

The SHORT WAVE Magazine

VOL. XL

JULY 1982

NUMBER 5

NRD-515

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

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

As a person not owning the receiver, you may ask what sets this particular one above all others. This is difficult to define — the feel of the equipment when wandering over the crowded band, its signal handling capability and selectivity can only really be appreciated by use. Technically, the equipment is above reproach. JRC's manufacture and production control methods as applied to other items in the range are equally applied to their amateur products. The other items I refer to, only a small part of the vast range, are marine radio

equipment, Marisat mobile terminals, Omega navigators, doppler sonar, echo sounder/fish finders, communication satellite earth stations and a complete range of avionic beacons, radar and associated products. Indeed, a wide range application of electronic and radio technology for land, sea and air.

You may be forgiven for associating such advanced technology with complexity of operation, a piece of equipment that needs an operator with an electronics degree. However, the assumption is incorrect. The NRD is easy to use with the minimum of controls to ensure the operator really enjoys his listening time. Digital readout, MHz, mode and filter bandwidth switches together with a VFO knob that will tune the band continuously without using any other control, from 10 KHz to 30 MHz or vice versa. To assist with difficult band conditions the NRD515 has pass band tuning and the medium wave broadcast section from 600 kHz to 1.6 MHz has a preselector control to cope with the crowded conditions. Add the optional 600 Hz CW filter and the 96 channel memory unit and, as other NRD515 owners would say, "a joy to own".

Now available for the radio amateur who is also a short wave man is the NSD515 transmitter. Again, part of my station, the NSD515 is, without a doubt, the only companion for the NRD515. A connecting harness which links the two units together provides full transceiver operation or on release of a push button the units assume their own identities and become separates. A "remote" position on the

transmitter MHz switch enables the receiver MHz switch to control the transmitter, so, as you tune across the band and into an amateur section then the transmitter automatically "comes up" on the same band. With the remote VFO push button selected on the transmitter and the MHz switch at remote, the transmitter becomes the slave of the receiver and operating simplicity is yours. Of course, in only seconds the two pieces of equipment can be set to work cross band or duplex.

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

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

NRD515	£ 1,090 inc VAT
NSD515	£ 1,223 inc VAT
NDH518	£ 198 inc VAT
NVA515	£ 34.50 inc VAT
NBD515	£ 148.35 inc VAT



perchance to dream

LOWE ELECTRONICS

Chesterfield Road, Matlock, Derbyshire. DE4 5LE.
Telephone 0629 2817, 2430, 4057, 4995. Telex 377482.

The TS-930S is a superlative, high performance, all-solid state, HF transceiver keyed to the exacting requirements of the DX and contest operator. It covers all Amateur bands from 160 through 10 meters, and incorporates a 150 kHz to 30 MHz general coverage receiver having an excellent dynamic range. Among its other important features are, SSB slope tuning, CW VBT, IF notch filter, CW pitch control, dual digital VFO's, CW full break-in, automatic antenna tuner, and a higher voltage operated solid state final amplifier. It is available with or without the AT-930 automatic antenna tuner built-in. **TS-930S FEATURES:**

- **160-10 Meters, with 150 kHz-30 MHz general coverage receiver.**
Covers all Amateur frequencies from 160-10 meters, including new WARC, 30, 17, and 12 meter bands, on SSB, CW, FSK, and AM. Features 150 kHz-30 MHz general coverage receiver. Separate Amateur band access keys allow speedy band selection. UP/DOWN bandswitch changes in 1-MHz steps. A new, innovative, quadruple conversion, digital PLL synthesized circuit provides superior frequency accuracy and stability plus greatly enhanced selectivity.
- **All solid state, 28 volt operated final amplifier.**
The final amplifier operates on 28 VDC for lowest IM distortion. Power input rated at 250 W on SSB, CW, and FSK, and at 80 W on AM. Final amplifier protection circuit with cooling fan. SWR/Power meter built-in.
- **Automatic antenna tuner, built-in.**
Available with AT-930 antenna tuner built-in, or as an option. Covers Amateur bands 80-10 meters, including
- the new WARC bands. Tuning range automatically pre-selected with band selection to minimise tuning time. "AUTO-THRU" switch on front panel.
- **CW full break-in.**
CW full break-in circuit uses CMOS logic IC plus reed relay for maximum flexibility, coupled with smooth, quiet operation. Switchable to semi-break-in.
- **Dual digital VFO's.**
10-Hz step dual digital VFO's include band information. Each VFO tunes continuously from band to band. A large, heavy, flywheel type knob is used for improved tuning ease. T.F. Set switch allows fast transmit frequency setting for split-frequency operations. A=B switch for equalising one VFO frequency to the other. VFO "Lock" switch provided. RIT control for ± 9.9 kHz receive frequency shift.
- **Eight memory channels.**
Stores both frequency and band information. VFO-MEMO switch allows use of each memory as an independent VFO, (the original memory frequency can be recalled at will), or as a fixed frequency. Internal Battery memory back-up, estimated 1 year life. (Batteries not supplied).
- **Dual mode noise blander ("pulse" or "woodpecker").**
NB-1, with threshold control, for pulse-type noise. NB-2 for longer duration "woodpecker" type noise.
- **SSB IF slope tuning.**
Allows independent adjustment of the low and/or high frequency slopes of the IF passband, for best interference rejection.
- **CW VBT and pitch controls.**
CW VBT (Variable Bandwidth Tuning) control tunes out interfering signals. CW pitch controls shifts IF passband and

simultaneously changes the pitch of the beat frequency. A "Narrow/Wide" filter selector switch is provided.

- **IF notch filter.**
100-kHz IF notch circuit gives deep, sharp, notch, better than -40 dB.
- **Audio filter built-in.**
Tuneable, peak-type audio filter for CW.
- **AC power supply built-in.**
- **Fluorescent tube digital display.**
Fluorescent tube digital has analog type sub-scale with 20-kHz steps. Separate 2 digit display indicates RIT frequency shift.
- **RF speech processor.**
RF clipper type processor provides higher average "talk-power", plus improved intelligibility. Separate "IN" and "OUT" front panel level controls.

Other features:

- SSB monitor circuit, 3 step RF attenuator, VOX, and 100-kHz marker.

Optional accessories:

- AT-930 automatic antenna tuner.
- SP-930 external speaker with selectable audio filters.
- YG-455C-1 (500 Hz) or YG-455CN-1 (250 Hz) plug-in CW filters for 455-kHz IF.
- YK-88C-1 (500 Hz) CW plug-in filter for 8.83-MHz IF.
- YK-88A-1 (6 kHz) AM plug-in filter for 8.83-MHz IF.
- MC-60 (S-8) deluxe desk microphone with UP/DOWN switch.
- TL-922A linear amplifier.
- SM-220 station monitor.
- HC-10 digital world clock.
- HS-6, HS-5, HS-4 headphones.



DX-traordinary TS 930S

TS 930S £1078.00 inc VAT, AT930 £125.00 inc VAT

LOWE IN LONDON

NOW OPEN, OUR EMPORIUM IN THE CITY

278 PENTONVILLE ROAD, LONDON N1 9NP (NO MAIL ORDERS)

THE EMPORIUM IS ON THE LOWER SALES FLOOR OF THE "HEPWORTHS" SHOP





handability TR 2500

“now hear this” R600

The TR-2500 is a compact 2 metre FM handheld transceiver featuring an LCD readout, 10 channel memory, lithium battery memory back-up, memory scan, programmable automatic band-scan and Hi/Lo power switch.

TR-2500 FEATURES:

- Extremely compact size and light weight 66 (2-5/8) W x 168 (6-5/8) H x 40 (1-5/8) D, mm (inches), 540g, (1-2lbs) with Ni-Cd pack.
- LCD digital frequency readout, with memory channel and function indication.
- Ten channel memory, includes “MO” memory for non-standard split frequencies.
- Lithium battery memory back-up built-in, (estimated 5 year life) saves memory when Ni-Cd pack discharged.
- Memory scan, stops on busy channels, skips channels in which no data is stored.
- UP/DOWN manual scan in 5kHz steps.
- 2.5W or 300mW RF output. (HI/LOW power switch.)
- Programmable automatic band scan allows upper and lower frequency limits and scan steps of 5kHz and larger (5, 10, 15, 20, 25, 30kHz . . . etc) to be programmed.
- Slide-lock battery pack.
- Repeater reverse operation.
- Keyboard frequency selection across full range.
- Frequency coverage, 144.000 to 145.995 MHz.
- Optional power source, MS-1 mobile or ST-2 AC charger/power supply allows operation while charging. (Automatic drop-in connections.)
- High impact plastic case.
- Battery status indicator.
- Two lock switches for keyboard and transmit.

STANDARD ACCESSORIES

- Flexible rubberized antenna with BNC connector.
- 400mA heavy-duty Ni-Cd battery pack.
- AC charger.

TR 2500	HANDHELD TRANSCEIVER	£ 207.00
ST 2	BASE STAND/CHARGER	£ 46.23
SC 4	SOFT CASE	£ 12.19
MS 1	MOBILE STAND	£ 28.29
SMC 25	SPEAKER/MIKE	£ 14.49
PB 25	NICAD PACK	£ 22.31
LH 2	LEATHER CASE	£ 21.39

A simple to use general coverage receiver covering 150kHz to 30MHz in 30 bands at an amazingly affordable price. Use of PLL synthesized circuitry provides high accuracy of frequency & excellent stability with the maximum ease of operation.

R600 FEATURES are:

- 150kHz to 30MHz continuous coverage, AM, SSB or CW.
- 6kHz IF filter for AM (wide), and 2.7kHz filters for SSB, CW and AM (narrow).
- Up-conversion PLL circuit, for improved sensitivity, selectivity and stability.
- RF Attenuator allows 20 db attenuation of strong signals.
- Tone control.
- Front mounted speaker.
- “S” meter, with 1 to 5 SIMPO scale, plus standard scale.
- Coaxial, and wire antenna terminals for 2MHz to 30MHz. Wire terminals for 150kHz to 2MHz.
- 100, 120, 220 and 240 VAC, 50/60Hz. (Selector switch on rear panel) & alternative 12 Volt dc operation.

Other features include carrying handle, record jack & head phone jack.



R600 £235 inc. VAT
carriage £5.00

HEAD OFFICE AND SERVICE CENTRE

Chesterfield Road, Matlock, Derbys. Tel. 0629 2817 or 2430.

Open Tuesday-Friday 9-5.30, Saturday 9-5.00. Closed for lunch 12.30-1.30.

For all that's best in ham radio, contact us at Matlock.

For full catalogues send 70p in stamps with your address. Mark enquiry SWM.



AMATEUR ELECTRONICS UK

Your number one source
for **YAESU MUSEN**



FT-ONE SUPER HF TRANSCEIVER

The ultimate in HF transceivers -
-the new FT-ONE provides continuous

RX coverage of 150KHz - 30MHz plus all nine amateur bands (160 thru 10m). All mode operation LSB, USB, CW, FSK, AM, *FM • 10 VFO system • FULL break-in on CW • audio peak filter • notch filter • variable bandwidth and IF shift • keyboard scanning and entry • RX dynamic range over 95 dB! and NO band switch!!!

***OPTIONAL**

FT-101ZD Mk III



YAESU's FT-101ZD WITH FM is the most popular HF rig on the market thanks to its very comprehensive specification and competitive price. Incorporates notch filter, audio peak filter, variable IF bandwidth plus many other features.

FT-902DM Competition grade HF transceiver



The YAESU world famous pace-setter with the acknowledged unbeatable reputation 160 thru 10 metres including the new WARC bands. All-mode capability, SSB, CW, AM, FSK and FM transmit and receive. Teamed with the FTV-901R transverter coverage extends to 144 & 430MHz.

FT-707 All solid-state HF mobile transceiver



The definitive HF mobile rig, digital, variable IF bandwidth, 100watts PEP SSB, AM, CW (pictured here with 12 channel memory VFO). Latest bands



FRG-7700 High performance communications receiver

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

KEEP AHEAD WITH THE NEW FT-102!

Once again YAESU lead the field with the exciting new FT-102 HF transceiver—no other manufacturer offers so many innovative features.



Better Dynamic Range

The extra high-level receiver front end uses 24 VDC for both RF amplifier and mixer circuits, allowing an extremely wide dynamic range for solid copy of the weak signals even in the weekend crowds. For ultra clear quality on strong signals or noisy bands the high voltage JFET RF amplifier can be simply bypassed via a front panel switch, boosting dynamic range beyond 100dB. A PLL system using six narrow band VCOs provides exceptionally clean local signals on all bands for both transmit and receive.

Total IF Flexibility

An extremely versatile IF Shift/Width system, using friction-linked concentric controls and a totally unique circuit design, gives the operator an infinite choice of bandwidths between 2.7kHz and 500Hz, which can then be tuned across the signal to the portion that provides the best copy sans QRM, even in a crowded band. A wide variety of crystal filters for fixed IF bandwidths are also available as options for both parallel and cascaded configurations. But that's not all; the 455kHz third IF also allows an extremely effective IF notch tunable across the selected passband to remove interfering carriers, while an independent audio peak filter can also be activated for single-signal CW reception.

New Noise Blanker

The new noise blanker design in the FT-102 enables front panel control of the blanking pulse

width, substantially increasing the number of types of noise interference that can be blanked, and vastly improving the utility of the noise blanker for all types of operation.

Commercial Quality Transmitter

The FT-102 represents significant strides in the advancement of amateur transmitter signal quality, introducing to amateur radio design concepts that have previously been restricted to top-of-the-line commercial transmitters; far above and beyond government standards in both freedom from distortion and purity of emissions.

Transmitter Audio Tailoring

The microphone amplifier circuit incorporates a tunable audio network which can be adjusted by the operator to tailor the transmitter response to his individual voice characteristics before the signal is applied to the superb internal RF speech processor.

IF Transmit Monitor

An extra product detector allows audio monitoring of the transmitter IF signal, which, along with the dual meters on the front panel, enables precise setting of the speech processor and transmit audio so that the operator knows exactly what signal is being put on the air in all modes. A new "peak hold" system is incorporated into the ALC metering circuit to further take the guesswork out of transmitter adjustment.

New Purity Standard

Three 6146B final tubes in a specifically configured circuit provide a freedom from IMD products and an overall purity of emission unattainable in two-tube and transistor designs, while a new DC fan motor gives whisper-quiet cooling as a standard feature. For the amateur who wants a truly professional quality signal, the answer is the Yaesu FT-102.

New VFO Design

Using a new IC module developed especially for Yaesu, the VFO in the FT-102 exhibits exceptional stability under all operating conditions.

ANCILLARY EQUIPMENT

SP-102 EXTERNAL SPEAKER/AUDIO FILTER

The SP-102 features a large high-fidelity speaker with selectable low- and high-cut audio filters allowing twelve possible response curves. Headphones may also be connected to the SP-102 to take advantage of the filtering feature, which allows audio tailoring for each bandwidth and mode of operation to obtain optimum readability under a variety of conditions.

FC-102 1.2 KW ANTENNA COUPLER

FV-102DM SYNTHESIZED, SCANNING EXTERNAL VFO

NEW! FT-230R 25watt 2m FM mobile

- Two independent VFO's
- 10 memories ● Priority function
- Memory and band scan
 - 12.5/25 KHz steps
 - Large LCD readout.

£239.00
INCL. VAT

FT-290R All-mode 2m portable

10 memories, 2 VFO's,
LCD display, C size battery,
easy car mounting tray, 2.5 watts out.

S-T-230-3

North West—Thanet Electronics Ltd, Gordon, G3LEQ, Knutsford (0565) 4040
 Wales & West—Ross Clare, GW3NWS, Gwent (0633) 880 146
 East Anglia—Amateur Electronics UK, East Anglia, Dr. T. Thirst (TIM) G4CTT, Norwich 650865 0692
 North East—North East Amateur Radio, Darlington 0325 55969
 South East—Amateur Electronics UK, Kent. Ken McInnes, G3FTE, Thanet (0843) 291297

or attractive H.P. terms readily available for on-the-spot transactions. Full demonstration facilities. Free Securicor delivery.

Amateur Electronics UK
508-516 Alum Rock Road · Birmingham 8
Telephone: 021-327 1497 or 021-327 6313
Telex: 337045
Opening hours: 9.30 to 5.30 Tues. to Sat. continuous — CLOSED all day Monday.

For full details of these new and exciting models, send today for the latest YAESU PRICE LIST & LEAFLETS. All you need do to obtain the latest information about these exciting developments from the World's No.1 manufacturer of amateur radio equipment is to send 36p in stamps and as an added bonus you will get our credit voucher value £3.60—a 10 to 1 winner!

As factory appointed distributors we offer you—widest choice, largest stocks, quickest deal and fast sure service right through—

TET ANTENNA SYSTEMS

THE ANTENNA WITH THE DIFFERENCE

TET HF antennas are unique in that they employ dual driven elements with the following distinct advantages—

- Improved gain over conventional arrays.
- Broader bandwidth with lower SWR.
- Enhanced front to back ratio.
- Better matching into solid state transceivers without an A.T.U.
- High power handling capacity.



HB33SP 3 element tri-band beam with dual drive for 14/21/28 MHz

TET SOLE AGENTS

TET manufacture an exciting range of multi-element HF beams including superb monobanders plus HF verticals. Also there is a full range of VHF/UHF antennas most of which have multi-element drive or distinctive technical features.

NEW from TOKYO HY-POWER LABS



HL-160V

VHF 160W Plus Linear

FEATURES:

160W output achieved with a pair of rugged MRF247 transistors. Drive requirement as low as 10W or 3W from hand-held. Selectable hi/lo output. Newly designed effective heat sink and high reliability one board construction.

SPECIFICATION:

Freq. Band: 144-146MHZ, Mode: FM-SSB-CW, Supply Voltage: DC 13.8V neg. ground, 12-23A, Output: 160W, RF Input: 1-15W (or 0.5-3W), Receive Pre-amp: 12 dB gain with low-noise 2SK 125 JFET, In/Out Connectors: SO-239 (50 ohm), Built-in Circuitry: COX, remote-control terminal, hi/lo output select, output power meter, reverse polarity protection, Dimensions: 218W x 82H x 299D (m/m), Weight: 3.5 kgs.



HL-82V

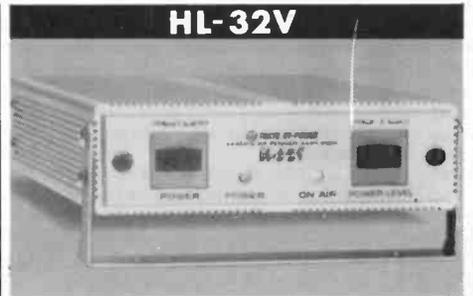
VHF 85W Plus Linear

FEATURES:

A compact 144MHZ band amp. with receive preamp and power output meter.

SPECIFICATION:

Freq. Band: 144-146MHZ, Mode: FM-SSB-CW, Supply Voltage: DC 13.8V neg. ground, 13A max., Output: 35-85W, RF Input: 2-12W, In/Out Connectors: SO-239 (50 ohm), Built-in Circuitry: COX, remote control terminal, receive preamp (MOS FET 12dB gain), output power meter, output select (hi/lo), reverse polarity protection, Dimensions: 152W x 92H x 217D (m/m), Weight: 1.8 kgs.



HL-32V

VHF 30W Linear

FEATURES:

A compact and light-weight 144MHZ band amp with 30W output. Drive power of 1W to 5W from hand-held radio. Hi/Lo output selection.

SPECIFICATION:

Freq. Band: 144-146MHZ, Mode: FM-SSB-CW, Supply Voltage: DC 13.8V neg. ground, 4A max., Output: 25-30W, RF Input: 1-5W, In/Out Connectors: SO-239 (50 ohm), Built-in Circuitry: COX, output select (hi/lo), reverse polarity protection, Dimensions: 100W x 30H x 158D (m/m), Weight: 520g.

- An S.A.E. will bring you full details.



Amateur Electronics UK
508-516 Alum Rock Road · Birmingham 8
Telephone: 021-327 1497 or 021-327 6313
Telex: 337045
Opening hours: 9.30 to 5.30 Tues. to Sat.
continuous - CLOSED all day Monday.

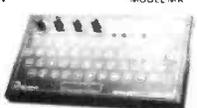


DATONG

KEYBOARD MORSE SENDER - THE ULTIMATE "MORSE KEY"

MODEL MK

- **STRAIN-FREE** sending. Converts 'hunt and peck' typing to perfect Morse. Just plug into any key jack and type.
- **CONVENIENCE:** no need for a power cable, four internal pen cells last for 300 hours and give continuous memory back up.
- **EXCLUSIVE COLOUR CODED KEYBOARD DESIGN:** Separate key switches beneath a tough polycarbonate membrane combine excellent "feel" with a splash proof wipe clean surface.
- **LAVISH MEMORY:** four 64-character memories with auto-repeat and programmable "pause" function, for all the routine sending.
- **BUFFER MEMORY:** ensures perfect sending despite less than perfect typing.
- **COMPREHENSIVE CHARACTER SET:** includes punctuation, procedure signals, accented letters. Plus a "merge" key for making any non-standard character.
- **BEAUTY AND STYLE:** only one inch thin and with four-colour panel Model MK looks every bit the thoroughbred it is. Model MK is supplied with output leads and spare connectors but without batteries (four HP7 pen cells).



BROADBAND PREAMPLIFIER - MODEL RFA

- Wide bandwidth, 5 to 200 MHz, lets Model RFA replace a whole collection of single band amplifiers.
- Low noise figure, high intercept point (+ 20 dbm), and moderate gain (9 db) make Model RFA ideal for improving the sensitivity of HF and VHF transceivers, scanner receivers, PMR, marine VHF, without difficulties with overload.
- RF switched for convenient use with transceivers.
- Solid construction (same die cast case as Models VLF and DC144/28) with SO239 connectors.



MODEL D70: THE GO-ANYWHERE MORSE CODE TRAINER

For building up your Morse code reception speed there is no better method than the Datong "Morse Tutor". You learn the code with the characters at normal speed but with an extra delay between each one. As you improve you reduce the "DELAY" control until, with it fully reduced, you find you are reading code at the chosen speed and with correct spacing.



An important feature is that the unit is completely portable. This allows you to practise wherever and whenever you find it most convenient. The all-CMOS design gives about 60 hours of practice from a lowcost PP3.

GENERAL COVERAGE RECEIVE CONVERTER

If you have a 2 metre all-mode receiving set up, just add Model PC1 in series with its antenna and you have a superb general coverage receiver. What better way to listen in to all the non-VHF amateur bands, not to mention everything else from 60 kHz to 30 MHz? For sheer value for money there is no better way to get high performance general coverage reception. After all what a waste it is if your expensive 2 metre all-mode rig covers one band only? Model PC1 will also extend the coverage of SX 200 type scanners to include all the long, medium and short wave bands as well. This is an excellent way to listen to your favourite short wave broadcast stations without the extra expense of a complete new receiver.



MODEL PC1

HIGH PERFORMANCE 2 METRE CONVERTER

Model DC144/28 is designed to overcome the overload and spurious signal problems experienced by conventional converters, it uses a Schottky diode balanced mixer with about 7 dbm of local oscillator drive. This, coupled with a 3SK88 r.f. amplifier, gives an excellent combination of low noise figure and strong signal handling capability. Its input and output gain controls also help you get the best out of your main receiver without flattening it with excessive gain.



MODEL DC144/28

Model DC144/28 is available either as a complete cased unit (die cast box, SO239 connectors) or as a ready built and tested PCB module.

MINIATURE RECEIVING ANTENNAS

If you don't have enough space to put up traditional receiving antennas, our active antennas are the answer. They need no tuning yet have constant sensitivity from 200 kHz to well over 30 MHz. Results are quite comparable to full size conventional antennas but the space saving is enormous. The indoor version (AD270) is 3 metres long and the outdoor version (AD370) is 2 metres long. A TV-type coaxial feeder cable of any reasonable length can be used yet because the antennas are balanced dipoles any interference picked up by the feeder is rejected. Because of their wide frequency coverage Datong Active Antennas are ideal accessories for modern general coverage communications receivers.



AD370

VERY LOW FREQUENCY CONVERTER MODEL VLF

Model VLF adds the missing bands below 500 kHz to your existing receiver. It also adds MW and LW coverage to amateur bands-only receivers for news, time checks etc.



MODEL VLF

Connected in series with the antenna Model VLF allows you to tune the 0 to 500 kHz range (and above at reduced sensitivity) using the ten metre band (28-30 MHz) on your normal receiver.

MULTI-MODE AUDIO FILTER - MODEL FL2

Model FL2 offers audio filtering capability which is totally in a class of its own. Although connecting in the loudspeaker line from any rig, Model FL2 simulates the effect of fully variable IF selectivity complete with pass band edges even steeper than those of multipole crystal filters. You can remove interference in SSB and winkle out weak CW to a truly remarkable extent. No less than twelve poles of tuneable filtering in Model FL2 can be used in six different ways depending on the mode switch. For example, for SSB you have independent low and high pass filters, each a 5 pole elliptic function type for knife edge cut-off, plus when needed, a separate 2 pole notch filter. All three filters tune linearly and separately from 200 to 3500 Hz. For CW all 12 poles are combined automatically to give incredible skirt selectivity and with independent calibrated controls for centre frequency and bandwidth.



MODEL FL2

MODEL ASP - THE "INTELLIGENT" RF CLIPPER

Model ASP modifies your speech signal direct from the microphone and makes it more effective at modulating your transmitter. The effect is as if the transmitter peak power were to increase by 6 to 10 db. "Intelligent" means that unlike other speech processors Model ASP automatically senses your voice level and reacts accordingly to always maintain the degree of true r.f. clipping selected (in decibels) by the panel push-buttons. Special circuitry does this without the undesirable side effects of simple a.g.c. devices. Adding a Datong r.f. clipper to a normal SSB transmitter has a similar effect to adding a linear amplifier but without the high cost and risk of TVI.



MODEL ASP

"CODECALL" SELECTIVE CALLING DEVICE

The Datong Codecall adds "selective call" to any radio voice channel. A single self-contained unit at each end of the link sends or receives a coded audio signal. When the correct code is received the receiver beeps loudly. The only connection needed to a transceiver is to the external loudspeaker jack. Sending is via direct audio into the microphone.



"Codecall" allows totally silent stand-by "CODE CALL" operation yet with confidence that when that specific call comes, you won't miss it.

Over 4000 different codes can be selected by internal link or by three 16-way panel switches, depending on the model. This practically eliminates false alarms.

NEW PRODUCT NOW AVAILABLE

MODEL DF1
Direction finder attachment for FM, VHF receivers - transceivers.

PROFESSIONAL QUALITY AT REMARKABLY LOW COST.

PRICES

All prices include delivery in U.K. basic prices in £ are shown with VAT inclusive prices in brackets.

FL1	59.00 (67.85)	AD370	45.00 (51.75)	RFA	25.50 (29.32)
FL2	78.00 (89.70)	AD270 + MPU	37.00 (42.55)	Codecall (Linked)	24.00 (27.60)
PC1	105.00 (120.75)	AD370 + MPU	49.00 (56.35)	Codecall (Switched)	25.50 (29.32)
ASP	69.00 (79.35)	MPU	6.00 (6.90)	Basic DF System	125.00 (143.80)
VLF	22.00 (25.30)	DC144/28	31.00 (35.65)	DF System	131.00 (150.70)
D70	43.00 (49.45)	DC144/28 Module	25.00 (28.75)	Complete Mobile DF System	173.50 (199.50)
D75	49.00 (56.35)	Keyboard Morse Sender	112.20 (129.00)		
RFC/M	23.00 (26.45)				
AD270	33.00 (37.95)				

● See previous advertisement or price list for further details.



ALL DATONG PRODUCTS ARE DESIGNED AND BUILT IN THE U.K.

Data sheets on any products available free on request - write to Dept S.W.
DATONG ELECTRONICS LIMITED
 Spence Mills, Mill Lane, Bramley, Leeds LS13 3HE, England. Tel: (0532) 552461



TRIED, TESTED AND TRUSTED

See review in February Rad.Comm.

IC-720A
Possibly the best choice in HF.
 £883.inc.



The main problem that the amateur of today has to deal with is deciding just which rig out of the many excellent products available he is going to choose. Technology is advancing at such a rapid rate and getting so sophisticated that many cannot hope to keep up. Some go too far!

Perhaps one way of dealing with the problem is to look at just what each model offers in its basic form without having to lay out even more hard earned cash on "extras". The IC-720A scores very highly when looked at in this light. How many of its competitors have two VFOs as standard or a memory which can be recalled, even when on a different band to the one in use, and result in instant retuning AND BANDCHANGING of the transceiver? How many include a really excellent general coverage receiver covering all the way from 100kHz to 30MHz (with provision to transmit there also if you have the correct licence)? How many need no tuning or loading whatsoever and take great care of your PA, should you have a rotten antenna, by cutting the power back to the safe level? How many have an automatic RIT which cancels itself when the main tuning dial is moved? How many will run full power out for long periods without getting hot enough to boil an egg? How many have band data output to automatically change bands on a solid state linear AND an automatic antenna tuner unit when you are able to add these to your station?

Well you will have to do quite a bit of hunting through the pages of this magazine to find anything to approach the IC-720A. It may be just a little more expensive than some of the others – but when you remember just how good it is, and of course the excellent reputation for keeping their secondhand value you will see why your choice will have to be an IC-720A!

IC-PS15 Mains PSU £99



Free carriage on direct sales – call us.

Remember we also stock Yaesu, Jaybeam, Datong, Welz, G-Whip, Western, TAL, Bearcat, RSGB Publications.



ASK ABOUT THE NEW RANGE OF CUE DEE ANTENNAS....the winners in recent tests!

Please note: Access Barclaycard owners – goods must be sent to address registered with credit card company



IC-2E £159.inc.
IC-4E £199.inc.
The World's most popular portables & now the marine version IC-M12

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

Fully synthesized – Covering 144 – 145.995 in 400 5KHz steps. (430-439.999 4E)

Power output – 1.5W with the 9v. rechargeable battery pack as supplied – but lower or higher output available with the optional 6v or 12v packs. Rapid slide-on changing facility.

BNC antenna output socket – 50 ohms for connecting to another antenna or use the Rubber Duck supplied (flexible 1/4 λ whip – 4E)

Send/battery indicator – Lights during transmit but when battery power falls below 6v it does not light, indicating the need for a recharge.

Frequency selection – by thumbwheel switches, indicating the frequency. 5KHz switch – adds 5KHz to the indicated frequency

Duplex simplex Switch – gives simplex or plus 600KHz or minus 600KHz transmit (1.6MHz and listen input on 4E)

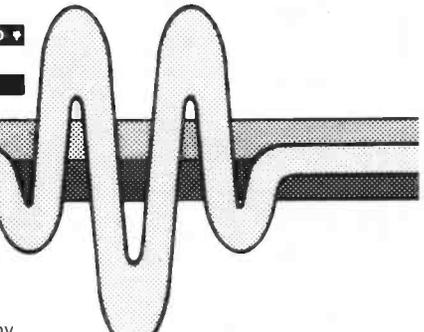
Hi-Low switch – reduces power output from 1.5W to 150mW reducing battery drain.

External microphone jack – if you do not wish to use the built-in electret condenser mic an optional microphone speaker with PTT control can be used. Useful for pocket operation.

External speaker jack – for speaker or earphone. This little beauty is supplied ready to go complete with nicad battery pack, charger, rubber duck.

ICML1	10W mobile booster for IC2E	49.00	BC25	Mains charger as supplied	4.25
BP5	11 volt battery pack	30.00	DC1	12 volt adapter pack	8.40
BP4	Empty battery case for 6 x AA cells	5.80	HM9	Speaker microphone	12.00
BP3	Standard battery pack	17.70	CP1	Mobile charging lead	3.20
BP2	6 volt pack	22.00	IC1.2.3	cases	each 3.60
BC30	Base charger for above	39.00		All prices include VAT	

The IC4E is going to revolutionise 70 CM!



IC-290E £366./IC-490E £445 inc.
Multimode mobiles
 290E-144-146 MHz/490E-430-440 MHz



10W RF output on SSB, CW and FM. Standard and non-standard repeater shifts. 5 memories and priority channel. Memory scan and band scan controlled at front panel or microphone. Two VFO's LED S-meter 25KHz and 1KHz on FM-1KHz and 100KHz tuning steps on SSB. Instant listen input for repeaters.

IC-730 The best for mobile or economy base station
 £586 inc.



ICOM's answer to your HF mobile problems – the IC-730. This new 80m-10m, 8 band transceiver offers 100W output on SSB, AM and CW. Outstanding receiver performance is achieved by an up-conversion system using a high IF of 39MHz offering excellent image and IF interference rejection, high sensitivity and above all, wide dynamic range. Built in Pass Band Shift allows you to continuously adjust the centre frequency of the IF pass band virtually eliminating close channel interference. Dual VFO's with 10Hz and 1KHz steps allows effortless tuning and what's more a memory is provided for one channel per band. Further convenience circuits are provided such as Noise Blanker, Vox, CW Monitor, APC and SWR Detector to name a few. A built in Speech Processor boosts talk power on transmit and a switchable RF Pre-Amp is a boon on today's crowded bands. Full metering WWV reception and connections for transverter and linear control almost completes the IC-730's impressive facilities.

IC-251 £499 inc.
 IC-451 £630 inc.
Great Base Stations



ICOM produce a perfect trio in the UHF base station range, ranging from 6 Meters through 2 Meters to 70 cms. Unfortunately you are not able to benefit from the 6m product in this country, but you CAN own the IC-251E for your 2 Meter station and the 451E for 70 cms.

Both are really well designed and engineered multi-mode transceivers capable of being operated from either the mains or a 12 volt supply. Both contain such exciting features as scan facilities, automatic selection of the correct repeater shift for the band concerned, full normal and reverse repeater operation, tuning rate selection according to the mode in use, VOX on SSB, continuous power adjustment capability on FM and 3 memory channels. Of course they are both fitted with a crystal controlled tone burst and have twin VFO's as have most of ICOM's fully synthesized transceivers.

IC-24G Low-priced mobile
 £169 inc.



The famous IC-240 has been improved, given a face lift and renamed the IC-24G. Many thousands of 240's are in use, and its popularity is due in part to simplicity of operation, high receiver sensitivity and superb audio on TX and RX. The new IC-24G has these and other features. Full 80 channels (at 25kHz spacing) are available and readout is by channel number – selected by easy to operate press button thumbwheel switches. This readout can clearly be seen in the brightest of sunlight. Duplex and reverse duplex is provided along with a 12 1/2 KHz upshift, should the new channel spacing be necessary.



IC-25E The Tiny Tiger
 £239 inc.

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

Tono RTTY and CW computers
 7000E-£550/9000E-£650 inc.



The TONO range of communication computers take a lot of beating when it comes to trying to read RTTY and CW in the noise. Others don't always quite make it!

Check the many facilities offered before you buy – especially look at the 9000E which also throws in a Word Processor. Previous ads have told you quite a lot about these products – but why not call us for further information and a brochure?



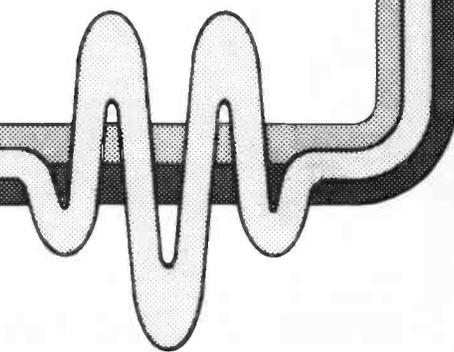
The MT-240X Multi-band trap dipole antenna (80m – 10m) is a superbly constructed antenna with its own Balun incorporated in the centre insulator with an SO239 connector. Separate elements of multi-stranded heavy duty copper wire are used for 80-40-15 and 20-10 Metres. Really one up on its competitors. £49.50 inc. VAT

Thanet Electronics

143 Reculver Road, Herne Bay, Kent. Tel: (02273) 63859. Telex 965179

Agents (phone first – all evening weekends only, except Scotland)
 Scotland – Jack GM8 GEC 031-657 2430 (daytime)
 031-665 2420 (evenings)
 Midlands – Tony G8AVH 021-329 2305

Wates – Tony GW3 FKO (0874) 2772 or (0874) 3992
 North West – Gordon G3LEQ Knutsford (0565) 4040
 ansaphone available



SMC SERVICE

Free Finance on most substantial items. Two year guarantee on Yaesu Musen. Free Securicor on major Yaesu items. Access and Barclaycard over the 'phone. Biggest branch, agent and dealer network. Ably staffed and equipped service department. Securicor 'B Service' contract at £4.49. Biggest stockist of amateur equipment. Twenty-four years of radio experience.

FREE FINANCE

On regular priced items from Yaesu, Ascot SMCHS, CDE, HyGain, Channel Master, Hansen, SMC, MFJ, KLM, Mirage and Hy Mound, on invoices over £100 SMC offers Free Finance! How is it done? Simple, pay 20%, split the balance equally over 6 months or pay 50% down and split the balance over a year. *You pay no more than the cash price!!*

GUARANTEE

Yaesu's own warranty does not extend outside Japan. Repairs are the responsibility of the UK retailer. SMC's two year guarantee is backed, as UK distributors, by daily contact with the factory and many tens of thousands of pounds of spares and test equipment. Avoid hawkers offering sets without serial numbers, spares, service or advice back up.

NEW SHOWROOM:

Our superb new showrooms located within our new administrative headquarters in Rumbridge Street (abuts the Osborne Road Stores/Service/Manufacturing complex) is now open six days a week 9 till 5-30.

Six "Yaesu line up length" demonstration benches provide you with full "on the air" and "side by side" evaluation facilities. Check out a FT102, FT-ONE or FT230R today.

SUPER SELECTION

In our catalogue you will find the widest selection anywhere:— 200 stock lines of Yaesu, 600 different antennas, masts, rotators, coaxes, plus 300 items of communications equipment.

If that is not enough to tempt you into our showrooms how about:— a FT107 (right), the six super prices (overleaf), a Bearcat 220 for £195, a MMT432/28 for £119 or a Hokoshin gutter mount ½λ for £10!!

— SUPER SALE!

As part of our inventory rationalisation scheme we are delighted to announce:— Substantial price reductions on the FT107 and accessories (see 'Sale' row).

Buy a FT107 and you can choose your accessories from the 'Line up' prices.

If sight of the full line up:— (FT + FP + DMS + FV + FTV + 144TV + SP — List £1,267.30) is too much to stand, it's yours for £999!!!



	FT107M	FP107	FP107E	DMS	FV107	FTV107	SP107P	SP107
LIST	£ 725.00	£ 101.95	£ 113.10	£ 92.75	£ 98.50	£ 119.20	£ 57.50	£ 29.90
SALE	£ 625.00	£ 90.00	£ 100.00	£ 90.00	£ 80.00	£ 110.00	£ 55.00	£ 29.00
LINE-UP		£ 80.00	£ 90.00	£ 80.00	£ 60.00	£ 100.00	£ 50.00	£ 25.00

WIDE COVERAGE ALL MODE Rx; FRG 7700 £329 inc. VAT @ 15% & SECURICOR



'7700 THE ONE WITH FM!

- ★ 30MHz down to 150kHz (and below).
- ★ 12 Channel memory option with fine tune.
- ★ SSB (LSB/USB), CW, AM, FM.
- ★ 2.7kHz, 6kHz, 12kHz, 15kHz, @ — 6dB.
- ★ 3 Selectivities on AM, squelch on FM.
- ★ Up conversion, 48MHz first IF.
- ★ 1kHz digital, plus analogue, display.
- ★ Inbuilt quartz clock/timer.
- ★ No preselector, auto selected LPF's.
- ★ Advanced noise blanker fitted.
- ★ Antenna 500Ω to 2MHz, 50Ω to 30MHz.
- ★ 20dB pad plus continuous attenuator.
- ★ Switchable A.G.C. Variable tone.
- ★ 110 and 240Vac plus 12Vdc option.
- ★ Signal meter calibrated in "S" and SIMPO
- ★ Acc; Tuners, Converters, LPF, Memory.
- ★ FRT7700; 150kHz-30MHz, Switch, etc.
- ★ FRV7700A; 118-130, 130-140, 140-150MHz.
- ★ FRV7700B; 118-130, 140-150, 50-59MHz.
- ★ FRV7700C; 140-150, 150-160, 160-170MHz.
- ★ FRV7700D; 118-130, 140-150, 70-80MHz.
- ★ FRV7700E 118-130, 140-150, 150-160MHz.
- ★ FRV7700F 118-130, 150-160, 170-180MHz.
- ★ FF5; 500kHz (for improved VLF reception).
- ★ MEMGR7700; 12 Channels (internal fitting).
- ★ FRA7700; Active Antenna.

SOUTH MIDLANDS COMMUNICATIONS LTD



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



GRIMSBY

S.M.C. (Humberside)
247A Freeman St.
Grimsby, Lincolnshire
Grimsby (0472) 59388
10-6 Tuesday-Saturday

STOKE-ON-TRENT

S.M.C. (Stoke)
76 High Street,
Talke Pts. Stoke
Kidsgrove (07816) (72644)
9.5-30 Tuesday-Saturday

LEEDS

S.M.C. (Leeds)
257 Otley Road,
Leeds 16, Yorkshire
Leeds (0532) 782326
9.5-30 Monday-Saturday

CHESTERFIELD

S.M.C. (Jack Tweedy) LTD
102 High Street,
New Whittington, Chesterfield
Chesterfield (0246) 453340
9.5 Tuesday-Saturday

BUCKLEY

S.M.C. (T.M.P.)
Unit 27, Pinfold Lane,
Buckley, Clwyd
Buckley (0244) 549563
9.30-5.30 Tues.-Sat. (Lunch 1.2.15)

SMC AGENTS

Bangor John G13KDR (0247) 55162
Tandragee Mervyn G13WVY (0762) 840656

Stourbridge Brian G3ZUL (02843) 5917
Neath John GW4FO1 (0639) 52374/2942

Edinburgh Jack GM8GEC (031665) 2420
Jersey Geoff GJ4ICD (0534) 26788

FT ONE £1,295 inc. VAT @ 15% & SECURICOR



*Option

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

- ★ 1.8-3.5-7-10-14-18-21-24.5-28MHz
- ★ All modes: — LSB, USB, CW, AM±, FM±, (±Option board)
- ★ Front end: extra high level, 24V DC operation
- ★ RF stage bypassable, boosts dynamic range over 100 dB!
- ★ Variable bandwidth 2.7KHz→500Hz AND IF Shift
- ★ Fixed bandwidth filters, parallel or cascade configurations
- ★ If notch (455KHz) AND independent audio peak
- ★ Noise blanker adjustable for pulse WIDTH
- ★ External Rx and separate Rx antenna provisions
- ★ THREE 6146B in special configuration — 40 dB IMD!
- ★ Extra product detector for checking Tx IF signal
- ★ Dual meter, peak hold ALC system
- ★ Mic amp with tunable audio network
- ★ SP102: — Speaker, Hi and Lo AF filters, 12 responses!
- ★ FV102: — VFO. 10Hz steps and readout, scanning, QSY.
- ★ FC102: — ATU, 20/200/1200 W FSD PEP, wire.
- ★ FAS-1-4R: — 4 way remote waterproff antenna selector.

FT102



FT902DM £885 inc. VAT @ 15% & SECURICOR



*Option

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

- ★ 160-10 metres including new allocations.
- ★ Variable IF bandwidth 2.4kHz down to 300Hz.
- ★ Selectable CW fixed bandwidth CW-W and CW-N*.
- ★ Semi-break in with sidetone for excellent CW.
- ★ Digital plus analogue frequency displays.
- ★ 180W PIP and — 31dB 3rd order intermod.
- ★ RF speech processor fitted — adjustable level.
- ★ VOX built-in and is adjustable from the front panel.
- ★ Wide dynamic range for big signal handling.
- ★ High usable sensitivity, for those weak ones.
- ★ Superb noise blanker — adjustable threshold.
- ★ Attenuator; 0-10-20dB, AGC; slow-fast-off.
- ★ Clarifier (RIT) switchable on TX, RX or both.
- ★ Low level transvertor drive output facility.
- ★ Universal power supply 110-234V AC and 12V DC*.
- ★ Incredible range of matching accessories
- ★ 6 models: Digital/Analogue — AM/FM options.

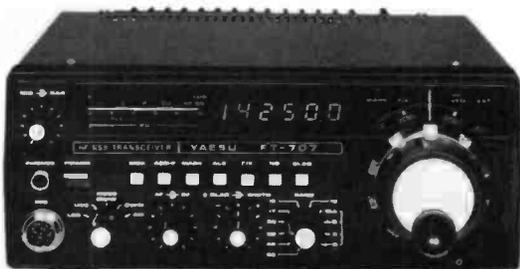
FT101ZD £635 inc. VAT @ 15% & SECURICOR



*Option

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

FT707 £569 inc. VAT @ 15% & SECURICOR





OVER
40%
OFF!!

Reductions shown are taken from previously advertised prices and are not necessarily those that the equipment has been offered continuously for the last 28 days. Certain items are shop soiled/ex demo - please enquire

2m SYNTHESISED £205 inc. CPU2500RKS. 10W keyboard mic up/down tuning etc., 25W RK model £210, 25kHz stepper version £220.



OVER
33%
OFF!!

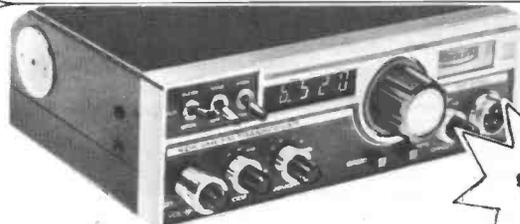
Reductions shown are taken from previously advertised prices and are not necessarily those that the equipment has been offered continuously for the last 28 days. Certain items are shop soiled/ex demo - please enquire

2m SYNTHESISED £175 inc. FT227RB. 10W remote tuning transceiver. **FT227RXS.** 227 fitted special scanner £195.



£50
OFF

2m, 250W (+) PEP. £449 NAG 144XL LINEAR. 4CX350F tube, 10W nom. drive, switchable pre-amp. RF and hard switching. Thermal delay, etc., etc.



£20
OFF

2m, 25W, FM, £179 inc. 2025 MARK II Full coverage 2M Transceiver, 12½kHz (set 12½-200kHz), rapid tune, 10 "easy write" memory channels, memory or band-scan between programmable limits, auto scan stop dependent on squelch and centre zero.



NEW
YAESU

2m, 25W, FM, £239 inc. FT230R 6" x 2" x 7", 12½/25kHz, ±600kHz, special LCD display, 10 memories, memory and band scan, RX priority feature, two independent VFO's.



SUPER
PRICE

COMMUNICATIONS Rx £995 inc. NRD515, 100kHz-30MHz, SSB/AM/CW/RTTY, Digital 100Hz VFO. (ills. with 24 chan. mem. option).

FT480R (2m) £379 inc. VAT @ 15% & SECURICOR **FT780R (70cm) £449 inc.** VAT @ 15% & SECURICOR

- ★ USB-LSB-CW-FM (A3j, A1, F3).
- ★ 30W PIP A3j, 10/1 W out A1 F3.
- ★ Bandpass filter no tune design.
- ★ Bandwidth 2.4kHz and 14kHz at -6dB.
- ★ Semi break in with side tone.
- ★ Very bright blue 100Hz digital display.
- ★ Display shows Tx & Rx freq (inc RIT).
- ★ String LED display for "S" and PO.
- ★ Digital receiver offset tuning.



- ★ 144-146MHz (143.5-148.5 MHz possible).
- ★ Excellent dynamic range and sensitivity.
- ★ FM; 25, 12½, 1kHz steps.
- ★ SSB; 1,000, 100, 10Hz steps.
- ★ Any TX Rx split with dual VFO's.
- ★ ±600kHz standard repeater split.
- ★ Four easy write-in memory channels.

F
T
4
8
0
R



- ★ Advanced effective noise blanker.
- ★ Memory scanning with slot display.
- ★ Up/down tuning/scanning from mic.
- ★ Priority channel on any memory slot.
- ★ Satellite mode allows tuning on Tx.
- ★ Scanning for busy or clear channels.
- ★ Size (Case): 8.3" D, 2.3" H, 6.9" W.
- ★ LED's; "On Air" Clar, Hi/Low, FM mod.
- ★ Matching PP80 Mains PSU available.



- ★ 1.6MHz shift now available
- ★ FT780R 1.6 fitted 1.6 MHz Shift £459 inc.
- ★ 430-434MHz (440-445) possible.
- ★ GaAs Fet RF for incredible sensitivity.
- ★ NMOS four bit micro control.
- ★ FM; 100kHz, 25kHz, 1kHz, steps.
- ★ SSB; 1,000, 100, 10Hz steps.
- ★ Repeater access by use of dual VFO's.
- ★ Four easy write-in memory channels.

F
T
7
8
0
R



SUMMERTIME = HAND PORTABLE TIME

LOW PRICE

FT207R
£ 159 inc.
VAT @ 15%
& POSTAGE



- ★ 144-146MHz (144-148 possible)
- ★ 12.5kHz synthesizer steps
- ★ 4 bit CPU chip for freq. control
- ★ Keyboard entry of frequencies
- ★ Keyboard lockout safety feature
- ★ Digital display to hundreds of Hz
- ★ Display auto shutdown timer
- ★ Four Channels of memory
- ★ Memory back up disable
- ★ Up/down manual tuning

- ★ Bandscan for busy or clear channels
- ★ Memory scanning features
- ★ ±600kHz split built in
- ★ Easy change NiCad packs.
- ★ BNC antenna connector
- ★ 2.5/0.2W of RF output
- ★ 0.3µV for 20dB quieting
- ★ D.T.M.F. encoder built in
- ★ Built in condenser microphone
- ★ Rx; 35mA squelch, 150mA full vol
- ★ Tx; 250mA low, 800mA high
- ★ 200mW AF to internal/external speaker
- ★ External speaker/mic available
- ★ "On Air" and "Channel Busy" LEDs
- ★ Double conversion 10.7MHz and 255kHz.
- ★ Any split + or - programmable
- ★ 1.7 (2.2)" D x 2.5 (2.7)" W x 6.7 (7.2)" H
- ★ C/w NiCad pack, helical and case

SALE
£159
inc.

FT290R MULTIMODE PORTABLE/MOBILE £249 inc. VAT @ 15% & SECURICOR

- ★ 144-146MHz (144-148 possible)
- ★ Multimode USB, LSB, FM, CW
- ★ 2.5W PEP, 2.5W/0.3W runs out
- ★ LED's, "on air", "busy" MC meter; S.PO
- ★ Integral telescopic antenna
- ★ Bandwidth 2.4kHz and 14kHz @ - 6dB
- ★ 100Hz backlit LCD Frequency display
- ★ 10 memory channels "5 year" backup
- ★ FM: 25kHz and 12.5kHz steps
- ★ SSB: 1kHz and 100Hz steps
- ★ Any TX/RX split with dual VFOs
- ★ ±600kHz repeater split 1750kHz burst
- ★ Up/down tuning from microphone
- ★ AF output 1W @ 10% THD
- ★ 58 (H) x 150 (W) x 195 (D) (1.3kg)
- ★ Rx, 70mA, Tx; 800mA (FM maximum)
- ★ Mobile bracket available (MMB II)



2 Yr. GUARANTEE
AND FREE FINANCE
AVAILABLE



★ FT90R SOON ★



FULL RANGE
OF MATCHING
ACCESSORIES

- ★ Matching 10W linear Amplifier
- ★ 8.5 - 15.2V DC External
- ★ 8'C NiCads or Drys
- ★ SMC 2.2 A/Hr NiCad £2.70 inc

FT208R(2m) FT708R(70cm)



- ★ 4 bit CPU chip frequency control
- ★ Keyboard entry of frequencies/splits
- ★ LCD digital display with backlight
- ★ Ten channels of memory
- ★ Memory back up five-year lifetime cell
- ★ Up/down manual tuning
- ★ Manual or auto scan for busy/clear
- ★ Priority channel with search back
- ★ Memory scanning feature
- ★ Scan between any two frequencies
- ★ Auto scan restart
- ★ Quick change NiCad pack
- ★ 1,750Hz tone burst
- ★ Built in condenser microphone
- ★ 500mW AF to int/ext speaker
- ★ External speaker/mic available
- ★ Keyboard offers 16 tone DTMF
- ★ 168(H) x 61(W) x 39(D)mm
- ★ C/w NiCad pack, helical



FT708R £219 inc. VAT @ 15% & POSTAGE

- ★ 430 - 440MHz (440 - 450 option)
- ★ 25kHz synthesizer steps
- ★ Any split + or - programmable
- ★ ±7.6MHz EU split standard
- ★ 1W or 100mW RF output
- ★ Rx: 20mA squelch, 150mA (max AF)
- ★ Tx: 500mA at 1W RF
- ★ 0.4µV for 12dB SINAD
- ★ Dual conversion 46.255MHz and 455kHz

FT208R £209 inc. VAT @ 15% & POSTAGE

- ★ 144-148MHz (144-148 possible)
- ★ 12.5/25kHz synthesizer steps
- ★ Any split + or - programmable
- ★ ±600kHz repeater split
- ★ 2.5 or 0.3W RF output
- ★ Rx: 20mA squelch 150mA max AF
- ★ Tx: 800mA at 2.5W RF
- ★ 0.25µV for 12dB SINAD
- ★ Dual conversion 16.9MHz and 455kHz

SOUTH MIDLANDS COMMUNICATIONS LTD

S.M. HOUSE, OSBORNE ROAD, TOTTON, SOUTHAMPTON, SO4 4DN, ENGLAND

Tel: Totton (0703) 867333, Telex: 477351 SMCOMM G, Telegram: "Aerial" Southampton



GRIMSBY

S.M.C. (Humberside)
247A Freeman St.,
Grimsby, Lincolnshire.
Grimsby (0472) 59388
10-6 Tuesday-Saturday

STOKE-ON-TRENT

S.M.C. (Stoke)
76 High Street,
Talke Pits, Stoke.
Kidsgrove (07816) 72644
9-5.30 Tuesday-Saturday

LEEDS

S.M.C. (Leeds)
257 Otley Road,
Leeds 16, Yorkshire.
Leeds (0532) 782326
9-5.30 Monday-Saturday

CHESTERFIELD

S.M.C. (Jack Tweedy) LTD
102 High Street,
New Whittington, Chesterfield.
Chesterfield (0246) 453340
9-5 Tuesday-Saturday

BUCKLEY

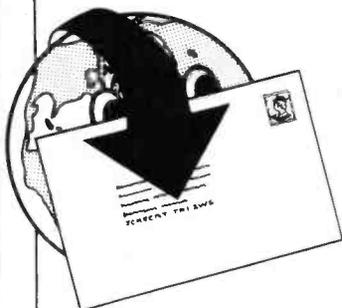
S.M.C. (T.M.P.)
Unit 27, Pinfold Lane,
Buckley, Chwyd.
Buckley (0244) 549563
9.30-5.30 Tues.-Sat. (Lunch 1-2.15)

SMC AGENTS

Bangor John G13KDR (0247) 55162
Tandragee Mervyn G13WVY (0762) 840656

Stourbridge Brian G3ZUL (03843) 5917
Neath John GW4FOI (0639) 55114/2942

Edinburgh Jack GMBGEC (031665) 2420
Jersey Geoff GJ4ICD (0534) 26788



YAESU TRANSCEIVERS

FT-ONE	1,295.00
FT-902	895.00
FT-102AM/FM	t.b.a.
FT-101ZD FM	695.00
FT-101ZD AM	650.00
FT-101Z FM	590.00
FT-101Z AM	575.00
FT-107	725.00
FT-707	599.00
FL-2100Linear Amp	425.00
FT-480VHF	379.00
FT-290VHF	249.00
FT-230VHF	239.00
FT-790UHF	t.b.a.

YAESU RECEIVERS AND ACCESSORIES

FRG-7	189.00
FRG-7700	329.00
FRG-7700M	409.00
FRT-7700ATU	37.00
FRV-7700A Converter	68.00
FRV-7700B Converter	75.00
FRV-7700C Converter	65.00
FRV-7700D Converter	72.00

ICOM

IC-720A
IC-730
IC-451
IC-251
IC-290
IC-25E
PS-15
IC-2E
IC-4E

Prices on application

TRIO

TS-930 TS-530	} Prices on application
TS-830 PS-30	
All other TRIO models available	

MICROWAVE MODULES

MMT144/28	2M Transverter for HF Rig	98.00
MMT432/28S	70cm Transverter for HF Rig	148.00
MMT432/144R	70cm Transverter for 2M Rig	184.00
MMT70/28	4M Transverter for HF Rig	115.00
MMT70/144	4M Transverter for 2M Rig	115.00
MMT1296/144	23cm Transverter for 2M Rig	184.00
MML144/25	2M 25W Linear Amp (3W I/P)	59.00
MML144/40	2M 40W Linear Amp (10W I/P)	77.00
MML144/100S	2M 100W Linear Amp (10W I/P)	129.00
MML432/20	70cm 20W Linear Amp (3W I/P)	77.00
MML432/50	70cm/50W Linear Amp	119.00
MML432/100	70cm 10/100W Linear Amp	228.64
MM2000	RTTY to TV Converter	169.00
MM4000	RTTY Transceiver	299.00
MMC50/28	6M Converter to HF Rig	27.90
MMC70/28	4M Converter to HF Rig	27.90
MMC144/28	2M Converter to HF Rig	27.90
MMC432/28S	70cm Converter to HF Rig	34.90
MMC432/144S	70cm Converter to 2M Rig	34.90
MMC435/600	70cm ATV Converter	27.90
MMK1296/144	23cm Converter to 2M Rig	59.80
MMD050/500	500MHz Dig. Frequency Meter	69.00
MMD600P	600MHz Prescaler	23.00
MMDP1	Frequency Counter Probe	11.50
MMA28	10M Preamp	14.95
MMA144V	2M RF Switched Preamp	34.90
MMF144	2M Band Pass Filter	9.90
MMF432	70cm Band Pass Filter	9.90
MMS1	The Morse Talker	115.00

MORSE EQUIPMENT

MK704	Squeeze Paddle	10.50
HK707	Up/Down Key	10.50
HK704	Deluxe Up/Down Key	14.50

MORSE EQUIPMENT

BY1	Keyer Paddle (black)	32.00
BY2	Keyer Paddle (chrome)	39.95
BY3	Keyer Paddle (gold-plated)	92.00

ROTATORS

KR250	Kenpro Lightweight 1-1½" mast	44.95
9502B	Colorotor (Med. VHF)	49.95
KR400RC	Kenpro-inc lower clamps	99.95
KR600RC	Kenpro-inc lower clamps	139.95

DESK MICROPHONES

SHURE 444D Dual Impedance	33.00
SHURE 526T Mk II Power Microphone	46.00
ADONIS AM502 Compression Mic 1 O/P	39.00
ADONIS AM601 Compression Mic + Meter 1 O/P	49.00
ADONIS AM802 Compression Mic. + Meter 3O/P	59.00

MOBILE SAFETY MICROPHONES

ADONIS AM 202S Clip-on	20.95
ADONIS AM 202F Swan Neck + Up/Down Buttons	30.00
ADONIS AM 202H Head Band Up/Down Buttons	30.95

DRAE PRODUCTS fully protected power supplies

4 Amp	27.95	12 Amp	69.00
6 Amp	44.95	24 Amp	99.00
VHF Wavemeter 130-450MHz	24.95		
Morse Tutor — new product	47.00		

TEST EQUIPMENT

DM81	Trio Dip Meter	63.25
AT145	Packer VHF Wavemeter	19.95
Welz SP15M	1.8-150MHz — 200W	29.00

LICENSED CREDIT BROKERS * Ask for written quotation. Credit Card sales by telephone.



Prices are correct as we go to press, but we reserve the right to vary them if forced to do so by the time this advertisement appears.

AMATEUR RADIO EXCHANGE



OUR STOCK IS JUST A PHONE CALL AWAY

In London's leading amateur radio store, Brenda and Bernie are now geared up to provide Britain's best phone and mail order service too. So, whether you want an HF transceiver or just a meter and a couple of PL-259s, try us. Any item in stock – and in our new premises we carry an even wider range than before – which is ordered before 2pm will normally be dispatched the same day. Carriage is free within mainland UK, and delivery will be as rapid as insured Post or Securicor can make it.

When it comes to paying the choice is yours. If you want to use your Access or VISA Credit Card, just give us your name, address and Card number, and your order is on its way. However, if you prefer to send a cheque, there won't even be a delay to clear it if you are

in the Call Book. Indeed, if you are a licensed Amateur (or if you have a Cheque or Credit Card), we can even arrange HP on the telephone, with free credit for up to 12 months if you put down a 50% deposit. Alternatively, we can offer normal HP terms over varying periods with smaller down-payments, including a special **10%** deposit scheme on transceivers.

This advertisement can only list a selection from our complete range, so please phone for up-to-date price and stock information, or send 50p for our full Stock List (refundable against any purchase over £5)... It's the next- best thing to browsing round the store...and don't worry about missing your cup of Brenda's coffee. We've even found a way of organising this for our post and telephone customers!



OTHER RANGES AND PRODUCTS

Standard • Welz • Datong • Sota • Packer • Wood & Douglas Kits

Antennas and accessories by Cushcraft, G-Whip, Jaybeam etc.

Scanning receivers by Bearcat; also the SX200N and AR-22.

Tono VHF amps. Tasco CW readers. Wraase SSTV kits etc etc.

FT-790

Yaesu's popular 2m Portable format now available for 70cm as well, with full 10MHz coverage, all-mode FM/CW/USB/LSB, 25/50kc steps, 1.6MHz shift for repeater operation, toneburst, etc.



PHONE FOR FULL DETAILS AND PRICE

FT-102

Yaesu's latest HF transceiver...a worthy successor to the evergreen FT-101 series, with so many extra features.

- Notch filter ● Three 6146B final tubes ● IF shift control
- Bandwidth control from 2.7kHz to 500Hz ● APF control

- RF processing ● Tunable audio network for speech tailoring
- SSB/CW/AM/FM

PHONE FOR FULL DETAILS OF THE TRANSCEIVER ITSELF AND OF THE RANGE OF MATCHING ACCESSORIES.



373 UXBRIDGE ROAD, ACTON, LONDON W3 9RH
Tel: 01-992 5765/6/7 Just 500 yards east of Ealing Common station on the District and Piccadilly Lines, and 207 bus stops outside.

136 GLADSTONE STREET, ST HELENS, MERSEYSIDE
 Tel: 0744 53157 Our North West branch run by Mike (G4NAR), just around the corner from the Rugby Ground.
 Closed Wednesday at Acton and Monday at St Helens, but use our 24-hour AnsaFone service at either shop.

DO YOUR SHOPPING

THE EASY WAY – THE BREDHURST WAY

TO ORDER ANY OF THE ITEMS LISTED BELOW SIMPLY WRITE EN-
CLOSING A CHEQUE OR PHONE AND QUOTE YOUR CREDIT CARD No.



HIGH ST., HANDCROSS, W. SUSSEX O444 400786

FT290R

£249



YAESU			
FT1	Superb HF Transceiver	1295.00	(-)
FT902DM	160-10m Band Transceiver	896.00	(-)
FC902	All Band A.T.U.	136.00	(1.50)
SP901	External Speaker	31.06	(1.50)
FT102S	160-10m Band Transceiver		
	Digital R.O.	p.o.a.	(-)
FT 707	8 Band Transceiver 200W Pep	569.00	(-)
FT 707S	8 Band Transceiver 20W Pep	485.00	(-)
FP707	Matching Power Supply	125.00	(5.00)
FTV 707R(2)	Transverter – 2M	198.00	(-)
FTV 707DM	Digital V.F.O.	203.00	(-)
FC707	Matching A.T.U./Power Meter	85.00	(1.00)
MR7	Metal Rack for FT707	15.70	(1.00)
MMB2	Mobile Mounting Brckt. for FT707	16.10	(1.00)
FRG7	General Coverage Receiver	199.00	(-)
FRG7700	200KHz – 30MHz Gen. Cov. Rec.	329.00	(-)
FRG7700M	As above but with Memories	409.00	(-)
FRT7700	Antenna Tuning Unit	37.85	(1.00)
FRA7700	Active Antenna	36.40	(1.00)
FT206R	2m F.M. Synthesised Handheld	209.00	(-)
FT706R	70cm FM Synthesised Handheld	219.00	(-)
NC7	Base Trickle Charger	26.85	(1.30)
NC8	Base Fast/Trickle Charger	44.10	(1.50)
NC9C	Compact Trickle Charger	8.00	(0.75)
FSB2	Batt. Sleeve for use with NC 7/8	3.00	(0.50)
FNB2	Spare Battery Pack	17.25	(0.75)
PA3	12v DC Adaptor	13.40	(0.75)
FT480R	2m Synthesised Multimode	379.00	(-)
FT780R	70cm Synthesised Multimode		
	(1.6MHz Shift)	459.00	(-)
FP80	Mtch. 230 V.A.C. Power Supp.	63.25	(1.50)
FT290R	2m Portable Syn. Multimode	249.00	(-)
Nicads	2.2 AMP HR Nicads Each	2.50	(-)
MMB11	Mobile Mounting Bracket	22.25	(1.00)
CSC1	Soft Carrying Case	3.45	(0.75)
NC11C	240 V.A.C. Trickle Charger	8.00	(0.75)
FL2010	Matching 10W Linear	64.40	(1.20)
FF501DX	H.F. Low Pass Filter 1KW	23.00	(1.00)
FSP1	Moile. External Speaker 8OHM 6W	9.95	(0.75)
YH55	Headphones 8 OHM	10.00	(0.75)
YH77	Lightweight Headphones 8 OHM	28.00	(1.00)
QTR240	World Clock (Quartz)	16.88	(0.75)
YM24A	Speaker/Mic. 207/208/708	21.00	(1.50)
YD148	Strand Mic. Dual IMP 4 Pin Plug	21.00	(1.50)
YM34	As 148 but 8 Pin Plug	21.45	(1.50)
YM38	As 34 but up/down Scan Buttons	24.90	(1.50)
FT290R	2m Synth F.M. Mobile 25W	239.00	(-)

FDK VHF/UHF EQUIPMENT			
Multi 700EX	2m F.M. Syn. 25W Mobile	199.00	(-)
Multi 750E	2m Multimode Mobile	289.00	(-)
Expander	70cm Transverter for M750E	199.00	(-)

STANDARD VHF/UHF			
C78	70cm F.M. Portable	219.00	(-)
CPB78	10W Matching Linear	67.00	(1.50)
C58	2m Multimode Portable	245.00	(-)
CM8	25W Matching Linear	79.50	(1.50)
CMB8	Mobile Bracket	19.95	(1.00)
CL8	Soft Carrying Case	6.95	(0.75)
C12/230	Charger	7.59	(0.75)

DRAE POWER SUPPLIES			
All with Over-Volts – Current Limit and Thermal Protection			
4 AMP		27.95	(1.50)
6 AMP		44.95	(2.00)
12 AMP		69.00	(2.00)
24 AMP		99.00	(3.00)

SWR – POWER METER			
Model 110	H.F./2m Calc. Power Reading	11.50	(0.50)
SWR25	2m F.M. 2m Twin Meter	11.50	(0.50)
UH74	2m/70	14.30	(0.50)
WELZ SP15M	H.F./2m 200W	29.00	(0.75)
WELZ SP45M	2m/70cm 100W	45.00	(0.75)
WELZ SP200	H.F./2m	59.00	(1.00)
WELZ SP300	H.F./2m/70	79.00	(1.00)
WELZ SP400	2m/70	59.00	(1.00)
DAIWA SW110A	H.F./2m	35.00	(-)
DAIWA CN620A	Cross Pointers	52.80	(-)
DAIWA CN630	2m/70 Cross Pointers	71.00	(-)

DUMMY LOADS			
DL30	PL259 30W MAX	5.00	(0.50)
DL60	PL259 60W MAX	8.80	(0.70)
DL60 N TYPE	60W MAX	16.50	(0.70)
CT300	WELZ 1kW MAX	42.95	(1.50)

TEST EQUIPMENT			
Drae VHF Wavemeter	130-450MHz	24.96	(-)
FXI Wavemeter	250MHz MAX	33.00	(0.75)
DM81	Trio Dip Meter	58.75	(0.75)
MMD 50/50	Microwave Mdlus. Freq. Coun.	69.00	(-)
Safebloc	mains connector	5.95	(0.75)

MAIL ORDER

9-12.30/1.30-5.30
Goods normally despatched
with 24hrs. Allow 28 days max.

TRIO			
TS930S	H.F. Transceiver	1078.00	(-)
AT930	A.T.U.	125.00	(2.00)
TS830S	160-10m Transceiver 9 Bands	694.00	(-)
YK230	Digital V.F.O. With Memories	215.00	(2.00)
AT230	All Band ATU/Power Meter	119.00	(2.00)
SP230	External Speaker Unit	34.96	(1.50)
DFC230	Dig. Frequency Remote Controller	179.00	(1.50)
YK88C	500Hz CW Filter	29.00	(0.50)
YK88CN	270Hz CW Filter	32.66	(0.50)
TS530S	160-10m Transceiver	534.00	(-)
TS130S	8 Band 200W Pep Transceiver	525.00	(-)
TS130V	8 Band 20W Pep Transceiver	445.00	(-)
VFO120	External V.F.O.	85.00	(1.50)
TL120	200W Pep Linear For TS120V	144.00	(1.50)
MB100	Mobile Mount for TS 130/120	17.00	(1.50)
SP120	Base Station External Speaker	23.00	(1.50)
AT130	100W Antenna Tuner	79.00	(1.50)
PS20	A.C. Power Supply – TS130V	49.45	(2.50)
PS30	A.C. Power Supply – TS130S	88.55	(5.00)
MC50	Dual Impedance Desk Mic.	25.76	(1.50)
MC35S	Fist Microphone 50K OHM IMP	13.80	(0.75)
MC30S	Fist Microphone 500 OHM IMP	13.80	(0.75)
LF30A	H.F. Low Pass Filter 1KW	17.90	(1.00)
TR9130	2m Synthesised Multimode	395.00	(-)
BO9	Base Plinth for TR9000	34.96	(1.50)
TR7800	2m Synthesised F.M. Mobile 25W	257.00	(-)
TR7730	2m Syn. F.M. Cmp. Mble. 25W	247.00	(-)
TR2300	2m Synthesised F.M. Portable	166.00	(-)
VB3000	10W Amplifier for TR2300	58.00	(1.50)
MB2	Mobile Mount for TR2300	17.71	(1.50)
RA1	Flexible Rubber Ant. for TR2300	6.90	(0.50)
TR2500	2m F.M. Synthesised Handheld	207.00	(-)
ST2	Base Stand	46.23	(1.50)
SC4	Soft Case	12.00	(0.50)
MS1	Mobile Stand	28.29	(1.00)
SAC25	Speaker Mike	14.49	(1.00)
PB25	Spare Battery Pack	22.30	(1.00)
TR8400	70cm F.M. Syn. Mobile T'ceiver	299.00	(-)
PS10	Bse. Station Power Supp. for 8400	64.86	(2.00)
TR9500	70cm Synthesised Multimode	449.00	(-)
R1000	Syn. 200KHz – 30MHz Receiver	297.00	(-)
SP100	External Speaker Unit	26.90	(1.50)
HC10	Digital Station World Time Clock	58.88	(1.50)
HS5	Deluxe Headphones	21.85	(1.00)
HS4	Economy Headphones	10.35	(1.00)
SP40	Mobile External Speaker	12.40	(1.50)
R600	Gen. Cov. Receiver	235.00	(-)

NEW FROM TRIO R 600
General Coverage receiver



£235

ICOM			
IC730	H.F. Mobile Transceiver 8 Band	596.00	(-)
IC720A	H.F. T'ceiver & Gen. Cov. Rec.	883.00	(-)
PS15	Power Supply for 720A	99.00	(3.00)
IC251E	2m Multimode Base Station	499.00	(-)
IC251E	2m Syn. Compact 25W Mobile	219.00	(-)
IC290E	2m Multimode Mobile	366.00	(-)
IC2E	2m F.M. Synthesised Handheld	159.00	(-)
ICL1/2/3	Soft Cases	3.50	(0.50)
ICHM9	Speaker/Microphone	12.00	(1.00)
ICBC30	230V A.C. Bse. Charger and Hod	39.00	(1.50)
ICBC25	230 V.A.C. Trickle Charger	4.25	(0.75)
ICCP1	Car Charging Lead	3.20	(0.50)
ICBP2	6V Nicad Pack for IC2E	22.00	(1.00)
ICBP3	9V Nicad Pack for IC2E	17.70	(1.00)
ICBP4	Empty Case for 6 x AA Nicads	5.80	(0.75)
ICBP5	11.5V Nicad Pack for IC2E	30.50	(1.00)
ICDC1	12V Adaptor Pack for IC2E	8.40	(0.75)
ICML1	10W Booster	49.00	(1.00)

T.V. INTERFERENCE AIDS			
Ferrite Rings 1 1/2" Dia. Per Pair		0.80	(0.20)
Toroid Filter T.V. Down Lead		2.50	(0.50)
Low Pass Filter LP30 100W		3.95	(0.50)
Trio Low Pass Filter LF30A 1kW		17.30	(1.00)
Yaesu Low Pass Filter FF501DX 1kW		23.00	(1.00)
HP4A High Pass Filter T.V. Down Lead		5.95	(-)

ANTENNA BITS			
H1	Q Balun 1:1 8kW Pep (PL259 Fitting)	9.95	(0.75)
T	Piece Polyprop Dipole Centre	1.00	(0.30)
C	Ceramic Strain Insulators	0.40	(0.10)
S	Small Egg Insulators	0.40	(0.10)
L	Large Egg Insulators	0.50	(0.10)
F	75 OHM Twin Feeder – Light Duty – Per Metre	0.16	(0.04)
F	300 OHM Twin Feeder – Per Metre	0.14	(0.04)
U	URM 67 Low Loss 50 OHM Coax – Per Metre	0.60	(0.20)
U	UR76 50 OHM Coax – Per Metre	0.25	(0.05)
Please send total postage indicated. Any excess will be refunded.			

MORSE EQUIPMENT			
MK704	Squeeze Paddle	10.50	(0.75)
HK707	Up/Down Key	10.50	(0.75)
	Practise Oscillator	8.75	(0.50)
EK121	Elbug	29.95	(0.75)
EKM12A	Matching Side Tone Monitor	10.95	(0.75)
EK150	Electronic Keyer	74.00	(-)

DESK MICROPHONES			
SHURE 444D	Dual Impedance	33.00	(1.50)
SHURE 526T	MK II Power Microphone	46.00	(1.50)
ADONIS AM 503	Compression Mic. 1 O/P	39.00	(-)
ADONIS AM 601	Comp. Mic + Meter 1 O/P	49.00	(-)
ADONIS AM 802	Comp. Mic + Meter 3 O/P	59.00	(-)

MOBILE SAFETY MICROPHONES			
ADONIS AM 202S	Clip-on	22.00	(-)
ADONIS AM 202F	Swan Neck + Up/Down Buttons	30.00	(-)
ADONIS AM 202H	Head Band + Up/Down Buttons	30.95	(-)

CONNECTORS – INTER-SERIES ADAPTORS			
BNC Plug to SO239		£1.75	
BNC Socket to PL259		£1.75	
BNC Plug to PL259		£1.75	
BNC Socket to SO239		£1.75	
BNC Socket to N Plug		£3.50	
BNC Plug to N Socket		£3.50	
SO239 to N Plug		£3.00	
PL259 to N Socket		£3.00	
Minimum postage 30p will cover 2 adaptors add 5p per connector in addition.			

AMATEUR T.V. CONVERTER
MMC 435/600
plug into your TV
£27.90

MICROWAVE MODULES			
MMT144/28	2m Transverter for HF Rig	99.00	(-)
MMT432/28S	70cm Transverter for HF Rig	149.00	(-)
MMT432/144R	70cm Transverter for 2m Rig	184.00	(-)
MMT70/28	4m Transverter for HF Rig	115.00	(-)
MMT70/144	4m Transverter for 2m Rig	115.00	(-)
MMT1296/144	23cm Transverter for 2m Rig	184.00	(-)
MML144/30LS	2m 30W Linear Amp (1/3 I/P)	65.00	(-)
MML144/100LS	2m 100W Lin. Amp (1/3W I/P)	145.00	(-)
MML144/40	2m 40W Linear Amp (1/3W I/P)	77.00	(-)
MML144/100S	2m 100W Lin. Amp (10W I/P)	129.00	(-)
MML432/20	70cm 20W Lin. Amp (3W I/P)	77.00	(-)
MML432/50	70cm 50W Lin. Amp (10W I/P)	119.00	(-)
MML432/100	70cm 100W Linear Amp (10W I/P)	228.64	(-)

MM2001	RTTY to TV Converter	169.00	(-)
MM4000	RTTY Transceiver	269.00	(-)
MMC50/28	6m Converter to HF Rig	27.90	(-)
MMC70/28	4m Converter to HF Rig	27.90	(-)
MMC144/28	2m Converter to HF Rig	27.90	(-)
MMC432/28S	70cm Converter to HF Rig	34.90	(-)
MMC432/144S	70cm Converter to 2m Rig	34.90	(-)
MMC435/600	70cm ATV Converter	27.90	(-)
MMK1296/1			

ADVERTISERS' INDEX

	Page
Amateur Electronics UK.....	230, 231, 232
Amateur Radio Exchange.....	240, 241
Amcomm Services.....	276
Arrow Electronics Ltd.....	273
J. Birkett.....	283
Bredhurst Electronics.....	242
British National Radio and Electronics School.....	278
Catronics Ltd.....	280
Colomor Electronics Ltd.....	282
Datong Electronics Ltd.....	233
Granville Mill.....	282
G2DYM Aerials.....	282
G3HSC (Rhythm Morse Courses) ..	282
Heathkit.....	281
D. P. Hobbs Ltd.....	283
Johns Radio.....	283
K.W. Communications Ltd.....	275
Lee Electronics Ltd.....	273
Leeds Amateur Radio.....	277
H. Lexton Ltd.....	272
Lowe Electronics Ltd.....	<i>front cover,</i> <i>inside front cover, 229</i>
Microwave Modules Ltd.....	275
MuTek Ltd.....	283
North West Communications.....	274
Partridge.....	278
P.M. Electronics Services.....	278
Polemark Ltd.....	277
Quartslab Marketing Ltd.....	276
Radio Shack Ltd.....	274
R.T. & I. Electronics Ltd.....	279
S.E.M.....	277
Small Advertisements.....	280, 281, 282
S.M.C. (T.M.P. Electronics).....	278
South Midlands Communications Ltd.....	236, 237, 238, 239
Spacemark Ltd.....	283
Stephen-James Ltd.....	271
S.W.M. Publications.....	<i>back cover,</i> <i>inside back cover, 279, 282, 284</i>
Thanet Electronics Ltd.....	234, 235
Tuition — Peter Bubb.....	282
Uppington Tele/Radio (Bristol) Ltd.....	279
Reg Ward & Co. Ltd.....	283
Waters & Stanton Electronics.....	243
Geoff Watts.....	283
W. H. Westlake.....	282
Wood & Douglas.....	279

SHORT WAVE MAGAZINE

(GB3SWM)

ISSN: 0037-4261

Vol. XL

JULY, 1982

No. 465

CONTENTS

	Page
Communication and DX News, by E. P. Essery, G3KFE.....	245
Basics for the SWL and R.A.E. Candidate, Part VI.....	248
“SWL”— <i>listener feature</i>	250
The Development of the “Winfield Wonder Wire”, by D. J. Reynolds, G3ZPF..	253
The Other Man’s Station—G3WUX.....	256
Plug In Your Soldering Iron and Begin Here, Part II, by Rev. G. C. Dobbs, G3RJV.....	257
“HF Antennas for All Locations”— <i>book review</i>	260
Clubs Roundup, by “Club Secretary”.....	261
The LAR Antenna Noise Bridge— <i>equipment review</i>	265
“A Word in Edgeways”— <i>Letters to the Editor</i>	266
VHF Bands, by N. A. S. Fitch, G3FPK.....	267

Editor: PAUL ESSERY, G3KFE/G3SWM

Advertising: Charles Forsyth

Published at 34 High Street, Welwyn, Herts. AL6 9EQ, on the last Friday of the month, dated the month following.
Telephone: 04-3871 5206 & 5207

Annual Subscription:

Home: £8.40, 12 issues, post paid
Overseas: £8.40 (\$17.00 U.S.), post paid surface mail

Editorial Address: Short Wave Magazine,
34 High Street, Welwyn, Herts. AL6 9EQ, England.

Prices shown in advertising in this issue do not necessarily constitute a contract and may be subject to change.

AUTHOR'S MSS

Articles submitted for Editorial consideration must be typed double-spaced with wide margins on one side only of A4 sheets. Photographs should be lightly identified in pencil on the back with details on a separate sheet. All drawings and diagrams should also be shown separately, and tables of values prepared in accordance with our normal setting convention — see any issue. Payment is made for all material used, and it is a condition of acceptance that full copyright passes to the Short Wave Magazine, Ltd., on publication.

Short Wave Magazine Ltd.

E. & O. E. VAT Reg. No. 239 4864 25

243

WATERS & STANTON ELECTRONICS

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

CALL IN AT OUR SUPER STORE
LARGEST STOCKS IN SOUTH EAST

TELEPHONE YOUR CREDIT CARD NO.
SAME DAY DESPATCH

SEND CHEQUE OR P.O.
BY RETURN DESPATCH

NOW STOCKING SONY VIDEO — C5 RECORDERS £429

TRIO — Official UK Dealers
New R600 RECEIVER

£235



It really is a fantastic performer!

TS830S	160-10m transceiver	694.00	n.c.
VFO 230	Digital VFO	215.00	5.00
AT230	All band ATU	119.00	5.00
TS530	160-10 metre transceiver	534.00	5.00
VFO 240	External VFO	92.00	5.00
PS30	AC power supply for TS180S	88.50	5.00
TS130S	8 band 200W mobile transceiver	525.00	n.c.
TS130V	8 band 20W mobile transceiver	445.00	n.c.
TL120	200W pep linear	144.00	2.00
MB100	Mobile mount	17.00	1.00
VFO 120	External VFO	86.00	2.00
SP120	External speaker unit	23.00	1.00
AT130	100w antenna tuner	79.12	1.30
MC50	Deluxe desk microphone	25.75	1.50
MC35S	Fist mic. 50K impedance	13.80	0.75
MC30C	Fist mic. 500ohm impedance	13.80	0.75
LF30A	HF low pass filter	17.90	1.00
TS780E	2m/70cm all-mode duobander	748.00	n.c.
TR9000	2m multimode mobile	369.00	n.c.
BO9	Base plinth for TR9000	34.95	2.00
TR7800	2m FM synthesised mobile 25W	257.00	2.00
TR2300	2m FM synthesised portable	168.00	2.75
TR2500	2m FM handheld transceiver	207.00	2.00
R1000	Gen. Cov. Receiver	297.00	n.c.

YAESU — Good stocks. Good prices & on the spot service
LATEST FRG7700 IN STOCK

£319
carr. £5



FT 101Z	160-10m 9 band trans. FM	590.00	n.c.
FT 101ZD	as above with digital FM	645.00	5.00
FT 707	80-10m 8 band trans. 10w	549.00	5.00
FP 707	230v AC PSU	125.00	5.00
FC 707	160-10m atu	85.00	2.00
FV 707DM	Digital vfo for FT 707	203.00	5.00
MMB2	Mobile mount	16.00	1.00
FL 2100Z	160-10m 1200 watt linear	425.00	5.00
FT 902DM	160-10m 9 band receiver	585.00	n.c.
FC 902	All band ATU	135.00	5.00
FT 208	2M FM synthesised handheld	209.00	n.c.
FT 708	70cm synthesised transceiver	219.00	n.c.
NC9C	Compact trickle charger	8.00	1.00
FT 480R	2m 10w SSB/CW/FM transceiver	365.00	2.00
FT 290R	2m portable synthesised multimode	249.00	n.c.
NC11C	240v trickle charger	8.00	0.75
FRG 7	General coverage receiver	199.00	n.c.
FRG 7700	1981 version of FRG 7000	329.00	5.00
FRG 7700	Antenna tuning unit	37.95	0.75

SEND S.A.E. FOR 16 PAGE FULL CATALOGUE



ICOM

FULL RANGE STOCKED — RING FOR OUR COMPETITIVE PRICES NOW

SUPER POWER METERS

SP200	59.95
SP300	79.95
SP400	59.95
SP15M	29.95
AC38	59.00
CT15A	6.95
CT15N	11.95
CT150	31.00
CT300	43.00
CH20A	15.95
CH20N	27.95
CT-03N	24.95
SP10X	t.b.a.
SP380	t.b.a.

WELZ,
THE
PROFESSIONAL
ANSWER
TO
AMATEUR
RADIO
REQUIREMENTS

KILL TVI DEAD HP4A

with braid breaker

£5.95

The filter that has been purpose designed for the UK TV system by one of Japan's most respected electronics manufacturers. Unbeatable performance — order yours today.



IT REALLY WORKS

SPRING BARGAINS YW-3 SWR METERS 3-150MHz

The best we know at the price!

£11.95
p&p 75p



DATONG DIGITAL TUTOR D70

Self contained electronic Morse sender £49.45 post free



NEW

COMMERCIAL GRADE 1KW 80-10M DIPOLES

Cancelled export order. 118ft long with 50ft coax feeder. 14swg alloy wire plus traps and all hardware.

(limited stocks) £39 + £2 p&p

NEW

DIPOLE KIT

Includes T-piece with 239 socket, insulators, guy rope, 50ft. terminated coax. Ideal for the D.I.Y. man. Suits any power. Few only at £13.95 (£1.50 p & p).

NEW STOCK NOW AVAILABLE

Prices correct at time of going to press. Carriage charges in brackets.

18-20 MAIN ROAD, HOCKLEY, ESSEX

OPEN MON-SAT 9.5.30 E.C. WED 1.00 PM

FASTEST MAIL ORDER SERVICE IN THE BUSINESS!



FDK — Sole UK Distributors
2M ALL-MODE M750E

£289



FREE CREDIT ON THE ABOVE MODEL

M700EX	2m FM 25w 12 1/2/25kHz trans.	199.00	n.c.
M.750E	2m FM/SSB/CW 144-146 trans.	289.00	n.c.
Expander	70cm transceiver	199.00	n.c.
PS750	230v AC 6amp psu	69.00	2.50
T1200	2m/FM synthesised handheld transceiver	179.00	n.c.
P11	2m FM 6 channel portable	109.00	n.c.
Palm IV	70cm FM 6 channel portable	149.00	n.c.
TB1	1750Hz tone burst	10.00	n.c.
TM56B	2m FM monitor	89.00	n.c.
CC2	Case for Palm II/IV	6.75	0.75p
BC2	230V AC battery charger	4.50	0.75p
Xtals	for Palm II and Palm IV	3.00	0.75p

FDK M700EX — 2M FM 25W
BRITAIN'S NUMBER ONE SELLER!

£199



AZDEN — Sole UK distributors
The amazing PCS3000 with remote control head — SAE for brochure

£219
2M 25W



PCS3000	2m 25W FM transceiver with det. head	219.00	n.c.
ECK3000	Option cable kit for remote head	25.00	n.c.
PCS300	2m 3W FM handheld + Ni-Cads & Charger	184.00	n.c.
Speaker Mic.	For above	t.b.a.	
Case	For above	t.b.a.	

AZDEN PCS300
The ultimate in handhelds!
(inc. S-Meter)

For full spec. Send for brochure **£184**

GLOBAL AT1000 ATU
SWL ATU

£32
p&p £1.75



Purpose designed for R1000, R300, FRG7 and FRG7700.

COMMUNICATION and DX NEWS

E. P. Essery, G3KFE

AS far as your conductor is concerned, the month has been one of inactivity on the operating front; instead, he has been interesting himself in rebuilding the beam when the weather permitted, and with the shack soldering-iron on the other side . . . for the rest, eat, sleep, work, and keep the weeds in something like check!

However, all has not been lost; we finished our little project and switched the rig on to see if it would give life to the newly completed box of tricks. Naturally, it didn't! So, disconnecting it again, we couldn't resist a quick spin round the bands, and found, not surprisingly, a fine specimen of the phenomenon known as 'summer doldrums' interlaced with early warning of an approaching thunderstorm!

The Bands

There can be no doubt at all that the current sunspot cycle has been very flat-topped, but of course that can only mean that the fall-away when it comes will be rather steeper. Meantime, we enjoy as much as we can!

Ten Metres

At this time of the year one cannot hope for much in the way of east-west QSOs, but there have been some nice ones in the N-S direction.

Thus, G3FPK (Purley) noted a new beacon, signing PY2AMI, on 28.399 MHz. Norman also notes that the Russians have put another amateur satellite on the air, by pushing it out of the *Salyut 7* space station. A telemetry channel on 29.578 MHz indicates its origin by prefixing the letters RK02 to each frame. There is a transponder aboard, with a downlink frequency around 29.58-29.62 MHz, but its uplink is 21.23-21.27 MHz, would you believe!

G3ZPF (Dudley) found the eighty-metre band somewhat useless so turned to SSB on Ten. This gave him HC1SK, and C53AP; a long one, this last, as it came a little before the 'grey-line' time and, as both sides were interested, they decided to hang around and see the predicted peak in signal strength and time. Sure enough it was there, rising fairly slowly in signal strength, but falling off again very quickly from the peak. Incidentally C53AP is G3LZZ at home.

For G3NOF (Yeovil) the two weeks prior to his letter were pretty punk. Before this, Don noted some Africans in the afternoon, South Americans in the evenings and some limited opening to USA, plus mainly looking at the W4 area and around 2100z; plus some short-skip

from Europe. Thus the G3NOF log contains entries referring to SSB contacts to DA1WA/HB0, HC1BP, K6SVL, VK9ZR (Mellish), YB0ACL, Z1AA, 5H3DM and 8P6OR.

Away up in Knutsford, G4HZW continues to use Ten, with TS-820 and two-element Quad. Tony's month was interrupted by a holiday in Scotland "in search of ornithological DX".

G3RKH (Retford) says he hasn't exactly been over-doing it, with some 24 entries in the log since the CQ WPX contest back in March, of which 16 refer to the DX bands. It added up to ZS2CC, ZS5MY, ZS6ABU, Z21GN, 9J2KL, VK9ZH (Willis), YB5AEU, YB0BAZ and JY9RV. Gotaways were S83H, 5H3DM, and 9M2FR, all of whom seemed fairly popular.

21 MHz

In behaviour, rather similar to Ten, but open a bit more and a bit more reliable.

G2HKU (Minster) is still on the sick-list, but very much on the mend; out and about, and visiting the hospital daily, doing the garden and playing radio. The latter activity on 21 MHz meant CW QSOs with KN8M/SV9, CE3DWL, FY7BD, UA9CES, and W3NZ.

Activity has been somewhat low says G2BON (Aldridge) but in fact Tom's SSB signals found their way on 21 MHz to JA4JWP, EA6KP, VK2DGS, VC1YX, YB8VB, UK0AMM, UA0WAY, RK7PAL, UK8KBD/U8K, VSSGA, and 5H3JR.

Next we have a new reporter in the shape of G4MVA (Scarborough) who opens by indicating how successful our pleas was on his behalf for the QSL details of FR7BX, in the May issue; Glynn mentions a dozen or more kind souls who wrote or telephoned with the required information, in some cases not leaving mention of their calls.

For this month, G4MVA notes pretty good conditions on the band in the CQ and the ITU contest, where he ran 50 watts and an inverted-vee, though after that the band was none too good right up to the date of his letter. The main mode in use was CW, which gave many VC, AM, PY, and CX stations, plus ZB2J, 9U5WR, A4XJO, CX5CO, UJ8JAS, VE1CER/NW1 questioned, UH8HCA, ZC4CW, ZC4BP, 9J2NO, KN8M/SV9, CM7OR, KV4AD/PJ6 (Saba Is.), SV1NA/SV5, CS7ITU, LX1GT, DJ6SI/5V, lots of JAs, 9Y4VU and 8J1ITU/1, plus OE8EHB/YK on SSB.

G3RKH notes just one QSO on this band, with HS1AMH, and remarks that

on a very quiet band they were able to have a longer QSO than normally would have been the case.

It is now time to look at the analysis of things by G3NOF (Yeovil). Early in the month around 0700 there were a few openings to W4, followed by the long-path openings to VK, ZL, KL, until 0900; not much from North America, but between 1600 and 1800 the band opened to DU, YB and SE Asia, with Africans around 1700-1900z. SSB QSOs were made with A71AA, A71AU, AP2P, AP2SQ, DF2AL/ST3, J3AH, JA6BEE, KA8JB in Japan, PY0TA (Trinidad Is.), RK7PAL, RX7QF, UK8XBD/U8K, VK9ZR (Mellish), VSSPP, VS5RB, VU2NA, WL7E, YB8UN, ZD9BV, ZS, 5W1DQ, 6W8AR, 6W8KA, 8Q7BN, 9K2BE, 9M2FR, and 9X5SL.

Jottings

We seem to have an odd situation arising in the matter of Heard Is. and their activation. On the one hand we have a letter from Jim Smith VK9NS, who indicates the nature of the problems involved and says that this year (or, rather, the first three months of 1983 should see him on Heard, as the various mishaps which killed the show for 1982 seem to be overcome. On the other hand, *TDXB* reproduces in full a letter dated April 27 in the form of a Press Release from IDXF. This says, in brief, that VK6XI, and N2DT, with support from WIA, N. Carolina DX Foundation and IDXF are organising an expedition to Heard for the Jan-March 1983 time-slot. This will be primarily a mountaineering effort, but the two amateurs will be operating for the 42-day period required by the mountaineering activity, all bands 160-10m., and equally split between the SSB and CW modes. They will be taking beams and linears so as to make the signals suitably powerful, and they *don't* intend to use lists, or even selective calling. All this, says IDXF, is conditional on indications of support and desire for a Heard Is. operation. Donations should be sent to the International DX Foundation, Box 117, Manahawkin, New Jersey. Neither party seems to recognise the other's activity at all, and on the part of VK9NS there seems to be a feeling of disenchantment with the Australians, an indication of which this scribe dislikes. It seems to us, simpletons that we are, that it is about time the two halves of the argument had their respective heads banged together until they show signs of sense; it seem quite daft to us to have the situation where it is possible that two

major expeditions may be mounted in one short season to Heard, when the DX-ers of this world would be happier to hear a DX-pedition to Heard plus a DX-pedition to somewhere else rare for the same overall cost.

The BY1PK signal seems to be continuing to operate, and we have hints that the first of the QSL cards are beginning to arrive. A favoured time to look for this station is 0630-0730z on a frequency segment of 21025-21050 kHz. It is also noted that BY1PK had been heard around 1430z in the same frequency area.

On a totally different theme, it may be recalled that some years ago we mentioned the record number of contacts made by KV5AA, Dick Spencley. At that time, W1WY was trying to get the 1976 total into the *Guinness Book of Records*, but the latter has been very half-hearted about it. Now the situation with KV4AA is that 1976-1981, a six year total of QSOs of some 195,000 have been made, of which around 60% were CW, and the remainder SSB — an average of around 88 contacts a day, and world-wide in extent. It seems the *Guinness Book of Records* are still considering whether to regard amateur radio as being within the scope of its terms of reference, and somehow we think it is about time they were stirred up. It is suggested that as many readers as possible write to Guinness Superlatives Ltd, 2 Cecil Court, London Road, Enfield EN26DJ, attention Mr. Colin Smith, pointing out to him that amateur radio is as much of a hobby activity as pole-vaulting or stamp-collecting. Seriously, it seems odd that Guinness should be considering whether or not amateur radio comes within the terms of reference of the *Book of Records*, rather than accepting that it does and asking if the KV4AA scoring is a record. Clearly, they need to be told by as many as possible that amateur radio exists and what it's about, and asked by radio amateurs why our hobby is ignored. Go to it, readers!

Changing tack again, we noted with interest that the Argentine radio amateurs were all put off the air, and the word was put out to the world media that they had been set to monitoring the signals of the British Task Force, which proposition was avidly soaked up by the world's press, but was for most amateurs a rather sick joke. If, in this day and age, any radio amateur could extract any 'meat' from monitoring, then your scribe would eat the Editorial Hat! As for the VP8s, they were of course put off the air immediately by the Argentines and their equipment was not just impounded but destroyed forthwith; indeed they were not allowed to keep even a BC receiver for the news. But, as in WW2, the prisoners seem to have been able to get around the problem by having a BC receiver under the floor or wherever, and listening clandestinely. Most cheering of all was that shortly after the recapture of

Goose Green and Port Darwin a VP8 signal was on the air again.

Twenty

This band has been open to *somewhere* almost round the clock, but during the last few days one would have needed ear-plugs just to survive the noise, let alone fish for DX! Alas this is how it always works out when so many are in such a small, relatively, chunk of spectrum and when nature is adding a chorus of crashes, and the Red Army choir are providing the refrain!

Our first reporter on the band, is G3RJV (Birmingham). George reckons that about the only time he gets for actually operating is when he is on a short holiday; this time he was at Darley Dale, near Matlock, running two watts of input to a home-brew transceiver. The aerial he reckons is quite the oddest he has used; a dipole had one end strung from an upstairs window frame and the other end taken by some 150 feet of kite string to a tree on the far side of some waste land. In six nights of operation the QRP CW gave some 20 countries, including W1-2-3-4, a couple of PYs and KV4AA, the latter seemingly always in the G3RJV bag from any /P location.

Next we turn to G3NOF; Don says he spent little time on the band, except for a few mornings when it has been mostly tenanted by VKs and ZLs. He made SSB QSOs with FG0GA, P29BS, VC7CVM, VKs, VK9NS, VK9ZR (Mellish) and VK0AN. The Mellish contacts brought G3NOF up to a total of 339 countries worked.

For G2HKU it was interesting to note how the regular ZL asked QSOs on SSB dropped by a couple of S-points as summer conditions came in. On CW, Ted offers KR4C/J6L, XT2AW, YV1AD, KH6IJ, ZK2VU, UK5QAQ, UK2GAT, K6DDO, CX7AO, PY1DFF and UF6FAL.

Twenty has been somewhat restricted for G2BON; it seems Tom has a bit of TVI on a neighbour's set, and with said neighbour having just come out of hospital G2BON reckons him not to be in a fit state to see G2BON bearing a fistful of filters and braid-breakers! However, the early mornings were still possible and so SSB was used to work NC4U/J6L, VR6TC, NR4S/J6L, ZK1YL, 5W1DQ, ZL4PO (Chatham Is.), JWOP (Spitzbergen), KH6FKG, KL7H, WBOJOS (N. Dakota), XE2BBD, WL7AME (Alaska), and VK3WJ.

A note on this band comes from G3FPK, who found ZK1AF on CW, with QSL via SM3CXS; in addition Norman heard, weakly amid the static crashes, operator 'Bob' from the Falklands, using a Racal RT230 hooked up to his own FL2100 linear and an inverted-vee for aerial.

Finally, G4MVA, who stuck to CW, this mode accounting for many PYs, VK,

and short-skip Europeans. R1ASF, OE1EHB/YK and TA1MB are singled out for special mention.

"CDXN" deadlines for the next three months—

August issue — July 1st
September issue — August 5th
October issue — September 2nd

Please be sure to note these dates

More Bits

Quite a variety of snippets in this month's mail. G2HKU remarks on the fiendish tactics of the wasps this year, they having sent in an advance party of bees; and another quite serious problem arising with frogs who have invaded the garden and continue to evade capture. Usually they are away and into the garden pond before you can get near them, annoying not only G2HKU but also the paid-up members of the pond community!

The International QRP CW contest is over the week-end of July 17/18, from 1500z on the Saturday through to the same time on the Sunday, and is the first one to be run by the World QRP Federation. Class-A stations are fixed stations with up to two watts input, Class-B the same but up to ten watts input, Class-C portables up to two watts, Class-D portables to ten watts, and Class-E stations over ten watts. Exchange RST, serial number of contact, and Class as above. Multi-operator stations may play for the full 24 hours, but single-op efforts must be off the air for at least one eight-hour period. Scoring is one point for QRP/QRO contacts, two points for QRP-QRP contacts; a station may be worked once on each band for QSO and multiplier credit. The multiplier is one for one's own country, two for other countries in the same continent, three for a different continent. All call areas count as multipliers. Bonus: QSO points and multipliers are doubled for a station running crystal control and not more than three crystals per band, and contacts with a crystal-controlled station count double. The usual 'X' on the end of the report indicates Xtal control. The frequencies of importance are: 1810, 3560, 14060, 21060, and 28060 kHz, and the final score will be QSO points times multiplier on each band, the band totals so derived being added together for the final score. Awards for fixed entrants will be from DL-AGCW, and QRP ARCI will take care of the portable stations, whence the fixed stations logs go to Siegfried Hari, DK9FN, Spessertstrasse 80, D-6453 Seligenstadt, West Germany, and the portables go to W. Dickerson, WA2JOC, 352 Crampton

Drive, Monroe, Mich. 48161, USA; in both cases logs are to be sent within six weeks of the end of the contest.

The same weekend sees the SEANET contest CW leg, this one going to full 48 hours, and the SSB leg is a month later. Exchange RS(T) plus a three-figure QSO number to start at 001. Stations outside SEANET area score as follows: stations within SEANET area with the prefixes DU, HS, YB, 9V1, 9M2, 9M6 and 9M8 are worth 20 points on Top Band, ten points on 80 or 40 metres, and four points on 14/21/28 MHz. Other SEANET area stations are worth 10 points on Top Band, 5 points on 80 and 40 metres, and two points on 14/21/28 MHz. QSOs between stations outside the SEANET area count zero. There is a multiplier of three points for each SEANET country worked, and the prizes will be presented at the SEANET Convention in November. Logs are to arrive by October 31, sent to Eshee, 9M2FK, PO Box 13, Penang, Malaysia, and include 1 IRC if a copy of the results is required.

We have a letter from the Hon. Sec. of Reading Telephone Area club, indicating that they will be putting on a Special-Event station signing GB2BT to commemorate the first full year of British Telecom, operating in the time-slot noon zulu on September 30 to the same time on October 1. The station will be on HF as follows: from the start until 1600z on 21/28 MHz, and again 1700z to 1800. From 2100 to midnight will be on the HF bands, as will the period midnight to 0500. The final spell will be from 0800z to the close, on 21/28 MHz. RTTY will be tried on the half-hour on the appropriate calling frequency, and they will use the satellites when possible. The club would like to hear from any other Telecom groups with other administrations to participate. There will of course be a special QSL for the operation. More details from N. W. Jaques, G8VQV, 40 Broad Lane, Upper Bucklebury, Reading RG7 6QJ.

We received details of the South America CW contests too late for inclusion, but we note that if anyone played the logs are to be sent not later than July 31 to PO Box 18003, 20772 Rio de Janeiro RJ, Brazil.

We hear from the Clyde Valley DX Group that they are proposing to operate from the four extreme points of Scotland in turn, with a special QSL for each station and an award for those working all four stations. The first station will be on from Mull of Galloway, QRA Locator XO26d, from noon on August 8 to noon on August 10, the second will be from Ardnamurchan point (WQ29b) between noon on August 12 to noon August 14; then they go to Dunnett Head, up in the north, at YS24f between 16 and 18 August, times as in previous stops, with the fourth operation from Buchan Head in ZR42h from August 20 noon until final close-down at noon August 22. They intend to operate 14, 21



As mentioned in the text, Dick Spenceley, KV4AA, is attempting to enter the Guinness Book of Records with his six-year total of no less than 195,000 QSOs, and is pictured here in his Virgin Islands shack.

and 7 MHz, plus some 144 MHz operating, and the detailed times can be obtained by writing to Gordon Hunter GM3ULP, Clyde Valley DX Group, 15 Quarry Road, Law, Carlisle, Strathclyde, Scotland. All we can say is that the activity has already aroused some interest abroad, and will be quite a demanding schedule for the operators considering the amount of ground to cover and hours to operate.

A note has come to hand from G3WUD, who has come back to the bands after a lay-off and is currently mastering an FT-101ZD. Bob says he will be going to C6 over the period June 25-July 9, and he will be looking for Gs on 14.3 MHz between 1800 and 2100z, with some time outside these hours on other bands. The actual spot is in Nassau looking out over the beach and with a good take-off.

The LF Bands

We are lumping them all together this time because there hasn't been an enormous clip and both space and time press in closely.

G2HKU spent most of his LF time on Top Band, where he made SSB contacts with GW4KAW, GW3XIG, and PA0PN, with CW accounting for UK2FAA, UT5AB, UK5WAA, UK2PCR, UK2RAC, UK5IAZ, UK9ADY, UK2BBB, UB5PBA, UB5QKN, UQ2GDQ, UK2BCC, UQ5QAQ, UQ2GAT, EX5AB, OK4AWQ/MM in the Channel bound for Gibraltar, LA9LE, UA1DZ, EI9J, LA4O, and UQ2PQ. A short time on 3.5 MHz QRP and managed LA2BBA and G6AB, with CW at full power on 7 MHz dealing with AM03AVV and UL7GAY.

Next we have G2BON, who had a brace of SSB contacts on 7 MHz, with 6W8AR and CO1HJ.

The winter DX season on Eighty is over, says G3ZPF, and so he has only a few Ws to show for his efforts over and above Europeans. David says "thank Heaven for CW when one is having a bout of

laryngitis" — we couldn't agree more!

G4MVA laid out his trawls on 7 MHz CW, and as a result worked many 'AM' stations — Spanish for the World Cup — HH2VP, VC2ZP, many PYs, UA1ZBM for Zone 19, UM8MBA, R1ASP, RK7PAL, RX7MAR, EX5UKW, UD6BW, and DJ6SI/5V, plus CT3AB on SSB. The weird prefixes among that lot were all from Russia and all commemoratives.

Turning to G2NJ (Peterborough) we find Nick around the CW end of Eighty. Four successive evenings brought in EA2ABL/MM around 2200z with keen demand for QSOs, of which Nick rates the one with G4NNU of Exeter who was running 3 watts. Later on in the month G2NJ found LZ2EY/MM who was north of the Faroes Is.

An interesting note comes in from G6VS (Thornton Cleveleys), who is ex-VU2EU and back in 1939 worked from Cherat in the North West Frontier district with a Windom and battery-operated transmitter, and had a QSO with PA0FV in The Hague. Some 43 years later, George, on May 3, 1982, worked PA0FVL; during the QSO George mentioned that he had held VU2EU all those years ago and PA0FVL came straight back with the details of the first QSO, read off the QSL on the shack wall! G6VS enclosed a copy of the copy made by PA0FVL of the original QSL card from which we see the receiver was a 1-V-1 and the input 5 watts on Twenty metres. Quite a long gap between those two QSOs.

Finis

Which is where we thank you for all your letters and other inputs to this piece, and tell you that the deadline for the next feature is given as usual in the 'box'; this date is for arrival, your letters addressed "CDXN", SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts. AL6 9EQ. Till then 73.

BASICS FOR THE S.W.L. AND R.A.E. CANDIDATE, PART VI

SUGAR-COATED THEORY

THIS time we are going to play the numbers game a little, and so we must start with some revision of our elementary algebra. In algebra we stop using words to describe things and instead use letters. By this one simple step we can turn a particular statement into a general one — and save ourselves the cost of some ink into the bargain.

Enough of algebra.

On to definitions, of which the first is that of inductance. An inductor is said to have an inductance of one henry, when a current varying at a rate of one ampere per second produces a back EMF of one volt.

A capacitor is said to have a capacity of one farad when the quantity of electricity of one coulomb results in a potential difference of one volt.

Notice some things about these definitions. In the first one observe clearly that we are talking about a *rate of change*; it doesn't matter whether the current varies from zero to one ampere or ninety-nine to one hundred amps in the second. This statement, of course needs qualifying a little in that we are assuming no saturation effects are taking place in the core of the inductor. Practical sizes of inductor vary from less than one microhenry up to tens of henries.

Looking at the capacitor definition, there isn't much to add; the range normally occurring takes us from picofarads (of which there are some one million million to the farad) through to microfarads, up to about 1000 μF in our hobby. Why is the basic unit so darn unwieldy? Simply because the whole system of units is based on the basic metre, kilogram and second.

Some time ago, we mentioned the reactance of a capacitor and the reactance of an inductor; and last time we talked in generalisations about a 'resonant circuit'. We can say that a tuned circuit is resonant at a frequency at which:

$$X_L = X_C, \text{ or } 2\pi fL = 1/2\pi fC$$

This is an equation such as we discussed a while back, and it would seem that with a bit of juggling we could get f to one side and both L and C on the other.

$$\begin{aligned} \text{Thus: } 2\pi fL \times 2\pi fC &= 1 \\ \text{which may be written } 4\pi^2 f^2 LC &= 1 \\ \text{Then: } f^2 &= \frac{1}{4\pi^2 LC} \\ \text{Whence: } f &= \frac{1}{2\pi\sqrt{LC}} \end{aligned}$$

where f is in hertz, L in henries, C in farads and $\pi = 3.142$.

Given this relationship and a calculator (or an adequacy of fingers and a good memory!) it becomes possible to calculate the resonant frequency of any combination of L and C . Apart from the rather obvious use of such formula one can use it to, for example, calculate the frequency swing of a tuned circuit in a receiver; one may have a nominal value for the inductor, and the maximum value of the capacitor, plus a guess at the stray capacitance; then another sum which uses the minimum of the capacitor plus the strays. The first will tell us the lower frequency and the second the upper limit. However, the effect of strays is far more marked at the high end of the range so it is always prudent to make a generous guess at the stray capacitance and the minimum capacitance of your tuning variable. It is somewhat mortifying to find after doing your sums accurately that you have just missed the band at the high end!

As an aside, if one starts from the same basic formula $X_L = X_C$ one can transpose it to bring either C or L to one side and all the other numbers on the opposite of the equals sign. If you just happen to have a dip oscillator this formula will enable you to find the inductance of an RF coil or the capacitance of a small capacitor. The method is simple: set the dipper to some frequency at the high end of a band, and add a known C across the coil. This will bring down the frequency and again one can note this new frequency. You now have enough data to find the value of inductance of the dipper coil, and from that you can go to the frequency before and after tapping your capacitor across. You now know the gross value of C for two frequencies and, knowing the value of the bit inside the dipper, can subtract it to leave the value of the unknown. By a similar line of argument you can work out the value of an RF inductor so small that a normal homebrew bridge won't "see" it.

Press On

To progress much further, we must start to think about "active devices" with which, plus our basic L , C , and R , we can turn our activities from the theoretical to the practically useful. The range of active devices is legion, but we are at this stage only interested in a few, namely the valve, the transistor, the FET, the diode, the light-emitting diode or LED, and the integrated circuit of which there are two forms, digital and linear. The valve does not serve us save as a power amplifier in a big transmitter or linear; and even there it is on the way out as the Power FET increases its range. Let us look briefly at the diode and then build on that to higher things.

However before diving in, it should be stressed that the following is a simplified description of what can be a confusing concept to grasp.

Basic Semiconductors

In order to make a semiconductor device we need to have available very pure raw material, which may be silicon, most commonly, germanium which was the early favourite and, the coming thing, gallium compounds. Since the basic principle is the same in all cases, we will talk of germanium. We require our germanium far more pure than is available from a chemical supplier, so we must refine it up to our standard. Assuming we have done this we can look at Fig. 1, and observe that the germanium in its purity shows four bonds to each atom and each bond is tied to another atom in a matrix. Now, we must introduce a chemical term, namely *valency*. Valency is the combining or replacing power of an atom as compared with a hydrogen atom — which has a valency of one; germanium has a valency of four. If we introduce into our germanium a controlled amount of an impurity having a valency of five or three, we change the matrix of Fig. 1 to look like Fig. 2a or 2b, depending on the valency of the impurity we introduce. What we must do in order to produce a usable device is to be able to introduce both types of impurity into specified parts of the bit of pure germanium — and it is the ability to do this in ever more closely controlled conditions which has taken us from the point-contact device of the very early days — *S.W.M.* ran an article on how to make point contact transistors at home back in the early 'fifties — on to the super transistors and ICs of the 'eighties.

To return to our lump of germanium, we can dope it with arsenic, having a valency of five, with the result shown in Fig. 2a,

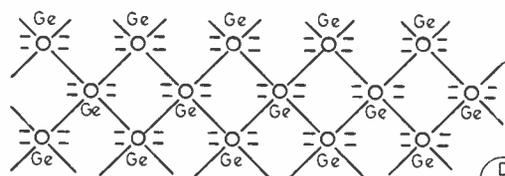


Fig. 1.

Fig. 1. The lattice formed by the four-valent germanium.

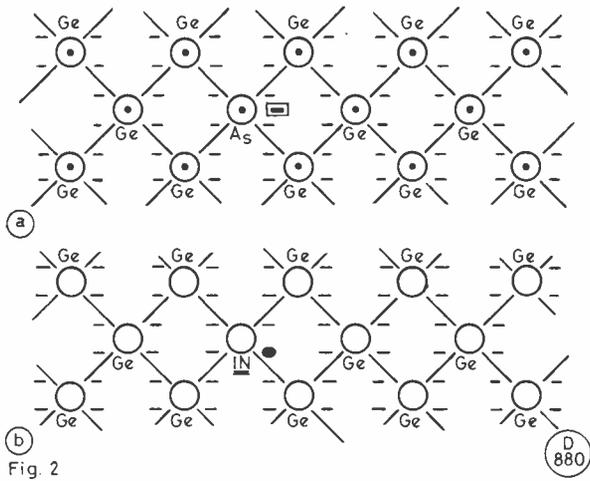


Fig. 2. Here we have introduced a very small impurity (as little as 1 part in 10^{11} is significant). At (a) the impurity is arsenic, which has a valency of five; hence we have one electron surplus as shown. At (b) the impurity is indium, which is trivalent, resulting in an incomplete bond due to the 'missing' electron, shown as a hole in the drawing.

so that we have a stray 'spare' electron which can't fit into the lattice. Alternatively, if we dope with the impurity indium, having valency three, as in Fig. 2b, we end up with a hole in the lattice where an electron is missing. The arsenic-doped material has a surplus of electrons and is called 'N-type material', while the indium-doped material's, having a surplus of holes, is called 'P-type material' — each hole is a place which will attract a negative electron if it can (whence we can regard the hole as being a positive charge). The neutral condition occurs when an electron fills a hole. Here endeth the mystery of the hole, almost. All we need to add is that the electron which filled the hole came from somewhere else and so left a hole behind it. Thus we may say to ourselves, discarding the surplus words, that holes move about just as do electrons.

Thus, if we take a piece of pure germanium at room temperature we will have a situation where electrons are moving about the lattice in a random manner, and so also are holes; if we were to put a voltage across the germanium we would find the positive holes would drift one way and the negative electrons in the opposite direction, so a current would flow in a direction depending on the way the applied voltage is attached.

Now let us proceed to Fig. 3, and here we have a piece of germanium of which part is N-type material and part P-type material. What will happen how? With no external connections whatever, we will find that electrons will cross the boundary and neutralise holes, thus creating a 'boundary layer' in which there are no holes or electrons, leaving the holes all in the P-type material and the electrons all in the N-type material. Thus we have an imbalance and as it stands current won't flow across the junction.

Observe that we are, at room temperature, looking at two different things happening simultaneously: (a) we have the 'minority carriers' due to the doping of the pure germanium into P-type or N-type, and (b) we have the 'majority carriers' which occur naturally. The latter we may regard as being irrelevant for the moment as they occur at random at a rate depending on the temperature, and normally balance themselves out, while the minority carriers produce the effects we want. However, we cannot dismiss the majority carriers completely from the picture as they in fact set fundamental limits to the operation of a practical device.

To return to Fig. 3, if we now put the terminals of a battery to the two ends of the piece of germanium, we will see two different effects. If we connect the battery positive to the N-type end and the negative to the P-type end, we will see an increase in the width of the boundary layer and not much else. If we reverse the battery

so the positive is to the P-type end and the negative to the N-type end we will find that a current flows, as the polarity of the applied voltage is such as to force minority carriers into and across the depletion or boundary layer. Thus we have an understanding, albeit oversimplified, of the simple diode.

Now, a few points of clarification. Firstly, it must be understood that to have a piece of N-type material and another of P-type and place them in contact is not enough; we have to generate those regions chemically starting from a piece of the pure material. Secondly, while the explanation given above for germanium is essentially the same in the case of silicon, the chemical differences are of some importance; for instance the intrinsic current due to the majority carriers won't matter much in the forward direction, but it will have the effect of allowing some small reverse current to flow when the diode is back-biased. This back current is going to be temperature sensitive, and we should also note that this intrinsic current can be affected by the action of light — an effect which is fairly easily controlled in the packaging, or even be put to use. The intrinsic current due to the minority carriers is far higher in germanium than in silicon, by some 1000 times, making silicon more attractive as a raw material. On the other hand the barrier potential to be overcome before the diode will go into full conduction is lower at about 0.3 volts for germanium than for silicon, where around 0.9 volts will be dropped across the silicon diode in full conduction.

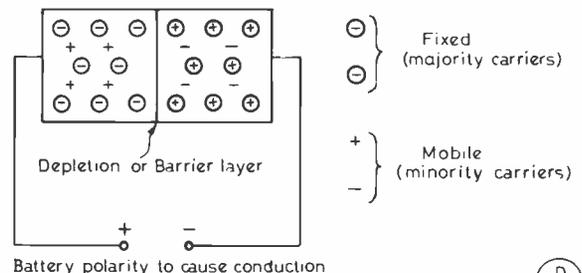
Limits

If you take an overly-high current out of a diode of either material, in the forward direction, then heat is the limit: heat due to the watts dissipated in forcing current through the semiconductor material, which will heat up the material enough to cause the majority current carriers to become dominant and so to destroy the diode.

How about the reverse-biased diode? If we look at the data sheets we will see a figure for the Peak Inverse voltage quoted. If we exceed this voltage the current will suddenly rise to a damaging level; the term 'avalanche effect' is a vivid description of what happens — just try it with a diode, a power-supply and a current meter, and see for yourself! In a normal diode for use as such the effect of excessive back voltage and avalanching is destructive, but we can work on the processing technique to control it to obtain the 'avalanche diode' which is usually called a Zener Diode (the true 'zener effect' only shows at very low voltages, about 5V or less). Such zener diodes can be used as elements in a voltage stabilising circuit as we shall see in due course.

Thus, we can summarise our knowledge of limits by saying that they are Absolute Ratings, not to be exceeded under any circumstance if one is to avoid destruction of the device.

Perhaps this is a good time to mention the light emitting diode or LED; this is in essence a diode based on gallium-arsenide which will emit light when it is biased into conduction. GaAs material may be doped with phosphorus and thus a range of colours can be



Battery polarity to cause conduction
Fig. 3

Fig. 3. Here a piece of germanium is doped to give P- and N-type areas, resulting in a depletion layer at the junction, where the mobile carriers from each side cancel, leaving a 'no-man's land' between the areas (in the absence of external effects). Connecting a battery as shown will cause conduction; if the battery is reversed, no current flows.

obtained, red, orange, green, and very recently one has seen a claim that a blue coloured LED is available. It is interesting to note that the forward voltage drop of a LED is usable — as indeed germanium or silicon diodes are — as a source of a low voltage stabiliser element below the bottom end of the range offered in zeners; it is also of interest to note that one may come across a LED which won't light up at all but is still a quite useful diode, so check 'em before you throw 'em away!

Rounding out our discussion of the P-N junction above, it is necessary to say that we have talked in terms of the simple junction diode as it was in the 'fifties; what has happened since is a process of steady and continual refining of manufacturing techniques; and it is perhaps a bit of a surprise that the key to the

latter is photographic, and in its turn derived from the litho printing process. A familiar route indeed, not unlike the road to the printed circuit board, but of ever-increasing accuracy. Chemically, the forward route has been marked by ever-improving control of the materials and the dopants, so that, for instance we can find such variants as the 'varicap' diode, in which the thickness of the barrier-layer is the controlled area; since there is no current in the depletion layer when the diode is back-biased, the layer can be regarded as a capacitor whose value in pF varies with the magnitude of the biasing voltage in a controlled manner. It rather seems that the original thinking to this as being rather in line with sales thinking — "if you can't lick the problem, feature it!"

to be continued

• • • SWL • • •

SHORT WAVE LISTENER FEATURE

By Justin Cooper

WE will start this time by mention of a letter we had from S. Foster, in his capacity as President of ISWL. He notes the problems they have been going through for the past few years, and the resulting falling off in membership. ISWL have now resolved their problems, and so the Hq address is now: c/o Hayden Drinkwater, 88 The Barley Lea, Coventry CV3 1DY. We hope that ex-members will rejoin and so aid the recovery plans — details from Hayden Drinkwater at the above address, and of course we should note that ISWL is one of two groups in the U.K. who operate a QSL service for members.

Technical

Let's start with *J. Worthing (Shrewsbury)* and his Realistic DX-302 troubles. Whenever there is a big signal 455 kHz up from a particular number of MHz — for instance 28.455 MHz — then that signal appears right across the band as an *untunable* interference. The receiver has IFs at 55.5-54.5 MHz, 3-2 MHz, and a final IF of 455 kHz. Jeff has had the receiver realigned but this doesn't solve the problem.

Starting from the beginning, we can say that if the interference is untunable it doesn't have anything to do with the variable frequency oscillators, and it is more than likely that the signal being looked at on 28.455 MHz doesn't live there anyway. As a first test one would find such interference, and then pull out the aerial plug from the receiver to see if the signal goes away. If it goes, then the interference comes from the aerial; if it stays, the interference is being picked up on mains lead or set wiring. Of course one must realise that the more IF frequencies there are, the more frequencies there are at which the various oscillators (and their harmonics too) can beat together to give tunable whistles — birdies — or, possibly, untunable whistles if crystal oscillators are involved. The latter have, in our case, to give a beat product at 455 kHz which can leak into the final IF stages, at which point there is no way of tuning it out. Thus, the *cure* is a bit difficult and involves firstly finding the combination of oscillator frequencies which will produce the effect followed by proving that these combinations are (or aren't) at the bottom of the problem; this is largely a calculation exercise. Having found the cause and proved it, one then has to find the cure. It would most likely be something daft, such as an earth tag that isn't earthed; and it wouldn't be the first time that merely taking the receiver to another site cured the problem! (One recalls that, thirty years ago, the Eddystone S640 suffered with such problems in some conditions, and there the

cure was usually to reverse the leads on the BFO capacitor as the RF was leaking into the receiver by way of the shaft of this control). The key is, above all, to find the offending combinations of frequency and how they are being mixed; and of course haphazard changing of mixer devices without a clear idea of the frequencies is hopeless. The mixer can only mix what is given to it!

Now we come to *H. Wood (Manchester)* who has come back to the fold after a spell in CB. Harold has some questions which are basic to all SWL's and so need answering here. Firstly, the question of QSL Bureaux: to QSL direct is expensive for the person sending the QSL card, and so if that person is prepared to accept some delay, he can batch his cards up and send them through the Bureaux. The Bureaux sort the incoming cards from users, and batch them up for sending to the other Bureaux, where they are sorted for the recipients, put into envelopes and sent off to the station concerned; the route back is the same. In general, one has to say that this method will only work as well as the end users allow it; if they are lax in getting cards away, and don't keep *s.a.e.'s* at the Bureau, then the whole thing gets bogged down.

There are two QSL Bureaux in the U.K. which are run for their members by respectively, RSGB and ISWL. So — if you want to use a Bureau for QSLs, you need to be in one or the other. The second question is about the QSL address; here we have to say that, in general, the station being listened to will give the route for his QSL — if he is on the receive end of a pile-up or in a contest he may only give his QSL address every third or fourth contact to save time, so you need to hang around to get this address. If you QSL direct and, by implication, want a QSL direct, then one should obviously provide funds for the return postage. This can be done by getting the correct stamps of the country concerned and sticking them on a self-addressed envelope, or, alternatively, one can use International Reply Coupons (IRCs) which one can buy from main Post Offices, and put these, along with an unstamped but self-addressed envelope and your report into the envelope before posting. The other chap redeems your IRCs at his local post office and gets the stamps in return, which he puts on your envelope with his QSL in it.

The second question is about the way the licensed chap is likely to view SWL reports: in general, he will QSL any report that is *useful* by which we imply that it covers several contacts, or even several days, with some note of the strength of other stations on the band at the same time from the same area, and maybe if the

transmitter signal is a bit 'off' a note of what it sounded like in full detail.

N. I. Neame (Lancing) noted our remarks last time about AC4YN and AC4RF, and turned up a copy of *QST* for August 1953 in which the passing of AC4YN is noted. Now, he wonders, who is wrong? Well as we recall the situation, AC4YN was operated by the present G5YN, Sir Evan Nepean, Bt., who is still active as far as we know. AC4RF we remember as being on from Tibet, taken by the Chinese when they invaded, imprisoned for several years and then released in the mid-fifties. He wrote a book, called "Captured in Tibet" and gave a talk to the Barnet Radio Club about his adventures, which was for a time in the RSGB tape library during the latter end of the 'fifties. One wonders, and so we shall be talking to those who recall, in an effort to get at the bottom of the puzzle!

Now we have a nice easy question from *A. J. Hall of Alvaston*; he wants to know when it is best to look for the Pacific stations and on what band. We would suggest 28/21/14 MHz during the mornings up till about noon. Tony sent us in a first list which just missed the deadline for the previous SWL, so we have taken in his scores to the ladder this time.

Newcomers

We have already mentioned one, namely Tony Hall, and there are others. First, *Mrs. C. Law (Chesterfield)* who slipped her first entry in with husband Mike's list, so we nearly missed it!

Next comes *P. D. Hunt (Woolwich, SE18)* who has come back to the hobby after a break of some years while the chores of young domesticity took over. Now he has a rebuilt CR-100 and took most of his prefixes on 14 MHz, as he says the receiver for some reason doesn't like SSB on 21/28 MHz. We would guess that the problem is insufficient BFO injection to the detector.

R. Wooden (Staines) has written before, but this time he has a list for the Table, and a note that he uses an Eddystone 730/4 with a half-sized G5RV aerial.

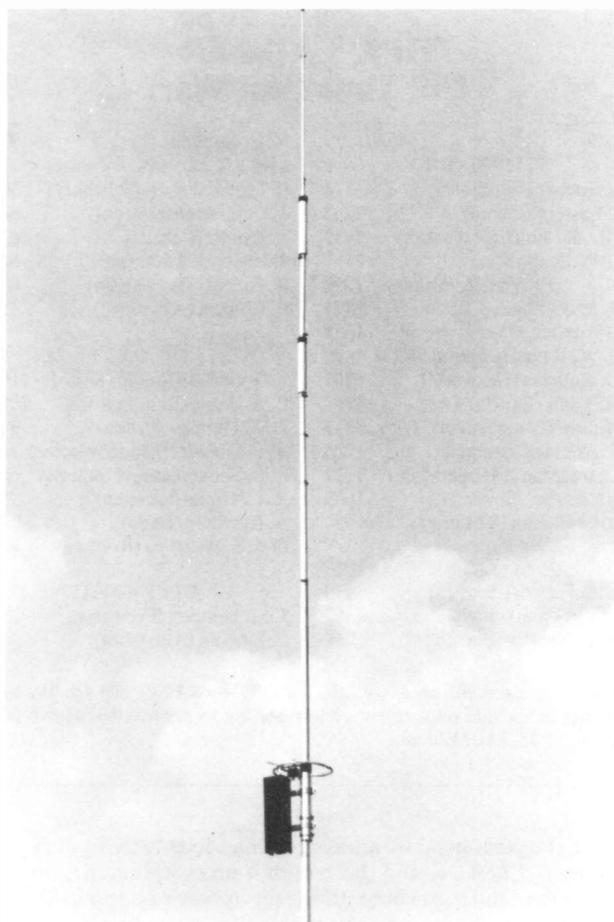
Another newcomer with a problem is *N. Carr (Preston)* who is infuriated at the number of prefixes he can't identify and wonders where to get a full list. We suggest he gets Geoff Watts' *Prefix List* — it is advertised in the magazine every month without fail, and is always right up to date when he despatches it. There is a lot of room to fit in new ones, which crop up almost daily of course — for instance the AM is a 'special' in connection with the World Cup football in Spain.

The Regulars

We kick off here with *N. Askew (Coventry)* who is well up the Ladder, but still managed a goodly crop this time, many doubtless having been turned up during the CQ WPX contest.

Another one with just a list this time is *N. Rodgers (Harwood)* who goes up to 1367.

Next we have *N. Jennings (Rye)* who has been hob-nobbing by telephone with Jim Dunnett to some considerable extent as a prelude to a serious attack on the RTTY front. On a different tack altogether, Norman wonders about a CW score amassed while using a processor, by which we assume he means a CW decoding device of some kind. We don't see that we could accept this — after all, such a rule would presumably exclude the YL your scribe



A new DX antenna from Cushcraft, the R3. The antenna gives 3dB of gain in each of the 10, 15 and 20m. bands and, by means of traps, consists of a half-wave vertical in each of these three bands; it can be ground or roof mounted, without the need for any earth, counterpoise or ground system. At the base of the antenna is a motorised antenna tuner unit, rated at 2kW, to match the high impedance feed point to the 50-ohm coaxial line. Full details of the new R3 may be obtained by sending a large s.a.e. to the sole U.K. importers and trade distributors, *Communications Products Ltd.*, P.O. Box 23, Halifax, West Yorkshire HX3 6AN.

knows of who copies her 30 w.p.m. by touch on the cone of a loudspeaker because she is deaf.

The other end of this activity, *J. Dunnett (Prestatyn)* has quietened down the interference from his TV timebase. He used three ferrite rings each with some ten turns of the aerial feeder wound into it; in the main lead, about half this number of turns, and in addition a bifilar-wound ferrite rod in a screened box also in the mains lead. All this has killed the timebase problem above 6 MHz, but there is still the broadband interference — 'noise' — at the lower frequencies in daylight, but at a level such that it isn't a nuisance when the band livens up after dark. Jim is thinking about buying an FT-101 for his rig when the ticket arrives and wonders about the front-end performance. All we can say is that the major makes are all beginning to take careful note of the need for a wide dynamic range at the front-end of a receiver, so you "pays your money and takes your choice".

Just after the deadline for last time we received a note from *K. Cooke (Cardiff)* who says he will help anyone in need of a QSL address if they will just include an s.a.e. with their enquiry. He is at 51 Celyn Avenue, Lakeside, Cardiff CF2 6EJ.

The absence of a long letter from *T. Kirby (Cheltenham)* is the result, we hear, of lots of time put into learning Morse — what better excuse can there be?

ANNUAL HPX LADDER

Starting date, January 1, 1982

SWL	PREFIXES	T. Kirby (Cheltenham)	296
D. McKinney (Portadown)	392	C. N. Woods (London W3)	267
A. J. Hall (Alvaston)	396	Mrs. C. Law (Chesterfield)	220
R. Wooden (Staines)	317	P. D. Hunt (Woolwich)	215

200 Prefixes to have been heard since January 1, 1982, for an entry to be made, in accordance with HPX Rules, p. 28, March issue. At score 500, transfer to the All-Time listings is automatic.

HPX LADDER (All Time Post War)

SWL	PREFIXES		
PHONE ONLY			
B. Hughes (Worcester)	2514	N. E. Jennings (Rye)	900
S. Foster (Lincoln)	2262	Mrs. J. Charles (Colchester)	740
Mrs. R. Smith (Nuneaton)	2135	B. L. Henderson (Salisbury)	708
E. W. Robinson		J. Dunnett (Prestatyn)	686
(Bury St. Edmunds)	2058	K. Cooke (Cardiff)	654
H. M. Graham (Chesham)	1474	J. Hayes (Edmonton)	628
J. Worthing (Shrewsbury)	1668	R. Everitt (Bluntisham)	620
G. W. Raven (London SE13)	1420	P. Lincoln (Aldershot)	559
M. Rodgers (Harwood)	1367	CW ONLY	
M. Toms (Barkingside)	1337	J. Goodrick (Bognor Regis)	1100
M. Law (Chesterfield)	1237	E. B. Ward (Ruddington)	1097
N. Askew (Coventry)	1226	J. M. Dunnett (Prestatyn)	966
J. Singleton (Skelmersdale)	1127	A. F. Roberts (Kidderminster)	961
J. Doughty (Bloxwich)	1069	P. L. Shakespeare (Foulness)	624
D. C. Casson (Reading)	1054	N. I. Neame (Lancing)	508
D. J. S. Williams		J. Rowland (Bude)	287
(Wednesbury)	1008	D. J. S. Williams (Romsey)	253
B. A. Payne (Leeds 18)	970	RTTY ONLY	
L. Stockwell (Grays)	952	J. M. Dunnett (Prestatyn)	254
Mrs. T. Parry (Blackpool)	950	P. Lincoln (Aldershot)	209

Minimum score for an entry: 200 for CW or RTTY, 500 for Phone. Listing to include only recent claims and be in accordance with HPX Rules, p. 28, March issue.

On the other hand we always get a nice long letter from *H. M. Graham (Chesham)* and this month is no exception, despite the fact that Maurice has been off the air by way of a trip to Greece and another ten-day session around Gloucestershire and North Wales. An interesting surprise letter came from Australia; Maurice had written last October to report on signals from P29NAB, to the address given in the 1980 *Call Book* — Rabaul, Papua/New Guinea, and the letter filtered its way through to Darwin where ex-P29NAB is now resident, having given up in PNG as long ago as 1977. The call has it seems been re-issued and the new address in fact appears in the 1982 *Call Book*; but as Maurice says, it was nice to get a letter in answer to a mis-aimed QSL card!

R. Everitt (Bluntisham) mentions hearing a W4 Maritime Mobile twice, firstly in Region 1 and then in Region 3; they don't count as two separate prefixes, as they only indicate very roughly where a ship may be at any time.

Even though he is already at 1200-plus, *M. Law (Chesterfield)* still managed to find a reasonable extra twenty prefixes this time.

Another one with a goodly crop this time is *Mrs. T. Parry (Blackpool)* who is creeping up towards the magic 1000 mark.

D. J. S. Williams (Romsey) is one of those who enter both the Phone and CW lists; on Phone he is near to the 1000, and he notes that a couple of lucky catches arose when a TN8 — his first one on SSB — was asked if he would go over to CW. He did, and gave our reader a new one on the key; and a VQ9 repeated the treatment the following day!

P. Lincoln (Aldershot) has a problem with a source of QRM which he believes to be down to the Aircraft Establishment some five miles away; we doubt that this is the case, but it would always be possible to write and ask them — they might be pleased to know they are getting out!

Back to *S. Foster (Lincoln)*, this time in his personal hat as a regular HPX entrant who was for a long time at the top of the Table. Stew once again succumbed to the temptation to listen seriously in the WPX contest, and ended up with some 26 hours of

the 48 at the receiver, 120 countries heard and quite a lot of new prefixes. Not as serious an entry as in previous years, but enough to make Stew say "I'm resting for the rest of the summer!"

Another one who collected up some profit from the WPX shindig is *Mrs. J. Charles (Colchester)*; she seems to have picked out most of the oddities available and identified them all, but for some reason she has grave doubts about the AM prefix from Spain. Perhaps she doesn't go much on World Cup Football!

As always, we have a long and interesting letter from *E. B. Ward (Ruddington)* who seems to be getting back into training with his 'crystal-filter ears' and FRG-7, at least on 14 MHz upwards. Barry doesn't seem to have a lot of time for the LF bands; he describes them thus: Forty, Injun country; Eighty, the Badlands; and 160 is labelled on his chart 'Heere be Dragons'. Perhaps we should suggest that as the reason LF band DX-ing is such fun.

Once in a while a good comb-out of the log is worth doing, says *B. F. Hughes (Worcester)*. This month he adopts his own proposal and rises in the HPX accordingly. On a different tack, he has received his XZ9A QSL card, by way of JA8IXM, and reckons it is a nice looking card as well as being rare DX.

G. W. Raven (Lewisham) says his recent inactivity is not due to loss of enthusiasm for SWL-ing so much as increased enthusiasm for other things. On a different tack, Geoff uses an FRG-7700 and the matching FRT-7700 ATU, along with a Datong AD370 Active Aerial and Datong FL2 to give what he reckons is the best compromise set-up for his location.

It is nice to see so many CW entrants for the Ladder getting up to the 1000 mark; the latest to approach this value is *A. F. Roberts (Kidderminster)* who is at 961 and looks to be over the mark next time with a bit of luck.

Some years ago we used to hear regularly from *P. L. Shakespeare (Foulness)*, but then came a time of stringency and his receiver was disposed of. However, last March he started again from scratch with a National Panasonic T100D, to which he has recently added an old Marconi CR-100 which gives the coverage of 21/28 MHz. Rather than collect up all his old prefixes immediately, Peter has decided to go for the 1000 from scratch and then only will he consolidate the two lists into one — that should keep him out of mischief for a while.

Mrs. R. Smith (Nuneaton) says she has been too busy with spring-cleaning and gardening to have much time for listening, but she still manages to make a good score by the standards of the rest of us, and it won't be long before she makes *B. F. Hughes* look to his laurels. She has her doubts about R6L heard one Saturday evening on 21.335 MHz; this one has been widely reported and seems to be quite legitimate.

B. Henderson (Ryde) is still in temporary 'digs' all the week, but hopes to make the permanent home shift in July, after son Simon has finished his exams. And, talking of exams, Brian is one of the many caught in the log-jam in the Home Office, so he has an FT-480R and Tonna aerial all ready to go the moment he gets the vital bit of paper.

Bottom of this time's pile is *E. W. Robinson (Bury St. Edmunds)* who notes this as the 66th list he has sent to the HPX table — which means a long time. Of the current lot, some 18 came from the WPX contest, and another 15 arose from the AM series from Spain; another interesting one was 4P1POP, a special commemorating 50 years of the Philippine national society.

Finale

We've come to the end once again, and so it only remains to mention the deadline date of July 22 to arrive for the next piece; the address as ever is: "SWL", SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts. AL6 9EQ. Meantime, happy landings!

THE DEVELOPMENT OF THE "WINFIELD WONDER WIRE"

AERIAL PRACTICE WITHOUT THEORY, AND DX-ING WITHOUT BEAMS, FOR THE NEWCOMER TO HF

D. J. REYNOLDS, G3ZPF

Background

ONE of the more pleasant "watering holes" in the author's locality is fairly close to a school where evening classes cater for the Morse test and RAE. Not surprisingly it has become somewhat of a magnet for the eager hopefuls attending the classes, and a fair number of licensed types swell the numbers at the regular weekly gatherings. Those with callsigns of several years standing are often quizzed by the throng of tyros on a variety of topics, especially at the times when the results are announced.

As a dyed-in-the-wool HF type, with a penchant for DX chasing, the author is frequently asked questions relating to aerials, and each year they are pretty well the same ones. After answering a short burst of "what's the best . . ." and "how do I . . ." type questions, the author generally twists the conversation around to a 'canned' history of aerial experiments at his own QTH, the idea being to try and generate the will to experiment in each of them, rather than just giving stereotype answers. In reproducing it in written form, perhaps others outside this locality may glean something from it, and take another look at what they consider an 'impossible' situation.

For Openers

A totally uncooperative planning authority precluded the use of beam antennas, and the restricted space available did cause problems on the lower frequency bands, but in spite of these difficulties it has still proved possible to radiate RF effectively all over the globe. Many new licensees seem to think that aerials are very much a go/no-go situation, and that unless constructed exactly as per the book, that they will not function at all. In answer to this, the author can only say that he has yet to see an antenna in any book that would fit into his garden without several extra bends in it, indeed there have been very few that would fit into his garden at all. Any antenna will radiate in some manner, even indoor ones (a fact that the author was able to demonstrate recently when he loaded up the curtain rail in his shack), and even without a beam and a linear it is possible to work a fair amount of DX. Admittedly they do make life much easier, if circumstances permit, but 100 watts or so of RF into a low, wire aerial can radiate RF all around the world, given (and here's the rub) a certain amount of nous on the part of the operator.

In The Beginning . . .

During his years as an SWL — a learning phase that many seem to bypass these days — the author used only indoor dipoles on a common feeder, yet managed a respectable entry in Justin Cooper's HPX Ladder in the time between "discovering" S.W.M. and the arrival of the licence. The first ten months of operation were spent on 160m, with a variety of end-fed wires, working the locals (and not-so-locals) on AM. The end-fed wires usually went around the edges of the limited space available (Fig. 1) and were adequate for what the author wanted to do on that band.

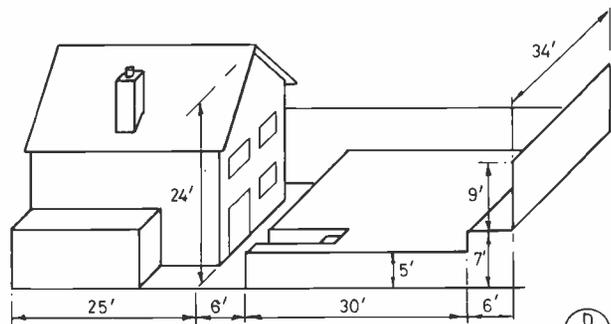


Fig. 1 Approximate dimensions of author's QTH

The Power and the Glory — and the TVI

When starting up on the HF bands, the end-fed wire was initially used, but after encountering a few RF 'hot' spots around the rig, and getting the 6-ft. strip light in the kitchen lit from end to end, a 20m. dipole was put up as per Fig. 2. Although fairly low, this aerial worked far better than ever expected, and after pausing to deal with some cases of TVI, a fair number of DX stations were quickly worked. The aerial was modified for two-band operation some time later, by the use of 300-ohm ribbon cable. Being inherently idle, it seemed an easier solution than using spacers (Fig. 3), but after picking it off the lawn a few times, it soon became apparent that the ribbon cable was no match for the winds that blow around this QTH. In addition to breaking at regular intervals, the resonant frequencies changed dramatically when it rained, a fact that was later learned to be a well known feature of 300-ohm ribbon. To overcome these problems some spacers were made from strips of plastic, and experience showed that to minimise the number of spacers needed, and to stop resonance shifting in the wet, that a spacing of 4-in. was desirable between each pair of dipoles (Fig. 4a). Erection and adjustment of parallel dipoles is greatly simplified if approached in a logical manner, and the following procedure was arrived at after much trial and tribulation.

The main thing is to take all of the strain in the top dipole, and let the others literally hang from the spacers. A great deal of time and effort was expended at this QTH in trying to get all 3 dipoles taut, before realising it was not necessary. Cut all of the dipoles to the theoretical lengths, working on the principle that it is easier to shorten the antenna than add to it. The fact that dipoles turn out shorter than the theoretical length is particularly true of parallel dipoles; presumably the proximity of one to another "loads" the length to some extent. Having erected the dipoles, check the SWR across each band. If all is well the SWR will be lowest at the bottom of each band, indicating the dipoles to be too long. Start with the 10m. dipole, and prune it to resonance within the band, and then re-check the other two bands, as resonance on these will almost certainly have altered slightly. Next trim the 15m. dipole, which will again shift the 20m. resonance, but NOT the 10m. one, since you are effectively trimming beyond its ends. Finally adjust the 20m. dipole, and the aerial is ready for use. As a guide to how much to cut off at a time, a dipole trimming chart is shown in Fig. 5.

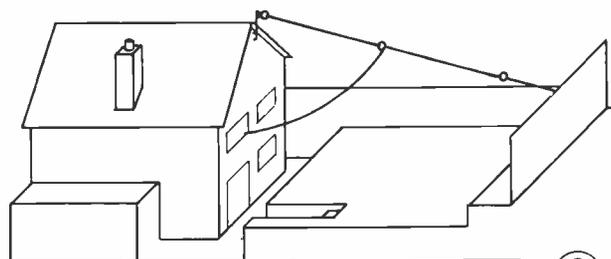


Fig. 2 Layout of the 20m dipole, which was later converted into a 3 band dipole system

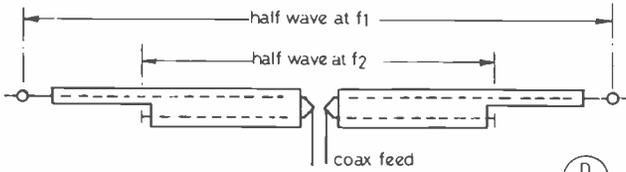


Fig.3 Parallel dipoles constructed from 300Ω ribbon

Some readers may well be wondering how 3 dipoles can be fed from the same feeder, and yet still match into 75 ohms. Taking 20m. as an example, the impedance of the 20m. dipole will be around 75 ohms, but the impedance of the other two dipoles on 20m. will be much higher, say 1000 ohms. The net result of these three impedances in parallel is about 65 ohms (or an SWR of 1.15:1), although the purists will point out that there is reactance as well to complicate the figures slightly.

The final version of the parallel dipoles worked exceptionally well, although at the time it was somewhat of an event to hear anything other than a local station on 10m. due to the state of the sunspot cycle. Even 20 and 15m. seemed to close fairly early in the evening, and this started off thoughts about an aerial for the 80 and 40m. bands. When first starting on the HF bands with a dipole, the ease with which a wide variety of DX was worked came somewhat as a surprise to the author, and so the matter was given some consideration. Given that there are over 300 countries currently valid for DXCC purposes, and that only 100 were needed to qualify, how great a radius centred on the UK was needed to enclose 100 countries within a circle of that radius on the face of the earth? It turns out that a radius of from here to New York is about all that is needed, which readers can check for themselves by use of a Great Circle map. It transpires that in the UK we are well placed for being able to work a wide variety of countries, whilst only covering about a third of the earth's surface.

“Vee Haf Vays of Radiating RF”

Since the available space precluded the use of dipoles on 40 and 80m, the alternatives of vertical or inverted vee were considered. Inverted vees seemed to give good inter-G working, but what about further afield? Verticals were claimed to come into their own on the long haul stuff, but never seemed too good for local and semi-local working. Verticals would also need a fair amount

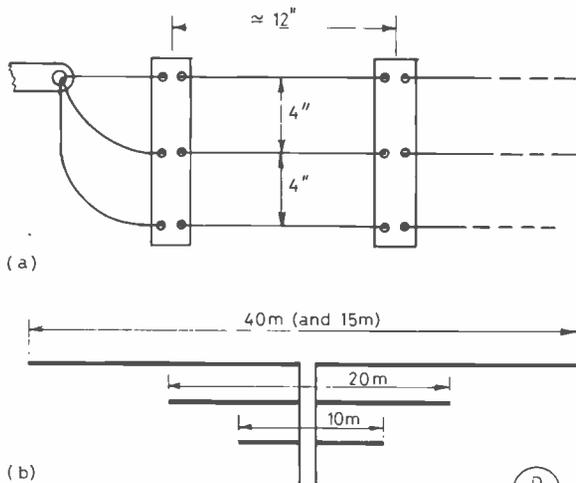


Fig.4

Fig. 4a. Construction of a three-band parallel dipole aerial; the spacers are made of strips of plastic. Fig. 4b shows a four-band dipole, using three parallel wires. Although the 40m. dipole will also be resonant on 15m., the SWR will be about 1.7:1 so solid-state rigs may need an ATU; the SWR is due to the higher feed impedance on 15m.

of copper to be buried if they were to be expected to work efficiently, and so the author came to realise (or was it hope) that an inverted vee would give better results than a poor vertical. A trap dipole was erected for 80/40m., of the W3DZZ variety, but due to the space available, it was more than slightly bent (Fig. 6). In spite of the fact that some references claim that the W3DZZ will work on 5 bands, it is basically only a two-band aerial, and the author certainly never managed to get his to operate on 20/15/10 metres without the aid of an ATU; in addition, only part of 80m. can be covered without an ATU, since the resonance is fairly sharp.

BAND	DIPOLE LENGTH	TRIM
80m	133' - 9"	1' - 6" per 50kHz
40m	66' - 10"	6" per 50kHz
20m	33' - 5"	3" per 100kHz
15m	22' - 4"	1" per 100kHz
10m	16' - 8"	3 1/4" per 500kHz

Fig. 5 Dipole length and trimming chart

After a few evening sorties on 80 and 40 metres, the USA and Canada had been worked on each band, which was very encouraging, but the performance on 10m. seemed rather poor for some reason. Initially this was put down to the state of the sunspot cycle, but it soon became clear that other locals were hearing stations on dipoles that were inaudible on the author's aerial. Presumably the many bends were causing some kind of cancellation, or maybe having to use an ATU because of the high SWR meant that the losses in the coax feeder were high. It was quickly decided that a compressed version of the trap dipole would be made, to reduce the amount of bends, and if that did not improve signals on 10m. then open wire feeders would be tried as well.

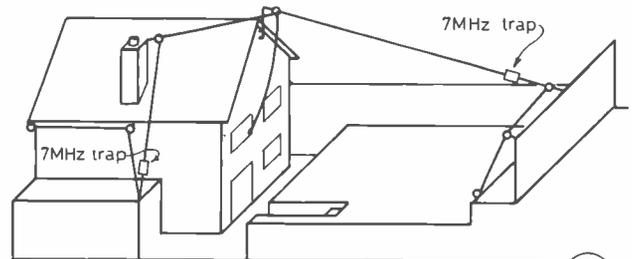


Fig.6. Layout of the W3DZZ type trap dipole

The author was still experimenting with 7 MHz traps with a high L/C ratio, when the W3DZZ was destroyed by lightning. Fortunately all aerals are disconnected when not in use, and so none of the equipment in the shack was damaged. The new traps were pressed into service, resulting in an aerial of the dimensions shown in Fig. 7. The traps were formed from a 12-in length of 1-in. o/d plastic pipe, with closewound turns of PVC covered wire over 9-in. or so. The capacitor was formed from a short length of TV coax, and the traps were resonated at about 7050 kHz by use of a GDO, trimming the coax to alter the frequency. It has been intended to use some 1/2-in. dia. coax for the capacitor, but none was to hand when the trap dipole “disappeared” and so the UHF TV coax was used instead. The compressed dipole worked quite well on 80 and 40m, but loading it up on 10m. by means of an ATU caused the capacitors to track across after a few minutes. If the larger diameter coax had been available, it would probably have been adequate to prevent disaster.

In the years since experimenting with the compressed trap dipole, the author has been intrigued to see two commercial versions become available, each the same dimensions as his, although presumably with better quality traps.

Look — No Traps

Returning to the main theme again, the author was now minus an aerial, and two sets of traps, so hurriedly put up a 100-ft. centre-fed (*i.e.* a trap dipole minus the traps) just to keep on the air. Results were as before, with the exception that the ATU was required full time, and even when the coax was replaced with open wire feeder, the performance on 10m. left a lot to be desired. The aerial was then shortened so that one leg, at least, would have no bends in it, and the length turned out to be 42-ft. each leg (Fig. 8).

The results from this aerial were most pleasing. Whilst the signals around Britain on 80m. seemed to be slightly down on before, the improvement on 10m. was quite dramatic, and this at a time when 10m. was beginning to perk up anyway proved to be a most effective combination. The aerial was physically in a very

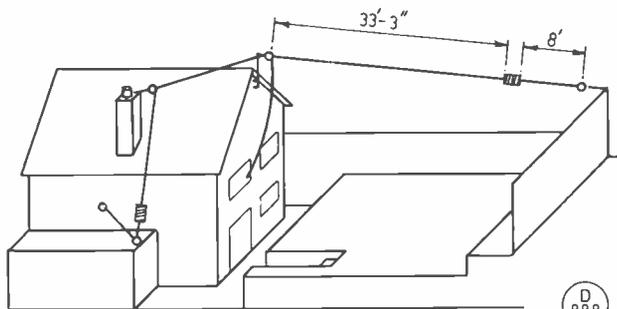


Fig. 7 Layout of the compressed trap dipole

sorry state, with a large number of joints in the wire, and of quite flimsy construction since it was only intended as a stopgap measure. The only pleasing thing structurally was the construction of the open wire feeder (of which more anon), but in spite of some very strong winds it survived some four years before the elements finally got the better of it.

As the aerial worked so well, the author immediately made another of the same dimensions, but this time of a more sturdy construction. Finding himself with insufficiently long lengths of wire "in stock", a visit was made to the local branch of *Woolworths* where two of their 60-ft. reels of bell wire were purchased, at the princely sum of £1.52 each. These were long enough to make one leg of the aerial and the feeder without any joints, and is how it came to be dubbed the "Winfield Wonder Wire".

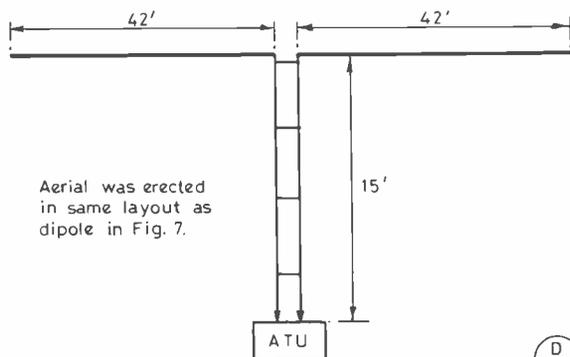


Fig. 8 The "Winfield Wonder Wire"

The aerial is still in use at the time of writing, and has been used with ATUs having both balanced and unbalanced outputs, although in the latter case, one leg of the aerial would have been acting simply as a counterpoise. It was mentioned earlier that initial tests seemed to indicate that signals on 80m. were down slightly compared to the 110-ft. version, but this may well have been Murphy up to his tricks, since the aerial has since proved

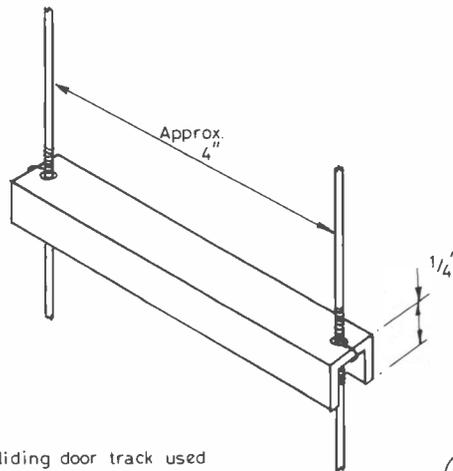


Fig. 9 Sliding door track used for spacers in open wire feeder

itself quite capable of working into ZL on 80m, and you can't get much further than that. It seems at its best on 40m, where it puts out an extremely potent inter-G signal, whilst still being able to deliver the goods on the long haul stuff. Over 100 countries have now been worked on every band except 80m, where the score is currently standing at 78, and over 200 have been worked on 20m.

Constructing Open Wire Feeders

Having tried a variety of materials for spacers, the author finally hit upon the idea of using sliding door track. The type used was of a "U" shaped cross section, and available in 6-ft. lengths for quite a reasonable sum. It can be cut with a kitchen knife since the plastic is fairly soft, yet the U-section gives it good rigidity, and the plastic used does not seem to go brittle on exposure to sunlight. It also has the desirable attribute of not rolling away when you cut it. In a highly unscientific manner, the author decided that 4-in. spacing looked about right, and cut up the plastic into appropriate lengths. Initial attempts at constructing a length of open wire feeder were both messy and time consuming, but eventually the following procedure was evolved, which makes the task quite simple (Fig. 9).

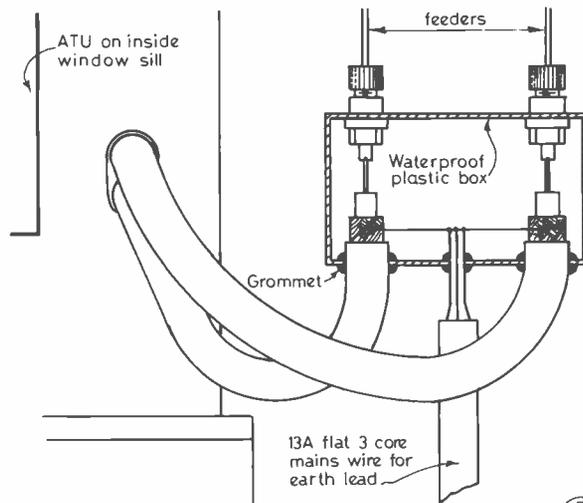
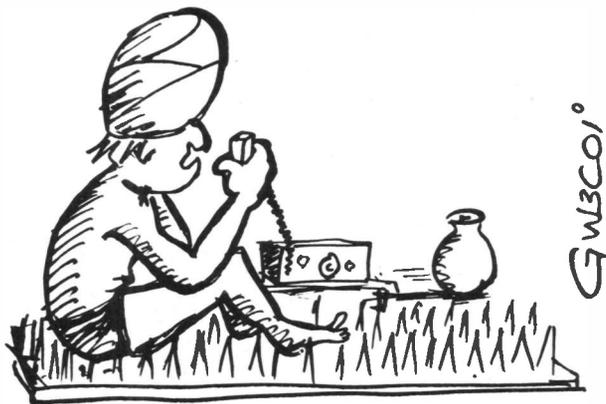


Fig. 10

Fig. 10. Detail of the feeder junction at the window frame. The box used by the author was a 'plastic imitation' of a diecast box; the mains cable used for the earth lead has all three cores in parallel, and is connected to an earth rod at the foot of the wall.



“... roger, all points noted. . . .”

One end of the feeder is tied to a convenient point (the handle of an old dustbin in the author's case), and they are then laid out down the garden. All of the spacers are slipped onto the free ends of the feeders, which are then pulled taut, and held under a couple of house bricks. The spacers can then be slid up the wires, and fixed at about 12-in. centres, which should ensure that the finished feeder looks neat and tidy. One snag with open wire feeders is getting them through the window frame, and a

compromise was made at this QTH to avoid having to butcher the frame. This is shown in Fig. 10, and it is assumed that the high SWR will not cause undue problems on such a short length of coax.

The author would be the first to admit that he is fortunate in having his shack directly under the feedpoint of the aerial. Many amateurs have their shack in the boxroom at the front of the house, and in such circumstances a coaxial feeder would have much to recommend it in terms of convenience. Readers with appreciable feeder runs may find the compressed trap dipole more appropriate to their circumstances.

Summary

Having used the 84-ft. centre fed for some time, the DJ9ZV aerial was noticed in “Amateur Radio Techniques”, which seems similar, and more recently an article in *Rad Com* extolled the virtues of an 84-ft. top, albeit with differing feed arrangements. An aerial without traps has the distinct advantage that it can be made to operate on the new bands simply by adjustment of the ATU.

Another use has been found for the sliding door track, and that is for fixing coax runs to a wall. If a track size is obtained that is a push fit for the coax in use, and is fixed to a wall with the ‘legs’ out, it provides a simple way of securing a run of coax, and has the advantage that if the coax has to be removed or replaced, it can be done in seconds.

Perhaps some readers may take heart from what has been described, and come to realise that even in restricted spaces, with low, wire aerials, an effective signal can be radiated on the HF bands. With a little experience on the part of the operator, any effort expended in aerial experimentation will be well rewarded.

THE OTHER MAN'S STATION — G3WUX

THE photograph shows Terry Robinson at his station G3WUX, located at 266 Rivermill, Harlow, Essex.

Terry first became interested in amateur radio in 1964 whilst still at school. An ‘apprenticeship’ was spent for two years as an

SWL, the R.A.E. being taken and passed in May, 1966; as Terry is blind, the exam was taken orally. CW was grasped with no difficulty whatsoever and G3WUX was issued on 13th September, 1967.

Initially Terry used his school's station equipment, which consisted of a K.W. Vanguard transmitter, Eddystone 888A receiver and G8KW trip dipole; this was at the Worcester College for the Blind. AM was then the prime interest, but Terry gradually trained himself as a very proficient CW operator and it is here that he excels — reading 40 w.p.m. and sending 30 w.p.m. on a bug key.

In 1970 G3WUX went to the University of Manchester Institute of Science and Technology, and graduated in 1973 with a B.Sc. in Electronics. Whilst there, he was a keen member of the UMIST Radio Society, G3CXX.

Terry moved to Harlow in 1973 but was QRT until the autumn of 1980 when the present gear was obtained. This consists of a Ten-Tec Omni ‘B’ for 160-10 metres, Trio TS-700 to drive a 70cm. transverter, and an Icom IC-202S for 2m; aerials are a 46-element multibeam, delta loop for HF and a half-wave vertical for 10m. All logging, of course, is done in Braille. G3WUX served as chairman of the Harlow & District Amateur Radio Society from 1975 to 1977, and is a very avid supporter of club activities including contests.

Terry does not allow his disability to hamper his enthusiasm for amateur radio, or indeed other pursuits: he's a dab hand at home-made beer and wine, does plenty of walking and is very keen on music. This summer he is planning a DX-pedition to Foula, one of the Shetland Islands.



PLUG IN YOUR SOLDERING IRON AND BEGIN HERE, PART II

A GUIDE FOR THE INEXPERIENCED
IN THE METHODS, TECHNIQUES,
PITFALLS AND FOLKLORE OF
BUILDING EQUIPMENT, WITH
PRACTICAL PROJECTS TO BUILD
ALONG THE WAY

REV. G. C. DOBBS, G3RJV

IN *Part I* of this series the starting point of construction was considered — concepts, tools, sources of information, etc. We now go on to look at techniques. Given the circuit and the components, how does the constructor set about making up the equipment? This will be done by taking simple examples which can be built to try out the techniques.

A lot of would-be constructors seem to be discouraged by the thought of using printed circuit boards, so we will begin with various methods which exclude such boards. Later the making of printed circuit boards will be described — not as difficult as many assume. This particular article will explore three methods of construction and is unusual in that one item of test equipment, the Crystal Calibrator, will be used as an illustration. The reader is advised to read the whole article and choose which version of this piece of equipment he wishes to build. Crystal calibrators are useful, I have three, but unless you want to have individual calibration of several pieces of equipment, or throw them at the local tom cats, one example is probably enough.

A crystal calibrator is not only a useful item of test equipment in the amateur station, but is essential to live up to the Home Office expectations of frequency monitoring. Precise frequency measurement and control are an essential part of the modern amateur radio scene. It would be ideal if we could all afford frequency counters and synthesized RF and AF generators, but it's only a hobby! Most of us use our basic station gear along with simple accessories to check and test their worthiness. A simple crystal calibrator is the easiest way for the amateur to check the exact frequency of his receiver or transmissions. The principle relies on the stability and accuracy of a quartz crystal oscillator to provide reference points on a receiver or transceiver.

An Ugly Calibrator

The circuit in Fig. 1. shows just about the most simple method of getting a low frequency crystal to oscillate: it is a simple FET transistor oscillator using a 100 kHz crystal. The crystal, X1, can be pulled onto the exact frequency by the trimmer capacitor VC1. The output is developed across a Radio Frequency Choke (RFC) and the output is taken to the receiver *via* C2. Several types of FET might be used in this circuit, but here the inexpensive 2N3819 is probably the simplest option. The FET has three leads, Source, Gate and Drain and the bias provided on the Sources may vary according to the individual 2N3819. These FETs are known for their variation in characteristics, so the resistor, R2, in the Source may require adjustment. A value of 10k worked well in the prototype, but if oscillation fails to occur, a lower resistance may be required.

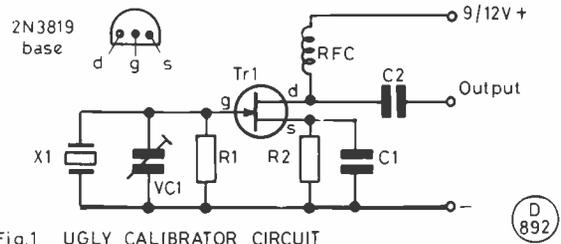


Fig.1 UGLY CALIBRATOR CIRCUIT

D 892

The method of construction chosen for this circuit is 'Ugly Construction'. I borrow this phrase from Roger Hayward (KA7EXM) son of a famous dad, Wes Hayward (W7ZOI); they coined the term in describing a QRP transmitter in the August 1981 issue of *QST*. In fact the technique has been used for many years by lots of us! It looks like components thrown on a board, but there is a little more to it. The advantage of the method is that the construction is quick, requires no etched boards and modifications can be made with great ease. The disadvantage is that it is not pleasing to the eye (imagine robot's vomit and you have the picture).

The method is really a variation of direct wiring, using a piece of unetched printed circuit board as a base plate. Any circuit has lots of grounded connections, these are simply soldered directly onto the piece of board; the other ends of components soldered to the base plate can act as mechanical supports for further components. If the builder runs out of secure anchor points, these can be added. The sophisticated method would be to use standoff insulators, but these cost money; high value resistors can serve this purpose, one end soldered to the base plate and the top end used as soldering post. If the values are high enough, this will have no effect on the circuit, so any old junk resistors of high value will serve. In this layout I used 2.2M ohm scrap resistors from a junk drawer, lower values could be used without adverse effects. The idea is to just add such resistors whenever a joint has to be made and there is no firm mechanical tie point available.

Fig. 2 shows my layout of the Ugly Calibrator. To illustrate the method, let us follow the wiring. X1 is in a crystal holder the grounded side of which is soldered directly to the printed circuit board base plate. The top of the holder provides the support for the gate (g) of the transistor. VC1, which is a Mullard semi-airspaced trimmer has one side of the vanes grounded to the base plate. There is a choice of two tags on the other vanes and the nearest to X1 is connected to the X1 holder, this tag also provides a solder point for R1, the other end being grounded. R2 is mounted vertically, with the bottom end to ground and the top securing the source (s) of TR1 and the ungrounded end of C1. Two of the added resistors are mounted vertically to support the RFC; these resistors do not appear in the circuit as they have no circuit action. One side of the choke support takes the drain (d) of TR1 and the output capacitor C2. The other choke support resistor accepts the supply voltage. That's it — not a thing of beauty, but it works. (As a matter of fact I'm quite fond of ugly construction, it has a sort of coarse appeal — perhaps worth framing a few examples and applying to the Arts Council for a grant). Once the technique has been tried with simple examples, it is possible to build quite complex circuits with this technique.

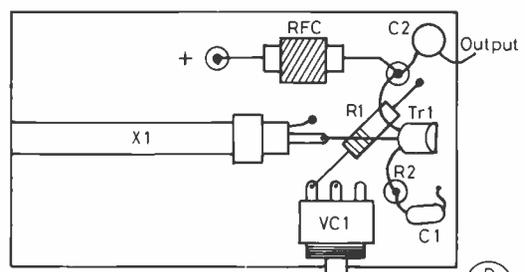


Fig. 2 UGLY CALIBRATOR LAYOUT (Top)

D 893

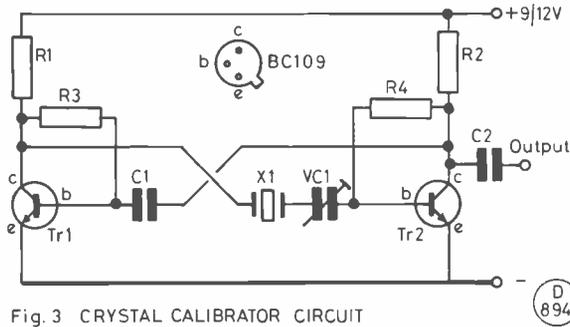


Fig. 3 CRYSTAL CALIBRATOR CIRCUIT

The calibrator can now be tested. Check out the wiring first, as with any piece of construction. A crystal can then be added and power applied. Listen for a note on a receiver, set on the CW or SSB mode, and tuning through tenths of a magahertz points. The oscillator has to be coupled to the receiver as loosely as possible to hear the output. I usually take a lead from the output (C2 in Fig. 1) and wrap it around the aerial input lead to the receiver. Have a look at the output on a counter if you have, or can borrow, one. VC1 allows the crystal to be adjusted onto exactly 100 kHz. This is most easily done using a free accurate calibration point on 200 kHz. This convenient 'free' standard is the *Radio 4* transmission on long wave; this provides a good calibration point as the frequency of *Radio 4* on long wave is 200 kHz, plus or minus ten to the many minus Nths. Wrap the output wire around your long wave portable receiver and adjust VC1 to zero beat the note, that is to get the lowest pitched note possible, or none. The circuit in Fig. 1. is about the simplest possible to oscillate a 100 kHz crystal and the value of R2 may have to be reduced to obtain reliable oscillation with some transistors. Obtaining oscillation of a 100 kHz crystal really means trying to get quite a large chunk of quartz to 'wobble' and for reliability of oscillation, the later circuits in this article are more reliable.

A Tagboard Calibrator

When the majority of amateur radio equipment was valve equipment, constructors frequently used tagboards and group boards to mount components between the bases of valves. With the advent of solid-state electronics tagboards seemed to go out of fashion in favour of printed boards. It is still possible to build quite a variety of circuits using such method. A simple project, like a crystal calibrator is easily mounted onto a tag or group board. The following project uses a single tagstrip, that is a number of solder tags mounted in line on a single strip of paxolin.

Fig. 3 shows another 100 kHz crystal oscillator circuit. This circuit is a version of the multivibrator and although it is more complex than the circuit used in Fig. 1, the results with 100 kHz crystals are usually better. Because of the low frequency of a 100 kHz crystal and the size of the quartz plate, some crystals are slow to start oscillation or may fail to oscillate in some circuits. This little circuit seems to kick even the most sluggish crystal into oscillation. TR1 and TR2 form the two sides of a multivibrator circuit, cross-coupled via C1 and the X1/VC1 combination. The frequency of the oscillation is controlled by X1 and can be adjusted slightly by VC1. The output is taken from the collector of TR2 via C2.

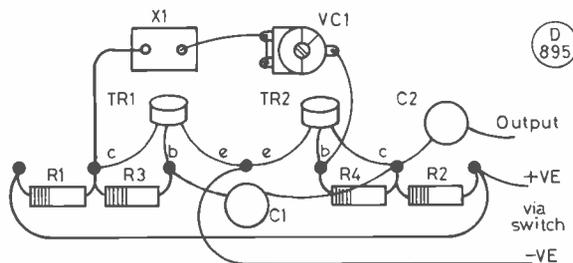


Fig. 4 CRYSTAL CALIBRATOR LAYOUT

The circuit is built onto a single tag strip as shown in Fig. 4. Seven soldering points are required so a tagstrip with at least this number of tags must be used. Tagstrips can usually be bought quite cheaply, in fact the prototype was a surplus tagstrip from a piece of junk which was brought at a radio rally for the case. Yet another illustration of a basic law in the home constructors world — never throw anything away because you will find a use for it in seven weeks time! Tagstrips are usually supplied with tinned tags, but never assume that they are fit for use as supplied. Clean the tags and tin them with fresh solder; tags seem to be 'muckphilic' as the Greeks of old might say. Ensure the leads are secured around the tags before soldering, follow the layout as shown and the construction is child's play.

As with the Ugly Calibrator, check the wiring and switch on for a first test. Notice that X1 and VC1 are not mounted on the tagstrip. These can be placed anywhere convenient in the mounting of the circuit. The G3RJV version was built into a small plastic box, one side of VC1 was soldered directly to the tag holding the base wire of TR2, for rigidity, and X1 was stuck to the side of the box with *Blutack*. The calibrator can be adjusted in frequency using the 200 kHz signal from *Radio 4* as described for the Ugly calibrator. The prototype had a little push button switch mounted on the side of the plastic case as an on/off switch. This circuit also has the advantage that harmonics from the crystal seem to extend further in frequency and 100 kHz points can be checked on a receiver well past 30 MHz. A good little circuit this — I usually take mine on holiday with my portable QRP transceiver.

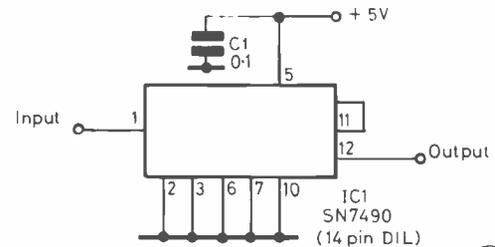


Fig. 5 TTL DIVIDE BY TEN CIRCUIT

Veroboard TTL Divide-By-Ten Circuit

Veroboard is a commercially produced circuit board which, although originally designed for prototyping work in the electronics industry, has become well known and frequently used by the amateur electronics constructor. It consists of an insulated board, which is drilled with a matrix of holes to accept component leads, the board is sold with holes spaced at intervals of 0.1 inch for 0.15 inch, the 0.1 inch spacing being the more commonly used type. Strips of copper join adjacent rows of holes on one side of the board. This forms the back of the board and component leads pushed through the holes can be soldered to the copper strip and are electrically joined to other components soldered onto the same track of copper. Circuits can be assembled using the system of copper tracks which can be connected to each other by link wires or breaks made in the tracks. This all sounds very complex in words, but an instant look at a piece of *Veroboard* will explain its makeup, and the first simple project using *Veroboard* is usually enough to give a beginner the method of using the board. A very simple, and useful, first *Veroboard* project can be an electronic divide-by-ten circuit for the 100 kHz calibrator.

A 100 kHz calibrator is a very useful item for frequency checking with a receiver or transceiver, but naturally only gives calibration points at 100 kHz intervals in the tuning range. This will clearly mark the low end of each band and give every 100 kHz up from there, but this is very, very, few check points on the small amateur bands. The ability to check calibration at every 10 kHz is much more useful, but to have a 10 kHz crystal oscillator is not really a viable proposition for the amateur. Such crystals are not always easy to obtain, are expensive and often difficult to get to oscillating with simple circuitry. A much more convenient

Tables of Values

Fig. 1

R1 = 150K
R2 = 10K, *see text*
C1 = 0.01 μ F
C2 = 1 nF

VC1 = 3-60 pF (Mullard trimmer)
RFC = 1.5 mH RF choke
X1 = 100 kHz crystal
TR1 = 2N3819

Fig. 3

R1, R2 = 5.6K
R3, R4 = 100K
C1 = 0.002 μ F
C2 = 0.1 μ F

VC1 = 3-60 pF (Mullard trimmer)
TR1, TR2 = BC108
X1 = 100 kHz crystal

Fig. 7

R1, R2 = 470R
R3 = 100R
C1 = 0.1 μ F
X1 = 1 MHz crystal

VC1 = 3-60 pF (Mullard trimmer)
LED = general purpose type
IC1 = 7400N (SN7400)

method is to accurately divide the 100 kHz signal into 10 kHz segments. That may sound difficult, but these days it is a very easy electronic task. What is required is a decade counter, a circuit which will count the 100 kHz signal as pulses and give an output every tenth pulse. This is most easily done using an integrated circuit from the TTL logic series, but there is no scope for space in this article (and come to think of it . . . not much ability on the part of the author!) to describe in detail the theory involved. "Solid State Basics for the Radio Amateur" by the ARRL, a useful book available from the *Short Wave Magazine* Publications Dept., does this very well.

The circuit is very simple and is shown in Fig. 5. The active component is a single integrated circuit, the 7490 decade counter. For our purposes it can be imagined as a 'Black Box' into which we feed a signal which is counted by the 7490 and a pulse emerges every tenth pulse of the input signal. In short, it divides the input signal by ten. The input goes into pin 1 of the 7490 and the divided by ten signal comes out at pin 12. Like all TTL circuits, the unit requires a 5 volt power supply. An odd voltage, but it need not be a problem, many amateurs use 4.5 volts from cycle lamp batteries as a supply which is adequate; and (tell it not in Gath!) TTL circuits seem to survive well on 6 volts which is easy to obtain.

Veroboard is ideal for such integrated circuit projects as the 0.1 inch hole matrix matches the spacing of pins on the DIL (dual in line) packaging used for many ICs. The layout is shown in Fig. 6. It is possible to solder the 7490 directly into the circuit board, but I prefer to use the IC holders into which the IC can be plugged and withdrawn if required. The drawing shows the top view of the layout, alterations to the *Veroboard* strips are also marked; follow these on the drawing. Breaks are required between the rows of pins on either side of the IC package, these are marked with crosses on the drawing. The simplest way to make such breaks is to use a small twist drill, just slightly larger than the width of the

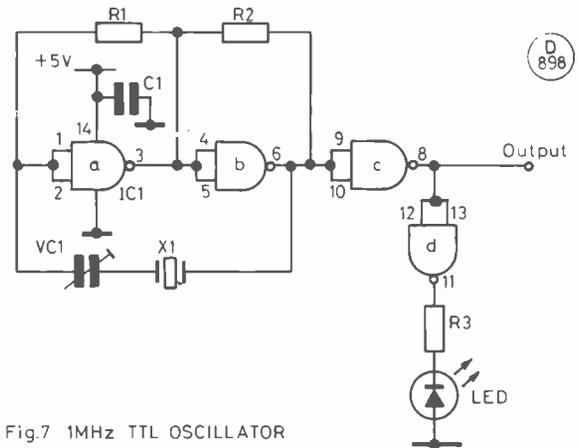


Fig.7 1MHz TTL OSCILLATOR

strips or tracks; locate the holes where the breaks are to be made, push in the point of the drill and rotate with slight pressure to cut away the copper. Remove enough copper to make a complete break in the track, but try to avoid cutting into the adjacent tracks. Clean off any bits of copper which have been removed and check to ensure that adjacent tracks are not being bridged by a loose piece of copper or the edges of the cutout hole.

The rest of the construction requires soldering. Soldering *Veroboard* can be tricky, but there should be no problems if some care is taken. The technique is to push the tip of the soldering iron into the right angle formed by the lead to be soldered and the track; apply solder to the opposite side of the lead, touching both track and lead and allow just enough solder to make a firm joint flow onto the track and lead. Too much solder can cause solder bridges to be made between adjacent tracks, too little solder will produce a poor joint. Carefully inspect the joint after soldering. The copper tracks are untinned as supplied by *Veroboard*, make no attempt to tin the tracks before making the joint — it fills the holes — but cleaning the tracks with a fine abrasive is a good idea.

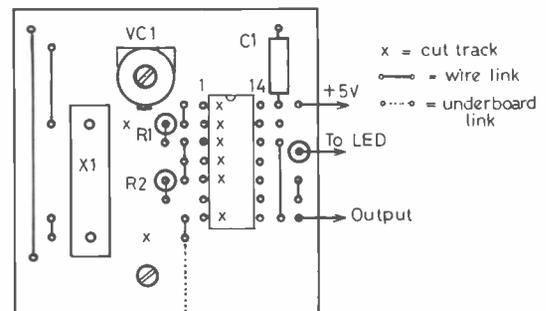


Fig.8 1MHz TTL OSCILLATOR LAYOUT (Full size)

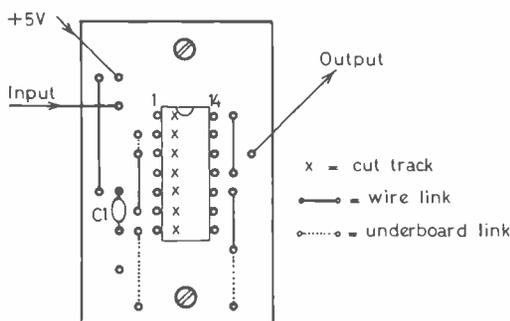


Fig.6 TTL DIVIDE BY TEN LAYOUT (Full size)

Several link wires are required, these are wires joining tracks on the board. These can be made with PVC covered wire on top of the board or bare wire under the board when several adjacent tracks are to be linked. The plain lines on the drawing show over board links and the dotted lines show under board links; notice that all the tracks below the IC on the drawing are linked below the board. In the centre of these linked tracks a mounting screw for the board is situated. If the circuit board is mounted in a metal case this screw will then take all the earth or ground leads to the case. C1 can be a cheap disc ceramic capacitor and acts to decouple the supply line. TTL circuits are fiendish little things for sending spikes out *via* the supply and it is always a good idea to add a decoupling capacitor as near the supply pin as possible which nicely takes any signals on the supply line to ground.

The Divide By Ten Circuit is very simple to use. A 100 kHz signal is fed into the input and a 10 kHz signal comes out of the output. However we have a slight problem, because the 7490 is

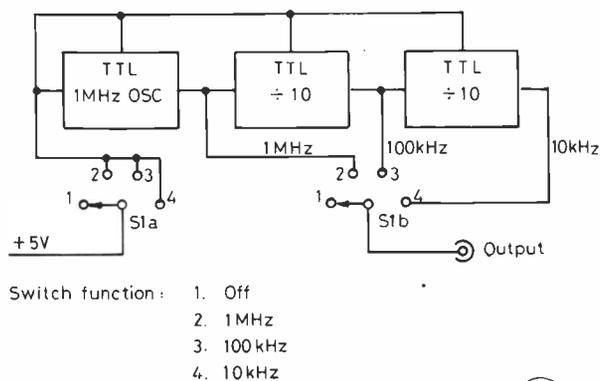


Fig. 9 SUGGESTED CALIBRATOR SWITCHING

D
900

dividing by counting the signal as pulses it requires a square wave type of signal for proper operation and most circuits used in crystal oscillators give a sine wave output. The output from the Tagboard Calibrator is suitable and can be used, but the Ugly Calibrator output is not really suitable. If the Tagboard Calibrator is used outputs can be taken directly from the oscillator for a 100 kHz output and from the Divide By Ten Circuit for a 10 kHz output. These outputs can be switched as shown later.

1 MHz TTL Oscillator

What better than to match the TTL *Veroboard* Divide by Ten Circuit with a similar *Veroboard* constructed TTL crystal oscillator? The circuit in Fig. 7 shows such an oscillator. Notice that the crystal used for the standard frequency in this case is at 1 MHz. The reason for this is simple, divide-by-ten circuits are simple and cheap so a higher frequency standard can be used and divided down in frequency as required. With two divide-by-ten circuits, we are able to produce accurate checks at 1 MHz, 100 kHz and 10 kHz points. The circuit looks quite different from the circuit for a TTL device in Fig. 5 because the more conventional method for showing TTL ICs in a circuit has been used. This diagram shows that the IC, a 7400, consists of 4 gates; two of these are used in an oscillator circuit, with feedback via X1 and VC1 controlling the frequency. A third gate buffers the output which leaves a spare fourth gate; this has been used as an indicator that the circuit is oscillating. Some of the output is fed into the gate which is used to drive an LED (Light Emitting Diode) via R3. The numbers in the gate symbols refer to the numbers of the IC pins.

The layout is shown in Fig. 8. All the components fit neatly onto a piece of *Veroboard* the same height as the Divide By Ten board. Once again links and breaks are shown in the same manner as Fig. 6. When making the breaks between the pins of the IC note that as pins 6 and 9 are joined, no break is required between these two pins. Wire up the board following the instructions for working with *Veroboard*, the resistors are mounted vertically and VC1 must be a Mullard semi-airspaced trimmer to fit onto the layout. The input, output and supply leads are taken to termination points. It is possible to buy *Veropins* to make such terminations, these are good, but expensive. A short length of stiff copper wire can be used to make such terminations or the connections can be soldered directly into the holes. In two cases, two link wires are terminated in the same hole which means that thin wire must be used, 5 amp fuse wire serves the purpose quite well.

Testing the 1 MHz TTL Oscillator is quite simple. After checking the wiring against the layout and the circuit diagrams, 5 volts is applied. A direct check can be had from a medium wave receiver, or an AM radio, as they oddly call them these days. The scale may be marked in kHz, if not, 300 metres wavelength is equal to 1 MHz and will give a reception point for the test. Once the 1 MHz oscillator is added to a Divide by Ten circuit, the output can be checked at 100 kHz by using the *Radio 4* method outlined earlier. At this point VC1 can be adjusted to accurate frequency. A number of Divide By Ten circuits can be added after

the 1 MHz Oscillator to give finer checking points; adding two such circuits gives 100 kHz and 10 kHz points. The various outputs can be taken from the appropriate point for injection into the receiver, but the most convenient method is to switch the outputs. The method of doing this is shown in Fig. 9. This layout uses a 4-way wafer switch, these are usually supplied with 3 poles (3 sets of switching) but only two are required. The first position is OFF and disconnects the supply line, the 1 MHz, 100 kHz and 10 kHz outputs are routed *via* the remaining three switch positions. If this arrangement is built up a comprehensive crystal calibrator is then available for use. The Home Office will be pleased.

Well — what a lot of calibrator ideas, which should you build? The Ugly Calibrator is simple, the Tagboard Calibrator is neat and handy but the complete TTL arrangement is perhaps the best bet for a good main station setup. All the components should be readily available and are relatively inexpensive. The crystals are the most expensive items, several mail order firms advertise such crystals or look for them at radio rallies.

This article has explored some of the simpler ways to build circuits, the next part will consider boards which are better suited to more complex circuits. It's really all quite simple, get your bits and plug in your soldering iron.

Book Review

“HF ANTENNAS FOR ALL LOCATIONS”

As far as main station equipment is concerned, it now seems to be the case of “Commercial rigs rule. O.K.?” However, one area where radio amateurs still enjoy experimenting for themselves is with antennas. Some have to make do with very restricted space and also imposed limitations, while others are more fortunate in this respect. So Les Moxon's, G6XN, new book, *HF Antennas for all Locations*, was eagerly grabbed for review.

The author has adopted a two-part approach to the subject, the first ten chapters on *How Antennas Work* comprising 146 pages. The second half, *Theory into Practice*, consists of nine chapters occupying 109 pages. The first chapter, *Taking a New Look at HF Antennas*, is really a resumé of what is to follow, in other words a preface. The reader is then taken through sections on waves and fields, gains and losses, feeding antennas, close spaced beams, arrays and long wires, the effects of ground reflexions, multiband systems, bandwidth consideration, antennas for reception and the effects of the environment on them.

Part Two deals extensively with practical designs and installations of single element, horizontal and vertical beams and large arrays. For those with awkward landlords or local councils, there are a few pages on invisible antennas, followed by a chapter on mobile and portable types. The final three chapters discuss the type of antenna to choose, making it work and ideas on construction and erection. There is a comprehensive index.

Over the years, G6XN has contributed many ideas about antennas which have appeared in features such as “Technical Topics” in *RadCom*, etc. It is very satisfying to have all this brought together in one such excellent book. If anyone reads this and wonders what to buy the OM or YL for a present, then you cannot go wrong to give him/her this “Bible.” *HF Antennas for all Locations* is a hardback publication, 246 x 189mm, published by the RSGB. It is available from *SWM's Publications Department* and at £6.10, including postage and packing, represents outstanding value. It is extensively illustrated throughout, the text being set in 9/10 point *Linotron 202 Times* face.

N.A.S.F.

CLUBS ROUNDUP

By "Club Secretary"

POSSIBLY as a result of the noises we made last time we seem to have a fairly hefty clip this time to write up . . . and it's a nice hot sunny Bank Holiday outside!

The Mail

Our first stop is at **Abergavenny**; they were originally formed as a group to aid the blind and handicapped, which is why they are based on Nevill Hall Hospital, in Abergavenny. They foregather on Thursday evenings at Pen-y-Fall Hospital, in the room above Male Ward 2. In addition they will have GB2ABC on the air on July 30, Abergavenny Border Counties Show. Contact the Hon. Sec. (See Panel) for full details.

Next we have old customers in the form of **Acton, Brentford & Chiswick**; July 20 at Chiswick Town Hall, for G3IGM to talk about the ferrite-cored balun transformer.

On to **Atherstone**, and this means the Tudor Centre, Coleshill Road, Atherstone on the second and third Thursdays. Thus on July 8 G2CVV, Fred Ward, will be talking to them about the history of radio, and on 15th there will be an Informal, with the club station on the air.

At **Aylesbury Vale** the group are, on July 13, having a visit, so we must refer you to the Hon. Sec. for the up-to-date information; visits have a tendency to have a set number which gets outrun at the last minute!

The subject for the meeting on July 20 at **Biggin Hill** is that of broadcast reception surveys. The venue is Biggin Hill Memorial Library.

The Hon. Sec. of **Borders** indicates that they are much taken with their new Hq at the "Waterloo Arms", Chirnside in Berwickshire, where they convene on the first and third Fridays of each month. Details from the Hon. Sec. — see Panel.

Now we take a look at the **Braintree** newsletter and its attractive cover indicating their 'catchment area'. One thing it doesn't do is tell us the venue! So for the details as to where to go on the evening of July 19, you must contact the Hon. Sec. — see Panel.

If you are in the **Burton-on-Trent** area, then you should be a member of the local club; details from the Hon. Sec. at the address in the Panel.

For **Bury** the Hq is at the Mosses Youth and Community Centre, Cecil Street, Bury. They mention only the July 13 date for a surplus equipment sale, but we believe they are in fact 'at home' every week on the same evenings.

Cheltenham have a new Hon. Sec. — see Panel for his particulars — although they still have a place at the Old Bakery, Chester Walk, Clarence Street. On July 1, they will have G3BA asking "Why Bother with VHF?", and then July 16 is set apart for a natter-and-home-computer evening.

Turning to **Chesham**, we are told that they now have a very good place of their own, after several months of hard work by members. For details, you should be in touch with the Hon. Sec. at the address in the Panel.

The Church Rooms, Church Lane, Wormley, near **Cheshunt**, opens its doors every Wednesday evening to the local club. For July they have natter evenings on July 7 and 21, leaving July 14 for a junk sale, and 28th for an evening out /P on Baas Hill Common, near Broxbourne.

Turning to **Chichester**, on July 5 they have the Annual Barbecue on Trundel Hill, Goodwood, map reference 884109, and on July 9/10 they were are setting up a special-event station, signing GB2CHI, in connection with the Chichester 907 celebrations, at the Guildhall, Priory Park, Chichester. On July 18 they will be at the Sussex Mobile Rally, and on July 19 they

have the normal club meeting at the Spitfire Social Club, Tangmere.

Another one we've not heard of before is at **Chilton**; they are to be found at Sir William Ramsey School, Hazlemere on the last Wednesday in the month. This gives July 28 for a talk on AMSAT. In addition they are running, on Monday and Tuesdays, an RAE/Morse class. A pity we don't have the name and address of the Hon. Sec. who could give you more details of the latter.

July for **Colchester** means the Anglian Mobile Rally, at Stanway School. The venue for normal club meetings is Colchester Institute, Sheepen Road, Colchester, and for the rest we have to refer you to the Hon. Sec. at the address in the Panel.

Next we come to a quite excellent newsletter from **Connemara** — we only hope they can keep this up in the long term, which is always the hard part! For details on the local club, see the Panel for the Hon. Sec. name and address.

The **Conwy Valley** scribe says we stung him into action last time round; but in fact we think that with all he has on his plate the locals are lucky he is so good with his reports. The group have their place, on the second Thursday of each month, at Green Lawns Hotel, Bay View Road, Colwyn Bay, and we have it that the July activity will be a Fox Hunt . . . if the Fox can afford the price of the petrol, he says!

Deadlines for "Clubs" for the next three months —

August issue — June 25th
 September issue — July 30th
 October issue — August 27th
 November issue — September 24th

Please be sure to note these dates!

Now we head for Cumbria, and **Copeland**; they are based on the Market Hall, Egremont, West Combria, where they are booked in on the first and third Wednesdays, and where also they look forward to visitors and new members with eagerness.

Down in the West Country, and **Cornish**, where the 'mob' (Club PRO's word, not ours!) turn out as usual on July 1, at the SWEB Clubroom, Pool, Camborne, with the business in hand the final details on their Mobile Rally, which comes up on July 18 at Camborne Technical College.

Crawley are next, and here we have a problem — their latest newsletter doesn't mention the venue or the July dates! So, we have to turn to the card-index, which gives the second and fourth Wednesdays; the former is the main meeting at Trinity United Reformed Church, Ifield, and the later date is an informal at a member's home.

At **Cray Valley** they continue to get together twice in each month, on the first and third Thursdays, at Christ Church Centre, High Street, Eltham.

The **Crystal Palace** group, from the July 17 meeting, will be at All Saints Church Parish Rooms, which lies at the junction of Church Road, and Beulah Hill — still the third Saturday of the month, one notes.

New Club

This one is called **Dacorum**, and they foregather at St. Stephen's Church Hall, Long Chaulden, Hemel Hempstead, which is booked for the first Tuesday of each month. More data from the Hon. Sec. — see Panel.

For once we haven't got the latest details on the **Derby** doings in July, so we have to content ourselves with a note of the HQ address — 119 Green Lane, Derby every Wednesday. The club have the whole of the top floor for a very nice clubroom.

We are still in the land of the living says the Hon. Sec. of

Names and Addresses of Club Secretaries reporting in this issue:

- ABERGAVERN: D. F. Jones, GW3SSY, 2 Dalwyn Houses, Llanover Road, Blaenavon, Gwent NP4 9HY.
- ACTON, BRENTFORD & CHISWICK: W. G. Dyer, 188 Gunnersbury Avenue, London W3 8LB. (01-992 3778)
- ATHERSTONE: T. J. Court, G4IAG, Wood View, Breach Oak Lane, Corley Ash, Coventry CV7 8AU (0676-41814)
- AYLESBURY VALE: M. J. Marsden, G8BQH, Hunters Moon, Buckingham Road, Hardwick, Aylesbury, Bucks. (0296-64783)
- BIGGIN HILL: I. Mitchell, G6EMW, 37B The Grove, Biggin Hill, Westerham, Kent TN16 3TA. (09594-75785)
- BORDER: A. McCreadie, GM8YPI, 16 Fancove Place, Eyemouth, Borders TD14 5JQ. (Eyemouth 50492)
- BRAINTREE: A. Williams, G6CIV, 12 Silver Street, Silver End, Essex. (Silver End 83516)
- BURTON-UPON-TRENT: H. Harrington, G3ACR, 38 Baker Street, Burton-on-Trent, Staffs. DE15 9LX. (Burton 43118)
- BURY: M. Bainbridge, G4GSY, 7 Rothbury Close, Bury, Lancs. BL8 2TT. (061-761 5083)
- CHELTENHAM: J. Holt, G3GWW, The Old Rectory, Brimsfield, Glos. CHESHAM: J. Ailridge, 15 Whichote Gardens, Chesham, Bucks. (Chesham 786935)
- CHESHUNT: R. Gray, G6CNV, 2 Sacombe Green Road, Sacombe, Ware, Herts. SG12 0JN. (Dane End 203)
- CHICHESTER: T. M. Allen, G4ETU, 2 Hillside, West Stoke, Chichester, Sussex PO18 9BL. (West Ashling 463)
- CHILTON: Name and address wanted.
- COLCHESTER: F. R. Howe, G3FJI, 29 Kingswood Road, Colchester. (0206-70189)
- CONNEMARA: P. J. O'Loughlin, EI9ARB, Connemara Radio Experimenters Club, Recess, Co. Galway, Eire. (Recess 8)
- CONWY VALLEY: J. Wright, GW4KGI, Eleven, Bryn Derwen, Abergele. (Abergele 823674)
- COPELAND: W. Duddle, G4EDV, 28 Rannerdale Drive, Whitehaven, Cumbria CA28 6JE. (Whitehaven 3548)
- CORNISH: A. C. French, G8TUI, 12 Pentalek Road, Camborne, Cornwall. (Camborne 717343)
- CRAWLEY: D. L. Hill, G4IQM, 14 The Garrones, Worth, Crawley, W. Sussex RH10 4YT. (Crawley 882641)
- CRAY VALLEY: P. J. Clark, G4FUG, 42 Shooters Hill Road, London SE3. (01-858 3703)
- CRYSTAL PALACE: G. M. C. Stone, G3FZL, 11 Liphook Crescent, London SE23 3BN. (01-699 6940)
- DACORUM: J. B. Adams, G4MXG, 8 Lindings, Chauldon, Hemel Hempstead. (Hemel Hempstead 215504)
- DERBY: Mrs. J. Shardlow, G4EYM, 19 Portreath Drive, Darley Abbey, Derby DE3 2BJ. (0332-556875)
- DERWENTSIDE: P. Howes, G8WEJ, 26 Hadrians Way, Ebchester, Co. Durham DH8 0PE.
- EDGWARE: H. Drury, G4HMD, 39 Wemborough Road, Stanmore. (01-952 6462)
- EDINBURGH: M. Darke, GM3KGG, 44 Inverleith Row, Edinburgh. (031-552 4593)
- FAREHAM: B. Davey, G4ITG, 31 Somervell Drive, Fareham, Hants. PO16 7QL. (Fareham 234904)
- FARNBOROUGH: I. Ireland, G4BJQ, 118 Mychett Road, Mychett, Camberley, Surrey. (Farnborough 43036)
- FINGAL: S. Linehan, E17CV, 9 Oak Lawn, Castleknock, Co. Dublin.
- GLENROTHES: I. Robertson, GM4HBG, 123 Altyre Avenue, Glenrothes, Fife.
- GREATER PETERBOROUGH: F. Brisley, G8ZVW, 27 Lady Lodge Drive, Orton Longueville, Peterborough, Cambs.
- GUILDFORD: Miss H. Davies, G8SXB, 23 Foreman Park, Ash, Aldershot, Hants. GU12 6JN.
- HARROW: C. D. Friel, G4AUF, 17 Clitheroe Avenue, Harrow, Middx. HA2 9UU. (01-868 5002)
- HASTINGS: G. North, G2LL, 7 Fontwell Avenue, Little Common, Bexhill-on-Sea.
- HAVERING: A. Negus, G8DQJ, 17 Courtenay Gardens, Upminster, Essex RM14 1DH. (Upminster 24059)
- HEREFORD: S. Jesson, G4CNY, 181 Kings Acre Road, Hereford. (Hereford 3237)
- I.R.T.S.: T. O'Connor, EI9U, 205 Collins Avenue, Dublin 9.
- ISLE OF WIGHT: I. Moth, G4MBD, Claygate, Collwell Road, Freshwater, I.o.W. (Freshwater 753948)
- JERSEY: Mrs. M. Smith, 19 Parade Road, St. Helier, Jersey, C.I. (Jersey 23249)
- LEITH (Nautical College): M. Gathergood, GM4KFK, c/o Halls of Residence, Leith Nautical College, 24 Milton Road East, Edinburgh EH15 2PP.
- LINCOLN: M. Wells, G8PNU, 4 Horner Close, Brant Road, Lincoln. (Lincoln 721277)
- MEIRION: W. Judge, GW4KEV, Tyddyn Mawr, Arthog, Nr. Dolgellau.
- MIDLAND: N. Gutteridge, G8BHE, 68 Max Road, Quinton, Birmingham B32 1LB. (021-422 9787)
- NORFOLK: P. Gunther, G8XBT, 6 Malvern Road, Norwich NR1 4BA. (Norwich 610247)
- NORTHERN HEIGHTS: R. Harker, G4CMK, 11 Buck Street, Denholme, Bradford. (Bradford 844442)
- PLYMOUTH: Mrs. P. L. Day, G4KYY, 46 Beatrice Avenue, Saltash, Cornwall PL12 4NG.
- PONTEFRAC: N. Whittingham, G4ISU, 7 Ridgedale Mount, Pontefract, W. Yorkshire WF8 1SB.
- R.A.I.B.C.: Mrs. F. Woolley, G3LWY, 9 Rannoch Court, Adelaide Road, Surbiton KT6 4TE.
- READING (Telephone Area): N. W. Jaques, G8VQV, 40 Broad Lane, Upper Bucklebury, Reading RG7 6QJ.
- REIGATE: C. S. Barnes, G8FEE, 25 Hartswood Avenue, Woodhatch, Reigate, Surrey RH2 8ET.
- RHYL: B. Jones, GW8OYT, 6 Rhodfa Maes Hir, Rhyl. (Rhyl 37284)
- ST. HELENS: P. Gaskell, G4MWO, 131 Greenfield Road, St. Helens, Lancs. WA10 6SH. (St. Helens 25472)
- SALISBURY: A. C. A. Newman, G2FIX, 74 Victoria Road, Wilton, Nr. Salisbury, Wilts. SP2 0DY.
- SOLWAY: S. R. Miles — address wanted.
- SOUTHDOWN: J. Pitt, G6BGT, 18 Kingsmere Court, 3 Hurst Lane, Eastbourne. (Eastbourne 643463)
- SOUTH MANCHESTER: D. Holland, G3WFT, 32 Woodville Road, Sale, Greater Manchester. (061-973 1837)
- SPALDING: Mrs. S. Kelshaw, 41 Glen Drive, Boston, Lincs. PE21 7QB. (0205-69235)
- STEVENAGE: S. Bailey, 187 Archer Road, Stevenage.
- STOURBRIDGE: M. Davies, G8JTL, 25 Walker Avenue, Quarry Bank, Brierley Hill. (Lye 4019)
- SURREY: R. Howells, G4FFY, 7 Betchworth Close, Sutton, Surrey SM1 4NR. (01-642 9871)
- SUTTON COLDFIELD: A. D. Turner, G8TUR, 10 Jervis Crescent, Sutton Coldfield, W. Midlands B74 4PW (021-353 2061)
- THAMES VALLEY: J. Axe, G4EHN, 65 Ridgway Place, Wimbledon, London SW19 4SP. (01-946 5669)
- THANET: I. B. Gane, G4NEF, 17 Penhurst Road, Ramsgate, Kent. (Thanet 54154)
- THORNBURY: A. Jones, G8AZT, 9 Queens Walk, Thornbury, Glos.
- TORBAY: H. Davies, G4DZH, 18 Bowland Close, Paignton, Devon TQ4 7RT. (Paignton 523063)
- TYNE-WEAR (Repeater Group): J. Laverick, G8XDF, 5 York Crescent, Newton Hall, Co. Durham DH1 5PU.
- UNIVERSITY OF KENT, CANTERBURY: P. Cockerell, G6CSZ, Keynes College, UKC, CT2 7NZ.
- VALE OF THE WHITE HORSE: I. White, G3SEK, 83 Portway, Didcot, Oxon. OX11 0BA. (0235-812584)
- VERULAM: G. Dale, G3PZF, 16 Palfrey Close, St. Albans. (St. Albans 57665)
- WAKEFIELD: R. Sterry, G4BLT, 1 Wavell Garth, Sandal Magna, Wakefield. (Wakefield 255515)
- WEST KENT: P. Reeve, G4GTN, 2 Court Road, Tunbridge Wells, Kent. (Tunbridge Wells 24689)
- WORTHING: Mrs. J. Lillywhite, 41 Brandon Road, Worthing, W. Sussex BN13 2PS.
- YEovil: D. L. McLean, G3NOF, 9 Cedar Grove, Yeovil, Somerset. (Yeovil 24956)
- YORK: K. R. Cass, G3WVO, 4 Heworth Village, York.

Derwentside — we don't doubt it! They are based at the R.A.F.A. Club, Sherburn Terrace, Consett, every Monday evening. The Hon. Sec. notes his previous offer of skeds with their club station, at HF or VHF, and says that to date he hasn't had a single offer. Surely some club would like a Monday-evening sked with Derwentside?

On the second and fourth Thursdays of each month, Edgware are in session at 145 Orange Hill Road, Burnt Oak, Edgware. At the time this piece was being put together the July 8 date was still open, while the July 22 one will be an informal as normal. We look forward to our next copy of their newsletter, which will, we understand, contain parts of the 1939 club newsletters in reprint form.

Every Tuesday evening sees the **Edinburgh** club heading for the City Observatory, Calton Hill; the club's place is within the grounds. So — enter the site, look for a 3.5 or 14 MHz dipole, and follow the feeder!

At **Fareham** the locals have Room 12 in Portchester Community Centre each week. July 7 is down for G8VOI to talk about Amateur TV, July 14 and 28 are natter-and-operating evenings, and on July 21 they are to have a talk on RTTY systems.

The July programme for **Farnborough** shows July 14 for a post-mortem on VHF NFD, and July 28 for G6CMG's talk on PCB manufacture. The club resides at the Railway Enthusiasts Club, Access Road, off Hawley Lane and near the M3 bridge, Farnborough.

Every Monday evening the **Fingal** group foregather, the venue being the Scouts Hall, Ballygall Road East, Dublin 11. This club is another to make the point that amateurs or SWLs are always welcome as visitors, particularly if they come from outside Eire.

From EI to GM, and **Glenrothes**, where the form is to meet each Wednesday evening for a chat, and on the third Sunday for the main meeting, at Provosts Land, Leslie.

At **Greater Peterborough** the local club are on the fourth Thursday of each month at Southfields Junior School, Stanground. More details from the Hon. Sec. *see* Panel.

Guildford live in the Hq of the Guildford Model Engineering Club in Stoke Park, and they have July 9 for a natter session, plus July 23 for a talk by G5RV on "HF Aerials and Equipment, 1927-1982".

Harrow Arts Centre is the home of the **Harrow** club, and they are to be found there every Friday evening. In the current newsletter we were a bit saddened to hear that some people had been carting their hand-helds into the bar and upsetting other users of the Centre; this had no sooner been sorted-out than they found themselves on the receiving end of a moan about members boxing-in other Centre-users' cars. Admittedly the club has some 70 members but nonetheless it is still better to take care not to annoy others than to suffer endless unjustified complaints for ever afterwards.

For **Hastings** the main meeting occurs on July 21, for a talk on Aerials and SWR, at West Hill Community Centre, plus informal chat nights at 479 Bexhill Road every Friday evening.

Hasving have a business meeting on July 7, informals on 14th and 28th, and a talk by Mr. Lamb of British Telecom Interference Branch on July 21. All these are at Fairkytes Arts Centre, Billet Lane, Hornchurch, Essex.

Now to **Hereford** and their Hq at the County Control, Civil Defence Hq, Gaol Street, Hereford. They are in session on the first and third Fridays of the month; for more details we must refer you to the Hon. Sec. — *see* Panel.

We go back across the water now to **I.R.T.S.**, the National Society for the EIs; this is the focal point to which enquiries about amateur radio in Eire should go, which includes of course details of local clubs around the country. Contact the Hon. Sec. — *see* Panel.

From EI we now move to **Jersey**, where the next meeting is down for July 14, at Communicare, St. Brelades, Jersey; the topic for the evening is to be the RSGB beacon building project.

Now to the **Isle of Wight**, which means Unity Hall, Wooton Bridge, every Tuesday for operating the club station, and every Friday for chatting.

Back up to GM — don't we just get around! — to **Leith Nautical College**; we understand that although the majority of the members are students with an interest in electronics, the club would welcome SWLs and licensed amateurs from outside to their meetings. All the details from the Hon. Sec. — *see* Panel.

We head now for **Lincoln** where the club seems to be booming again, at their base in the City Engineers Club, Central Depot, Waterside South, Lincoln; for the other details we have to refer you to the Hon. Sec. — *see* Panel.

Things have been happening at **Meirion**, and we have it that they now gather at Nannau Country Club, Llanfachreth near Dolgellau, and we understand a full programme has been drawn up for the new Hq. Details from the Hon. Sec. — *see* Panel.

The **Midland** group have a unique official among their ranks — G8GAZ is their elected Post Boy. We have it that their next formal meeting is on July 20, but the gang are in informal session at Hq every Wednesday evening. The July 20 date is for G4KVC to talk about recording techniques. The venue of the club is 294A Broad Street, which is opposite the Birmingham Repertory Theatre.

The **Norfolk** crew are based at Crome Centre, Telegraph Lane East, Norwich. July 7 and 21 are both down for CW tuition and an informal chat for the rest, July 14 is a talk by G8MJQ on super-regen receivers, and on July 28 there is a briefing for the forthcoming Fox Hunt.

The **Northern Heights** group have meetings on Wednesdays at



A quiz between Liverpool and St. Helens Amateur Radio Societies, held recently at the St. Helens club, was so closely fought that the teams drew 64 points apiece and a decision had to be made over the ownership of the trophy, a superbly engineered and original Mast and Antenna in the shape of a question mark, made by St. Helens club member Graham Ford, G6CNN. In the end it was decided that each club should hold the trophy for a six-month period, commencing with the Liverpool boys. On the left is the Liverpool captain, Eric Grossmith, G3WOH, and the St. Helens captain, Paul Gaskell, G4MWO, on the right; in the centre is Eric Walton, G4FSN, of Bolton A.R.S. who acted as 'neutral' questionmaster.

Photo by G8MJY

the Bradshaw Tavern, Bradshaw, Halifax. The main dates in July are on 14th, when they have a junk sale, and 28th for a talk on getting started on 3cm — and two members being married at the end of July, at which all the gang will be present, unless, the newsletter says, there is a contest that week-end. Sentimental lot, your Halifax types!

Down to the West Country now, and **Plymouth**, and here we are somewhat up a gum-tree, as the Hq quoted for some meetings is different from our records. On July 5 they have a de-briefing of the NFD, to decide who made the mistakes, and on July 19 G4DGU of *MuTek Ltd.*, will be talking about receivers. That should be an interesting one — we have heard Chris before — and so we refer you to the Hon. Sec. at the address in the Panel, for venue details.

Although on paper the **Pontefract** group meet on alternate Thursdays, we hear that there is nearly always someone working on the new shack on the top floor of the Carleton Community Centre. July 8 is down for a talk by G4JHQ on his frequency meter, and on July 22 they have the Annual Foxhunt, with members of other clubs welcome too.

Now we come to **R.A.I.B.C.**, where the members are blind or invalid amateurs or SWLs, and the fitter among us are Supporters or Representatives. The current issue of "Radial" contains a most interesting account of a visit to St. Kilda by G3WLY.

We have a letter from the Hon. Sec. of **Reading Telephone Area** club about the special-event station they are putting on, between noon on September 30 to noon on October 1, to celebrate BT's first year of operation. More details from the Hon. Sec. — *see* Panel.

July 20 is down for the **Reigate** club's junk sale, at the Constitutional and Conservative Centre, Warwick Road, Redhill, Surrey.

Next we have to note that there is a club in **Rhyl**, based on the Ambulance Station, Rhyl. The normal meeting is on July 8, and then on July 22 the club have a junk sale.

The **St. Helens** lot have Hq at the Conservative Association Rooms, Boundary Road, St. Helens, where they foregather on Thursdays. The programme is still open for July 8 and 15, but we note on July 1 a summer Foxhunt, with July 22 down for preparing for their station at the St. Helens Show on July 29.

Down to **Salisbury**, and here we learn that the group have moved into a new Hq at Grosvenor House, 26 Churchfields Road, Salisbury, each Tuesday evening.

Up in **Solway** the AGM has just been passed at the Education Centre, Maryport, Cumbria, and the club is attracting new members. We need the new Hon. Secs. address for the Panel!

At **Southdown** the group have a place at the Chaseley Home for Disabled Ex-Servicemen, Southcliff, Eastbourne, on the first Monday of each month.

Nice to hear again from **South Manchester**, and they are still in residence at Sale Moor Community Centre, Norris Road, Sale, where they have a Friday evening each week for a lecture or similar, while the Mondays are for operating in the club shack which is now also at the Centre.

Now **Stevenage**, where there will be a demonstration station on the air on July 15, in the canteen of British Aerospace Plant B in Argyle Way, Stevenage. More details from the Hon. Sec.

Many clubs seem to be actively welcoming into their circle the ex-CB operators and turning them to our hobby; one such is at **Spalding**, where they foregather on the first Friday in each month at the Maple Room, White Hart Hotel, Market Place, Spalding.

July 5 at **Stourbridge** is a constructional evening, and on 19th G3CLG will be talking of "Fifty Years of Radio", both being held at Longlands School, Brook Street, Stourbridge.

Turning now to **Surrey**, they are in residence at *T. S. Terra Nova*, 34 The Waldrons, South Croydon, on the first and third Mondays. July 5 was still to be settled at the time they wrote, and on July 19 it is an informal with the station on the air.

Twenty-five years ago a club was formed in **Sutton Coldfield** so in August they will have an exhibition at the Library — the Central Library is also their Hq on the second and fourth Mondays of the month *except* in August.

Pressing on we come to **Thames Valley** serving an area around their Hq in the Library Meeting Room, Watts Road, Giggs Hill, Thames Ditton; on July 6 they have a talk by G6ENI, in line with their regular 'first Tuesday in the month' philosophy.

At **Thanet** the group all head for Birchington Village Centre on July 2 for some mini-talks, 16th for a talk on RTTY, and on July 30 there is a talk on Raynet laid on.

If you are interested in joining the club in **Thornbury**, all the current details of venue, programme and so on, can be obtained from the Hon. Sec. — *see* panel.

Changes in the Management are noted from **Torbay** and reflects in our Panel; the group still have their Hq at Bath Lane, rear of 94 Belgrave Road, Torquay, where there is a monthly business-and-lecture session on the last Saturday of the month, plus weekly informals at the same place every Friday evening.

Tyne & Wear Repeater Group report on the GB3TW set-up; they are well organised both from the engineering aspect and the back-up; it is indeed the aim at the moment to have a complete back-up equipment available in the event of a failure. In addition this group have been giving talks about the repeater to various local clubs in the area — and they are prepared to visit other clubs within a reasonable distance to talk about GB3TW. Details from the Hon. Sec. — *see* Panel.

Recruiting

This is the name of the game in the **Vale of the White Horse**; and as a start in the right directions they are adding an extra meeting each month, so now they are at the "White Hart" in Harwell village on the first and third Tuesdays; the former to be a formal and the latter an informal chat session where anyone with a problem can be assisted.

University of Kent, Canterbury write to let us know that they

are still in business. They have a place atop the highest hill in East Kent on which their Versatower sits, with tri-band beam for HF and two 14-element Parabees for HF. They meet there on Tuesday evenings in term times with alternating talks and natter evenings. Details from the Hon. Sec. — *see* Panel.

On July 27, **Verulam** will be having a talk on 1296 MHz Repeater working. As usual, this is at the Charles Morris Memorial Hall, Tyttenhanger Green, Tyttenhanger, near St. Albans. As for the informals, these are at the new R.A.F. Association Hq in New Kent Road, St. Albans, on the second Tuesday of each month.

A change of venue for the **Wakefield** crowd, for July and August, occurs while Holmfield House is undergoing alterations. Thus the new place is Room C, Unity House, Westgate; July 13 is down for a talk on computer graphics by G4BLT, and on July 27, a car Treasure Hunt will start from the Car Park at Holmfield House at 7.30 p.m.

West Kent now, and here the formal meeting is down for July 9 at the Adult Education Centre, Monson Road, Tunbridge Wells. They also have natter evenings at the Drill Hall, Victoria Road, Tunbridge Wells, fortnightly from June 29.

At **Worthing** they have a weekly booking at the Amenity Centre, Pond Lane, Durrington, 7.30 for 8 p.m., on the following dates: July 6, Question Time and VHF NFD Discussion; July 13, G4KIT on the ZL Special; July 20, a Quiz; and July 27 for a talk by G4HSY.

A very successful club is at **Yeovil**, based on Building 101, Houndstone Camp. On July 1 there is an NFD briefing, and on 8th G3MYM talks about VHF Propagation. On July 15, G3MYM turns their eyes on to a method of measuring aerial input impedance, and on 22nd the topic is "Ideas for Direct-Conversion Receivers" — which leaves July 29 for a natter. Typical attendance at this club is around 50-60.

An interesting point crops up from **York**, where we are told that the 'missing' third Friday of each month can now be taken to give a weekly programme — if they can educate the members not to miss the third Friday! Old habits die hard! The venue for York is the United Services Club, 61 Micklegate, York.

Finale

That's the lot for this time; deadlines are given in the 'box' in the body of the piece. The address, as always, is "Club Secretary", SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts. AL6 9EQ. And for your scribe — it's that gardening!

Special Event Stations

July 29-30, St. Helens & District A.R.C. will be operating GB2STH from the annual St. Helens Show, at the Showground Site, Sherdley Park, Marshalls Cross Road, St. Helens, on HF and VHF/UHF, and a special QSL card is expected to be available. Further details from Paul Gaskell, G4MWO, 131 Greenfield Road, St. Helens (25472), Merseyside WA10 6SH. **July 31**, Yeovil A.R.C. will be operating GB2FAA at the International Air Day, R.N.A.S. Yeovilton, Yeovil, Somerset, for the Royal Naval A.R.S. **August 14-15**, Yeovil A.R.C. will be operating GB2YFT at the Yeovil Festival of Transport, Barwick Park, Yeovil, Somerset (on A37). **August 21**, GB2MSS will be operated by Yeovil A.R.C. at the Mid Somerset Show, Shepton Mallet. For details of the stations operated by Yeovil A.R.C., contact D. McLean, G3NOF, QTHR, tel: 0935-24956.

For anything radio you want to buy, sell, or exchange, use the Readers' Advertisements columns in "Short Wave Magazine"

EQUIPMENT REVIEW

THE LAR ANTENNA NOISE BRIDGE

SINCE amateur radio recommenced after W.W.2 we have seen a complete change from almost all home built or converted ex-service transmitting and receiving equipment, to the present day dominance of commercial transceivers. While few radio amateurs now build their own Tx and Rx gear, many still experiment with antennas both for home station and mobile use. There is not much to learn about the simple dipole antenna but multiband systems do require careful design and checking if disappointing results are to be avoided. Over the years, a number of designs for gadgets to enable antenna parameters to be measured have appeared in handbooks and magazines. The *antenna noise bridge* is one such aid and it first appeared in commercial form many years ago from *Omega-T Systems Inc.* of Texas, U.S.A. Reviewed here is a British version made by the Leeds company **LAR Modules Limited**.

The Circuit

It is well known that diodes are noisy, especially the zener variety, and this property can be used to generate broadband noise in the RF spectrum. Although no circuit diagram was provided, inspection suggests that here the emitter/base junction of a transistor is used as the diode noise source, followed by a three stage RC coupled amplifier. The noise signal is coupled into the bridge part through a wideband transformer wound on a ferrite bead. The device is powered from a small nine volts battery.

Construction

The front panel layout can be seen in the photograph. The electronics are accommodated on a 50 by 40mm. glass fibre p.c.b. soldered onto the pins of a 220 ohms *Germet* potentiometer. A front panel mounted on/off switch is provided. The antenna and receiver connectors are SO-239 sockets. The battery is secured inside the case by the simple method of a double-sided sticky strip. A spare piece is supplied for the first replacement battery. The impedance scale is calibrated at the 55, 110, 165 and 220 ohms points and the size of the device is 96mm. wide, 70mm. deep and 85mm. high.

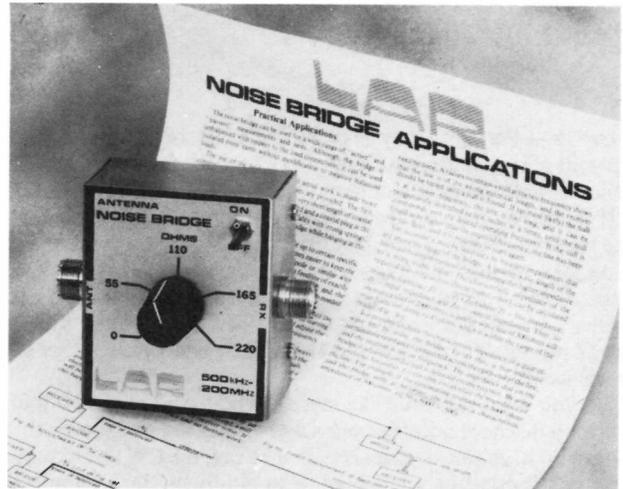
Tests

The current consumption from a PP3 size battery was just 15mA so battery life should be long. The specification states the useful frequency range as 500 kHz to 200 MHz and the impedance range from zero to 220 ohms. Checks were made in the eight amateur bands from 3.5 to 30 MHz and in the 144 MHz band. First the level of noise output was investigated using an *Icom IC-730* as the receiver. This requires 30 μ V, plus/minus 1 μ V, to give an S9 meter reading without using the optional preamplifier. The output from the **LAR Antenna Noise Bridge** gave readings between S8 and S9 throughout the range 3.4 to 25.1 MHz, and S7½ in the 28 MHz band. Next, many precision carbon-film resistors were placed across the antenna socket and the null point readings noted. The scale proved to be perfectly linear and "spot on" at 90 ohms. At the high end, the error was a maximum of 20 ohms low while at the low end, when the potentiometer was set to zero ohms, an 18 ohms resistor gave a null. A 50 ohms resistor nulled out at about 58 ohms on the scale.

For the next test at 145 MHz, a *Datong 144/28 MHz* converter was used ahead of the IC-730. To achieve an S9 meter reading, the 10dB preamplifier had to be switched in. The gain of the converter

is 18dB so it would seem the noise output is about 28dB down on that at HF. Even so, the nulls on various impedances were quite positive.

To ascertain the resonant frequency or frequencies of an antenna and its impedance(s) at resonance(s), the antenna is plugged into antenna socket and the knob turned until a null is found. Fine turning with the Rx will reveal the resonant frequency. Some additional twiddling should enable the deepest null to be obtained. The Rx will show the exact resonant frequency and the knob the impedance.



Conclusions

The **LAR Antenna Noise Bridge** is very simple to operate and accurate enough for amateur use. If a supply of precision resistors is available, the purist could draw his own super-accurate scale. The choice of 55, 110, 165 and 220 ohms markings is a bit unfortunate as it is not very easy to interpolate in between. Far better if 50, 100, 150 and 200 had been used. One must be very careful when using this bridge with a transceiver to ensure that the Tx cannot be accidentally switched on. The reviewer pulled out the key jack, switched off the VOX and disconnected the microphone plug during the tests.

This very useful accessory comes neatly packed in a box and includes a re-print of Ron Glaisher's, G6LX, article on noise bridges which appeared again in the March 1982 issue of the *Magazine*. The cost is £31, including V.A.T., but if you buy from the makers, another £2 for postage and packing is required. Thanks to **LAR Modules Limited** of 60 Green Road, Leeds, LS6 4JP for the loan of this item.

N.A.S.F.

Subscription rate to
Short Wave Magazine
is £8.40
for a year of twelve
issues, post paid

SHORT WAVE MAGAZINE, LTD.,
34 HIGH STREET,
WELWYN, HERTS. AL6 9EQ

“A Word in Edgeways”

Letters to the Editor

The views expressed here are not necessarily those of the Editor, nor should they be taken to represent any particular SHORT WAVE MAGAZINE policy.

Dear Sir — Perhaps I may be permitted a little bit of space to back up your correspondent A. Reeley's call for more CB operators to join the ranks of radio amateurs (May "WIE"). I, too, am an ex-CB'er, having been on the air locally around the "home 20" for the past three years. Then, last August, along with several others, I decided to join the local tech. and have a go at the R.A.E. course. We all duly signed up for the May '82 exam, but decided to have a go at the December '81 test — "just to see what it's like"; we all passed. Then it was the Morse test, and I passed that last week — May 10.

So you see if someone like myself, who hasn't studied a thing since I left school umpteen years ago — and not much even then — can do it, so can anyone! Needless to say, the CW test required help and for that I am indebted to an old-timer, Jack Campbell, G13OLJ, who reads and sends at 45-50 w.p.m., and carries on a conversation with me at the same time! All it takes is a little bit of dedication and help from a friend.

Stewart Mackay, G14???

Dear Sir — I refer to the following entry in "Clubs Roundup" on p. 157 of the May, 1982, issue of *S.W.M.*

"WACRAL is a group of committed Christian amateurs, denomination irrelevant, and world-wide in coverage. More details from the Hon. Sec."

I know nothing of this organisation, nor have I reason to dispute its good intentions. I would, however, respectfully submit that such an advertisement in an amateur radio magazine is not merely inappropriate, but actually disgraceful.

If you may, to join, be a Christian, any kind of Christian, from anywhere in the world, so long as you are a Christian, but not — one must presume, under any circumstances — be a Jew, or a Hindu, or a Buddhist, or a Muslim, or an atheist for that matter, what conclusions must one draw?

Amateur radio is, *inter alia*, about freedom of communication, without restriction based on colour, belief or politics. Our hobby grew from the ashes of a war caused at least in part by such selective discrimination.

Let this organisation exist by all means, but please do remember that it is not so very long ago in the lives of many *S.W.M.* readers, that the phrase 'committed Christians only' had only one meaning.

Short Wave Magazine by its own excellence, and being our only flag-carrier, must I think carry that much more responsibility in these matters.

Anthony Quest, Leeds

Dear Sir — The points made by J. P. Gilliver, G6JPG, in June "Word in Edgeways" about short duration contests are very valid as many people do not have the time or inclination to indulge in the longer national or international contests.

In order to meet the needs of those who prefer the shorter sessions, the RSGB introduced the Cumulative 160 and 80 metre

series of short contests which are held in January of each year. This concept has proved very popular and has been, or is being, extended to VHF and other other HF bands.

*R. L. Glaisher, G6LX,
Deputy Chairman,
HF Contests Committee*

Dear Sir — After trying several shops on the Saturday before Bank Holiday, my "dearly beloved" and I realised that your May issue had not yet arrived at the newsagents.

On the night of the Holiday, my husband was taken ill and rushed into hospital, operated on and placed in the Intensive Care Unit.

All night I sat by his bedside, anxiously awaiting just some slight sign of life. Eventually the following afternoon, he opened his eyes and saw me there. He moved his lips. I bent to hear the faint whisper of this man who had been snatched back from the edge of beyond. "Did you get my *Short Wave Magazine*?", he asked!

This sounds like a tall story, but I assure you it's true. Fortunately, on the Tuesday I had managed to slip out of the hospital and find a copy in the nearby town.

I now know just where I stand in his affections — second to you!

Mrs. B. Friling, Redhill

Dear Sir — I read with interest the article by G3XSE on the 10 MHz modification to the TS-520S transceiver in the June issue of *Short Wave Magazine*. The author was clearly not aware that I have already produced just such a modification for the TS-520 and TS-820 series transceivers, and full details are available by simply sending a 15½p stamp to Matlock and requesting the appropriate sheet.

The modifications were designed so that they can be carried out without requiring any mechanical work, such as drilling holes, and without needing additional coils or alignment. A kit of parts including the correct heterodyne crystal is available for £11.50 inc. VAT.

*John Wilson, G3PCY,
Director, Lowe Electronics Ltd.*

Dear Sir — I know amateur radio is only a hobby, but nevertheless there are times when little things annoy me intensely. Before revealing my particular irritation, may I say I am very impressed by the standards of G4-plus-3 stations — so much so that I feel sure lots of them must be ex-professional or ex-service operators.

Just a few, however, are a bit weak on procedure and seem unaware that 'es' is the recognised abbreviation for 'and', using it instead as an abbreviation for 'is'; for example "QTH es London". As everybody on the air is too polite to point out the error of their ways, they will go through life without ever knowing that 'es' means 'and'; 'is' is just sent as 'is'.

M. A. Sandys, G3BGJ

*Address your letters for this column to "A Word in Edgeways",
SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts.
AL6 9EQ.*

VHF BANDS

NORMAN FITCH, G3FPK

The Satellite Scene

ON May 17, the Russians placed another amateur radio satellite into orbit. It appears to have been literally "placed" there by the simple expedient of being pushed out of the airlock of the *Salyut 7* space station by the astronauts therein. The initial orbit was 91.353 minutes at an inclination of 51.594°, the altitude being 344 kms. However, such low orbits are subject to considerable atmospheric drag and already this "bird" is descending.

The craft is known as *ISKRA 2* and has a telemetry channel on 29.578 MHz. Each *TLM* frame is preceded by the callsign *RK-02*. A transponder is reported to be on board with an uplink in the 15m. band, 21.23-21.27 MHz, and a downlink in the 10m. band, 29.58-29.62 MHz. From the London area, orbits crossing the equator between 17° and 152°W will be in range. Unlike other satellites, all descending orbits are out of range. Under line-of-sight conditions, the signals should be copied for about 9½ minutes. For latest information, readers are advised to listen on 3,780 kHz from 1900 local time each weekday evening when predictions are given in the AMSAT net. (Some late news just in suggests this spacecraft will burn up between July 10 and 17 on re-entry. The transponder was switched on briefly once, on June 4).

Readers reports on satellite activity are surprisingly few, but Adrian Chamberlain, G6ADC, (Coventry) is a user. He reckons his newly installed *HQ-1 Mini Beam* for 10m. has made a fantastic difference to the reception of downlink signals in the band and writes, "Where I could not hear anything before on my wire dipole, signals are now zooming in at S5-7." He reports strong Mode B signals from *Oscar 8*, even on horizon-skimming passes. Adrian uses the RS satellites and his best DX so far is W4BE via *RS-6* on May 1 and who is near Tampa in Florida. At G3FPK, signals from the several RS beacons are steady and strong, but the transponded signals as received on a ground plane aerial are always subject to fast fading, very much like aircraft flutter on VHF signals, suggesting spinning and/or tumbling of the spacecraft.

At the time of editing, it seems that the University of Surrey's *U-O-9* command station will be unable to radiate anything like enough power to "get in" to the spacecraft's

desensitised command receiver. A last ditch attempt will have been made by the time this appears to regain command with the help of a U.S. amateur with a big *E-M-E* station. This state of affairs arose because, during the transfer of software in the spacecraft, the primary computer issued a false command which switched on the 435 MHz telemetry beacon. The 145 MHz beacon was already on so both command receivers were very severely desensitised. The problem is to get sufficient signal from a ground station to override the local signal from the spacecraft. Your scribe would be very surprised if this can be done, unless a sort of Jodrell Bank radio telescope dish can be borrowed!

Beacon News

In the 4m. band GB3BUX on 70.05 MHz and GB3WHA on 70.04 MHz are now operating under their new calls. (Ex-GB3SU and GB3SX respectively). The paperwork for the GB3CTC beacon is now with the Home Office. The new site is Hensbarrow Downs in XK56b, about three miles north of St. Austell. The 4m. QRG is 70.03 MHz., the 2m. one 144.915 MHz and the 70cm. one 432.970 MHz.

Concerning GB3SWH mentioned last month, the South West Herts. UHF Group has sent some more information. The nominal QRG is 10.368240 GHz with 80 milliwatts *e.r.p.* horizontally polarised in a figure-of-eight pattern with major lobes NE/SW. The location is St. Peter's Church tower in Bushey, three kilometres south of Watford (ZL29f) and the aerial is 170 metres *a.s.l.* CW identification consists of two sequences of A1B followed by two on F1B with a shift of about 1 kHz. The time between each callsign is 15 seconds. Reception reports to Trevor Groves, G4KUJ, on King's Langley (09277) 62201 and any donations can be sent to Brian Greenaway, G3THQ, at 5 Lansdowne Grove, London, NW10 1PL.

Repeater Notes

Ron Glaisher, G6LX, was in the U.S.A. recently and travelled extensively. He used many repeaters and experienced virtually none of the abuse which occurs regularly with certain, notorious English relays, such as GB3SL. He reports that many now feature synthesised speech identification. One "private" repeater on the east coast was being abused by non-subscribers trying to use it. This one was equipped with "voice print" facilities so that only users whose voices it could match could get in. (Clever, but what is to stop anyone recording a registered user's voice to gain access? Ed.)

Chris Bartram, G4DGU, (Devon) claims that GB3CH near Liskeard in Cornwall on RB2 is the first relay to feature a *Gasfet* RF amplifier in a noiseless feedback circuit at the masthead. Any challengers? In the May offering, page 137, mention was made of a "Raynet" repeater on 145.8 MHz, heard by

GW3NYY. Richard Hope, GW8TVX, is the Group Controller of the West Glamorgan Raynet Group and confirms this repeater is RSGB approved and licensed by the Home Office. It is a manually switched station operated by one of the Group's licensed members only during properly constituted exercises or in emergencies. For this reason, it does not have a proper callsign, but the Group's call, GW8SPA, is used.

The repeater is housed in a concrete building within the BBC/IBA site at Kilvey Hill, overlooking Swansea, giving it exceptional coverage, including the many small bays and beaches of Gower. The system is based on a modified *Storno 600* with an ARRL design, six cavity duplexer. All hardware was donated by local amateurs, *s.w.l.'s* and industry. GW4BCF, GW8PYY and GW2FYV together modified, built and tuned it up.

Award News

Two metre VHF Century Club award no. 347 goes to Dave Robinson, G4FRE, for operation from his Nuneaton, Warks., QTH. First licensed as G8JMO, he got the class A call after intensive CW tuition at the University College of North Wales, in Bangor, in January, 1977. 2m. operation on SSB started with a *Yaesu FT-101B* and *Microwave Modules* transverter with a 5-ele. *Yagi* at 15ft. Late 1977 saw the addition of a 4CX250B amplifier for MS work, and the replacement of the 5-ele. by a 9-ele. *Tonna Yagi* in mid-1978. In late-1978, an *Icom IC-202* was used to drive the amplifier. 2m. operation from Nuneaton ceased in Sept. 1979 when Dave moved to the Ipswich area. Now main interest is UHF and SHF but with some 4m. operation from a /A location.

DX Notes

Operation from the Balearic island of Minorca, EA6, is planned from CZ square from July 1 to 15, by members of the F6KAW club. Operation on 144.21 MHz only and no prior skeds were being made: presumably the 20m. VHF net should be monitored in this period. Roger Thorn, G3CHN, passes along some information from Alain Puillandre, F6HRP, (ex-F1CRP) about a French DX-Pedition to Morocco to YU and YV squares between July 10 and 17. Unfortunately, no callsigns or frequencies were mentioned, but the gear list sounds formidable. *Viz*:— On 144 MHz., 1 kW and 8 x 13-ele. aerials; 432 MHz., 1 kW and 8 x 21-ele. *Yagis*; 1,296 MHz., 150W and 8 x 23-ele. aerials, and a dish for 10 GHz! This may be the same foray mentioned in the May feature, on page 135.

Manfred Eisel, HB9POM, with HP9PMF and HB9RFR, plan operation from the principality of Liechtenstein from July 30 to Aug. 1. The site will be the 2,562m. Faulknis peak in EH78c. The gear will be a couple of *IC-202* transceivers with

20 watts PA on 2m. using a 16-ele. beam and an HB9CV. On 70cm., a pair of IC-402's "barefoot" at 2 watts with 2 x 19-ele. beams. Preferred QRG's: 144.200 and 432.200 MHz. Skeds requests by July 25 to:—HB9POM, Rosenweg 4, CH-7302 Landquart, Switzerland.

Looking ahead to the *Perseids* meteor shower in August, Nick Peckett, G4KUX, (Co. Durham) writes that he, Jerry Goldsmith, G4CJG, and Chris Gill, G8EEM, plan to operate from the Isle of Skye in WR square, from the 7th to the 14th, but that no prior skeds will be made. On 4m., he will have full power to a 3-ele. beam; on 2m., full power to a 16-ele. at 40ft. and on 70cm., about 50 watts to a 21-ele. Proposed QRGs are 70.26 MHz CW and SSB on 4m. On 2m., 144.260 for tropo. SSB and 144.428 MHz for SSB MS traffic. 144.128 MHz for CW tropo. and MS. On 70cm., 432.260 MHz for SSB and CW. The QRA will be WR48e, 4 kms. SE of Dunvelan. On 4m., GM4CJG/P; on 2m., GM4KUX/P and on 70 cm., GM8EEM/P. They will be on the 20m. VHF net for sure and possibly on 40m. for arranging local tropo. skeds if someone can do the net control act in SE England. Any offers?

Six Metres

John Baker, GW3MHW, (XM60d) reports plenty of E-layer signals mainly from a QTF of 110° but from the south on May 15, when ZB2VHF on 50.035 MHz was received at 1555 for the first time this E "season." It was heard again on the 17th at 1114 at S6 and was followed at 1122 by a crossband 6/20m. QSO between ZB2BL and John. Jim was S2 on SSB. There is a Sunday sked on 14.28 MHz at 0830 with ZB2BL to which U.K. 4m. and 6m. enthusiasts are invited. Jim reports that ZB2GW is on 6m. and listening on 4m. He is building a 4m. SSB Tx.

Four Metres

In the E's opening on June 5, Brian Bower, G3COJ, copied the Cyprus beacon 5B4CY (QU51b) for an hour from 1745. ZB2BL was on and I5CTE and HB9QQ were working 4m. stations *via* 10m. Roger Greengrass, G4NRG, (Essex) is not yet on the band as he is still saving up for a transverter, but at least he has an aerial. Dave Lewis, GW4HBK, (Gwent) is busy improving his station with an 8-ele. *Yagi* in place of the 6-ele., and a *muTek* pre-amplifier. New stations worked include GW4NOS in Mid Glamorgan and G3YJX in Cornwall. Dave worked the C.U.W.S. folk on the band when they were signing GJ6UW.

GW3MHW mentions G4JQY (Cheshire) as another new 4m. station heard from his YM24e QTH. In the E's event of May 25, G3ENY and about five others, worked SM6PU who was on 10m. During a visit to southern France at the end of April, G4JCC, who holds the reciprocal

ANNUAL FOUR BAND TABLE

January to December 1982

Station	FOUR METRES		TWO METRES		70 CENTIMETRES		23 CENTIMETRES		TOTAL Points
	Counties	Countries	Counties	Countries	Counties	Countries	Counties	Countries	
G2AXI	36	6	60	12	39	9	10	2	162
G8TFI	—	—	70	13	49	9	—	—	141
G4JZF	—	—	71	14	47	8	—	—	140
G8RZP	—	—	69	15	35	10	—	—	129
G8RZO	—	—	69	15	33	10	—	—	127
GD2HDZ	33	5	44	9	30	5	3	2	126
G3PBV	16	5	51	12	26	5	3	1	115
G6ADC	—	—	60	12	32	3	—	—	107
G3FIJ	18	1	45	11	18	3	—	—	96
G4DEZ	—	—	67	26	—	—	—	—	93
GW3NYY	—	—	62	16	7	2	—	—	87
G8VRJ	—	—	37	10	21	5	8	3	84
G8VR	10	1	47	25	—	—	—	—	83
G3FPK	—	—	66	16	—	—	—	—	82
GM4CXP	8	3	45	13	6	3	—	—	78
G8LFB	—	—	62	16	—	—	—	—	78
G6ECM	—	—	61	16	—	—	—	—	77
G3BW	—	—	40	14	14	3	2	2	75
G4K LX	—	—	53	18	3	1	—	—	75
G4MUT	—	—	41	11	22	1	—	—	75
G8WUU	—	—	41	10	17	4	—	—	72
GW3CCF	—	—	40	7	12	2	5	1	67
GM8OEG	—	—	51	14	—	—	—	—	65
G4ARI	—	—	55	10	—	—	—	—	65
G4FKI	18	1	22	8	9	1	—	—	59
G8VVF	—	—	47	12	—	—	—	—	59
G6CGY	—	—	42	12	—	—	—	—	54
G6AJA	—	—	44	10	—	—	—	—	54
G6FSH	—	—	46	8	—	—	—	—	54
G8KAX	—	—	23	4	13	2	8	1	51
G4NRG	—	—	22	13	10	2	—	—	47
G8XTJ	—	—	41	6	—	—	—	—	47
GW4HBK	21	4	14	5	—	—	—	—	44
G8XHL	—	—	25	8	4	2	—	—	39
GM4COK	—	—	21	15	1	1	—	—	38
G8ZYL	—	—	31	5	—	—	—	—	36
GW8TVX	—	—	24	6	3	2	—	—	35
G8LXY	—	—	18	1	12	2	—	—	33

Three bands only count for points. Non-scoring figures in *italics*.

call F0FDB, copied Johns test call at 1943 at RST 319, but a crossband QSO with Steve on 20m. did not materialise. John reports that OZ1FDH has 4m. receive capability and that ZS1FV, who has 6m. gear, is thinking of crossband possibilities.

Two Metres

One of Murphy's Laws must be that any big opening will occur just *after* copy deadline. This was the case with the first extensive E's event on June 5, which lasted from about 1614 to 1950. Many IT9 stations were on at considerable strength, as were some IS0s, IS0CSX/P (EA16b) being very consistent in the Field Day contest. 9H1B and 9H1BT were worked (HV), also Italian stations in the 1, 7, 8 and 0 call areas. Some very short skip signals were noted, such as a French station in DD square and I1MFS in ED01f. At least two Corsican stations were worked, Brian Bower, G3COJ, (Bucks.) contacting FC1KPK (EB14d) at 1926 and who seemed a rather inept operator. Brian also got I7TBF (IA64a) and the portable IS0.

Clive Penna, G3POI, (Kent) found two more squares, EA and IY. John Hunter, G3IMV, (Bucks.) reached the formidable total of 300 squares thanks to IS0TFX in EA. Another Sardinian station on was IR0QDV (EZ), a prefix new to your scribe. Paul Turner, G4IJE, (Essex) got two new countries, 9H and IS0, and five more

squares out of it, including F6FRE in DD. IS0PUD (EZ) was heard working GM8YJU and GM3WCS, so it seems many areas must have enjoyed this event. On the 20m. VHF net later, DK1PZ (EL59g) reported strong E's from EA1, 4, 5 and 7 in Spain and CT stations were worked by continentals.

G3CHN (Devon) caught the unusual E's opening to Sweden on May 25 and worked SM3COL (IW06f) at 1514; SM2GHI (MZ01h) at 1517 for best DX *via* E's at 2,358 kms. and SM2CKR (KX12j) at 1526. Dave Sellars, G3PBV, (Devon) reports this event starting around 1500 and worked SM3COL at 1503, then SK3LH (JX) at 1508. After alerting G3CHN by telephone, Dave heard SMS 3AFT (IW), 2BHX and 2CFG (JX), then worked SM2GHI. By 1530, it had all gone.

A slight correction to the G3UNU list of Romanians worked on May 9 reported last month. YO6ADW is in NG71d and it was YO6KNT, not KNX in MG33a. G3UNU also found the May 25 Swedish E's opening which lasted in Nottingham from 1500 to 1527. Mark Turner, (G8OBS) the operator, lists SM2BHX (KZ58j), SM3COL, SM3AFT, SM3GCR (JX54c), SM2CFG (JX30f) who was only running 10 watts to a 16-ele. beam, and SM2GHI. SM3KJB (JX54e) was heard at 1505.

John Moxham, G8KBQ, (Somerset) managed to work SM3COL, SK3LH,

SM2BHX, SM2GHI and SM2CKR between 1500 and 1528. George Gullis, G8MFJ, (Wilts.) heard nothing on May 9, but on May 25 heard an F6 working a weak SM at 1505. The only Swede George got was SM3COL at 1509. '2BHX and '2GHI were heard and he reckons he was just on the edge of it all. Other stations who worked into SM in this opening included GW8JLY (YL) and G4ASR (YM). Later, on the 20m. VHF net, SM3COL and '2GHI said they did not hear any French stations, but SM3JLA (JX), whose Tx was out of order, heard F6EOQ at 1453. In the morning of the 25th Geoff Browne, GJ4ICD, worked some EA7s via E's but, because of the short distance for the mode, had to elevate his aerials some 20° for the best results.

Quite an eventful period apart from the E's. In the May 27 *Aurora*, G3CHN worked GM6CFN (XR) and GM8OEG (YQ) and Roger "... heard all the usual gang..." on CW at a QTF of 20° from 1700 to 1810. G3PBV heard Gs further east from Devon working DLs and OZs on May 13, but nothing heard in Newton Abbot. Dave worked all the advertised GUs on their activity day, May 30, when conditions were favourable. "A good effort and well organised," was his verdict.

G8OBS, operating G3UNU, mentions the May 13/14 tropo. opening to LA, OZ and north Germany. LA8EW (DS78f) was worked on the 13th and LA5XAA (CS39j) was heard at S9. Mark writes that the May 27 *Ar* started at 1430 and was very weak up to 1620. Best DX was GM3XOQ/A in ZT on the Shetlands, which is counted as another *country*, as is IT9, for our annual table. He switched on again at 1800 when signals were stronger, working LA9BM (EU), SM0DCX (IT) also other SMs, PAs, GMs and GI5MPS (WO). The GM, LA and SM signals were peaking at 25°, the GI at 35° and the PAs at 35-50°. Another weaker *Ar* was noted the next day from 1510 to 1620 with a few LAs and SMs heard and worked, plus GM and GI all at QTF 25°.

Tim Raven, G4ARI, (Leics.) has sent in an entry for the annual table and reckons he does not hear many GMs and wonders if they beam south very often? Ken Osborne, G4IGO, (Bristol) heard only a dozen GMs in the May 3 *Ar* but did work PA2VST/LX/P on tropo. that day. May 21 brought a QSO with F6BUL/P (DF11j) and Ken's MS successes include OK1MDK (HJ) on May 8, LA9BM (EU) on the 9th, IV3HWT (GF) on the 15th, I1ANP (EE) on the 21st, and SM7DLZ (IQ) on the 23rd, EU, EE and IQ being new squares.

Paul Turner, G4IJE, has devoted a lot of time to MS concluding SSB skeds with SM5MIX (HS) on May 8 and F1JG (CD) on the 9th. On May 20, a back scatter QSO was completed with PA3BIY (CM) in two hours, both beaming at BF square. A similar test with PA0RDY (CM) was over



"... these handheld rigs are fine for the odd QSO..."

in one hour on the 31st, and with PA3BBI (CM) on the 25th. Between May 9 and June 4, successful QSOs were made with YU3ZV (HG), OK1KTL (HK), YU1AWW (KE), DJ5MS (GI), SM5CHK (HS), SK7JD (IR), YU3DRW (HG), DK1PZ (EL) and LA8OW (EU). Paul has completed 55 MS QSOs this year up to June 4.

Graham Taylor, G4JZF, (Staffs.) has put up a T.E.T. 8-ele. *Quagi* and worked GM8HVB/P (Central) for an all-time new county on the band. He made 146 QSOs in the QRP contest, best DX being F1EAN/P in ZG40h. Roger Greengrass, G4NRG, (Essex) now has a 16-ele. *Tonna Yagi* up at 30ft. and added PA2VST/LX/P on May 10 for a new country. Bob Percival, G6CGY, found conditions from Cleveland very variable. The May 3 gales brought his aerials down but, being a past aerial rigger, that was a minor problem.

Mick Cuckoo, G6ECM, (Kent) was on in the European contest on May 2 and worked some Fs in CI and ZJ. On the 13th and 14th, conditions were very good towards Denmark. Nine QSOs with OZs in EP and EQ were made between 2200 and 2400 and 0900 to 1030. At 1900 on the 14th., GB3ANG was over S9 and GB3LER, S8. A "CQ" call raised GM4IPD (YR80j) at S9-plus-40dB. Later, GM4LBE (ZU65f) was worked. GM4MYL/P was calling CQ on F3E from YQ08f at enormous strength. On the 21st, Mick heard a brief snatch of an I4 who was working F6HII/P (DF11j). He got the F6 later for a new square. The *Yaesu* FT-221R has been "muTeked" and the Rx side taken straight to the board via an external relay. The aerial is an 11-ele. H.A.G.

Garry Clark, G6FSH, (Coventry) now has a *Yaesu* FT-290 and 25 watts amplifier. He sent along a sketch showing how he has utilised the cupboard-under-stairs for a shack. This ruse can be useful when the distaff side gives the "thumbs down" to a room-type shack. Your scribe recalls a

friend ripping out the downstairs loo and turning it into a comfortable shack! Apart from his success with the May 25 E's, G8KBQ worked F6BUL/P (DF11j) on the 21st and the numerous GUs on May 30.

The Brakespears have been busy, both in the shop and on the radio. Jackie, G8RZO, got PA2VST/LX/P on May 10 when John, G8RZP, was out. On the 14th, GM4LBE (Shetland) was very strong and PAs were heard working into OY. In the 144 MHz contest, G8RZP operated and best DX was DD7UZ in FJ58f. Some LXs were also worked. 770 QSOs resulted worth over 9,000 points. G4NBS and G6ECM were the other operators. In the *Ar* on May 27, GM8NXC (YP) and GM5DTB (ZR) were contacted, the latter a new one. On the 30th, both GU4NYT/P (Alderney) and DL4YAM/P (FH) were very loud. On June 1, GW8PVH/P (XM) was worked.

Chris Easton, G8TFI, was an operator of G4NXO/P in Gloucs. for the May 22/23 contest which brought 670 contacts and about 7,000 points, best DX being HB9AEN/P (DG). Condition seemed flat but with good periods of lift on the Sunday but with some time lost due to static rain. Chris reports that in the E's on May 25, the GIs worked into OH. Kevin Piper, G8TGM, (W. Sussex) is using a borrowed SSB home-built rig giving 10 watts to a 14-ele. *Parabeam* at 27ft. Conditions in the May 22/23 contest were not too good on the coast and best DX heard and worked was GM3ZXE/P (YQ24g).

John Fitzgerald, G8XTJ, (Bucks.) now has two aerials up. A 6-ele. *ZL-Special* adorns the north side of the house and a 4-ele. *Yagi*, the south. He reckons fewer people are now using the SSB calling frequency and he hopes folk will QSY well away from the 144.3 MHz area, anyway, if only to clobber the FM-ers who use 144.2!

Arthur Breese, GD2HDZ, never seems to enjoy good conditions. His new ones for the table were all got on May 22. Andy Renouf, GJ8SBT, worked LX1GR on

QTH LOCATOR SQUARES TABLE

Station	23cm.	70cm.	2m.	Total
GJ4ICD	1	97	213	311
G3VYF	—	94	283	377
G3JXN	43	87	124	254
G3XDY	30	84	123	237
G3COJ	24	74	126	224
G18KNV	8	73	164	245
G3PBV	14	65	128	207
G2AXI	8	60	106	174
G3NAQ	—	58	128	186
G4BVI	9	58	—	67
G4NBS	13	57	89	159
G8FMK	16	57	71	144
G8ATK	6	56	113	175
G4HFO	—	55	80	135
G8HHI	6	52	121	179
G8KBQ	4	51	120	175
G4ERX	6	46	104	156
G4NQX	—	46	111	157
G8KAX	11	45	79	135
GD2HDZ	12	44	90	146
G4JZF	—	43	120	163
G8RZO	—	43	109	152
G8RZP	—	41	109	150
G4GFX	7	40	103	150
G4BWG	—	38	136	174
G8JJR	—	38	108	146
GW3NYY	—	36	156	192
G4NFD	—	36	138	174
G4MCU	—	34	128	162
G4MUT	—	32	50	82
G3BW	5	31	191	227
G3FIJ	—	29	86	115
G8MFI	—	28	136	164
G8VRJ	8	28	88	124
GM4CXP	—	26	144	170
G8CXQ	—	25	123	148
G4AWU	—	22	130	152
G4NWT	—	22	55	77
G8WUU	—	20	56	76
G8LXY	—	20	34	54
G4IGO	—	19	212	231
G4ERG	—	16	223	239
EA3LL	—	15	231	246
G6ADC	—	15	50	65
GW3CBY	3	14	65	82
G4HMF	—	13	116	129
GM4COK	—	12	182	194
G4MJC	—	12	85	97
9H1BT	—	11	210	221
G4OAE	—	7	140	147
G8KPL	—	7	91	98
G8JAG	—	7	81	88
G4KLX	—	5	74	79
G4NRG	—	5	39	44
G6DDK	—	4	53	57
G4GXL	—	4	52	56
G8VR	—	3	182	185
G8TIN	—	3	56	59
G4LDY	—	3	41	44
G3POI	—	—	358	358
G3IMV	—	—	303	303
DK3UZ	—	—	287	287
SP2DX	—	—	280	280
G3IJE	—	—	250	250
G3CHN	—	—	217	217
G4DEZ	—	—	205	205
G3FPK	—	—	180	180
G3KEQ	—	—	173	173
GW4EAI	—	—	158	158
GJ8SBT	1	—	138	139
G8LFB	—	—	119	119
G8TGM	—	—	111	111
GM4IPK	—	—	102	102
G4GHA	—	—	95	95
G4IRX	—	—	85	85
G8RWG	—	—	71	71
GM8OEG	—	—	69	69
G8VVF	—	—	68	68
G6ECM	—	—	66	66
G8XMP	—	—	62	62
G6ABB	—	—	49	49
G8XQS	—	—	47	47
G8MBI	—	—	40	40
G8ZYL	—	—	36	36

Starting date January 1, 1975. No satellite or repeater QSOs. "Band of the month" 70cm.

May 15 and on the 21st, the whole of France was coming into Jersey. F6BUL/P (DF) was "end stop" on the S-meter and a QSY to an FM channel was made.

Derrick Dance, GM4CXP, (Borders) worked many northern DLs, PAs, OZs

and some LAs in the May 12-15 tropo. lift. On the *Ar* front, signals were first heard on May 27 from the work QTH (YP27d) at 1428 on an *Icom* IC-202e and indoor dipole. At home at 1553, GB3LER was 52A and he went on to work 24 stations until fade-out at 1838. These were in DL, G, GI, LA, OZ and PA, mainly at QTFs 40-55° but more easterly at the end. The following day, at 1458, more *Ar* signals were heard at work. On May 1, GB3LER was copied at 41A at 1625 at QTF 40°.

Andy Swiffin, GM8OEG, (Dundee) was on for the May 3 *Ar* from 1645 to 1730. It was a weak event and a few stations in GM square, and a GD were contacted. It fizzled out at 1820, but did produce three new squares. During the May 12-15 tropo. event, Andy worked 202 stations comprising 4 LAs, 12 OZs, 39 DLs and 147 PAs. He says that, "... by popular request..." GM3ZXE, GM4JGM and himself plan a trip to XS square for the *Perseids* possibly, with high power and at least one 11-ele. aerial. More firm details later.

Sheldon Hands, GW8ELR, (Dyfed) is back again with 400 watts and two, bayed 16-ele. *Yagis*. An eleventh hour letter from GJ4ICD covers the *E's* on June 5 which lasted from 1604 to 1946 during which Geoff worked 14 Italian squares. Some closer stations, like I1KTC (EF) could only be copied with 15° of aerial elevation. YU6KGB, HG8E? and possibly a Vatican City station were heard. He also reports a massive solar outburst on June 4 at 1340, lasting twenty minutes, with noise at 30 dB.

Another *E's* session occurred on June 8, mainly to Iberia. Strong FM Band 2 stations were received at G3FPK and G3IMV worked CT1WW (WB) at 1826 and CT4IB (VB) at 1840. CT1AUW was heard. Jim Rabbits, G8LFB, worked CT4KQ (WA21e) at 2005 but he only lasted a couple of minutes.

Seventy Centimetres

G3PBV worked all the Guernsey Bailiwick stations on May 30, except the Alderney one, who was on FM. All the signals were very strong. Chris Bartram, G4DGU, (Devon) reckons his county is not as rare as G8RZO/G8RZP suggested in last month's piece. Chris, and Paul Widger, G8AGU, both run 400 watts, while G3PBV, G3AUS, G4MAW and G8MXE also run reasonable power. Many others on lower power are regularly active. Dave Thorpe, G4FKI, (Essex) is off the band at present due to transverter problems.

G4JZF has launched an 88-ele. *Multibeam* now and PE1CNQ in CN was worked on May 14 for a new one. The 30th brought GU8FBO for a new county, country and square. GW8ELR was also contacted. G8KBQ is now up to 51 squares on the band, the latest being GW8UZL

(XN) in Anglesey, otherwise activity has been low for John.

Jackie, G8RZO, notes a good lift on May 17 when DL3VZ (FN), OZ1EKI (EP) and DL6LAF (EO) were worked. G8TFI reckons it will be hard going to work much more on 70 cm. as he will be out contesting a lot. Chris is still looking for his first GM of 1982 and asks, "Anyone interested in skeds?" He did work GW8ELR (XL) on May 31 and says that Sheldon hopes to increase his present 3 watts.

Gigahertz Bands

Dave Robinson, G4FRE, (Ipswich) operated from his /A location in AM76c on May 2 and worked G4HWA/P in Humberside for a new county, and a DB8 in DN for a new square. Other DLs were on from DO, EO and DM and Dave is now up to 17 squares on 23cm. Going back to April 18, from a portable location, AM78f, Dave operated on 13cm. on 2.32 GHz and worked PA2DOL (CL), G3LQR (AM), PA0FRE (CL) and PA0WWM (CM). The gear was 2W of CW with a 23-ele. *Quad Loop Yagi*, the Rx being a 3.5 dB noise figure job with two NE64535s and interdigital converter. Dave has finished a converter for 3.456 GHz.

From AL07b, on May 12, G8HPU/P worked PA0DBQ (CM) on 10 GHz. The next day, he and Dave heard PA2DOL (CL), the PA0DBQ beacon in CM and the Eindhoven University beacon, PA0MS/A. On May 14 at 0545, the PA0DBQ beacon was copied again and around 2100, G4FRE/P worked PE1BLE/A (BL), with PA2DOL and PA0DBQ heard. Both use G3JVL transverters, G8HPU a 2ft. dish and G4FRE an 18 inch one. At one time, PA0MS/A was so strong that it could be heard on an open waveguide with the dish lying in the back of the car!

Final Miscellany

G6LX worked a new *E-M-E* station in Vermont, K1WBB, who has a 288-ele. array on 2m. Peter Burden, G3UBX, has sent details of the Midlands VHF Convention scheduled for October 9 at the Wolverhampton Polytechnic. Tickets are £1.00 in advance or £1.25 at the door. All inquiries to G3UBX at 28 Coalway Road, Wolverhampton, WV3 7LX. G8MFJ asks, "Do you know anything about a contact between I4MKN and TU2JM on March 13?" Presumably it was on 2m. and George heard it being mentioned on the 20m. VHF net.

Deadlines

So much for May and beginning of June. All your input for the August issue by July 7 please, and for the next piece, by August 4 to: "VHF Bands," SHORT WAVE MAGAZINE, 34 High Street, WELWYN, Herts., AL6 9EQ. 73 de G3FPK.

STEPHENS-JAMES LTD.

47 WARRINGTON ROAD, LEIGH, LANCS. WN7 3EA
Telephone (0942) 676790

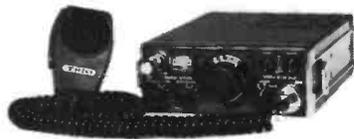


LANCASHIRE & THE NORTH WEST'S LEADING RETAILER IN AMATEUR RADIO. 20 YEARS SERVING THE AMATEUR'S BY AMATEURS SPECIALIZING ONLY IN AMATEUR RADIO EQUIPMENT.

THE ONLY APPROVED TRIO DEALER FOR NORTH WEST ENGLAND



TR7730 the new compact 2m Transceiver £247.94



TR2300

TR2300 2m Synthesised Portable Transceiver. We have lost count of the number of this model we have sold over the last 12 months. Hikers, campers, climbers, you can hear them all over the country and reliability which is the essence of TRIO equipment. £166.75

JAYBEAM	
5Y/2M 5 element yagi.....	£12.08
8Y/2M element yagi.....	£15.53
10Y/2M 10 element.....	£33.35
PBM/14/2m, 14 element Parabeam.....	£48.30
5XY/2m, 5 element crossed yagi.....	£24.73
8XY/2m, 8 element crossed yagi.....	£31.05
10XY/2m, 10 element crossed yagi.....	£40.83
Q4/2m, 4 element Quad.....	£25.88
Q6/2m, 4 element Quad.....	£33.93
D5/2m, 5 over 5 slot fed yagi.....	£21.85
D8/2m, 8 over 8 slot fed yagi.....	£29.33
UGP/2m, ground plane.....	£10.12
MBM48/70cms, Multibeam.....	£31.05
MBM88/70cms, Multibeam.....	£42.55
TAS 1/2" 2m, Whip mobile.....	£15.30
C5/m, Colinear.....	£47.73
C8/70cm, Colinear.....	£54.05
D15/1296 23cm, Antenna.....	£36.80
Carriage on Antennas £4.50.	



TR7800

Continuing TRIO's policy of presenting the Radio Amateur with the finest equipment available, we were pleased to announce the NEW TR7800 2m FM Mobile Transceiver. 15 memory channels - Priority channels with simplex ± 600 KHz or non-standard operation - "Priority alert" bleeps when signal on M14 priority channel. Frequency coverage 144.00, 145.955 in switchable 5 KHz or 25 KHz steps. Front keyboard for selecting frequencies, programming memories and controlling scan function. ALL THIS and MORE for £257.60.



TRIO R1000

R1000 Receiver £297.86
The latest general coverage from Trio. Frequency coverage 200 KHz to 30 MHz in 30 bands. Using an advanced PLL system. Full digital readout. Three filters 12 KHz for AM - 6 KHz narrow AM and 2.7 KHz SSB. Also incorporates a noise blanker. Operation is from 100-240V AC or 12V DC.

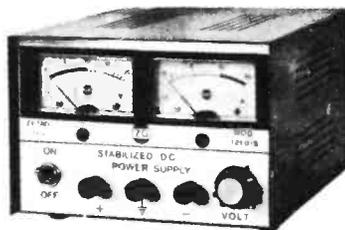


The TS930S latest transceiver from Trio Price: £1078.00 inc. VAT.

TRIO	
TS830S HF Transceiver.....	£694.83
AT230 All band Antenna Tuner/SWR.....	£119.83
TS530S HF Transceiver.....	£534.98
SP230 Speaker.....	£34.96
DFC230 Digital remote control.....	£179.86
TS130S Solid State HF Transceiver.....	£525.09
TS130V Solid State HF Transceiver.....	£445.05
PS20 Power supply.....	£49.46
PS30 Power supply.....	£88.55
AT130 Antenna Tuner.....	£79.12
TL922 2 KW Linear Amplifier.....	£624.91
TR2300 Portable 2m Transceiver.....	£166.75
TR2500 Hand Held 2m Transceiver.....	£207.00
TR7730 the compact 2m Transceiver.....	£247.94
TR7800 25 watt 2m FM Transceiver.....	£257.60
TR7850 40 watt 2m FM Transceiver.....	£314.87
TRIO TR9130 2m Transceiver.....	£395.00
TR9500 70cm Multimode Transceiver.....	£449.88
TS930S HF Transceiver.....	£1080.00
R1000 Solid State Receiver.....	£297.85
R600 Solid State Receiver.....	£235.00

Full range of TRIO Accessories stocked.

DATONG PRODUCTS	
PCI General Coverage Converter.....	£120.75
Low Frequency Converter.....	£25.30
FL1 Frequency Audio Filter.....	£67.85
FL2 Multi-Mode Audio Filter.....	£89.70
Automatic RF Speech Clipper.....	£79.35
RF Speech Clipper.....	£26.45
D70 Morse Tutor.....	£49.45
AD370 Active Antenna (outdoor).....	£51.75
AD270 Active Antenna (indoor).....	£37.95
2M Converter.....	£35.65
Keyboard Morse Sender.....	£129.00



MOD. 1210 S

SOLID STATE STABILISED POWER SUPPLIES
Maximum ratings quoted. Prices include postage.
Model 125 10-15V 5 amp..... £29.50
Model 156S 4-15V 5amp Twin Meter..... £40.00
Model 1210S 4-20V 10 amp Twin Meter..... £75.00

RECEIVERS AND TRANSCEIVERS	
SR9 Tunable 144-146MHz Receiver.....	£46.00
R512 Aircraft Band Scanning Receiver.....	£135.00
Regency Digital Flight Scan Synthesised Aircraft Band Receiver.....	£215.00
Yaesu FRG7 Receiver.....	£199.00
'Sky ACE' Hand Held Aircraft Band Receiver.....	£49.50
AR22 2m Hand Held Receiver.....	£83.00
R528 Hand Held Aircraft Receiver.....	£88.50
FXI Station Wavemeter.....	£34.00
2-way Antenna Switch 3-30MHz.....	£5.00
3-way Antenna Switch 3-30MHz.....	£10.00
FDK 700EX Transceiver.....	£199.00
FDK 750E Transceiver.....	£299.00
DL50 50 watt 5ohm Dummy Load.....	£6.50
DL500 Dummy Load/Wattmeter 1 Kw. 3-400MHz-50 ohms.....	£38.00
WH.2 VHF Wavemeter.....	£22.30



J.R.C. NRD515D

General coverage receiver 100 KHz to 30 MHz fully synthesised. Digital readout PLL synthesiser with rotary type encoder pass band tuning - modular construction. £1,098.00

Matching Transmitter Solid State 100 Watts available.

NEW 24 CHANNEL MEMORY UNIT.

ACCESS & BARCLAYCARD facilities. Instant HP service. Licensed Credit Broker - quotations upon request.

Try our new "Overnite" service for £6.00. Guaranteed 24 hour service if order placed before 11 a.m. (except North GM).

Part exchange always welcome. Spot cash paid for good clean equipment. If you have equipment surplus to your requirement we would be pleased to sell this on commission for you.

Shop Hours: 9.30 to 5.30 Monday to Friday. 4.30 p.m. Saturday.

No parking problems. Turn at the Greyhound Motel on the A580 (East Lancs.) Road, S.A.E. with all enquiries. 25p will bring you latest information and prices. Postage carriage extra.

ALL OUR PRICES INCLUDE VAT
SEND S.A.E. FOR OUR UP-TO-DATE SECONDHAND LIST.

FULL RANGE OF DIAWA ANTENNA ROTATORS, SWR METERS, AUTOMATIC ANTENNA TUNERS, WELLZ SWR METERS AND ATU'S IN STOCK. ALSO AVAILABLE FROM STOCK G4MH MINIBEAMS HQ1 MINIBEAM. AND A WIDE RANGE OF HY-GAIN ANTENNAS + THE NEW TET RANGE

MN7 ATU/RF Meter 250Watts.....	£124.20
MN2700 ATU 2 KW.....	£253.00
DL 300 Dummy Load 300 Watts.....	£20.70
DL 1000 Dummy Load 1KW.....	£37.95
TV 3300 Low Pass Filter.....	£18.40
AK75 Doublet Antenna 132' top with 470ohm Feeder.....	£29.90

TRIO TS530S NEW £534.98 ALL BAND HF TRANSCEIVER



TS830S HF SSB TRANSCEIVER £694.83

The new TS830S, the latest from TRIO. A high performance, very affordable HF SSB/CW transceiver with every conceivable operating feature built in for 160 through 10metres (including the new three bands). The TS830S combines a high dynamic range with variable bandwidth tuning (VBT), IF shift and an IF notch filter, as well as very sharp filters in the 455 KHz second IF. Together with the optional VFO230 (remote digital display VFO) which provides split frequency operation and 5 memories for frequency hold, the amateur has available today's advanced technology linked to the proven reliability and exceptional linearity of a valve PA.

- * VBT variable bandwidth tuning
- * IF notch filter
- * IF Shift
- * Various filter options
- * Built in digital display
- * 6146B final with RF negative feed-back
- * Optional Digital VFO for increased flexibility
- * Innovative PLL system of frequency generation
- * RF speech processor
- * Adjustable noise blanker level
- * Adjustable audio tone
- * RF attenuator
- * RIT/XIT
- * SSB monitor circuit
- * Expanded frequency coverage

**G4JDT
HARVEY**

EAST LONDON HAM STORE

**G8NKV
DAVE**

H. LEXTON LIMITED

**191 FRANCIS ROAD LEYTON E.10
TEL 01-558 0854 TELEX 8953609 LEXTON G**

RADIO & ELECTRONIC ENGINEERS

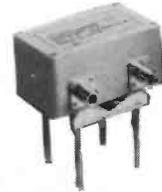
ENGINEERS ALWAYS AVAILABLE ON THE PREMISES

MAIN (UK) SERVICE CONTRACTOR TO HITACHI SALES (UK) LTD

DRESSLER AMPLIFIERS



EXCLUSIVE TO US



GASFET MASTHEAD PREAMPS

D to A.T.V.
D70c 70cm
D200C *150FM 300W SSB

TBA £499.00 D200 *300FM 600W SSB £499.00
£300.00 D200S *500FM 1kW £600.00

VV70GAAS £75.00
VV2GAAS £40.00
VV200GAS £69.00
VV200GAS £75.00
Powered by the linear or with separate ST200
.9dB signal to noise
.2dB insertion loss
3SK97 GASFET

These are high power 240V linears using 4C x 150 or 4C x 250 or 4C x 350 Eimac
Tubes NOT using the grounded Grid system.
Fully protected, no thermal damage to PA finals possible.

ICOM

HF TRANSCIEVERS

IC730 200W £586.00
IC2KL 500W linear £839.00
IC2KLPS Power Supply £211.00
IC AT 100 100W auto A.T.U. £249.00
IC AT 500 500W auto A.T.U. £299.00

ICOM

ACCESSORIES

BP5 IIV Pack £30.15
BP4 Empty case for 6XAA £5.80
BP3 STO Pack £15.50
BP2 6V Pack £22.00
DC1 12V adaptor £8.40
WM9 Mic speaker £12.00
CP1 Mobile Charging load £3.20
LC1 1/2/3 cases £3.50
BC30 base charger £39.00
MML1 10W Booster 49.00

YAESU

FT1 £1295.00
FT902 DM POA
FT101Z POA
FT101ZDFM POA
FT101ZDAM POA
FT707 200W PEP POA
FP707 PSU POA
FC707 ATU POA
FV707 DM VFO POA

SPECIAL OFFERS

FT707 + FP707 + FC707
SPECIAL PRICE POA

FT277ZD Soco all extras inc POA
FT7670X POA
FT902DM Sommerkamp POA
FC902 ATU POA
FV901 DM VFO POA
SP901 speaker POA
YO901P Scope POA
FTV901 Transverter POA
FT208 VHF POA
FT708 UHF POA
FT290 Multimode POA

ALL ACCESSORIES AVAILABLE

MICROWAVE MODULES

MMA 144V 2m Preamp £34.90
MML 144/25 RF AMP £59.00
MML 144/40 £77.00
MML 144/100S New with Preamp £129.95
MMT 432 144
2-70 Transverter £184.00
MMT 28/144 10m Transverter £99.00
MM81 Morse Talker £115.00
MM 4000 RTTY
SEE IT WORKING AT OUR SHOP
£299.00 inc. keyboard
Full range stocked

STANDARD

CPB 58 £79.50
CPB 78 £67.50
C78 70cm Portable £219.00
C58 2mtr. Port ssb/FM £239.00
CMB8 Mounting tray £19.95
CL8 Carry case £6.95
Battery charger 7.95
Set Nicads 11.00

ROTATORS ETC

DIAWA
DR7600X £135.00
DR7600R 144.00
DR7500R £105.00
KENPRO
KR250 £44.00
KR400 £90.00
HAM IV £189.00
CHANNEL MASTER 9502 £50.00
CN620 1.8-150MHz
Pwr/swr £52.00
CN2002 2.5 kW PEP auto ATU £190.00

DATONG

PCI G/C converter HF on 2mtr £120.75
VLF very low frequency converter £25.30
FL1 frequency agile audio filter £67.85
FL2 multimode audio filter £89.70
ASP/B auto RF speech processor (Trio) £79.35
ASP/A auto RF speech processor (Yaesu) £79.35
D75 manually controlled RF Sp/Processor £56.35
RFC/M RF speech clipper module £26.45
D70 Morse titor £49.45
AD270 indoor active antenna £37.95
AD370 outdoor active antenna £51.75
MPU1 PSU for above £6.90

TRIO/KENWOOD

TS930S POA
TS830S HF Transceiver £680.00
TS130S HF Transceiver £530.00
TR8400 UHF mobile £320.00
TR9500 UHF Multimode £440.00
TR7800 VHF mobile £268.00
TR7850HP FM 2m £295.00
TR7730 2m FM £230.00
TR9000 £370.00

Many Trio/Kenwood accessories available

CUSHCRAFT ANTENNA

HF, A3 20/15 10/3 ele ARX 2B Ring Ranger 6dB 144-10T x YAGI £38.95
beam 8bD £170.00 vertical £32.00 144-20T x YAGI £55.00
AV3 20.15.10 Trapped CS100 Speaker £13.50 147-20T
vertical £39.95 A144.44 ele Yagi £18.25 144-146 x YAGI £55.00
AV5 10.15.20.40.80. A144.77 ele Yagi £23.00
Trapped vertical £84.95 A144.11 11 ele Yagi £29.95
ARX2K Conversion Kit RINGO
Mk1 to Ringo MkII £14.18
214B 14 ele boomer
05.2dB £59.95

RECEIVERS ALL ON SPECIAL OFFER -

R600 Trio/Kenwood } POA
R1000 Trio/Kenwood } PHONE
FRG7 Yaesu } HOT LINE
FRG7700 Yaesu } 01-556 1415
FRG7700 Memory }
FRT7700 Tuner }
FRV7700 A/B/C/D/E Convertors }
TC2001 inc. M/Adaptor £148.00 }
SEARCH II £55.00 }

ICOM PORTABLES

IC2E FM 2m £159.00
IC202 SSB £169.00
IC402 70cm £242.00
IC4E FM 70cm £199.00

All accessories available - see below

ICOM MULTIMODES



IC251 2m £495.00
IC451 70cm £366.00
IC290 2m

ICOM FM MOBILES



IC24G £165.00
IC25E £259.00

ICOM 720A G/C



IC720A 200W £883.00
PS15 Power Supply £99.00
PS20P/S with speaker £130.00
IC730 See panel, below left

ALL ACCESSORIES AVAILABLE - PLUGS SKTS CO-AX 2MTR COLINEAR £31.50. 70CM COLINEAR £31.50



PRICES INCLUDE VAT AT THE PRESENT RATE OF 15%
OPEN MON-FRIDAY 9:00-5:30. SATURDAY 10:00-3:00. INSTANT HP FACILITY AVAILABLE
EASY ACCESS M2-M11-M1 NORTH CIRCULAR ROAD-EASY PARKING



OPEN MONDAY-SATURDAY
(CLOSED THURSDAY), 9-5
GIVE US A RING FOR PRICES -
DETAILS - INFO.
0277 (BRENTWOOD) 226470 OR 219435.

ARROW

ELECTRONICS LTD.
DEPT. SW1, LEADER HOUSE
COPTFORD ROAD, BRENTWOOD,
ESSEX CM14 4BN

SOMMERKAMP UK DISTRIBUTOR



FT-ONE with full option specification and General coverage Transceiver £1526.00



FT2772D Mk III + FM, Fan, Mic., DC unit, CW Filter £710.00



FT290R with 3SK88 front end input monitor and NC11C charger £249.00



FRG7700M General coverage receiver + Memory unit £369.00



TS788DX(R) 10M all-mode AM/FM/SSB/CW 80 Watts NEW MODEL with Repeater Offset £365.00
ALSO: Exclusive to SOMMERKAMP authorised dealers NEW 15AMP PSU for TS788DX £79.00 AND NEW: "K-WHIP" 4 MHz wide band Mobile Antenna. 1982 SOMMERKAMP CATALOGUE SHORTLY AVAILABLE.

YAESU MUSEN AUTHORIZED DEALER



FT1012D
Mk III + FM
£665



FT902DM
with Fan, Mic., Keyer unit and Memory
AM/FM/SSB/CW
£885.00 +
FREE PADDLE KEYS



FT-ONE YAESU BASIC MODEL WITH PSU
ONLY £1295.00 EX STOCK

FT208 £209
FT706 £219
NEW MATCHING 2M/70cm HANDY'S



FT290R £249
FT480R £379
FT707 £589
FP707 £125.00
FC707 £80.00
FV707 £180.00



FRG7700

FRG7700 Yaesu £329.00, with memory £409.00; **FRT7700** Tuner £37.85; **FF5** Filter £9.95; **FRV7700A** Converter £68.75; **FRV7700B** Converter £75.50; **FRV7700C** Converter £69.00; **FRV7700D** Converter £66.00



We offer full 2-year warranty of main dealer network - full service - parts - information - full range of stock on permanent demonstration.



IC720A The latest, beautiful solid state general coverage HF transceiver from ICOM £883.00. PSU: PS15 £99.00



IC251E Matching Gear is so nice! ICOM'S 2M ALLMODE Base Station at £499.00

IC2E NOW REDUCED @ £159.00 AND **IC4E** NEW 70cm VERSION £199.00
Remember your "2E" accessories will fit "4E"



FULL ACCESSORIES STOCKED

IC24G £169.00 **IC202S** £169.00
IC25E £259.00 **IC402** £245.00
IC290E £366.00 If it's not listed please ring - we've probably got it!

ASK FOR DETAILS OF OUR INTEREST FREE CREDIT TERMS!!

REMEMBER: we only sell Amateur Radio and associated components/accessories

AUTHORISED "STANDARD" DEALER

C8800 2M FM	£252.00
C7800 70cm FM	£270.00
C78 70 cm FM	£219.00
C58 2M All mode	£225.00
CPB58 Linear	£79.00
CPB78 Linear	£62.00
CMB8 Mobile Mount	£20.00
CLC8 Case	£7.00
C12/230 Charger	£8.00

SPECIAL PRICE ON "AA" NICADS WITH STANDARD PORTABLES.

4MH MINIBEAMS £80.00

Tri-Band 3.6dB gain only seven feet turning radius. Just the job for the difficult location. **ESSEX DISTRIBUTOR FOR 4MH.**

TRIO INSTRUMENTS

AUTHORISED DISTRIBUTOR
Please send for free catalogue of Oscilloscopes, etc., including:
C1303G 1.8-54 MHz Monitorscope with two-tone oscillator. £170.00
DM801 Grid Dip Meter. £63.00
PF810 Power Meter. £85.00
SG402RF sig. Gene. 100kHz-30MHz £68.00

STOP PRESS!!!

NEW YAESU FT102 H.F. TRANSCEIVER
IN STOCK BY TIME OF PUBLICATION THIS VERY LATEST FROM YAESU - FULL DETAILS SENT ON REQUEST (SAE APPRECIATED) PLUS A TRADE-IN PRICE ON YOUR EXISTING EQUIPMENT. OUR TRADE-INS ARE ALWAYS GENEROUS.

ASK FOR OUR TRADE-IN PRICES OR OUR USED LIST - WARRANTY WITH ALL USED GEAR.



"PHONE YOUR ORDER FOR TODAY'S DESPATCH ALL WE NEED IS YOUR OR NUMBER. SMALL SPARES - PLUGS - AERIALS - PHONE FOR A QUOTE FOR THAT NEW RIG!"

ALL ADVERTISED PRICES INCLUDE TAX

Lee Electronics Ltd



London's Leading Stockists of:
STANDARD YAESU ICOM FDK KDK MICROWAVE MODULES LUNAR SST SHURE HI-MOUND CDE STOLLE
TELECOMM ANTENNAE J-BEAM SWAN KATSUMI, ETC.

YAESU GENERAL COVERAGE COMMUNICATIONS RECEIVER FRG7700



- ★ 150KHz - 29.999MHz, FULL COVERAGE HIGH STABILITY DUAL PLL SYSTEM
- ★ AUTOMATIC BAND PASS FILTER SELECTION
- ★ 3 FILTERS FOR AM RECEPTION
- ★ FAST/SLOW AGC SWITCH
- ★ NARROW BAND FM RECEPTION CAPABILITY
- ★ TIMER FACILITIES
- ★ SINPO CODED SIGNAL STRENGTH METER

- ★ RECEIVER NOISE BLANKER
- ★ TWO ATTENUATOR FACILITY
- ★ HIGH QUALITY AUDIO (1.5 WATTS OUTPUT)
- ★ 24 VOLT AC OR (WITH ADAPTOR KIT) 13.8 VOLTS DC
- ★ RECEIVES SSB, AM, CW AND FM (NARROW BAND)
- ★ ALL CONVERTORS AVAILABLE

PRICE **£329.00** inc VAT

£409.00 inc VAT WITH 12 CHANNEL MEMORY

Free amplifier worth **£15.00** with every receiver purchased

400 EDGWARE ROAD
LONDON W2
01-723 5521 Tlx: 298765



INSTANT H.P.
& P/PEX. WELCOME

Send 25p for full details of our range.

DO A DEAL WITH RADIO SHACK!



BEARCAT 220 FB



COLLINS KWM 380

TRIO
 DRAKE
 COLLINS
 HYGAIN
 BEARCAT
 J BEAM
 ICOM
 YAESU
 KDK
 FDK
 DATONG
 JRC
 HAL
 BENCHER
 NYE VIKING
 HUSTLER



TRIO TS-930S



DRAKE TR-7A

AND EVERYTHING ELSE IN AMATEUR RADIO

Just around the corner from West Hampstead Station, Jubilee Line.

30p in stamps for full list + details.



RADIO SHACK LTD.

188 BROADHURST GARDENS, LONDON NW6 3AY

Giro Account No. 588 7151 Telephone: 01-624 7174 Cables: Radio Shack, NW6 Telex: 23718



YAESU

TRIO

REVCO

JAY BEAM

TAL

G8XKS
TONY

SPARES &
SERVICE

NORTH WEST COMMUNICATIONS (LIVERPOOL)

G8XKS
TONY

MAIL ORDER

2M + H.F. AT ITS BEST

"YAESU"

FT208



FT207



FT101ZD Mk 3

FT707



THE FT290R

LOOK AT WHAT YOU GET
FOR ONLY £339.00.

BASIC SET + NI-CADS
 + MM 144/25W LINEAR AMP
 + CHARGER + CASE.
 A GREAT ALL ROUNDER.

FT290R



117 OXFORD ROAD, WATERLOO, LIVERPOOL L22 7RE
 051-920 7483

P
A
C
K
E
R

C
O
M
M
U
N
I
C
A
T
I
O
N
S

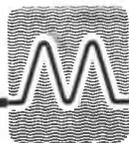
P
M
C
R
Y
S
T
A
L
S

S
O
T
A

M
I
R
A
G
E

K
E
N
P
R
O

H
A
N
S
E
N



MICROWAVE MODULES LTD

THEY'RE ALL NEW... AND FIRST CLASS!

MM2001

RTTY TO TV CONVERTER



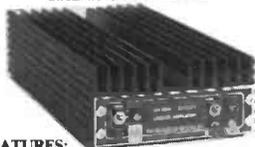
NOW WITH EXTRA FACILITIES!
— SUITABLE FOR UOSAT

This converter, MM2001, contains a terminal unit, and a microprocessor controlled TV interface, and requires only an audio input from a receiver and a 12 volt DC supply to enable a live display of "off-air" RTTY and ASCII on any standard domestic UHF TV set. **THE MM2001 WILL DECODE THESE SPEEDS:**
RTTY: 45.5, 50, 70, 100 baud
ASCII: 110, 300, 600, 1200 baud
A printer output (centronics compatible) allows hard copy of received signals. This unit is compatible with amateur and commercial transmissions.

£169 inc. VAT (P + P £2.50)

MML144/30-LS

**144 MHz 30 WATT
LINEAR & RX PREAMP**



FEATURES:

- 30 WATTS OUTPUT POWER
- SUITABLE FOR 1 OR 3 WATT TRANSCEIVERS
- LINEAR ALL MODE OPERATION
- STRAIGHT THROUGH MODE WHEN TURNED OFF
- ULTRA LOW NOISE RECEIVE PREAMP (3SK88)
- EQUIPPED WITH RFXOX

This new product has been developed from our highly successful MML144/25. It is suitable for use with 1 watt or 3 watt transceivers and the input level is switch selectable from the front panel. Other front panel mounted switches controlling the switching circuitry allow the unit to be left in circuit at all times. The linear amplifier and the ultra low noise receive preamp can both be independently switched in and out of circuit. In this way maximum versatility is afforded.

£65 inc. VAT (P + P £2.50)

MML144/100-LS

**144 MHz 100 WATT
LINEAR & RX PREAMP**

FEATURES:

- 100 WATTS RF OUTPUT SUITABLE FOR 1 WATT OR 3 WATT TRANSCEIVERS
- STRAIGHT THROUGH MODE WHEN TURNED OFF
- ULTRA LOW NOISE RECEIVE PREAMP (3SK88)
- EQUIPPED WITH RFXOX
- SUPPLIED WITH ALL CONNECTORS

This new two stage 144MHz solid-state linear amplifier has been introduced as a result of the large number of low power transceivers currently available. When used in conjunction with such transceivers this unit will provide an output of 100 watts.

Several front panel mounted switches controlling the switching circuitry allow the unit to be left in circuit at all times. The linear amplifier and the ultra low-noise receive preamp can both be independently switched in and out of circuit. In this way maximum versatility and flexibility is available to the user at the flick of a switch.

USE THIS NEW AMPLIFIER WITH YOUR FT290R, C58, TR2300 etc, AND HAVE MOBILE OR BASE STATION PERFORMANCE

£145 inc. VAT (P + P £3)

MTV435

435 MHz TELEVISION TRANSMITTER



FEATURES:

- 20 WATTS PSP OUTPUT POWER
- BUILT IN WAVEFORM TEST GENERATOR
- TWO VIDEO INPUTS
- FOR RX CONVERTER
- TWO CHANNEL USING PLUG-IN CRYSTALS

This high performance ATV transmitter consists of a two channel exciter, video modulator and a two stage 20 watt linear amplifier. The unit will accept both colour and monochrome signals, and a sync pulse clamp is incorporated to ensure maximum output. An internal pin diode aerial c/o switch allows connecting of the aerial to a suitable receive converter when in the receive mode. (MMLC435/600 — £27.90).

Full transmit/receive switching is included together with an internal waveform test generator which will assist the user in adjusting the gain and black level controls.

£149 inc. VAT (P + P £3)

ALL MICROWAVE MODULES PRODUCTS ARE FULLY GUARANTEED FOR 12 MONTHS (Including PA Transistors)

SPACE PERMITS ONLY A BRIEF DESCRIPTION OF THESE NEW PRODUCTS, HOWEVER A FULL DATA SHEET IS AVAILABLE FREE ON REQUEST. OTHER NEW PRODUCTS INCLUDE:

- | | | |
|---------------|--|-----------------------------|
| MMS2 | — ADVANCED MORSE TRAINER: | £155 inc. VAT (P + P £2.50) |
| MML28/100-S | — 10 METRE 100 WATT LINEAR/RX PREAMP | £129.95 inc. VAT (P + P £3) |
| MMK1691/137.5 | — 1691MHz WEATHER SATELLITE CONVERTER: | £115 inc. VAT (P + P £2.50) |

OUR ENTIRE RANGE OF PRODUCTS WILL BE EXHIBITED AND ON SALE AT MOST OF THE 1982 MOBILE RALLIES BY OUR SALES TEAM. SEE YOU THERE



WELCOME

MICROWAVE MODULES Ltd.

BROOKFIELD DRIVE, AINTREE, LIVERPOOL L9 7AN, ENGLAND
Telephone: 051-523 4011 Telex: 628608 MICRO G
CALLERS ARE WELCOME. PLEASE TELEPHONE FIRST

HOURS:

MONDAY TO FRIDAY
9-12.30, 1-5.00

ENTER THE NEW WORLD of KW + TEN-TEC

Introducing a New Concept in HF communications

A NEW SERIES WITH NEW FEATURES, NEW PERFORMANCE, AND ALL 9 HF BANDS.

CONTINUING THE SUCCESS OF A GREAT RANGE OF TRANSCEIVERS BACKED BY KW SERVICE —

- The OMNI-C (TOP of any class)
- The DELTA (an excellent "work-horse" for Home station or Mobile)
- The ARGONAUT (amazing performance at low-cost)

AND NOW!
The **KW+TEN-TEC 'ARGOSY'**



Come to KW for all your other amateur radio requirements KW service and guarantee — KW maintains the tradition of service the company is renowned for. Output-transistors unconditionally guaranteed for 12 months. The KW + TEN-TEC units offered above are introduced as a prelude to fully UK assembled equipment.

* (A full range of accessories is available for KW + TEN - TEC equipment)

- Other KW units available
- KW 107 Supermatch
- KW trap dipole
- KW E-Z match
- KW traps
- KW Balun
- KW antenna switch.

KW + TEN-TEC ARGOSY HF SSB/CW TRANSCEIVER
10-80 metres, 100 watts (Switchable to 10 watts).
Notch Filter. Full break-in on CW. Automatic normal sideband selection plus reverse. 12 - 14v D.C. input. All solid-state. For the price of £320.00+VAT. **A WINNER AT LOW COST.**

KW COMMUNICATIONS LTD

Vanguard Works, Jenkins Dale, Chatham ME4 5RT
Tel: 0634-815173 Telex: 965834 KW COMM G

Sound Advice-Sound Value

A GOOD START is essential to short wave listening and expert advice is important in achieving this. If you've made up your mind to buy a receiver you should be aware it will perform only as well as the antenna it sees. The old adage regarding wire antennas "as long and as high as you can" is still good, but at best is only good for PEAK PERFORMANCE on one or two frequencies, or at worst none.

Whichever frequency you tune your receiver to, for PEAK PERFORMANCE on all frequencies you need good matching between your Receiver and Antenna to get the best from it. If you plan to listen on the high frequency bands up to 30MHz then you know you can't have an antenna for every frequency! BUT we can offer you MUCH IMPROVED PERFORMANCE

from your receiver by using an antenna tuning unit that will electrically change the length of your antenna to match the frequency you select. In other words - A MATCH FOR ALL FREQUENCIES.

You'll see many antennas being advertised under gimmicky names, but when it comes down to it they're only random wires or odd configurations. At the end of the day, if you're expecting the performance the manufacturers specified, then you'll have to buy an antenna tuning unit. DON'T! We'll give you one ABSOLUTELY FREE when you buy your FRG 7700 or FRG 7700M, as well as complete advice on an antenna to suit your available space (which should only cost you a couple of pounds!).

1 YAESU FRG 7700 + FRT 7700 £329.00
1 YAESU FRG 7700M + FRT 7700 £409.00
VAT included



What can you lose? So get cracking MAKE A GOOD START! HAVE PEAK PERFORMANCE FROM THE OFF AND DON'T FORGET, ADD £5.00 IF YOU REQUIRE SECURICOR DELIVERY.

YAESU - JAYBEAM - HYGAIN - BANTEX - AMTECH - CUSHCRAFT - ICOM
and 50 other major lines - all ex stock.



Amcomm Services,
 194, Northolt Road, South Harrow,
 Middlesex HA0 2EN.
 Telephone: 01-864 1166, 01-422 9585.
 Telex: 24263.

SHOWROOM OPENING HOURS
 TUESDAY TO SATURDAY
 10.00 - 6.00 CONTINUOUS



OPPOSITE SOUTH HARROW
 TUBE STATION ON THE
 PICCADILLY LINE

FOR QUALITY CRYSTALS - AT COMPETITIVE PRICES. POPULAR FREQUENCIES IN STOCK

2 METRE STOCK CRYSTALS. Price £1.96 for one crystal. £1.74/crystal when two or more purchased.

	HC6/U	HC6/U	HC25/U	HC25/U	HC25/U	HC6 & 25/U
	30pF TX	30pF TX	30pF and 20pF TX	20pF and 30pF RX	25pF and 20pF TX	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
S8	-	-	12.1000	14.9444	18.1500	44.8333*
S9	-	-	12.1020	14.9472	18.1531	44.8416*
S10	-	-	12.1041	14.9500	18.1562	44.8500*
S11	-	-	12.1062	14.9527	18.1593	44.8583*
S12	-	-	12.1083	14.9555	18.1625	44.8666*
S13	-	-	12.1104	14.9583	18.1656	44.8750*
S14	-	-	12.1125	14.9611	18.1687	44.8833*
S15	-	-	12.1145	14.9638	18.1718	44.8916*
S16	-	-	12.1167	14.9667	18.1750	44.9000*
S17	-	-	12.1187	14.9694	18.1781	44.9083*
S18	-	-	12.1208	14.9722	18.1812	44.9166*
S19	-	-	12.1229	14.9750	18.1843	44.9250*
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

SR = Series Resonance *HC25 only
Also in stock: R0 to R7 and S8 to S23 for following: Belcom FS1007, FDK TM56, Multi 11 Quartz 16 and Multi 7, Icom IC2F, 21, 22A and 215, Trio Kenwood 2200, 7200, Union 2030 and Yaesu FT2FB, FT2 Auto, FT224, FT223 and FT202
Also in stock 4MHz TX in HC6/U for 145.8MHz. Icom crystals TX for 145.6MHz (RR0). 44MHz RX crystals in HC6 for 145.8 and 145 (RR0). All at above price.
4 METRE CRYSTALS for 70.26MHz in HC6/U at £2.25. TX 8.78250MHz. RX 6.7466 or 29.78MHz in stock.
70cm CRYSTALS in stock 8.0222 and 12.0333 in HC6 £1.85. Pye Pocketfone PF1, PF2, PF70 and Wood and Douglas £4.50 a pair or TX £2.25, RX £2.50, SU8(433.2) RB0, RB2, RB4, RB6, RB10, RB11, RB13, RB14 and RB15.
CONVERTER CRYSTALS in HC18/U at £2.85. In stock 38.666, 42.000, 70.000, 96.000, 101.000, 101.500, 105.666 and 116.000MHz. 26.000HC6 £2.00
ONE BURST AND I.F. CRYSTALS in HC18/U at £2.25 in stock. 7.168MHz for 1750kHz and 10.245MHz for 10.7MHz IF's.
FREQUENCY STANDARDS in stock £2.75. HC6 200kHz, 455kHz, 1000kHz, 5.000MHz and 10.000MHz. HC13 100kHz, HC18 1000kHz, 7.000MHz, 10.700MHz, 48.000MHz and 100.000MHz. 4.0000HC18 £2.00

MADE TO ORDER CRYSTALS SINGLE UNIT PRICING

	Price Group	Adjustment Tolerance ppm	Frequency Ranges	Price and Delivery	
				A	B
Fundamentals	1	200 (total)	10 to 19.999kHz	-	£23.00
	2	200 (total)	20 to 29.999kHz	-	£16.50
	3	200 (total)	30 to 159.999kHz	-	£10.50
	4	200 (total)	160 to 999.999kHz	-	£6.00
	5	50	1.00 to 1.499MHz	£10.50	£6.00
	6	10	1.50 to 1.999MHz	£4.75	£4.40
	7	10	2.00 to 2.599MHz	£4.75	£4.40
	8	10	2.60 to 3.999MHz	£4.55	£4.10
	9	10	4.00 to 20.999MHz	£4.55	£4.00
	10	10	21.00 to 24.000MHz	£6.00	£5.40
3rd OVT	11	10	21.00 to 59.999MHz	£4.55	£4.00
5th OVT	12	10	60.00 to 99.999MHz	£5.00	£4.50
13	10	100.00 to 124.999MHz	£6.15	£5.50	
5th, 7th & 9th OVT	14	20	125.00 to 149.999MHz	-	£6.00
15	20	150.00 to 225.000MHz	-	£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 200kHz HC13/U, 170kHz to 170MHz HC6 or HC33/U, 4 to 225MHz, HC18 and HC25. Where holders are not specified crystals above 4MHz will be supplied in HC25/U.

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 specification. Special rates for bulk purchase schemes including FREE supply of crystals used in UK repeaters. The above prices apply to small quantities of crystals for amateur use. We would be pleased to quote for larger quantities or crystals for professional use.

EMERGENCY SERVICE SURCHARGES (to be added to A delivery prices). 4 working days £12. 6 working days £7. 8 working days £5. 13 working days £3. Surcharges apply to each crystal not each order and are subject to VAT.

CRYSTAL SOCKETS HC6/U and HC25/U 20p. MINIMUM ORDER CHARGE £1.50.

TERMS. Cash with order, cheques and postal orders payable to QSL Ltd. All prices include postage to UK and Irish addresses. Please note Southern Irish cheques and postal orders are no longer acceptable. Please send bank draft in pounds Sterling.

PRICES ARE EX VAT. PLEASE ADD 15%



MARKETING LTD. P.O. BOX 19, ERITH, KENT, DA8 1LH
 Telephone: 01-690 4889 (9-5) 24 hr. Ansafone: Erith (03224) 30830
 Telex: 8813271 GECOMS G (Attention QUARTSLAB).

PARTRIDGE G3CED

THE WIRELESS PIONEER OF THE 1920s
OFFERS YOU A SOLUTION TO YOUR

ANTENNA PROBLEMS

AMATEUR HF AND 2M BANDS. CB HARMONIC
AND TVI FREE — LOW ANGLE —
OMNI-DIRECTIONAL

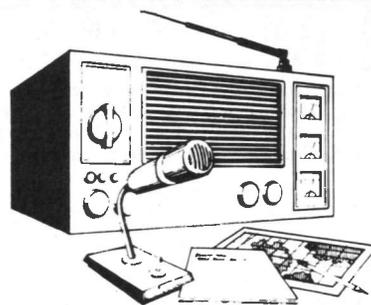
WORLD WIDE COMMUNICATION WITH
ONE 2 FOOT ANTENNA!!!

PRICES DELIVERED. ANTENNAS PLUS ATU

- Mini-multiband—80 thru 10+ 2M + CB coax fed..... £80
 - Mini-multiband—80 thru 10+ 2M + CB 10ft. wire fed..... £80
(Extra feeder — 60p per 10ft. fitted)
 - Stand-off wall bracket..... £6
 - Both above systems for receiving only..... each £50
 - CB only system — 1/1 SWR for more power..... £45
 - CB antenna tuner for 1/1 SWR..... £20
 - “Joyframe” hand rotatable multiband antenna —
Receive version £60
QRP TX version £110
- (Coaxial cable not included in the above prices)
- SEND STAMP FOR FULL DETAILS OF THE
“DO IT ALL WITH THE MIGHTY MINI OR JOYFRAME”

PARTRIDGE

188 NEWINGTON ROAD, RAMSGATE, KENT CT12 6PZ
Tel. 0843 53073 For Technical Info. 0843 62839



BECOME A RADIO AMATEUR

Learn how to become a radio amateur in contact
with the whole world. We give skilled preparation
for the G.P.O. licence.

No previous knowledge required.

Free!

Brochure without obligation to :-

**British National Radio
& Electronic School**
READING, BERKS. RG1 1BR

Name

Address

STW 7/815

BLOCK CAPS PLEASE

P.M. ELECTRONIC SERVICES

2, ALEXANDER DRIVE, HESWALL, WIRRAL,
MERSEYSIDE, L61 6XT.

Telephone: 051-342 4443. Telex: 627371.
Cables: CRYSTAL BIRKENHEAD.

Prices exclude VAT — U.K. customers please add 15% VAT
Commercial and Professional Crystals
New Faster Service

We are now supplying crystals to most commercial and MIL specifications in the range
1 MHz to 60 MHz, ordered in small quantities, within 2½ weeks AT NO EXTRA CHARGE.
We also have an even faster EXPRESS SERVICE for that very urgent order. We can also
supply crystals for commercial applications e.g. Microprocessor, TV etc., at very
competitive prices. Let us know your needs and we will send a quote by return,
alternatively telephone or telex our Sales Engineer Mr. Norcliffe who is normally available
in the office for technical enquiries between 4.30 and 6.30 p.m.

Crystals Manufactured to Order to Amateur Specification	Order to Amateur Specification	Price
6 to 9.99kHz HC13/U.....	1.5 to 2.59MHz (fund) HC8/U.....	£32.80
10 to 19.99kHz HC13/U.....	2.6 to 21MHz (fund) HC8/U.....	£31.00
20 to 29.99kHz HC13/U.....	3.4 to 3.99MHz (fund) HC18 & 25/U.....	£23.08
30 to 59.99kHz HC13/U.....	4 to 5.99MHz (fund) HC18 & 25/U.....	£21.73
60 to 79.99kHz HC13/U.....	6 to 21MHz (fund) HC6, 18 & 25/U.....	£15.69
80 to 99.99kHz HC13/U.....	21 to 25MHz (fund) HC6, 18 & 25/U.....	£13.08
100 to 149.99kHz HC13/U.....	25 to 28MHz (fund) HC6, 18 & 25/U.....	£11.32
150 to 159.99kHz HC8/U.....	18 to 63MHz (30/T) HC6, 18 & 25/U.....	£11.32
160 to 399.99kHz HC8/U.....	60 to 109MHz (50/T) HC6, 18 & 25/U.....	£7.83
400 to 499.99kHz HC8/U.....	105 to 125MHz (50/T) HC18 & 25/U.....	£7.00
500 to 799.99kHz HC8/U.....	125 to 149MHz (70/T) HC18 & 25/U.....	£7.83
800 to 999.99kHz HC8/U.....	150 to 179MHz (90/T) HC18 & 25/U.....	£11.01
1.0 to 1.499MHz HC8/U.....	180 to 250MHz (90/T) HC18 & 25/U.....	£11.25
		£13.50

TOLERANCES: Up to 800kHz — Total tolerance = ± 100ppm 0°C to +70°C. Over
800kHz — Adj. tol. = ± 20ppm. Temp. tol. = ± 30ppm -10°C to +60°C. Unless
otherwise specified fundamentals will be supplied to 30pf circuit conditions and
overtone to series resonance.

DELIVERY: 1MHz to 106MHz — 4/6 weeks, other frequencies — 6/8 weeks. Prices shown
are for “one off” to our standard amateur specifications, closer tolerances are available.
Please send us details of your requirements.

4 METRE, 2 METRE AND 70 CENTIMETRE STOCK CRYSTALS

We stock crystals for 70.26MHz on 4m. On 2m we stock R0 thru R8 and S18 thru S24. For
70cm we have R0 thru R15 plus SU8, SU18 & SU20. For full details of the above stock
crystals plus details of our Converter, Marker and Alternative IF crystals, crystal sockets
and our AERIAL RANGE see page 108 April Short Wave Magazine or send SAE to the
above address.

S.M.C. (TMP ELECTRONIC SUPPLIES)

The Company that offers you: —
**2 YEAR GUARANTEE AND FREE FINANCE
ON SELECTED ITEMS**

(Invoices over £100. Subject to normal credit restrictions)

“Free Finance”? “Yes you pay no more than the
cash price”, “How’s it done?” “You can pay 20%
down and split the balance in 6 equal parts or pay
50% down and split the balance into 12 equal
parts”. “How long does all this take?” “If you have
a call sign and appear in the call book it’s INSTANT!”

FULL RANGE OF YAESU EQUIPMENT IN STOCK,
ALSO HY-GAIN, MICROWAVE MODULES, CDE
ETC., ETC.

UNIT 27, PINFOLD WORKSHOPS, PINFOLD LANE, BUCKLEY,
CLWYD, N. WALES, CH7 3PL.
TEL: BUCKLEY (0244) 549563.

Open Tuesday-Friday 9.30-5.30. Saturday 9.30-4.00, Lunch 1.00-2.00.

Closed for Annual Holiday from 4 pm 24th July to 9.30 am 17th August.

G2BAR HAM BAND AERIALS.

	Price inc. VAT.	P.P.
2 metre Folded Dipole YAGI	£9.78	£2.00
5/FD. 5 element Square section Boom	£9.78	
8/FD. 8 element Reinforced Boom	£12.58	
2 metre 'J' Pole		
1/JP. 1/4 wave matching sections, enclosed connectors with half wave radiator 15mm square elements	£9.78	
70cms. Folded Dipole YAGI's		
7/FD. 7 element square section boom	£9.20	
11/FD. 11 element reinforced boom	£12.58	
H.F. YAGI BEAMS		
2 element YAGI Beams		
Driven and director elements. Boom to element clamps		
Tubular Gamma Match tuning unit supplied.		
10 metre - 2 element array	£34.50	£6.00
15 metre - 2 element array	£42.50	
20 metre - 2 element array	£52.50	
3 element YAGI Beams		
10 metre - 3 element array	£46.00	
15 metre - 3 element array	£57.00	
20 metre - 3 element array	£68.00	
Well designed and constructed		
Boom to Mast; bracket plate; 4 U Bolts	£4.60	£2.00
Trapped Vertical 1/4 wave 300 watt.		
10 - 15 - 20 metres. Tuned Slim Line Traps -		
Telescoping Aluminium Elements for easy adjustments	£34.50	£6.00
PORTOMASTS 12/4 telescoping aluminium tubing extended to 12'6" mast including 3 guys and ground pegs	£12.00	£2.00
18ft. Portomast with 6 guys and ground pegs	£16.00	
TELESCOPING ALUMINIUM TUBING OD. sizes quoted price per foot.		
1 1/4" @ 42p - 1" @ 39p - 3/4" @ 36p - 1/2" @ 34p - 1/4" @ 29p - 1/8" @ 24p. Plus VAT @ 15% and P.P.		
4 + METRE RANGE		
1/2 Wave Centre Fed Dipole		
15' Boom section and Mast bracket	£5.75	£2.00
2 Element Folded dipole YAGI with Boom and Mast bracket supplied	£10.35	
4 Element Folded dipole YAGI with reflector		
2 Directors Boom and Mast bracket supplied	£16.10	£6.00
6 Element Folded dipole YAGI with reflector and 4 directors		
3 Section and mast bracket supplied	£27.60	£6.00

UPPINGTON TELE-RADIO (Bristol) LTD.

12-14 Pennywell Road, Bristol BS5 0TJ.

Tel. 557732

Please send 30p stamps for descriptive leaflets.

R. T. & I. ELECTRONICS LTD.

Ashville Old Hall, Ashville Road, London E11 4DX Tel. 01-539 4986

Nearest Station: Leytonstone (Central Line)

We are MAIN DISTRIBUTORS for AVO, MEGGER, TAYLOR and SULLIVAN INSTRUMENTS

FULLY OVERHAULED EQUIPMENT

EDDYSTONE EC10Mk. 1. RECEIVER	£103.50
EDDYSTONE EC10Mk. 2. RECEIVER	£126.50
EDDYSTONE 840C. RECEIVER	£109.25
EDDYSTONE 730/4. RECEIVER	£149.50
EDDYSTONE 680X. RECEIVER	£166.75
EDDYSTONE 940. RECEIVER	£236.90
EDDYSTONE 880/2. RECEIVER	£420.00
EDDYSTONE 1001. RECEIVER	£517.50
EDDYSTONE 830/7. RECEIVER	P.O.A.
EDDYSTONE 990V 27-240Mhz. RECEIVER	P.O.A.
EDDYSTONE 990S 230-870 Mhz. RECEIVER	P.O.A.
HAMMARLUND MODEL SP600X. RECEIVER	£245.00
HAMMARLUND MODEL HQ170. AMATEUR B.S. RECEIVER	£213.90

NEW EQUIPMENT

TRIO R-300 Receiver	£193.89
YAESU FRG-7 Receiver	£199.00
YAESU FRG-7000 Receiver	£299.00
YAESU FRG-7700 Receiver	£329.00
MEMORY UNIT FOR FRG-7700	£90.95

AVO & MEGGER EQUIPMENT (A Few Examples)

AVO Digital Multimeter Model DA211	£67.85
AVO Digital Multimeter Model DA212	£94.76
AVO Digital Multimeter Model DA116	£155.00
AVO Digital Multimeter Model DA117 Auto Range	£186.00
AVO Digital Multimeter Model DA118	£231.72
Taylor Analogue Multimeter Model 131	£21.96
Taylor Analogue Multimeter Model 132	£28.52

Cases for AVO, TAYLOR & MEGGER instruments in stock. Send for Details.

We also repair all types of instruments. Trade and Educational enquiries invited.

SINCLAIR DM235 Digital Multimeter	£60.38
Carrying Case for DM 235	£8.86
Mains Adaptor for DM 235	£5.69
SINCLAIR PDM35 Pocket Digital Multimeter	£39.68
SINCLAIR PFM200 Pocket Digital Frequency Meter	£57.27
JOYMATCH IIIIB	£22.55
JOYMATCH A.T.U. Kit, £10.50	A.T.U. Kit Assembled, £12.75
Artificial earth and bandswitch, £10.50	

SHURE MICROPHONES, 526T £39.33; 444, £32.43; 401A, £16.56; 202, £15.18; 201, £14.49. Full details on request.

CROTECH OSCILLOSCOPES IN STOCK.

TMK METERS: Model TP10S, £20.41. Model 500TU-B, £36.36. Model TW20CB, £41.69. Model TPSSN, £23.57. Model 700, £71.30. Also in stock Leather Cases for above. Model 700B, £76.16. Full details on request.

In present conditions we regret that all prices are subject to alteration without notice. ALL PRICES INCLUDE VAT AND CARRIAGE. Terms: C.W.O., Approved Monthly Accounts, Hire Purchase and Part Exchange. Special facilities for export.

HOURS - 9.30 am - 5.30 pm MON.-FRI. CLOSED SATURDAYS

WORLD RADIO/TV HANDBOOK 1982

The World's only complete reference guide to International Radio & Television Broadcasting Stations. It includes: Frequencies, time schedules, announcements, personnel, slogans, interval signals and much more besides of value to the listener.

Lists all International short-wave stations, including frequencies, for each country; foreign broadcasts, long and medium wave stations (AM broadcast Band), TV stations and domestic programmes. Long recognised as the established authority by broadcasters and listeners. It is the only publication that enables you to identify BC stations quickly and easily. Enables you to fill more pages in your log book on the SW BC bands and helps you add more BC-station QSL cards to your collection.

£11.35

(The above price includes postage and packing).

from

SHORT WAVE MAGAZINE
34 High Street, Welwyn, Herts. AL6 9EQ

WOOD & DOUGLAS



A NEW range of products is available from us to cover the increased interest in video transmission.

TVUP2 TV Up Converter is a two r.f. stage receive converter with a crystal controlled local oscillator. The pcb accepts signal at 70cms and outputs them at Channel 36 on a standard TV set. The TV output is filtered and there is a 'de-sense' input to allow monitoring of local signals without compression. Overall gain is 25dB minimum, noise figure better than 2.5dB.

Kit - £19.60

Assembled - £26.95

TVM 1 TV Modulator converts any 70cms transmit strip into a series modulated DSB video transmitter. The pcb accepts composite video signals and incorporates a sync pulse clamp and black level adjustment. With an external pass transistor the board will source up to 2 amps current drive.

Kit - £5.30

Assembled - £8.10

ATV-1 Video Transmitter a boxed finished video transmitter giving 3W p.s.p. The unit is housed in a vinyl-topped enclosure measuring 8" x 5" x 2". Video input is via two independently switched BNC inputs, each having a front panel mounted level control. There is a receiver output via a PIN diode aerial switch for connection to an Up Converter such as the TVUP2. The rear panel also has a monitor output for waveform inspection on an oscilloscope. The unit has internal preset controls for black level and sync stretching circuitry. The unit is unique in that it is dual mode. There is a NBFM modulator included to allow station identification at 70cms simply by plugging a microphone into the front panel socket. The whole unit runs from a 14V maximum PSU and will give good reliable service in either mode. A one year guarantee is offered on parts and labour.

Boxed ready to go at £87.00

ATV-2 Video Transceiver the natural progression from the ATV-1. The highly successful ATV-1 and TVUP2 circuitry have been combined to give a complete video station. All you require is a standard TV set and a camera. What could possibly be easier?

Boxed ready to go at £119.00

Incidentally as both these units have NBFM facilities you will not be left high and dry with a white elephant should video be removed from 70cms. Simply plug in a new crystal and you can work your local FM repeater.

70LIN3/10E is a 3W to 10W linear designed as a video booster for the ATV2 or 2 to give 10W minimum output from our very popular video transmitters. The board is 'straight through' with no power supply connected or when in receive mode. It has automatic r.f. sensed changeover when transmission takes place. The unit is of course usable for NBFM operation with the new handheld transceivers such as the IC4-E.

Kit - £28.95

Assembled - £39.10

Just a few examples of our ever increasing range. An SAE will bring you the latest details and prices. Technical enquiries can be answered between 7-9p.m. on either 07356 5324 or 0256 24611. Kits when stock are return of post otherwise allow 28 days. Assembled/boxed items, allow 20/40 days. Prices include VAT at the current rate. Please include 70p postage and handling on total order except boxed items which should be £1.00 for recorded delivery.

9 HILLCREST, TADLEY, BASINGSTOKE, HANTS RG26JB

We apologise for the inconvenience but shall be closed for annual holiday between 3rd to 17th July.

Catronics YOUR
ONE-STOP
SHOPPING CENTRE
for Complete Equipment from
TRIO, PHILIPS, etc.
& Accessories from Jaybeam, Microwave Modules, etc.

**THINK JAYBEAM—
THINK CATRONICS**
We generally have the wide range of
'Jaybeam' aerials in stock as follows:

FOR 2m Band:		FOR 70cms Band:	
C5/2M 5dB colinear	£47.70	C8/70cm 8dB colinear	£54.00
LR1/2M 4½dB Vertical	£25.85	D8/70cm Double 8 yagi	£22.40
5Y/2M 5 element yagi	£12.05	PBM18/70cm 18 ele	
8Y/2M 8 element yagi	£15.50	Parabeam	£27.55
10Y/2M 10 ele 'long yagi'	£33.30	MBM48/70cm 48 ele Multi	£31.00
PBM10/2M 10 ele		MBM88/70cm 88 ele Multi	£42.50
Parabeam	£39.65	8XY/70cm Cross 8 ele yagi	£36.75
PBM14/2M 14 ele		12XY/70cm Cross 12 ele	
Parabeam	£48.25	yagi	£46.00
5XY/2M Cross 5 ele yagi	£24.70	X6/2M/X12/70cm Dual	
8XY/2M Cross 8 ele yagi	£31.00	Band	£41.35
10XY/2M Cross 10 ele yagi	£40.80		
Q4/2M 4 ele quad yagi	£25.87	FOR 23cms Band	
Q6/2M 6 ele quad yagi	£33.90	D15/1296 Double 15 yagi	£36.75
D5/2M Double 5 yagi	£21.80	PHASING HARNESSSES:	
D8/2M Double 8 yagi	£29.30	PMH/2C 2m circular	£8.05
SVMK/2M Vert Mount Kit	£8.05	PMH/2M 2m stacking	£10.90
UGP/2M Unipole	£10.90	PMH/70 70cm stacking	£9.20
HO/2M Mobile 'halo'	£5.15	MASTS, ROTATORS, etc.:	
HM/2M 'Halo' + 24" mast	£5.75	SPM 16' portable mast	£16.35
X6/2M/X12/70cm Dual		PME 4' extension	£2.75
Band	£41.35	9502 Rotator	£55.75

ALL PRICES INCLUDE VAT, but please ADD CARRIAGE as follows: Harnesses, halos, and UGPs — £1.50. Other aerials and masts — U.K. mainland, £5.50.

LISTEN TO THE WORLD
WITH A RECEIVER FROM **Catronics** Best Selection LOWEST PRICES

MEDIUM WAVE/SHORT WAVE

Trio R-600 is a new high class general coverage receiver covering 30 bands between 150kHz and 30MHz with a PLL synthesiser. Both digital display readout (1kHz resolution) and analog display (10kHz resolution) are provided for easy and accurate tuning. The R-600 also includes three IF filters, RF ATT and tone control, etc., to ensure the best receiving conditions for each mode. 240V ac/12V dc supply. £235.

AIRBAND (VHF)

Signal R517 portable fully tuneable 118 to 143MHz with provision for 3 crystals (extra) 1.8V sensitivity. Fine Tuning control, Telescopic aerial. Catronics Price £48

Signal R528 portable crystal controlled channels, with scanner. High performance, pocket size. Catronics Price £69.50 + crystals £2.80 ea.

MARINE/AMATEUR (VHF)

Search SR9 fully tuneable coverage + provision for 11 crystals. Fine tuning and Squelch controls. 12Vdc supply. Excellent value at Catronics Price only £46

Lowie DS10 portable, 10 crystal controlled channels automatically scanned. Re-chargeable batteries and charger included, Telescopic aerial. £75 + crystals £2.80 ea.

SYNTHESISED SCAN—AIR/MARINE ETC.

SX200N—the ultimate scanner for 32,000 channels covering 26-88, 108-180, 380-514MHz AM and FM, 16 memory channels, 2 speed scan, 3 squelch modes + Digital Clock Display. Listen to 10m-70cm Amateur, Aircraft and Marine Bands. 230V ac/12V dc supply. New version with improved filters, etc.

ALL FOR ONLY £284

Additional crystals for above receivers: Airband and Marine, £2.80; Amateur, £2.50.

All prices include VAT but add carriage: R600 & SX200N, £5.50, others £1.50

Goods may be ordered via PRESTEL: use MAILBOX account 016889701 — or pay by Barclaycard, Trustcard, VisaCard, Access, Eurocard, Master Charge, etc.: cash, cheques, H.P. or Catronics Credit Charge Card

Post orders normally dealt with on same day as received.
Everything covered by CATRONICS THREE STAR GUARANTEE.

CATRONICS are only 300 yards from Wallington Railway Station (L.B. or VIC.).
Frequent buses from Croydon and Sutton. Three big car parks within 100 yards.

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

Shop/Showroom open Monday to Friday 9 a.m. — 5.30 p.m.
(closed for lunch: 12.45 — 1.45.) Saturdays: 9 a.m. — 12.45 p.m.

("SITUATIONS" AND "TRADE")

20p per word, minimum charge £2.40. No series discount. All charges payable with order. Insertions of radio interest only accepted. Add 50 per cent for Bold Face (Heavy Type). No responsibility accepted for transcription errors. Box numbers 40p extra. Send copy, with remittance, to the Classified Dept., Short Wave Magazine Ltd., 34 High Street, Welwyn, Herts. AL6 9EQ.

TRADE

APPLE software: programs on disc, £10 inc. p/p, s.a.e. for details.—G3ZPF, QTHR.

Listener and QSL cards, quality printing on coloured and white gloss card at competitive prices. Send s.a.e. for samples.—S.M. Tatham, "Woodside", Orchard Way, Fontwell, Arundel, West Sussex.

Aircraft Communications handbook, including spot MF, HF, VHF, UHF, frequencies, airports, air traffic control centres, weather reports, broadcast times, beacons, long range stations, call signs, maps, etc., 384 pages, £7.50 plus £1 p/p.—PLH Electronics, 97 Broadway, Frome, Somerset BA11 3HD.

August issue: due to appear July 30th. Single copies at 80p post paid will be sent by first-class mail for orders received by Wednesday, July 28th, as available.—Circulation Dept., Short Wave Magazine, 34 High Street, Welwyn, Herts. AL6 9EQ.

QSL cards. Sample pack and price list forwarded on receipt of 22p stamp.—Derwent Press, 69 Langstone Drive, Exmouth, Devon EX8 4HZ.

RTTY/CW Decoder: easy to build kit with 8-character alphanumeric LED display (expandable), or with latched ASC11 output and strobe for computer interface—requires same connections and software as parallel encoded keyboard. 45 and 50 baud RTTY, 5 to 30 w.p.m. Morse. Kit price (excluding case) £64.50 with display, £39.75 as interface. Parts available separately; construction data £3.95 plus s.a.e.—MacRitchie (Micros), 100 Drakies Avenue, Inverness IV2 3SD.

Amateur Equipment bought and sold, cash waiting. Contact G3RCQ. Hornchurch 55733 evenings.

Courses—RADIO AMATEURS EXAMINATION, City and Guilds. Pass this important examination and obtain your licence, with an RCC Home Study Course. For details of this and other courses (GCE, professional examinations, etc.) write or phone: **THE RAPID RESULTS COLLEGE, Dept. JV1, Tuition House, London SW19 4DS.** Tel: 01-947 7272 (9 a.m. to 5 p.m.), or use our 24-hr Recordacall Service, 01-946 1102, quoting Dept. JV1.

Aerial wire, 14 s.w.g. hard-drawn copper, 70-ft. coils, £5.75; 140-ft. coils, £9.50. TVI/AFI, cure it with ferrite rings, 67p each. Amsat 28 MHz pre-amp. kits, complete, £7.85. All prices include postage and VAT.—TMP Electronics, Unit 27, Pinfold Workshops, Pinfold Lane, Buckley. Clwyd CH7 3PL.

Personalised QSL's 100 for £12.50, 5000 for £42. Log books available. Send s.a.e. for samples.—Printshop, 89 Derwent Street, Consett DH8 8LT.

READER'S ADVERTISEMENTS

10p per word, minimum charge £1.50 payable with order. Add 25 per cent for Bold Face (Heavy Type). Please write clearly, using full punctuation and recognised abbreviations. No responsibility accepted for transcription errors. Box Numbers 40p extra. Send copy, with remittance, to the Classified Dept., Short Wave Magazine Ltd., High Street, Welwyn, Herts. AL6 9EQ.

READERS

For Sale: Myers synchronous detection AM module, fully assembled, £20. — Ring Williams, 0376-23604.

For Sale: Standard C58/78 mobile mount, carrying case, microphone, rubber duck, and nicad charger, £30. Reason? Rig pinched! — Ring Nick, G6HUR, 021-329 2136.

Wanted: Ex-R.A.F. receiver Type R.1475 and matching mains PSU. Both preferably in very good condition and appearance, with no modifications or parts removed. I will pay for transit by B.R.S. Write (no phone calls please) with details of condition and price. — Barker, 42 Swinhoe Gardens, Wideopen, Newcastle-upon-Tyne NE13 6AF.

Exchange: Narco Mk. 7 certified aircraft transceiver, 360-channel, 12v., no mic. Part-exchange either way for two-metre multimode, etc. — Ring Hunt, Poynton 876192 (Cheshire).

Exchange or Sell: FT-101ZD/FM Mk. III, one year old, for modern 2m. FM with PSU. Or W-H-Y? S.E. Labs 'scope, solid state, £50. Transformers, 1185-0-1185v. 400mA, £10 each. — Ring Hamer, Coventry 504982.

Selling: Hamerlund HQ-120 super pro-plus power supply unit, spare set of valves, good condition, sensible offers please. — Poulton, 1 Brook Street, Renishaw, Sheffield, Yorkshire.

Sale: Valradio transvertors, 24v. DC/240v., 50 Hz, as new, 500W, £200; 200W, £100. — Osborne, G3HMO, QTHR. (Tel: 01-701 2224 day, 01-639 5147 evenings).

For Sale: Trio TR-2300, input repeater monitor added, also mic. switch, complete with leather case, carrying strap and charger, £135. — Ring Koester, 04243-2177.

Sale: Grundig Satellit 3400 Professional, hardly used, excellent condition, £200. (Manchester area). — Box No. 5768, Short Wave Magazine, 34 High Street, Welwyn, Herts. AL6 9EQ.

For Sale: Trio R-1000 communications receiver, boxed, as new, with matching SP-100 extension speaker, £280. JIL SX-200N scanning receiver, little used, boxed, as new, £220. — Ring Wolverhampton (0902) 772056 office hours.

Selling: Swan SS-200 HF transceiver and PSU, £200 or near offer. Model A-2000 ATU/SWR/Power meter, 80-2m., unused, in box, connecting leads, £50 or near offer. CW Tx, 80-10m., with PSU (slight attention required), £20 or near offer. **Wanted:** Multi standard VHF/UHF colour TV; also light weight rotator. — Ring West, G4EDE, 01-274 2708, or Thanet (0843) 26116.

For Sale: Yaesu FT-290R, nearly new, £200. Two-metre, 10-ele, crossed Yagi, £30. HF antenna rotator, £50. Mast, 32-ft., £25. — Ring Hallam, Grimsby (0472) 825698.

August issue: due to appear July 30th. Single copies at 80p post paid will be sent by first-class mail for orders received by Wednesday, July 28th, as available. — Circulation Dept., Short Wave Magazine, 34 High Street, Welwyn, Herts. AL6 9EQ.

Selling: Trio R-600, 3 months old, mint, original packing, with manual, £200 or near offer. — Ring Dawson, 01-733 8878.

Wanted: SSB unit for Grundig Satellit 2000 or 2100, any condition. — McGill, 48 Sutton House Road, Hull HU8 0NL.

Offering: Darke SPR-4 receiver with all accessories, mint condition, must sell, first reasonable offer secures. — Ring Carpenter, 01-650 6596.

Wanted: Eddystone S.640, or Hambander, receiver. Non-working accepted if complete and unmodified. — Ring Fowle, Broadstone (0202) 698142.

For Sale: R-820 receiver, SP-820 speaker, very good condition (cost over £700 new), sell for £475 or near offer. Must sell, need cash! — Ring White, Chipping Sodbury 310811.

TUNE IN FOR TOP RESULTS.



Whichever class of operator you are — A or B — Heathkit offer you the finest equipment. Highly advanced for its class. Just the thing for passing out celebrations.

For Class B Operators

VF 2031. Handheld 2.00 Metre FM Transceiver. 8 channels. Crystal control — Simplex and repeater modes of operation. Internal Nicads complete with charger. Output 2.0 watts.

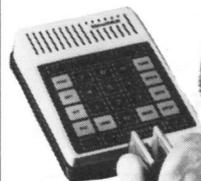
VF 7401-2. 2.00 metres FM Digital Scanning Transceiver.

Simplex and repeater operation.

Selectable pre-programmed frequency scanning capability. 15 watts nominal output. Operates from your car mobile or from optional VFA 7401-1 AC power supply.



VF 7401-2.



SA5010

For Class A Operators

SA5010uMatic (TM) Memory keyer. Uses a microprocessor providing buffer storage up to 240 characters. Speed, weight, spacing and auto repeat selected by 'command strings'. Speeds 1-99 words a minute.

There are lots more high quality amateur radio kits to choose from. All worth making. All exceptionally good value for money. Send for your copy of the Heathkit catalogue and broadcast the good news.

To: Heath Electronics (UK) Limited, Dept (SW7), Bristol Road, Gloucester GL2 6EE.

Please send me a copy of your new catalogue. I enclose 28p in stamps. SW7

Name

Address

N. B. If you are already on the Heathkit mailing list, you will automatically receive a copy of the latest Heathkit catalogue without having to use this coupon.

HEATH  You build on our experience

HEATHKIT

AMATEUR RADIO TUITION DECEMBER

Those long dark winter evenings may seem a long way off at present — yet December is the next opportunity you will have of taking the City & Guilds Radio Amateurs Examination. Now is the time to take the first step into a lifetime hobby that will be exciting, friendly, sometimes difficult but always rewarding. Send a stamped addressed envelope for our brochure and information on the small group special 5 day courses which prepare for this important examination and your Home Office Licence.

PETER BUBB — Tuition
58 Greenacres, Bath, Avon, BA1 4NR.
or telephone 0225 27467

PORTABLE MAST GOVERNMENT SURPLUS 32ft. Heavy Duty Aluminium

Comprising: —

Eight — 4ft. x 2in. Interlocking Tubular Sections.

Eight — Galvanised Ropes.

Four — 27in. Steel Guy Securing Stakes.

Base Plate and Various Accessories.

All packed in strong marine ply in carrying storage container.

£46 including carriage and VAT.

'GRANVILLE MILL'
Vulcan Street,
Oldham OL1 4EU.

Telephone No. 061 652 1418 & 061 633 0170.

EX-GVT MORSE KEYS

We can offer the above Keys (Type W.T. No. 2 Mk. 3/1).

AT £3.90 EACH. (Post/Packing 50p each.)

These are strongly built and fully adjustable. See Last month's advert for our usual line in Cables.

W. H. WESTLAKE, CLAWTON, HOLSWORTHY, DEVON.

G2DYM ANTI-INTERFERENCE ANTI-TVI TRAP DIPOLES inc. WARC NEW BANDS TRANSMITTING & S.W.L. MODELS DATA SHEETS LARGE SAE. AERIAL GUIDE 50p.

Callers Welcome.

Tel: 03986-215

G2DYM, UPLOWMAN, TIVERTON, DEVON

"S.W.M." DX ZONE MAP

9th Edition!

Great Circle Projection on durable, quality, paper for wall mounting, 33 3/4 in. wide by 24 1/2 in. deep. Giving essential DX information — bearing and distance of all parts of the world relative to the U.K., the Zone areas into which the world is divided for Amateur Radio purposes, with major prefixes listed separately. Distance scale in miles and kilometres. Time scale in GMT. Marking of Lat./Long. close enough for accurate plotting. Hundreds of place names, mainly the unusual ones, and most of the rare islands.

Price £3.50 inc. p/p

Publications Dept.

Short Wave Magazine Ltd.,

34 High Street, Welwyn, Herts. AL6 9EQ.

Tel: Welwyn (043871) 5206/7

Sale: Realistic PRO-2008 8-channel microprocessor scanner receiver (£200 new), hardly used, £110 or near offer. — Ring Hothersall, Sittingbourne 73117 after 6 p.m.

Sale: Yaesu FT-201, excellent condition, very little used, best offer over £250. Hammarlund HQ-170 and K.W. Viceroy, both in working order, £75 each. Buyers collect. — Ring Hawkesford, G2HKT, 021-783 7668.

Wanted: Heathkit SB-620 Scanalyser and Advance SG63E FM/AM signal generator. Details of condition and price please.

— Hughes, Electronic Engineering Dept., UCD, Merrion Street Upper, Dublin 2, Eire. (Tel: Dublin 761584 ext. 222, office hours).

For Sale: Yaesu FT-101ZD, FM, with FC-902, new, must sell. — Ring Derby 557705.

Icom/Trio-Kenwood owners: very informative separate newsletters. — Send s.a.e. for details to G3RKC, QTHR.

Sale: Standard C8800 2m. transceiver, £140. Aluminium mast, rotator, 2m. quad, 48-ele 70cm. beam, Ringo Ranger and cable, £110. 10 amp. protected supply, £30. Toyo SWR bridge and dummy load, £50. MM frequency counter, £40. 10-metre converter, £15. All as new.—Ring Stallard, G8XGX, Harlow 39300.

Selling: Sony ICF-6800 multi-band receiver, six months old, hardly used, cost £367, accept £300. Buyer collects.—Ring Thurlow 544.

RESEARCH ASSISTANT — South London

Enthusiastic person required to assist in the research and development of micro-processor control and signalling systems for hand-portable and mobile radio systems. A knowledge of the basic program language is essential and the ability to understand Pascal programs together with other structured language is desirable. Interesting position for young, intelligent, creative and flexible persons with ability and a desire for maximum involvement in a very small but elite dept. Sense of humour and nerves of steel essential.

WRITE in confidence to: **Managing Director, Box No. 5767, SHORT WAVE MAGAZINE LTD., 34 High Street, Welwyn, Herts. AL6 9EQ.**

MORSE ^{MADE} _{EASY} BY THE RHYTHM METHOD!

FACT NOT FICTION •

No expensive equipment required only a turntable

If you start RIGHT you will be reading amateur and commercial Morse within a month. (Most students take about three weeks). That's why after 25 YEARS we still use three scientifically prepared special records with which you cannot fail to learn the MORSE RHYTHM automatically. It's as easy as learning a tune. 18 w.p.m. in 4 weeks guaranteed. Complete course comprising 2x 12" + 1 x 7" multi-speed records + books. U.K. p.p. £7.00. Overseas, sufficient for 750 gms.). Despatch by return from: — S. Bennett, G3HSC, (Box 14), 46 Green Lane, Purley, Surrey CR2 3PC. 01-660 2896.

ALL VALVES & TRANSISTORS

Call or phone for a
most courteous quotation
01-749 3934

We are one of the largest
stockists of valves etc. in the U.K.

COLOMOR ELECTRONICS LTD. 170 GOLDHAWK ROAD
LONDON W12

SOLID STATE BASICS

for the Radio Amateur

Published by the A.R.R.L., this book contains a complete beginner's course in solid-state theory, with simple projects to build, and backed by excellent diagrams and illustrations. There are sections to cover, amongst others, transmitters, receivers and linear IC's. Clearly written, this title is a 'must' for all those who want a thorough grounding in the subject. Complete with index.

159 pages

£3.70 inc. post

Order from:

**Publications Dept.,
SHORT WAVE MAGAZINE LTD.,
34, High Street, Welwyn,
Herts., AL6 9EQ**



The range

SLNA 70s	The 4m version of the best-selling 144MHz switched preamplifier.....	£33.90
SLNA 70u	The unswitched version of the 70s.....	boxed £20.38, unboxed £12.41
SLNA 144s	The best rf switched 144MHz mosfet preamp currently available.....	£33.90
SLNA 144u	The unswitched version of the 144s.....	boxed £20.38, unboxed £12.41
BLNA 432ub/1	1.5dB nf/14dB gain sub-min preamp (29 x 17 x 5 mm) for fitting inside 432MHz transceivers.....	£10.29
BLNA 432ub/2	1.3dB nf version of above.....	£14.95
TLNA 432s	The definitive bipolar 432MHz switched preamplifier. < 1.4dB nf/14dB gain typical with 100W through-power capability.....	£49.90
TLNA 432u	The unswitched version of the 432s.....	boxed £24.80, unboxed £18.50
GLNA 432z	Unswitched professional gasfet 432MHz preamp. 8dB nf/13dB gain (-1) £49.50. 65dB nf/13dB gain (-2).....	£59.50
HDRA 95u	High dynamic range Band II preamp. 1.5dB nf/9dB gain (-1) or 1.5dB nf/11.5dB gain (-2).....	£22.30
BBBA 860u	250-860MHz broadband low-noise amplifier 2.3dBnf/10dB gain at 860MHz.....	£20.50
BBBA 500u	20-500MHz high dynamic range broadband preamplifier.....	£20.38
RPCB 144ub	FT 221/225 front-end board. Still the best commercially available front end for 144MHz - winner of most 144MHz contests and international best-seller!.....	£64.50

MuTek also stocks Kungsimport antenna combiners, dish feeds and all sorts of oddies for the serious vhf'er. Phone for further details or send an S.A.E. with your query. Tnx!
All above prices include VAT at 15%. Carriage on all items (except antennas and Combiners) is now 70p incl VAT.



muTek limited - the rf technology company

Bradworthy, Holsworthy, Devon EX22 7TU (0409 24) 543



J. BIRKETT 25 THE STRAIT, LINCOLN LN2 1JF. Tel. 20767

ITT POLYESTER CAPACITORS .022uf 400v.w. @ 3 for 10p, 0.1uf 100v.w., @ 5p ea. 0.1uf 400v.w. @ 3 for 10p, 1.5uf 100v.w. @ 10p, 2.2uf 250v.w., @ 15p.

MULLARD CERAMIC PLATE 44pf 100v.w. 2% at 6 for 15p.

WESTINGHOUSE 50 PIV 1.5amp Diodes. Wire ended @ 12 for 50p.

20 x 6mm COIL FORMERS With Can @ 3 for 25p.

RADIO TELEPHONE 6mm TUNING CORES 100 for 50p, 200 for 80p.

TRANSISTORS BC 548, BC 558, BSX19, BSX20, BSX21, All at 6 for 50p.

RADIO TELEPHONE RUBBER DUCK around 450MHz @ 75p each.

ITT CRYSTAL FILTERS 10.7MHz B.W. ± 7.5KHz @ £5 each.

ITT CRYSTAL FILTERS 1.4MHz B.W. 3KHz Type 538 ACB @ £5 each.

MULLARD CRYSTAL FILTERS 455KHz B.W. 7KHz @ 50p, VERNITRON FM4 10.7MHz @ 50p.

SUB-MINIATURE MONOBLOC LEADLESS CAPACITORS 50v.w. 10pf, 220pf @ 5p each. 820pf @ 6p, 1000pf @ 8p, 0.047uf @ 12p, 0.1uf @ 15p.

ITT CERAMIC PLATE CAPACITORS 0.01uf 63v.w., @ 20p doz.

SPECIAL RESISTORS 100Meg 5% @ 25p, 500MEG 5% 2.5K.V. @ 30p, 5000MEG 20% 2.5K.V. @ 40p, 50,000MEG 10% @ 60p.

CAMBION WIRE ENDED R.F. CHOKE 68U.H. 470mA @ 15p each.

20 ASSORTED HIGU CRYSTALS For £1.

30 ASSORTED SILVER MICA CAPACITORS For 60p.

MULLARD R.F. POWER TRANSISTORS BLY 83, 175MHz, 7.5 Watt 12 Volt @ £4.95.

MULLARD UHF POWER TRANSISTOR BLY53A 7 Watt 13 Volt 470MHz @ £8.95.

Please add 30p for post and packing. Orders over £3 post free.

NEW! SAMSON ETM-8C MEMORY KEYS

● 8 memories (each one will store approx. 50 Morse characters) - can run once only, or repeat continuously. ● Easy chaining of memory texts to build up longer message sequences. ● Keypad control of memories, REPEAT, & key-down TUNE functions. ● Speeds 8-50 wpm, self-completing, variable (weighting) ratio. ● Normal or squeeze keying with the well-known built-in Samson fully-adjustable precision twin paddle unit. ● Uses 4 AA batteries: only 1µA idling current - Why switch off? ● Keys tx by reed relay or transistor. ● Sidetone oscillator. ● Complete C-MOS keyer & controls on one PCB (ICs in sockets). ● New style case, 4 1/2" W x 2" H x 6 1/4" D. **ETM-8C, £124.95.**

ETM-3C C-MOS KEYSER. Used worldwide for years by Pro. & Amateur stations. Fully-adjustable Samson twin paddles built in for normal or squeeze keying. 8-50 wpm. Relay or transistor keying. Sidetone. 1µA idling current (uses 4 AA batts.). **ETM-3C, £66.95.**

JUNKER PRECISION HAND KEY. Still going strong after 50 years in professional use. Front & back contacts, fully adjustable. Hinged cover. Free-standing. **£41.65.**

BAUER SINGLE-PADDLE UNIT. 1 1/2" x 2" base for home-built El-bugs. Adjustable gaps/tensions. **£13.95.**

All prices INCLUDE delivery UK and 15% VAT. Please send a stamp with enquiries.

SPACEMARK LTD.
Thornfield House, Delamer Road, Altrincham, Cheshire. (Tel: 061-928 8458)

COMMUNICATION EQUIPMENT IN THE SOUTH WEST

FT1.....	£1295.00	YAESU	FT230.....	£239.00
FT101ZDFM.....	£665.00		FT290.....	£249.00
FT90ZDM.....	£885.00		FT208.....	£209.00
FC902.....	£135.00		FT480.....	£379.00
FT707.....	£569.00		FRG7.....	£199.00
FC707.....	£85.10		FRG7700.....	£329.00
FP707.....	£125.25		FRG7700M.....	£409.00
FT107DMS.....	£799.00		FT708.....	£219.00

all other Yaesu products also stocked.
Ancillary equipment stocked include:
Microwave Module products, Drae P.S.U.s and Wavemeters, S.E.M. range, Jaybeam aerials, Shure microphones, plugs, sockets, rotators, cables, etc.
Comprehensive range of valves

REG. WARD (G2BSW) & CO. LTD.
GEORGE STREET, AXMINSTER, DEVON EX13 5DP
Telephone (0297) 33163

G4DSG D.P. HOBBS (NORWICH) LTD. G3HEO
RADIO COMPONENT SPECIALISTS

YAESU FT290R 2m T/Ceiver.....	£249.00
YAESU FRG7 0.5-30MHz Gen. Cov. Rec. 1MHz Segments.....	£199.00
YAESU FRG7700 0.15-30MHz Gen. Cov. Rec. Clock, Timer, Digital Display.....	£309.00
TRIO R1000 Gen. Cov. Rec. 200kHz-30MHz.....	£297.85
TRIO R800 Gen. Cov. Rec.....	£236.00
YAESU FT480R All mode 2m T/Ceiver.....	£379.00
SX 200N Scanning Receiver 26 to 512MHz.....	£264.00
DAIWA SR9 2 Metre or Marine Monitor Receivers. VFO + 11 fixed positions.....	£46.00
"ASDEN" PCS300 2m FM Handheld.....	£184.00
SL 1600 2m VHK. 16 Channel Scanning Monitor Receiver.....	£39.50
FDK 700EX 2 Metre FM T/Ceiver Dig. Display, Scan, Tone-Burst, etc.....	£189.00
FDK 750E 2 Metre FM/SSB CW T/Ceiver Dig. Display, Tone-Burst, etc.....	£289.00
R517 Airband Rec. Tuneable + 3 Fixed Xtal Positions.....	£49.75

Jaybeam Aerials, Test-Meters, Microphones, Microwave Modules, Converters, Transverters, Linears, Preamps, etc., for 2 Metres/70cms, Bantex Aerials.
Prices include VAT. All Mail Orders to Norwich. Barclay Card & Access.

13 St. Benedict's St., Norwich. Tel. 615786
Open 9 a.m. - 5.50 p.m. Mon. - Sat. Closed all day Thursday.

Also Visit D.P. Hobbs Ltd., 11 King St., Luton. Telephone 20907.
Closed all day Wednesday.

RADIO AMATEUR PREFIX-COUNTRY-ZONE LIST
published by GEOFF WATTS
Editor of "DX News-Sheet" since 1962

The List you have always needed, the list that gives you everything, and all on one line! For each country: -

a. its DXCC "status"	e. the continent
b. the normal prefix	f. the "CQ" Zone No.
c. the special prefixes	g. the ITU Zone No.
d. the ITU call sign block allocation	

Full information on Antarctic stations, USSR Klub-stations, obsolete prefixes used during the past 10 years, and much more.
The List can be kept always up-to-date because ample space has been provided for adding every new prefix, each new ITU allocation, etc.
Everything arranged alphabetically and numerically in order of prefix. Ideal for Contest operators and SWL's.
Tell your Club-members about it. Order an extra copy for that overseas friend. 15 pages. Price 60p (UK), overseas (air mail) \$2.00 or 5 IRCs

GEOFF WATTS
62 BELMORE ROAD, NORWICH NR7 0PU, ENGLAND

JOHNS RADIO

Whitehall Works, 84 Whitehall Road East, Birkenshaw, Bradford, BD11 2ER
Tel. No. 0274-684007 - Demonstration by Appointment - V.A.T. not included

LARGE PURCHASE OF RACAL EOPT. COMMUNICATIONS RECEIVERS.
500kc/s - 30mc/s in 30 bands 1MHz wide. RA14L - £175. RA117E - £225, a few sets available as new at £75 extra. All receivers are air tested and calibrated in our workshop, supplied with full manual, dust cover, in fair used condition. New black metal louvered cases for above sets £25 each. RA218 - SSB-ISB & fine tune for RA117 - £50.
TRANSMITTER DRIVE UNIT MA79 1.5mc/s - 30mc/s SSB-ISB-DSB-FSK-CW - £150.
AERIAL TUNING UNIT & protection unit MA197B - £25 to £50. DECADE FREQUENCY GENERATORS MA350B (solid state synthesiser. for MA79 or RA117 - RA217 - RA1217 - £150 to £200. MA250 - 1.6mc/s to 31.6mc/s - £150. (New) MA259G precision frequency standard - 5mc/s 1mc/s 100khz - £100 to £250. RA70 & PV78 frequency shift converter - £50. DIVERSITY UNIT MA168 new & boxed contains product detector for SSB & BFO - £25. Most above supplied with full manuals. RACAL SPARES new & boxed - RA17L Chassis - £20. I.F. Strip - £15. Calibrator - £8.
OSCILLOSCOPES COSSOR CDU150 - 35mc/s - Twin Beam - Solid State - £175 with manual. EXTEL TRANSTEL MATRIX PRINTERS 5 level baudot code, accepts speeds up to 300 bauds, supplied set to 50 & 75 bauds switched, tested with manual - £165. TEKTRONIX OSCILLOSCOPE 647 & 647A Solid State 50mc/s and 100mc/s bandwidth - £250 and £300, tested circuit and instructions.

SIMPLE, LOW-COST WIRE ANTENNAS

by William Orr, W6SA1

Now with data on the new amateur bands!

This excellent and thoroughly recommended handbook is *the* publication on the practical approach to building aerials. After starting with aerial fundamentals there are discussions and descriptions of ground-plane, end-fed, DX dipole, vertical and wire beam antennas, plus coverage on a universal HF antenna system and working DX with an "invisible aerial"; the SWR meter and coaxial cable also have chapters to themselves.

The whole book is presented in an authoritative, immensely clear, readable and enjoyable manner with the emphasis on the practical throughout — to the extent that even the chap who can hardly strip a piece of co-ax need not feel at all left out! Just as practical for the SWL, too!

192 pages

£4.45 inc. post

Order from

Publications Dept.

Short Wave Magazine Ltd.

34 High Street, Welwyn, Herts. AL6 9EQ

CALL BOOKS

INTERNATIONAL:

RADIO AMATEUR CALL BOOKS (1982)

Foreign ("DX") Listings £11.80

U.S. Listings £12.40

U.K. Callbook, 1982 Edn. (RSGB) £4.60

MAPS

"SHORT WAVE MAGAZINE" DX ZONE MAP

(GREAT CIRCLE) in colour. *Latest 9th edition.* £3.50

AMATEUR RADIO MAP OF WORLD Mercator Projection —

Much DX Information — in colour. *Latest 14th edition.* £1.10

RADIO AMATEUR MAP OF THE U.S.A. AND NORTH

AMERICA State Boundaries and Prefixes, size 24" x 30",
paper. *Latest 7th edition.* 95p

RADIO AMATEUR'S WORLD ATLAS In booklet form,

Mercator projection, for desk use. Gives Zones and
Prefixes. *Latest 11th edition.* £1.65

LOG BOOKS

Amateur Radio Logbook £2.80

Receiving Station Log £2.60

Mobile Logbook £1.10

(The above prices include postage and packing)

Available from:

Publications Dept.

Short Wave Magazine

34 High Street, Welwyn, Herts. AL6 9EQ

Tel: Welwyn (043871) 5206/7

(Counter Service, 9.30-5.00 Mon. to Fri.)

(Giro A/c No. 547 6151)

HAM RADIO

A BEGINNER'S GUIDE

by R. H. Warring

Written by a well-known author, this book deals with transmitting and receiving equipment; its installation and maintenance; the operation of amateur stations; call signs; amateur transmitting licences; Morse Code transmission described in detail.

Excellent reading for those wishing to gain a sound knowledge of Amateur Radio without the need to become too technically expert.

152 pages

£4.10 inc. post

Publications Dept.

**Short Wave Magazine Ltd., 34 High Street,
Welwyn, Herts. AL6 9EQ. Tel: Welwyn (043871) 5206/7**

EASIBINDERS

To hold together 12 copies of "Short Wave Magazine"

Strongly made with stiff covers, and bound in red Wintrel Achina, these handsome binders have the title and date frame blocked in gold on the spine. Price **£4.65** including post/packing.

Publications Dept.

Short Wave Magazine Ltd.,

34 High Street, Welwyn, Herts. AL6 9EQ.

AMATEUR RADIO

by Gordon Stokes and Peter Bubb

The Lutterworth Press are the publishers of this book, which is intended for those wishing to study for the R.A.E. and comprises nineteen chapters, plus Introduction and Index, covering the basic, technical material the would-be candidate needs to obtain a "pass". Copiously illustrated with simple diagrams and excellent plates. Published in hardback.

192 pages

£9.60 inc. p/p

Publications Dept.

SHORT WAVE MAGAZINE LTD.

34 HIGH STREET, WELWYN,
HERTS. AL6 9EQ

AMATEUR RADIO OPERATING MANUAL

New Second Edition

Most of the chapters in the new 2nd edition of this popular RSGB title by R. J. Eckersley, G4FTJ, have been revised and updated. Chapters cover: the Amateur Service; setting up a station; operating practices and procedures; DX; contests; mobile, portable and repeaters; amateur satellites; RTTY; SS/TV; special event stations; with appendices and index. *Extract from a review in "Short Wave Magazine": " . . . this book should be of greatest interest and use to the newly licensed amateur with little, practical operating experience, to whom it can be thoroughly recommended".*

208 pages

Publications Dept.

£4.95 inc. p/p

Short Wave Magazine Ltd.,

34 High Street, Welwyn, Herts. AL6 9EQ.

Butterworth Group publications now in stock

Practical Aerial Handbook, 2nd edition	£7.95
Two-Metre Antenna Handbook	£5.35
Questions and Answers on Amateur Radio	£2.25
Beginners Guide to Radio, 8th edition	£4.35
Beginners Guide to Electronics, 3rd edition	£4.35
Electronics Q. & A., 2nd edition	£2.35
Questions and Answers on Transistors, <i>new</i> 4th edition	£2.05
Projects in Amateur Radio and Short Wave Listening	£3.30
Guide to Broadcasting Stations, latest 18th edition .	£3.40
The World's Radio Broadcasting Stations and European FM/TV Guide, <i>new title</i>	£6.10
Radio Valve and Semiconductor Data, 10th edition .	£4.35
Foundations of Wireless and Electronics, 9th edition	£7.10
Radio and Electronic Laboratory Handbook, 9th edition	£21.25
Practical Electronics Handbook	£4.40
Electronics Pocket Book, <i>new</i> 4th edition	£6.20
Oscilloscopes — How to Use Them, How They Work, <i>new</i> <i>title</i>	£3.85

prices include postage and packing

Publications Dept.
SHORT WAVE MAGAZINE LTD.
34 HIGH STREET, WELWYN,
HERTS. AL6 9EQ

1982 AMATEUR RADIO "CALLBOOKS"

Foreign ("DX") Listings £11.80
U.S. Listings £12.40



The above prices include postage and packing

Publications Dept.,

Short Wave Magazine

34 High Street, Welwyn Herts. AL6 9EQ

Tel: Welwyn (043871) 5206/7

BETTER SHORT WAVE RECEPTION

by William I. Orr W6SAI and Stuart D. Cowan W2LX

New 1981 (5th) Edition!

In the latest edition of this excellent work for all those who own (or intend to own) a radio receiver, these two well-known and respected writers have produced chapters covering: the radio spectrum and what you can actually hear world-wide; the tuning of a shortwave receiver; the business of buying a receiver, both new and secondhand; a description of the SW Rx in non-technical terms, together with receiver adjustment and alignment; DX-ing above 30 MHz; a description of the VHF receiver; building and adjusting efficient aerials; reception techniques.

Thoroughly readable and "digestible", this book is without doubt a very valuable addition to the bookshelf of any SWL.

160 pages

£3.80 inc. post.

Order from:

Publications Dept.
Short Wave Magazine Ltd.
34 High Street, Welwyn, Herts. AL6 9EQ

THE RADIO AMATEUR'S HANDBOOK, 1982

(ARRL)

59th Edition

Considerable added material to the 1982 edition includes more emphasis on digital communication techniques, and tables and charts for the new WARC amateur radio bands; plus several new construction projects. This superb book continues to be the radio amateur's indispensable 'A to Z' reference title.

640 pages

hard cover, £11.50 inc. p/p
soft cover, £9.25 inc. p/p

Publications Dept.
SHORT WAVE MAGAZINE LTD
34 HIGH STREET, WELWYN,
HERTS. AL6 9EQ

Technical Books and Manuals

(ENGLISH AND AMERICAN)

AERIAL INFORMATION

Antenna Handbook (Orr and Cowan).....	£4.45
Practical Aerial Handbook, 2nd Edition (King)....	£7.95
Beam Antenna Handbook.....	£3.95
Cubical Quad Antennae, 2nd Edition.....	£3.15
Simple Low Cost Wire Antennas, by Orr.....	£4.45
73 Vertical Beam and Triangle Antennas (E. M. Noll).....	O/S
73 Dipole and Long-Wire Antennas (E. M. Noll)....	£4.35
Antenna Book (ARRL), <i>new 14th Edition</i>	£6.00
The (ARRL) Antenna Anthology.....	£3.15
Two-metre Antenna Handbook, F. C. Judd G2BCX.....	£5.35
HF Antennas for All Locations (RSGB), <i>new title</i> ..	£6.10

BOOKS FOR THE BEGINNER

Amateur Radio (<i>Lutterworth Press</i>).....	£9.60
Questions and Answers on Amateur Radio, by F. C. Judd G2BCX.....	£2.25
Transistors Q & A, (Newnes), <i>new edition</i>	£2.05
Electronics Q & A (Newnes), <i>2nd Ed.</i>	£2.35
Elements of Electronics, <i>Book 1</i>	£2.50
Elements of Electronics, <i>Book 2</i>	£2.50
Elements of Electronics, <i>Book 3</i>	£2.50
Elements of Electronics, <i>Book 4</i>	£3.35
Elements of Electronics, <i>Book 5</i>	£3.35
Solid State Short Wave Receivers for Beginners (R. A. Penfold).....	£1.50
Beginners Guide to Radio (8th Edition).....	£4.35
Beginners Guide to Electronics, 3rd Edition.....	£4.35
Beginners Guide to Microprocessors and Computing.....	£2.05
Course in Radio Fundamentals, (ARRL).....	£3.10
Guide to Amateur Radio, 18th Edition (RSGB)....	£2.95
Ham Radio (A Beginners Guide) by R. H. Warring..	£4.10
Morse Code for the Radio Amateur (RSGB).....	£1.20
Understanding Amateur Radio (ARRL).....	£4.05
Radio Amateur's Examination Manual, <i>Latest 9th edition</i> (RSGB).....	£3.00

GENERAL

Projects in Amateur Radio and Short Wave Listening (<i>Newnes</i>).....	£3.30
How to Build your own Solid State Oscilloscope (Rayer).....	£1.75
How to Make Walkie Talkies (Rayer).....	£1.75
How to Build Advanced Short Wave Receivers (Penfold).....	£1.40
Better Short Wave Reception, <i>1981 (5th Ed.)</i>	£3.80
FM & Repeaters for the Radio Amateur (ARRL)...	£3.70
Easibinder (to hold 12 copies of "Short Wave Magazine" together).....	£4.65
Oscar — Amateur Radio Satellites.....	£4.30
World Radio & TV Handbook 1982 Edition.....	£11.35
The World's Radio Broadcasting Stations and European FM/TV (Newnes).....	£6.10
World DX Guide.....	£5.40
Guide to Broadcasting Stations (new 18th Edition)	£3.40

Radio Stations Guide.....	£2.05
Long Distance Television Reception (TV-DX) for the Enthusiast (<i>revised edition</i>).....	£2.25
Solid State Basics for the Radio Amateur (ARRL).	£3.70
An Introduction to Radio DXing.....	£2.30
Radio Amateurs DX Guide (14th Edition).....	£2.05
Electronic Test Equipment Construction (Rayer)...	£2.05
Power Supply Projects (Penfold).....	£2.05

HANDBOOKS AND MANUALS

Radio Communication Handbook, Vols. 1 and 2 combined (paperback), RSGB.....	£11.05
TVI Manual (<i>2nd Edn.</i>) (RSGB).....	£1.85
Radio and Electronic Laboratory Handbook by Scroggie-Johnstone, latest 9th Edn.....	£21.25
RTTY Handbook (<i>73 Magazine</i>).....	O/S
Slow Scan Television Handbook (<i>73 Magazine</i>)..	O/S
Working with the Oscilloscope.....	£4.05
The Radio Amateur's Handbook 1982 (ARRL) soft cover.....	£9.25
The Radio Amateur's Handbook 1982 (ARRL) hard cover.....	£11.50
Shortwave Listener's Handbook.....	£5.55
Learning to Work with Integrated Circuits (ARRL).	£1.70
Weather Satellite Handbook.....	£5.40
Single Sideband for the Radio Amateur (ARRL)...	£2.95
Test Equipment for the Radio Amateur (RSGB)...	£5.75
Amateur Radio Operating Manual (RSGB) <i>2nd Ed.</i> ...	£4.95
Practical Electronics Handbook (Newnes).....	£4.40
Oscilloscopes — How to Use Them, How They Work (Newnes).....	£3.85

USEFUL REFERENCE BOOKS

Solid State Design for the Radio Amateur (ARRL).	£5.20
Foundations of Wireless and Electronics, 9th Edition (Scroggie).....	£7.10
Amateur Radio Techniques, 7th Edn. (RSGB)....	£6.00
U.K. Call Book 1982 (RSGB).....	£4.60
Hints and Kinks (ARRL).....	£3.10
Radio Data Reference Book (RSGB).....	O/P
Electronics Data Book (ARRL).....	£3.15
Radio Frequency Interference (ARRL).....	£2.40
Amateur Radio Awards, (RSGB).....	£3.40
Electronics Pocket Book, <i>new 4th Edition</i> (Newnes).....	£6.20

VALVE AND TRANSISTOR MANUALS

Towers' International Transistor Selector, latest Edition (Up-Date No. 2).....	£10.60
Radio Valve and Semiconductor Data (10th Edition).....	£4.35
International Transistor Equivalents Guide.....	£3.35

VHF PUBLICATIONS

VHF Handbook, Wm. I. Orr.....	£3.85
VHF Manual (ARRL).....	O/P
VHF/UHF Manual (RSGB) 3rd Edition.....	£8.60

O/P (Out of print)

THE ABOVE PRICES INCLUDE POSTAGE AND PACKING

O/S (Out of stock)

Many of these titles are American in origin

(Terms C.W.O.)

Prices are subject to alteration without notice.

Available from **SHORT WAVE MAGAZINE**
Publications Dept.

34 High Street, Welwyn, Herts. AL6 9EQ — Welwyn (043871) 5206/7

(Counter Service: 9.30-5.00 Mon. to Fri.)

(GIRO A/C No. 5476151)