62
IC211E 2M FM/SSB	£481.77
Xtals for 215/22 p/pair	£4.50
Cases 202/215/402	£6.75
Mobile mounting bracket 202/215	£10.75

LUNAR LINEAR AMPLIFIERS

2M10-80P 2m 10W input 80W Output with 9dB gain pre-amp	£120.00
2M10-150P2M 10W input 150W Output with 9dB gain pre-amp	£177.50
2M3-150 2m 3W input 150W Output with 9dB gain pre-amp	POA
2M25-150P2M 25W input 150W Output with 9dB gain pre-amp	£160.00

SST ANTENNA TUNERS

SST1 Random Wire Tuner	£22.00
SST2 Coax Wire Tuner	£26.75
SST3 Impedance Match unit	£13.50

ROTATORS

AR22	£43.00
CD44	£95.00
AR40	£47.50
HAM 11	£129.00
KR400	£85.00

KYOCUTO DIGITAL 2015
10W mobile 400ch Tx/rx £245

J-BEAM ANTENNAS
ALL MODELS IN STOCK

All above prices + VAT, carr. free

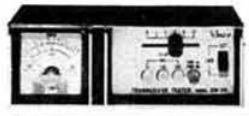
HELICAL ANTENNAS

2m with BNC	£3.85 each
2m with PL259	£3.85 each
2m for IC215, Trio 2200 Gx, standard C146A	£3.50

All + post 25p + 12½% VAT

SEND 25P IN STAMPS FOR COMPLETE PRICE LIST AND CATALOGUE

SWR25 This ever popular twin SWR and power meter covers 3·5-150MHz at **£10.50** plus 8% VAT and 25p P & P.
SWR 15 Single meter SWR and FS 3·5-150MHz at **£8.50** plus 8% VAT and 25p P & P.



UH74 SWR and power meter switchable HF, 2M & 432MHz with remote head at **£14.25** plus 8% VAT and 25p P & P.

Tecknowledgey for sale.

The Mark III FM Tuner

DIY Hi-Fi will never seem the same again. Ambit's Mark III tuner system is electrically & visually superior to all others. Some options available, but the illustrated version with reference series modules: £149.00 + £18.62 VAT

With Hyperfi Series modules £185.00 + £23.12

ALL TUNER KITS £3 carriage

Features of the system

- Precision construction & design of all parts
- Time/frequency display
- State of the art performance with facilities for updates, using modular plug in systems.
- Deviation level calibrator for recording
- All usual tuner features

Digital Dorchester All Band Broadcast Tuner: LW/MW/SW/SW/SW/FM stereo

A multiband superhet tuner, constructed using a single IC for RF/IF processing - but with all features you would expect of designs of far greater complexity. The FM section uses a three section (air gang) tuned FET tunerhead, with ceramic IF filters and interstation mute; AM employs a double balanced mixer input stage, with mechanical IF filters - plus a BFO and MOSFET product detector for CW/SSB reception. Styled in a matching unit to the Mark III FM only tuner, employing the same degree of care in mechanical design to enable easy construction. MW/LW reception via a ferrite rod antenna.

Electronics only (PCB and all components thereon) £33.00 + £4.12 VAT
Complete with digital frequency readout/clock-timer hardware £99.00 + £12.37 VAT
Complete with MA1023 clock/timer module with dial scale £66.00 + £8.25 VAT
Hardware packages are available separately if you wish to house your own designs in a professional case structure. Please deduct the cost of electronics from complete prices.

LW/MW/FM LCD Digital Frequency Display - Info/PW feature

Update your old radio, or build this into a new design. Or use it as a servicing aid - this low power unit with LCD display reads direct frequency in kHz/MHz, or with usual AM/FM IF offsets for received frequency. Low power LCD means no RFI - 15-20mA at 9v even with the divide by 100 prescalar. FM resolution is 100kHz, AM 1kHz. Sensitivities better than 10mV

Complete kit £19.50 +*£1.56 VAT. Built and tested version £24.00 +*£1.92 VAT
Various other DFM systems described in our catalogue part 2 - including a one chip solution to providing digital display of FRG7 kHz dial, combined with clock/timers etc.

PW SANDBANKS PI METAL LOCATOR

Maintaining our professional approach to home constructor kits, we offer the pulse induction 'Sandbanks'. Now with injection molded casing for greatly improved enviromental sealing. **£37.00+ *£2.96vat.**

VHF MONITOR RX WITH PLESSEY IC

4/9 channel version of the PW design - but **using standard 3rd OT crystals,** and **TOYO 8 pole crystal filter** with matching transformers. Coil sets from our standard range to cover bands from 40 to 200MHz. **Complete module kit £31.25 +£3.90vat .**

CTI - REMCON RADIO CONTROL

A tried and tested RC system with a full set of supporting hardware from a well known manufacturer. Please send for details - and watch our ads for further news of developments in RC products.

Radio and Audio Modules : The biggest range/ best specs:

EF5801/3/4 6 stage varicap tunerheads with LO feed and various levels of sophistication. New 5804 include pin AGC loop 'on board', 5801:£17.45+£2.18vat - 5803:£19.75+£2.47vat 5804:£24.95 +£3.18vat. *Frequencies in 40-180MHz on appcn.*

EF5402 4 stage varicap with TDA1062, compound FET/Bipolar input stage, low noise, balanced mixer, pin agc, osc output. A worthy successor to the 5400. £10.75+£1.34vat
The 5402 is available centred on a wide range of frequencies from 30MHz to 180MHz. Non standard units £14.75+£1.84 - 3 weeks.

8319 4 stage varicap tunerhead from Larsholt using MOSFET RF and mixer stages. New temperature compensated oscillator for wide ranges of ambient temperature £13.45+£1.68vat

7252 Complete Larsholt FM tuner less stereo decoder. £26.50+£3.31vat
7253 Stereo FM tunerset from Larsholt with FET head. (as 7252)
944378 Hyperfi stereo decoder. The very best. £19.95+£2.49vat
911223 Pilot cancel stereo decoder, priced to make the MC1310 as obsolete as it now deserves to be.£12.50+£1.56vat
Inotec 1-A fully DC tuned and switched LW/MW/FM stereo tuner to interface with syntheiser control etc.A first! Details OA

COMPONENTS for Radio and Audio ICs, HMOS etc.

The list is too long to attempt here, but AMBIT specializes in all types of semiconductor for radio reception, including devices operating from DC to 5GHz. New low cost SBL1 diode ring mixers (equiv case MD108 etc) -first with HMOS fets, now with a PCB for DC amplifier, and offset sense and protection relay for speakers. See catalogue and updates for most info, pse send an SAE for information on anything you cannot find in catalogues.

Radio ICs	cost + vat		Stereo ICs	cost + vat		AF power ICs	cost + vat	
CA3089E	1.94	24	MC1310P	1.50	19	LM380N	1.00	12
CA3189E	2.45	30	uA758	2.20	27	TBA810AS	1.09	14
HA1137W	2.20	27	CA3090A	2.75	34	TDA2002	1.95	24
SN76660	0.75	9	HA1196	3.95	49	TBA820M	0.75	9
TDA1090	3.35	42	HA11223	4.35	54	from the general list:		
TDA1083	1.95	24	KB4437	4.35	54	LEDs:all colours and low prices		
TDA1220	1.40	17	KB2224	2.75	34	2SJ48/2SK134 HMOS		
SL6640	2.75	34	Preamp ICs/switches			9.90 +£0.80 vat(Pair)		
MC3357	3.12	39	TDA1028	3.50	44	Signal fets/transistors and		
HA1197W	1.40	17	TDA1029	3.50	44	TOKO COILS & FILTERS!		
MC1496	1.25	16	TDA1074	4.14	52			
LM373/4	3.75	49	KB4438	2.22	28			

OSTS: Remember all OSTS stocks are obtained from BS9000 approved sources - your assurance that all devices are very best first quality commercial types. Some LPSN TTL is presently in great demand, so please check by phone before ordering .

TTL: Standard AND LP Schottky

All prices listed in pence *

'N'	'LSN'	'N'	'LSN'
7400 13	20	7455 35	24
7401 13	20	7460 17	
7402 14	20	7463	124
7403 14	20	7470 28	
7404 14	24	7472 28	
7405 18	26	7473 32	38
7406 38		7474 27	38
7407 38		7475 38	40
7408 17	24	7476 37	38
7409 17	24	7478	38
7410 15	24	7480 48	
7411 20	24	7481 86	
7412 17		7482 69	
7413 30		7483A	110
7414 51		7484 97	
7415	24	7485 104	99
7416 30		7486	40
7417 30		7489 205	
7420 16	24	7490 33	90
7421 29	24	7491 76	110
7422 24	24	7492 38	78
7423 27		7493 32	99
7425 27		7494 78	
7426 36	27	7495A 65	99
7427 27	29	7496 58	120
7428 35	32	7497 185	
7430 17	24	74100 119	
7432 25	24	74104 63	
7433 40	32	74105 62	
7437 40	24	74107 32	38
7438 33	24	74109 63	38
7440 17	24	74110 54	54
7441 74		74111 68	
7442 70	99	74112	38
7443 115		74113	38
7444 112		74114	38
7445 94		74116 198	
7446 94		74118 83	
7447 82	89	74119 119	
7448 56	99	74120 115	
7449	99	74121 25	
7450 17		74122 46	57
7451 17	24	74123 48	73
7453 17		74124	137
7454 17	24	74125 38	44

'N'	'LSN'	'N'	'LSN'
74126 57	44	74185 134	
74128 74		74188 275	
74132 73	78	74190 115	92
74133	29	74191	
74136	40	74192 105	180
74138	60	74193 105	180
74139	60	74194 105	187
74141 56		74195 95	137
74142 265	38	74196 99	110
74143 312	38	74197 85	110
74144 312		74198 150	
74145 65	97	74199 160	
74147 175		74247	90
74148 109	191	74248	90
74150 99		74249	93
74151 64	84	74251	90
74153 64	54	74253	105
74154 96		74257	108
74155 54	110	74258	153
74156 80	110	74259	420
74157 67	55	74260	153
74158	60	74261	353
74159 210		74266	40
74160 82	130	74273	124
74161 92	78	74275	312
74162 92	130	74279	52
74163 92	78	74283	120
74164 104	130	74290	90
74165 105		74293	95
74166	38	74295	120
74167 70		74298	100
74168		74324	157
74169	200	74325	242
74170 230	200	74326	247
74172 625		74327	232
74173 170		74353	100
74174 87	120	74362	100
74175 87	110	74365	715
74176 75		74366	49
74177 78		74367	49
74180 85		74368	49
74181 165	350	74373	77
74182 160		74374	77
74183	210	74375	77
74184 135		74376	60

74377	124
74378	93
74379	130
74386	37
74390	140
74393	140
74395	139
74396	133
74398	180
74399	150
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4013	55p	4072	20p	4538	150p		
4014	95p	4073	20p	4539	110p		
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4027	55p	4096	105p	4562	530p		
4028	72p	4097	372p	4566	159p		
4029	100p	4098	110p	4568	281p		
4030	58p	4099	172p	4569	393p		
4031	250p	4160	90p	4572	25p		
4032	100p	4161	90p	4580	600p		
4033	145p	4162	90p	4581	319p		
4034	200p	4163	90p	4582	164p		
4035	120p	4174	104p	4583	84p		
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4037	100p	4194	95p	4585	100p		
4038	105p	4501	23p				
4039	250p	4502	91p				
4040	83p	4503	69p				
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FND500	red CC 150p
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Current news: Work continues apace on our HMOS PA kit, and by the time this is published - we expect to be about to launch the product in a style that matches the Mark III system. The unit uses separate transformers and power supplies, and includes a DC offset sensing circuit combined with slow switch-on using a relay. We introduce the HyperFi FM IF with this advert - and a separate leaflet is available on request with an SAE. All new pricelist revision also available with an SAE. The Mullard DC controlled tone/volume and switch ICs with a 'more than HiFi' specification are in stock at last - together with reams of data (over 50 pages now). Also, RC enthusiasts will be interested to learn that we are supplying parts for various kits now.

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ASP201	¼ wave 2m	3.20	1.55
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- ★ **Highly stable zener diode controlled 116MHz oscillator**
- ★ **Low noise receive converter 2.0dB noise figure**
- ★ **RF VOX network provides automatic changeover**

SPECIFICATION

GENERAL

Frequency Coverage	:	28–30 MHz
Input frequency range	:	144–146MHz
DC power requirements	:	11–13.8 Volts (12.5 volts nominal)
Current Consumption	:	300mA quiescent 2.1 Amps peak
R.F. Connectors	:	50ohm BNC sockets
Power Connector	:	5 pin DIN socket
Size	:	187 × 120 × 53mm (7⅜ × 4¾ × 2⅛")
Weight	:	900 grams (2lb)

RECEIVE SECTION

Overall converter gain	:	30dB typical
Overall converter noise figure	:	2.0dB maximum
Input Impedance	:	50ohm
IF output impedance	:	50ohm

TRANSMIT SECTION

Input Impedance	:	50ohm
Input Modes	:	SSB, FM, AM or CW
Input required for full output	:	300mW or 10 watts with supplied 15dB attenuator
Power Output	:	10 watts continuous rating
Output Impedance	:	50ohm
Relative 116MHz output	:	Better than −65dB
Other spurious outputs	:	Better than −50dB

LOCAL OSCILLATOR

Local oscillator frequency	:	116MHz
Maximum frequency error at 28MHz	:	±1kHz/hour
Typical drift at 28MHz	:	1kHz/hour
Frequency sensitivity over voltage range 11–13V	:	50Hz

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When used in conjunction with such a transceiver, this transverter will allow any 144MHz SSB, FM, AM or CW equipment to be used at 28MHz.
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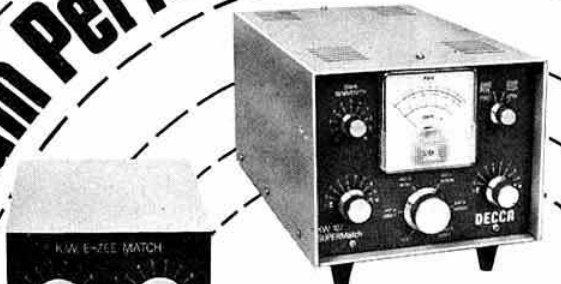

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Selects up to 3 Antennas. Low-insertion loss up to 200 MHz 1 Kw p.e.p. rating.

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Antenna Tuner 10-80 metres, matches 50/75 ohm input to co-ax fed antenna's, also twin feeder and single wire systems.

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The Decca-KW Balun is broadband-3 to 30 MHz, rated up to 2 KW p.e.p. 1:1 Ratio 50 ohms 'unbalanced' feed to 'balanced' output. Waterproof moulded case. Suitable for Dipole and Beam Antenna.

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	HC6/U 30pF TX	HC6/U 30pF TX	HC25/U 25pF and 40pF Tax	HC25/U 20pF and 30pF RX	HC25/U 25pF and 20pF TX	HC6 & 25/U SR RX
R0	4.0277	8.0555	12.0833	14.9888	18.1250	44.9666
R1	4.0284	8.0569	12.0854	14.9916	18.1281	44.9750
R2	4.0291	8.0583	12.0875	14.9944	18.1312	44.9833
R3	4.0298	8.0597	12.0895	14.9972	18.1343	44.9916
R4	4.0305	8.0611	12.0916	15.0000	18.1375	45.0000
R5	4.0312	8.0625	12.0937	15.0027	18.1406	45.0083
R6	4.0319	8.0638	12.0958	15.0055	18.1437	45.0166
R7	4.0326	8.0652	12.0979	15.0083	18.1468	45.0250
S20	4.0416	8.0833	12.1250	14.9777	18.1875	44.9333
S21	4.0423	8.0847	12.1270	14.9805	18.1906	44.9416
S22	4.0430	8.0861	12.1291	14.9833	18.1937	44.9500
S23	4.0437	8.0875	12.1312	14.9861	18.1968	44.9583

All Repeater Channels for FT221 in stock plus Yeasu FT2FB, FT2 Auto, FT224, Trio 2200 and Icom IC22A, 215 series crystals for R0 to R7, S20 to S23. Also in stock 4 and 8 MHz TX in HC6/U for 145.8 MHz Icom crystals TX and RX for 145.25 MHz (S10) and TX for 145.6 MHz (RR,') 44 MHz RX crystals in HC6 and HC25 for 145.8 and 145 (RR,') and HC6 only for 145.475 MHz (S19) Other crystals in stock — send sae for details.

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Crystals held in stock for Pye Pocketfone PF1 for SU8 (433.2 MHz) and all UK repeater channels RBØ, 2, 4, 6, 10 and 14 at £4.50 a pair or TX only £2.25, RX only £2.50. Also 8.0222 and 12.0333 in HC6/U for SU8 at £1.85. We can supply crystals in 6 to 8 weeks for **any** frequency within the 70cm amateur band for Pye, W15U, U10B, U450L and FDK Multi U11 at £2.50 per crystal.

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	Price Group	Adjustment Tolerance ppm	Frequency Ranges	Price and Delivery A	B
Fundamentals	1	200 (total)	10 to 19.999 kHz	—	£23.00
	2	200 (total)	20 to 29.999 kHz	—	£16.50
	3	200 (total)	30 to 99.999 kHz	—	£10.50
	4	200 (total)	100 to 999.999 kHz	—	£ 6.00
	5	50	1.00 to 1.499 MHz	£5.90	£ 5.50
	6	10	1.50 to 1.999 MHz	£3.90	£3.50
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	8	10	2.60 to 3.999 MHz	£3.40	£3.00
	9	10	4.00 to 20.999 MHz	£3.35	£2.95
	10	10	21.00 to 24.000 MHz	£3.70	£3.30
3rd OVT	11	10	21.00 to 59.999 MHz	£3.35	£2.95
5th OVT	12	10	60.00 to 104.999 MHz	£3.35	£3.00
	13	10	105.00 to 119.999 MHz	£5.00	£4.85
5th, 7th & 9th OVT	14	20	120.00 to 149.999 MHz	—	£6.00
	15	20	150.00 to 225.000 MHz	—	£7.50

Unless otherwise requested fundamentals will be supplied with 30pF load capacity and overtones for series resonance operation.

HOLDERS — Please specify when ordering — 10 to 200 kHz HC13/U, 170 kHz to 170 MHz HC6 or HC33/U, 4 to 225 MHz, HC18 and HC25.

DELIVERY Column A 3 to 4 weeks, Column B 6 to 8 weeks.

DISCOUNTS 5% mixed frequency discount for 5 or more crystals at B delivery. Price on application for 10 or more crystals to same frequency and specification. Special rates for bulk purchase schemes including **FREE** supply of crystals used in UK repeaters.

EMERGENCY SERVICE SURCHARGES (to be added to A delivery prices). 4 working days £8, 6 working days £6, 8 working days £4, 13 working days £3 (maximum of 5 crystals on 4 day delivery).

CRYSTAL SOCKETS HC6/U and HC25/U 16p

MINIMUM ORDER CHARGE £1.50

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TERMS. Cash with order, cheques and postal orders payable to QSL Ltd. All prices include postage to UK and Irish addresses.

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The module uses a low power multi-function linear integrated circuit for reliability and ease of assembly and is available as a kit or made and tested unit. Full assembly and test instructions are provided.

Price: KIT £18.63 (H) M & T £23.20 (H)

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Phase Modulator PM-1/4-12MHz*	£7.59	£8.91
Power Supply Module PSM-1	£4.93	£6.05
Transmitter Timer TT-1	£6.05	£7.21
*State frequency required.	All (H)	

A selection of components from our Issue 10 catalogue:
Resistors 5% 330mW, carbon film, E12 values from 10R to 1Meg. 1-24 **2p**, 25-99 **1.8p**, 100+ **1.6p**, 500+ **1.4p ea.** (H)
PC Presets: 1K, 2K5, 5K, 10K, 25K, 50K, 100K, 250K, 500K, 1Meg. **10p ea.** (H)

Disc Ceramics: 5pF-10nF, 1-24 **4p**, 25-99 **3½p**, 100+ **3p ea.** (H)
Ceramic Feedthrough Capacitors: 1nF solder in, **6p ea.** (H). 1nF threaded with nut, **12p ea.** (H)

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1N914	3p(H)	1N4002	4½p	1N4005	5½p	1N5401	13½p
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1N4001	4½p	1N4004	5p	1N4007	6½p	RL209	11p

Seven Segment Displays LED:
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MC14543P	£1.44	MC14553P	£3.21	4000	£0.15
4027	£0.36	4073	£0.24	7490N	£0.32

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The revolutionary new way to practice morse code reception. The DATONG Morse Tutor gives you an unlimited supply of precision morse at the turn of a switch, PLUS built-in oscillator for sending practice.

Now, you can practice receiving morse whenever, and wherever, you like.

The DATONG MORSE TUTOR sends a continuous stream of precision morse in five character groups which never repeat. For optimum learning efficiency it has a calibrated variable speed control plus a separately variable delay facility between characters.

It delivers letters only, numbers only, or mixed letters and numbers. It comes with a built-in tone oscillator for sending practice (key required), built-in loudspeaker, and also a separate earpiece for private listening.

Learn morse, the easy, convenient and self-pacing way with the DATONG D70 Morse Tutor. Supplied complete with battery for only **£37.00** plus VAT giving a total of **£41.62**.

Model D70

Model ASP Automatic R.F. Speech Processor

Our R.F. Speech Processors, using the advanced technique of R.F. clipping, greatly increase your talk power and help your voice punch through the QRM.

They work on any rig, with any speech mode, at any power level, and on any band. Simply connect in series with your microphone to get a really punchy speech signal. MODEL ASP, our latest model, offers for the first time the ultimate convenience of instant push-button selection of the desired amount of clipping and elimination of manual level setting.

Prices: ASP **£65.00** plus VAT (**£73.13** total); RFC **£40.00** plus VAT (**£45.00** total); RFC/M **£21.50** plus VAT (**£24.19** total).

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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!

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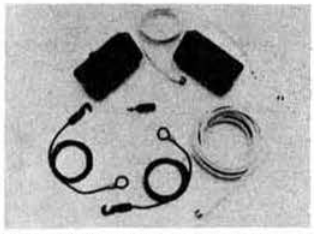

For sensitive reception right through from MSF at 60kHz to Band 1 TV DX around 50MHz, without the need for an antenna farm, MODEL AD170 is ideal. Designed for loft mounting, MODEL AD170 has no adjustments and needs no external tuning units.

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Neons Panel mounting, type JH8, 8mm hole, 240V, red, amber or clear, **35p** each, any 5+: **30p**, 10+: **27p.**
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Resistor Kits. E12 series, **22Ω to 1M, 57 values,** 5% carbon film, ¼W or ½W (please state). **Replenishments available**
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NICAD RECHARGEABLES—physically equivalent to zinc-carbon types AAA(U16) **£1.64**; AA(U7) **£1.20**; C(U11) **£3.15**; D(U2) **£4.94**; PP3 **£5.20. ANY 5+** : less 10%; **ANY 10+** : less 20%.
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Please see notices regarding

VAT INCREASES

on pages 668 and 682

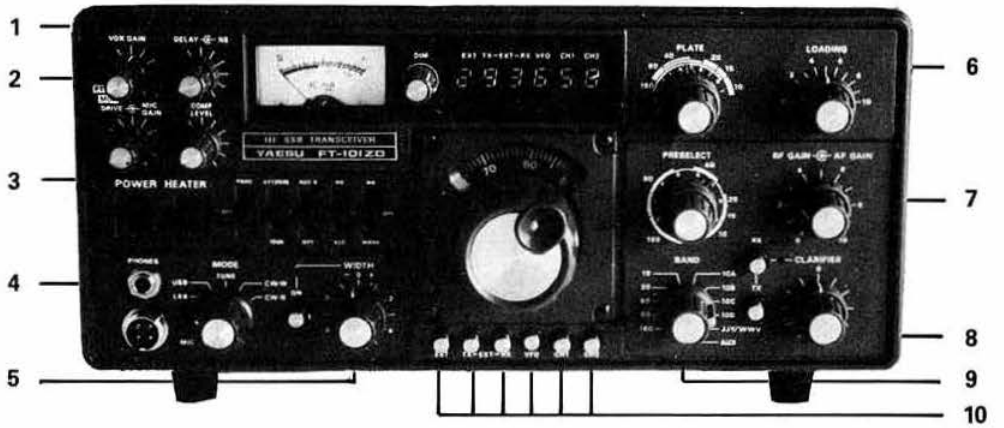
The Shop with the Smile!

AMATEUR RADIO EXCHANGE

Proprietors: Brenda Aptaker, Bernard Godfrey (G4AOG)

No stock list this month, because everybody knows that we always carry a full range of transmitters, receivers and accessories. Instead, just a "full-frontal" of the beautiful new FT-101ZD which is here in stock NOW . . . and one picture is worth a lot of words!

Come and try it . . . come and buy it . . . come and have a cup of Brenda's coffee either way, or see us on our Stand at the major Summer Rallies.



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Build, understand, and program your own computer for only a small outlay.

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JOIN THE REVOLUTION

Dear Reader, We are certain that Micro Computers are going to revolutionise hobby electronics in general and amateur radio in particular. Our telex machine is still red hot from sending messages world-wide to find the best technology for our purposes. Our research and tests indicate that the American "XITEX" and British "NASCOM" products are the best and we have been appointed distributors for both companies kits and assembled units. Advanced amateurs are already sending and receiving cw automatically at up to 150 WORDS PER MINUTE with "XITEX". We are distributing the NASCOM 1—now in use in many amateur stations—a runaway success with 12,000 kits already sold. The NASCOM 1 continues at £165 plus vat but the revolution will really start with the NASCOM 2. Details are still secret but if we whisper—on board, addressable memory: Monitor 2K ROM, Video 1K RAM, work space/user 1K RAM, 8K Microsoft Basic (MK36000 ROM), 8K Static RAM, 16 programmable I/O lines, 128 characters, numbers in the range 1·70141E38 to 2·9387E—38,128 characters, 57 key Licon solid state keyboard etc etc – remember, don't tell anybody NEWS OF THE REVOLUTION WILL SPREAD SOON ENOUGH.

Buy your NASCOM and XITEX products from Knights, we know your requirements and we will assist you with extra documentation, extra diagrams, and extra construction notes. Programmes in preparation include QTH locator, beam direction and distance, contest entry, cw rtty ascii, auroral calendar, best time and direction for meteor scatter skeds, satellite, moonbounce, games, plus business programmes—stock control, restaurant menus, etc.

Forget about conventional amateur radio, forget about "SQUEAKY", turn off the TV (it will make a good vdu), tune into micro-technology, JOIN THE REVOLUTION. We have been in the radio business for 40 years and this is the most exciting development yet. Write, 'phone or telex for full details of all XITEX and NASCOM Micro Computer products.

73, and special 88's where appropriate,

Graham Knight GM8FFX

P.S. We will soon be holding Micro-Computer Seminars throughout the country. If your club or area would like to visit one please write.

NOTICE TO READERS

VAT CHANGES

Prices quoted in advertisements in this issue show, or include, VAT at the pre-budget rates of 8% and 12½%. The correct rate is now **15% on all taxable items.**

When ordering please check the correct price with the supplier,

OR allow for the increase in your remittance,

OR send a "limited open" cheque.

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LOW NOISE STRIPLINE TRANSISTORS with data @ **£3** each.
DUAL GATE MOSFETS LIKE 40673 @ **33p**, 4 for **£1.10.**
LOW NOISE DUAL GATE MOSFETS MFE 131 @ **50p** each.
DAU TRIMMERS 2 to 9pf, 7 to 35pf, 6 to 45pf, 8 to 125pf, 8 to 140pf. All **15p** each. **R.F. SIGNAL TRANSISTORS** MPS 6514 @ **10p**, AF 239 @ **50p**, 2N5179 @ **50p**, 2N5180 @ **50p**, BFY90 @ **50p.** (BFY).
HFC600 FREQUENCY COUNTER 600MHz S.A.E. for leaflet @ **£115.**
Please add 20p for post and packing on UK orders under £2, overseas postage at cost.

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CRYSTAL FREQUENCY RANGE USE (TX or and HOLDER) OUTPUT FREQUENCY	4MHz-TX:HC6/U	8MHz-TX:HC25/U	8MHz-TX:HC6/U	10MHz-RX:HC6/U	11MHz-RX:HC6/U	12MHz-TX:HC25/U	14MHz-RX:HC25/U	18MHz-TX:HC25/U	35MHz-TX:HC6 & 25/U	44MHz-RX:HC6/U	44MHz-RX:HC25/U	48MHz-TX:HC6 & 25/U	52MHz-RX:HC25/U	72MHz-TX:HC25/U
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	a	a	c	c	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	b	b	e	a	e	e	c	e
145.300/S12	e	e	e	e	e	e	e	e	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	e	e	e	e	e	e	e	e	e	e	e	e	e	e
145.475/S19	e	e	e	e	e	e	e	e	e	e	e	e	e	e
145.500/S20	a	b	a	c	c	a	b	b	e	a	a	e	c	e
145.525/S21	a	b	a	c	c	a	b	b	e	a	a	e	c	e
145.550/S22	a	b	a	c	c	a	b	b	e	a	a	e	c	e
145.575/S23	a	b	a	c	c	a	b	b	e	a	a	e	c	e
145.600/R0R	a	b	a	c	c	a	b	b	e	a	a	e	c	e
145.625/R1R	e	e	e	e	e	e	b	e	e	a	a	e	c	e
145.650/R2R	e	e	e	c	e	e	b	e	e	a	a	e	c	e
145.675/R3R	e	e	e	c	c	e	b	e	e	a	a	e	c	e
145.700/R4R	e	e	e	c	c	e	b	e	e	a	a	e	c	e
145.725/R5R	e	e	e	c	c	e	b	e	e	a	a	e	c	e
145.750/R6R	e	e	e	c	c	e	b	e	e	a	a	e	c	e
145.775/R7R	e	e	e	c	c	e	b	e	e	a	a	e	c	e
145/800/R8R	a	b	a	c	c	a	b	a	e	a	a	e	c	e
145.950/S38	a	e	e	a	e	e	e	e	e	a	a	e	e	e

Prices: (a) **£1.95** (£2.19), (b) **£2.32** (£2.61), (c) **£2.80** (£3.15), (d) and (e) **£3.92** (£4.41)
AVAILABILITY: (a), (b), (c) and (d) stock items normally available by return (we have over 5000 items in stock). (e) Four weeks normally but it is quite possible we could supply from stock. **N.B.** Frequencies as listed above but in alternative holders and/or non stock loadings are available as per code (e).
ORDERING: When ordering please quote (1) Channel, (2) Crystal frequency, (3) Holder, (4) Circuit conditions (load in pf). If you cannot give these, please give make and model of equipment and channel or output frequency required and we will advise if we have details.

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All at **£3.00** (£3.37), 38·6666MHz (144/28), 42MHz (70/28), 58MHz (144/28), 70MHz (144/4), 71MHz (144/2), 95MHz (342/52), 96MHz (1,296/432/144), 101MHz (432/28), 101·50MHz (434/28), 105·6666MHz (1,296/28) and 116MHz (144/28).

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6·0 to 19·999kHz.....**£28.12** (£31.63)
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B Mid frequency fundamentals in HC6/U, HC18/U or HC25/U

Adj. tol. ±20ppm — Temp. tol. ±30ppm −10 to +60°C

†800 to 999·9kHz....**£9.50** (£10.64)
*†1·0 to 1·499MHz....**£9.40** (£10.57)
*†1·5 to 2·599MHz....**£4.24** (£4.77)
*†2·6 to 5·999MHz....**£3.92** (£4.41)
*ø3·4 to 3·999MHz.....**£4.96** (£5.58)
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* 6·0 to 20·99MHz.....**£3.92** (£4.41)
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C High frequency overtones in HC6/U, HC18/U or HC25/U

Adj. tol. ±20ppm — Temp. tol. ±30ppm −10 to +60°C

*15 to 20·99MHz (3 O/T) **£4.24** (£4.77)
*21 to 63MHz (3 O/T) **£3.92** (£4.41)
*60 to 62·99MHz (5 O/T) **£4.88** (£5.49)
*63 to 105MHz (5 O/T) **£4.48** (£5.04)
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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.
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QM70 'BUCCANEER' 28-2mtr Linear Transverter 15 Watt.....£87.78
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70cms Transmitter	70FM05 T	£16.00	£23.50
70cms Multichannel	70MC06TR	£25.00	£37.50
70cms Power Amp (10W)	70FM10	£19.50	£26.50
70cms Power Amp (3W)	70FM3	£10.00	£13.50
70cms Pre-Amp	70PA1	£4.40	£5.25
70cms Converter	70RX2/2	£16.00	£21.00
2M Transmitter	144FM2 T	£19.75	£27.50
2M Receiver	144FM2 R	£35.25	£47.75
384MHz Source (500mW)	MD05 T	£18.00	£26.50
384MHz Power Amp (10W)	MD10PA	£19.50	£26.50
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	1N4749	24v	1W	.25
	1N753A	6.2v	500 mW Zener	.25
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	1N759A	12v	"	.25
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4004	3.95	4020	.85	4040	.75	4082	.30
4006	.95	4021	.75	4041	.69	4507	.95
4007	.25	4022	.75	4042	.65	4511	.95
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4009	.35	4024	.75	4044	.65	4515	2.95
4010	.35	4025	.25	4046	1.25	4519	.85
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7412	.25	74132	.75	74H101	.95	74LS160	1.15
7413	.45	74141	.90	74H103	.55	74LS164	2.90
7414	.75	74150	.85	74H106	1.15	74LS193	2.00
7416	.25	74151	.95	74L00	.30	74LS195	1.15
7417	.40	74153	.95	74L02	.30	74LS244	2.90
7420	.25	74154	1.15	74L03	.35	74LS259	1.50
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7448	.50	74191	1.25	74LS00	.40	74S40	.30
7450	.25	74192	.75	74LS01	.40	74S50	.30
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7453	.20	74194	.95	74LS03	.45	74S64	.15
7454	.25	74195	.95	74LS04	.45	74S74	.70
7460	.40	74196	.95	74LS05	.45	74S112	.60
7470	.45	74197	.95	74LS08	.45	74S114	.85
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7480	.75	75492	.65	74LS22	.45	74S158	.80
7481	.85	74H00	.20	74LS32	.50	74S194	1.50
7482	.95	74H01	.30	74LS37	.45	74S196	2.00
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Advertisement copy dates for display and classified advertisements are as follows:

Issue	Copy date	Pub date
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October	24 August	4 Oct
November	21 September	1 Nov
December	19 October	6 Dec
Jan 1980	16 November	3 Jan

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by E. T. Heron & Co Ltd, Essex and London