

The SHORT WAVE Magazine

VOL. XL

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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 blanker ("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

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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

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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

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
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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!

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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 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.

TET SOLE AGENTS

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

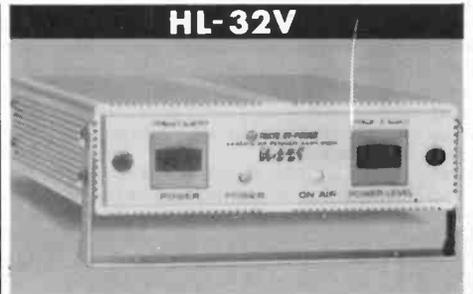
VHF 85W Plus Linear

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:

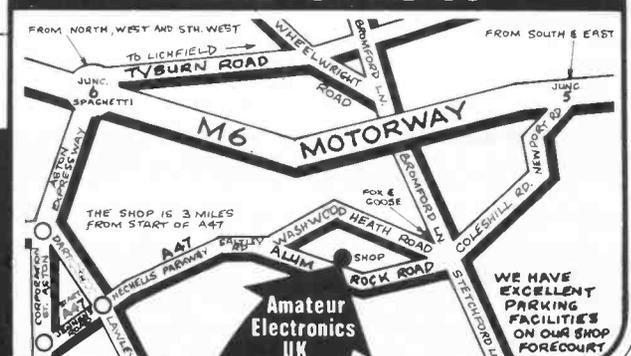
Freq. Band: 144-146MHZ, Mode: FM-SSB-CW, Supply Voltage: DC 13.8V neg. ground, 4A max., Output: 25-30W, RF Input: 1-5W, In/Out Connectors: SO-239 (50 ohm), Built-in Circuitry: COX, output select (hi/lo), reverse polarity protection, Dimensions: 100W x 30H x 158D (m/m), Weight: 520g.

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



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WHERE TO FIND US



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.

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.



MODEL VLF

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.



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

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.

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 revue 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)

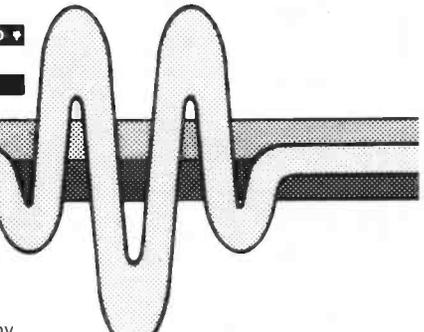
Hi-Low switch – reduces power output from 1.5W to 150mW reducing battery drain.

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



IOW 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.



Well worth thinking about!
 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?



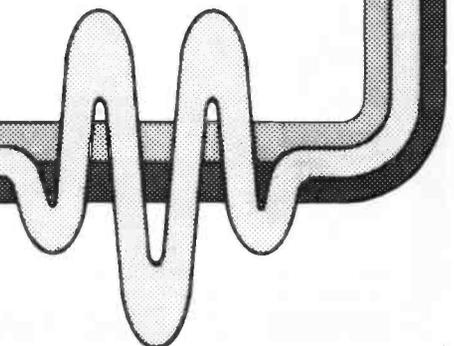
The MT-240X Multi-band trap dipole antenna (80m – 10m) is a superbly constructed antenna with its own Balun incorporated in the centre insulator with an SO239 connector. Separate elements of multi-stranded heavy duty copper wire are used for 80-40-15 and 20-10 Metres. Really one up on its competitors.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

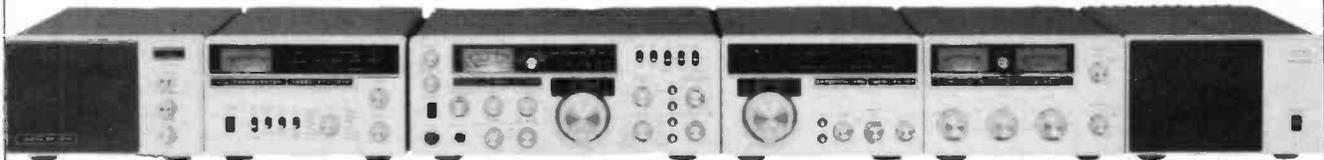
If that is not enough to tempt you into our showrooms how about:— a FT107 (right), the six super prices (overleaf), a Bearcat 220 for £195, a MMT432/28 for £119 or a Hokoshin gutter mount ½λ for £10!!

— 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.

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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 waterproof 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!!

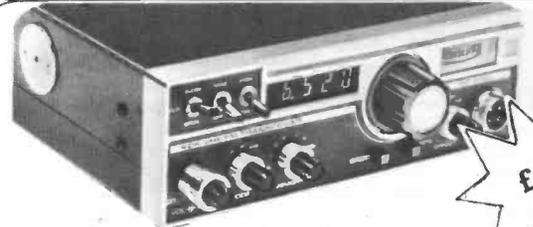
Reductions shown are taken from previously advertised prices and are not necessarily those that the equipment has been offered continuously for the last 28 days. Certain items are shop soiled/ex demo - please enquire

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.

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- ★ 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.

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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)

FT708R £219 inc.

VAT @ 15%
& POSTAGE



- ★ 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



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- ★ Rx: 20mA squelch, 150mA (max AF)
- ★ Tx: 500mA at 1W RF
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- ★ Dual conversion 46.255MHz and 455kHz

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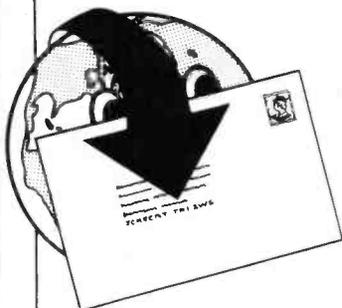
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MMT70/144	4m Transverter for 2m Rig	115.00	(-)
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MML432/50	70cm 50W Lin. Amp (10W I/P)	119.00	(-)
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MM2001	RTTY to TV Converter	169.00	(-)
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MMC435/600	70cm ATV Converter	27.90	(-)
MMK1296/144	23cm Converter to 2m Rig	59.80</	

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(GB3SWM)

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Editor: PAUL ESSERY, G3KFE/G3SWM

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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,

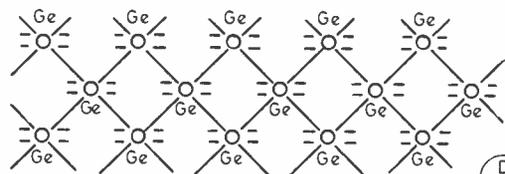


Fig. 1.

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

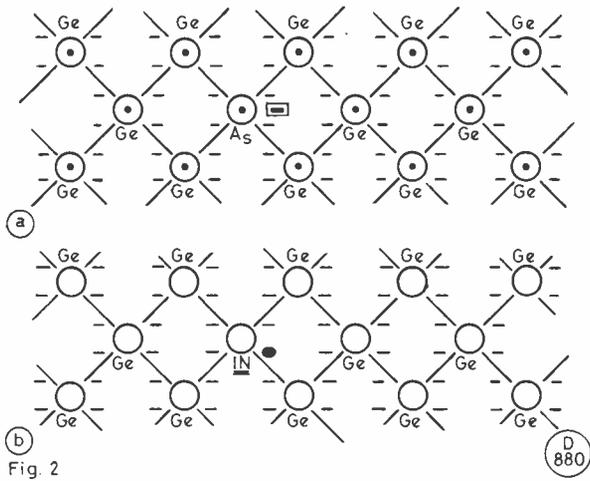


Fig. 2. Here we have introduced a very small impurity (as little as 1 part in 10^{11} is significant). At (a) the impurity is arsenic, which has a valency of five; hence we have one electron surplus as shown. At (b) the impurity is indium, which is trivalent, resulting in an incomplete bond due to the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

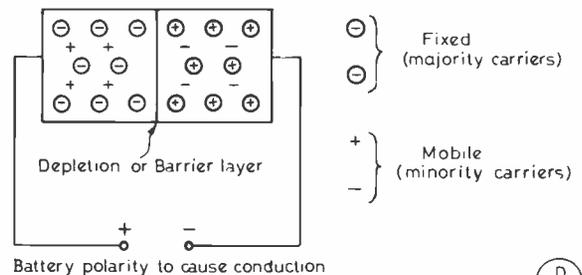
Limits

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.

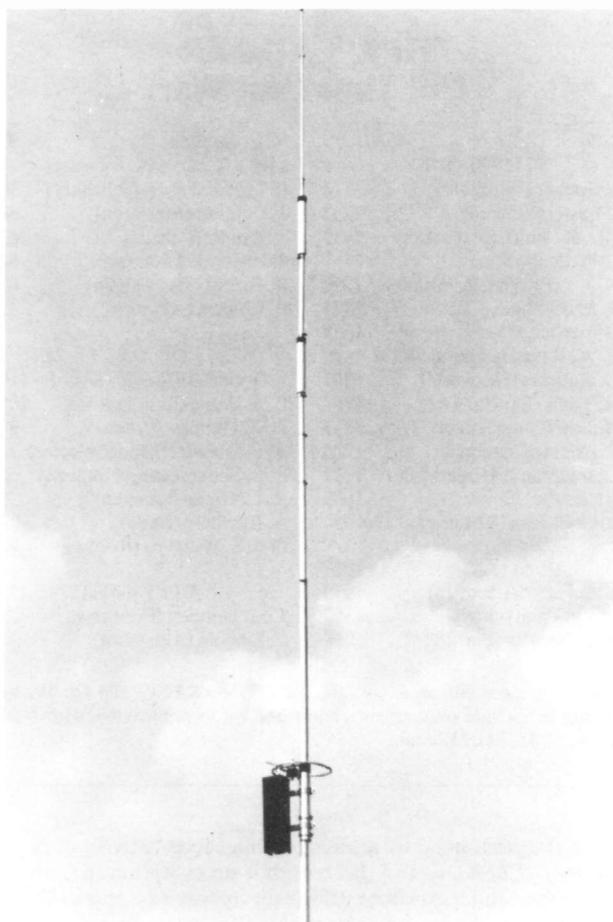
Another newcomer with a problem is *N. Carr (Preston)* who is infuriated at the number of prefixes he can't identify and wonders where to get a full list. We suggest he gets Geoff Watts' *Prefix List* — it is advertised in the magazine every month without fail, and is always right up to date when he 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 liven's 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.

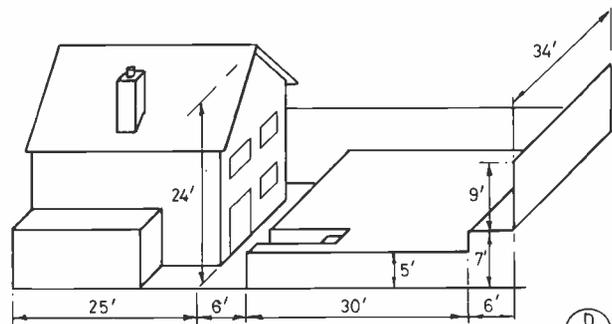


Fig.1 Approximate dimensions of author's QTH

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.

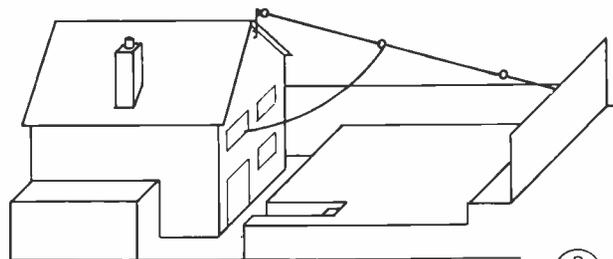


Fig. 2 Layout of the 20m dipole, which was later converted into a 3 band dipole system

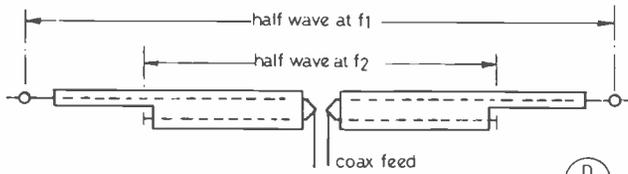


Fig.3 Parallel dipoles constructed from 300Ω ribbon

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

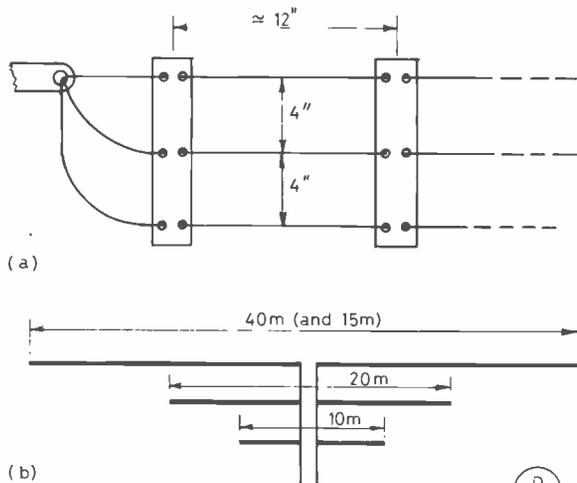


Fig.4

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.

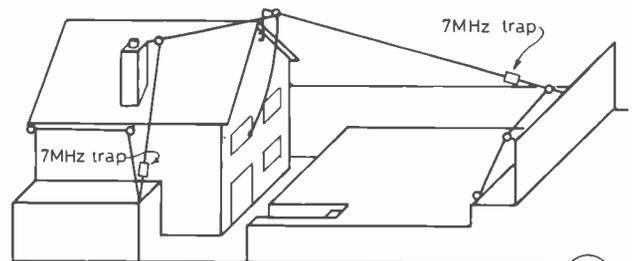


Fig.6. Layout of the W3DZZ type trap dipole

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

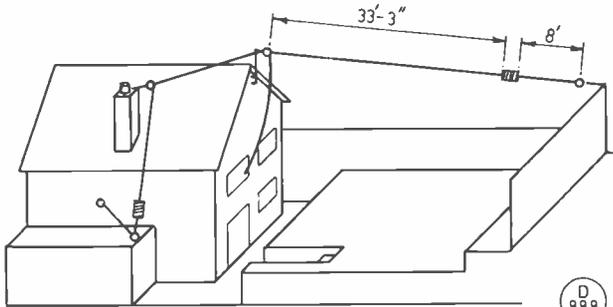


Fig. 7 Layout of the compressed trap dipole

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".

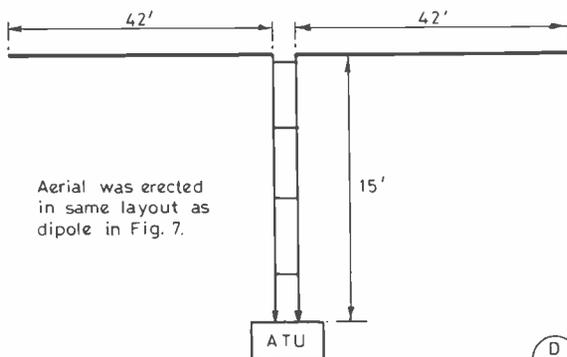


Fig. 8 The "Winfield Wonder Wire"

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

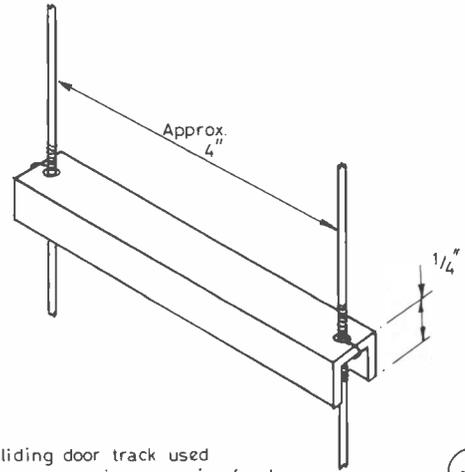


Fig. 9 Sliding door track used for spacers in open wire feeder

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).

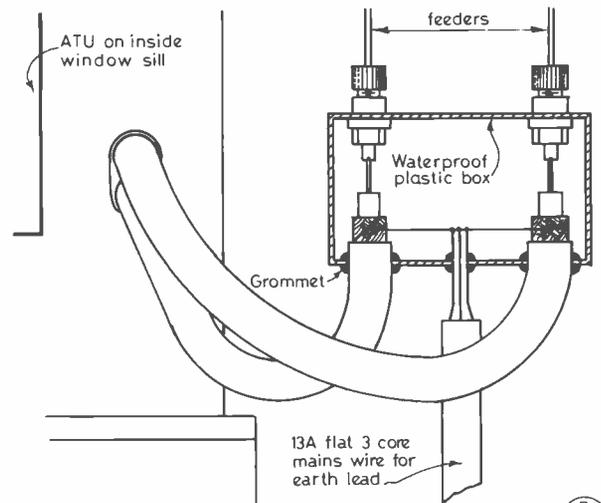
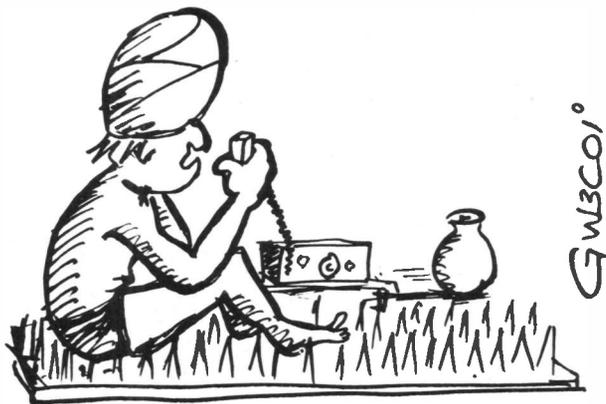


Fig. 10

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.

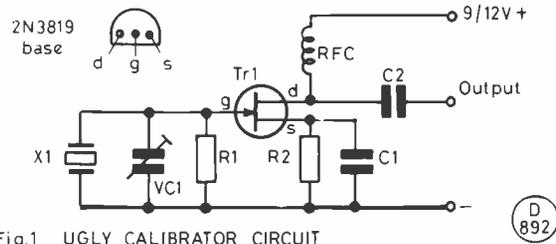


Fig.1 UGLY CALIBRATOR CIRCUIT

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 Choke; 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.

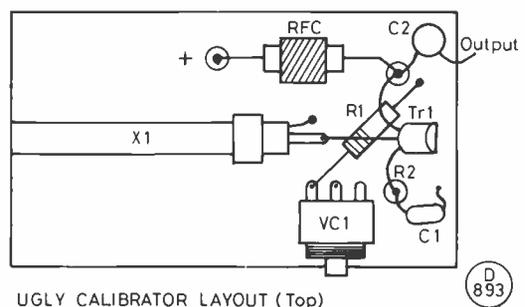


Fig. 2 UGLY CALIBRATOR LAYOUT (Top)

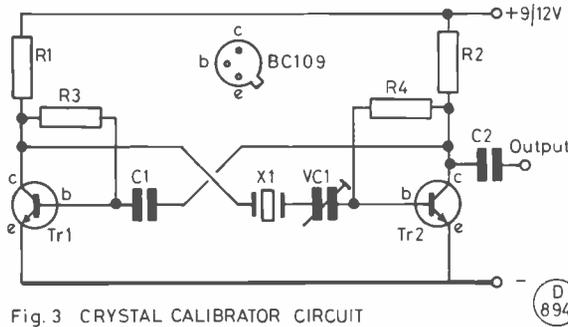


Fig. 3 CRYSTAL CALIBRATOR CIRCUIT

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.

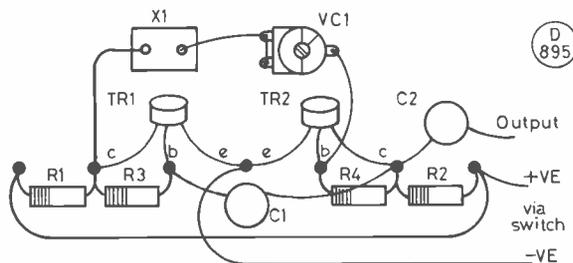


Fig. 4 CRYSTAL CALIBRATOR LAYOUT

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.

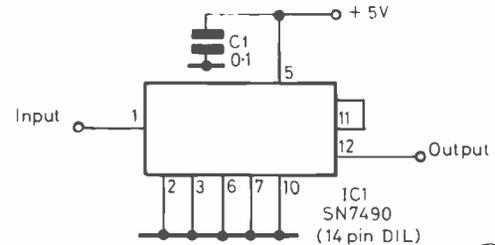


Fig. 5 TTL DIVIDE BY TEN CIRCUIT

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

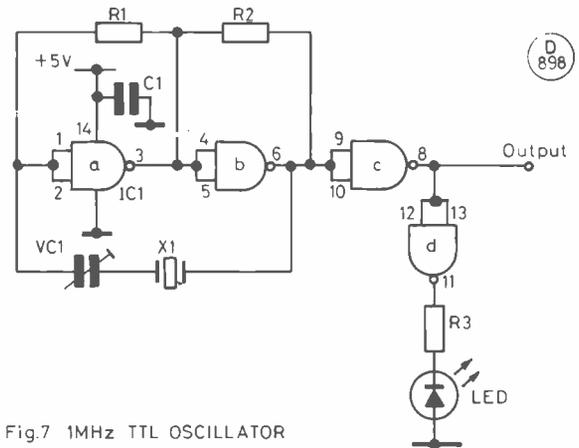


Fig.7 1MHz TTL OSCILLATOR

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.

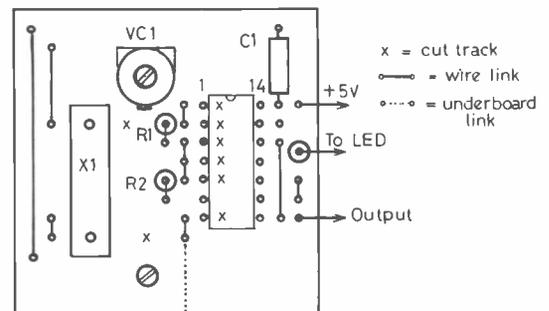


Fig.8 1MHz TTL OSCILLATOR LAYOUT (Full size)

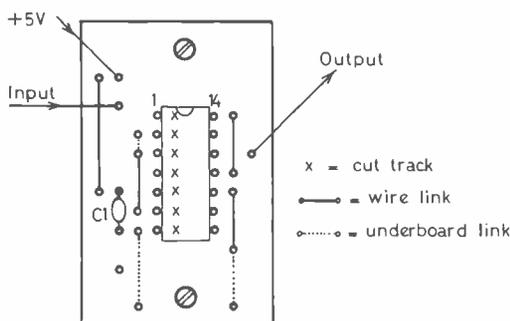


Fig.6 TTL DIVIDE BY TEN LAYOUT (Full size)

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 overboard links and the dotted lines show underboard 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

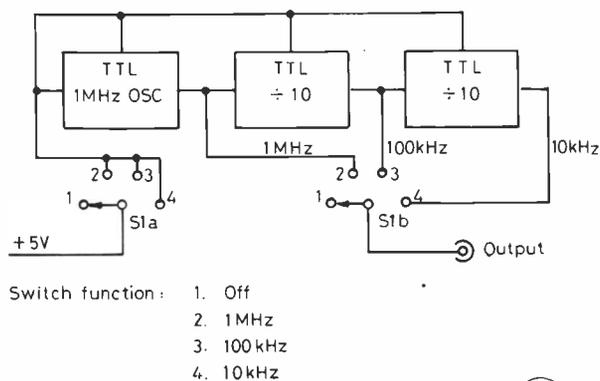


Fig. 9 SUGGESTED CALIBRATOR SWITCHING

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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. Ailtridge, 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.
- GREAT 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.
- SOLWAL: 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 25515)
- 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 Parabeads 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.

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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.

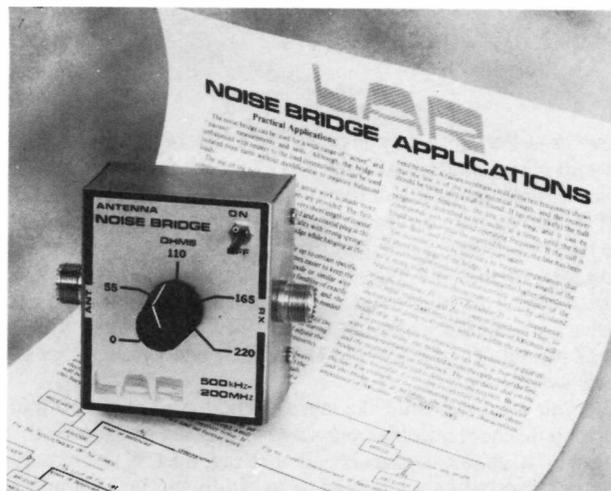
Tests

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.

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“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
G4GFY	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
G8VYF	—	—	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 Rabbitts, 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. G8MFI 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.

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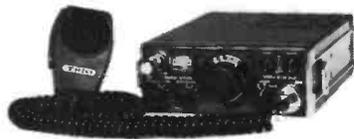


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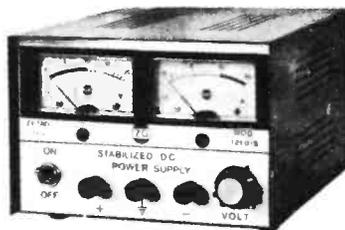


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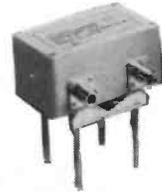
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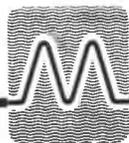
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MM2001

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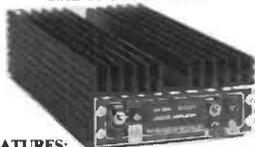
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This converter, MM2001, contains a terminal unit, and a microprocessor controlled TV interface, and requires only an audio input from a receiver and a 12 volt DC supply to enable a live display of "off-air" RTTY and ASCII on any standard domestic UHF 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 RFXVOX

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 RFXVOX
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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.

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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)

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| 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) |

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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
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	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

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.

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	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.

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

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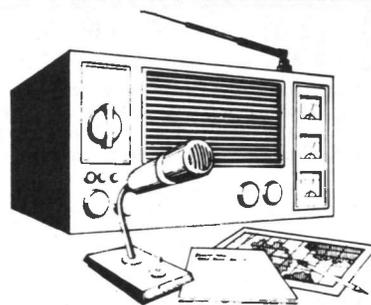
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30 to 59.99kHz HC13/U.....	4 to 5.99MHz (fund) HC18 & 25/U.....	£21.73
60 to 79.99kHz HC13/U.....	6 to 21MHz (fund) HC6, 18 & 25/U.....	£15.69
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100 to 149.99kHz HC13/U.....	25 to 28MHz (fund) HC6, 18 & 25/U.....	£11.32
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800 to 999.99kHz HC8/U.....	150 to 179MHz (90/T) HC18 & 25/U.....	£11.01
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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
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DELIVERY: 1MHz to 106MHz — 4/6 weeks, other frequencies — 6/8 weeks. Prices shown
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2 element YAGI Beams		
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Tubular Gamma Match tuning unit supplied.		
10 metre - 2 element array	£34.50	£6.00
15 metre - 2 element array	£42.50	
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