Now from Trio, the R2000 general coverage receiver. By taking all the superb features of the R1000 and combining them with the latest in micro-processor control Trio have, in one step, completely revised the standard by which short wave receivers are judged. Among the many features provided for the discerning listener are programmable scan, memory scan, memory retention of the mode set for a particular frequency and last, but not least, Trio have included an FM mode — why FM after all this time and our repeated comment that for a short wave broadcast receiver FM is not really necessary. Take a look at the rear panel of the R2000 a socket marked VHF converter. Wouldn’t it be superb if Trio produced a VHF converter covering from 118 to 174 MHz — then you would require FM, you would also require AM. Study the features and I am sure you will agree the Trio R2000 is the receiver for you.

Continuous Coverage from 150 KHz to 30 MHz.

Use of an innovative up conversion digitally controlled PLL circuit provides maximum ease of operation and superb receiver performance. Front panel up/down band switches allow easy selection within the full coverage of the receiver. The VFO is continually tunable throughout the full 150 KHz — 30 MHz range.

All modes SSB, CW, AM and FM.

To give full listening potential USB, LSB, CW, AM, and FM are provided for easy selection by push buttons having adjacent led indicators.

Adjustable Tuning Rate.

Tuning speed switches enable the tuning rate to be in either 50 Hz, 500 Hz or 5 KHz. A frequency lock switch is included to guard against accidental shift.

Ten Memories Store Frequency, Band and Mode Data.

Each of the ten memories can be tuned by the VFO, thus operating as ten built in digital VFO's. The original memory frequency can be recalled by simply pressing the appropriate memory channel key. All information on frequency, band, and mode is stored in the selection memory. The "auto M" switch allows two types of memory storage: when the "auto M" switch is off, data is memorized by pressing the "M in" switch; when the "auto M" switch is on the frequency being used at that time is automatically memorized.

Memory Scan.

Scans all memory channels or may be user programmed to scan specific channels. Frequency, band and mode are automatically selected in accordance with the memory channel being scanned.

Programmable Band Scan.

Scans automatically within the programmed bandwidth. Memory channels 9 and 0 establish the scan limit frequencies. The hold switch interrupts the scanning process. However, the frequency may be adjusted using the tuning knob whilst in the scan hold position.

Lithium Battery Memory Back Up.

Memory and VFO information is maintained by an internal lithium battery (estimated life, five years), a most important feature when moving the receiver from location to location.

Clock Display with Integral Timer.

Two 24-hour quartz clocks are built in to allow for programming two different time zones. An integral timer is provided for on and off switching of the receiver.

Three Built In Filters with Narrow/Wide Selector.

In the AM mode 6 KHz wide or 2.7 KHz narrow may be selected. In the SSB mode 2.7 KHz is automatically selected. In the CW mode 2.7 KHz is again chosen and if the optional YG455C filter is installed then 500 Hz in the narrow position. In the FM mode 15 KHz bandwidth is automatically selected. Other important features are: squelch on all modes, noise blanker a large 4 inch front mounted speaker, tone control, HF attenuator, AGC switch, high and low impedance antenna terminals, optional 13.8V DC operation, record jack and, of course, provision for a VHF converter.

All in all, a truly remarkable receiver.

R2000 £398.00 inc. VAT. Carr. £5.00
remember the **KX 2**
now available
the **KX 3**

The KX3 is a wide range general coverage tuning unit specially developed for the short wave listener. Using high Q coils, and air spaced variable capacitors, the KX3 is designed to give additional front end selectivity as well as wide range impedance matching.

As a further feature, the range from 10KHz to 500KHz is provided with a low pass filter so as to allow listening below 500KHz whilst rejecting strong medium wave stations in the 500KHz to 1.5 MHz band.

 Provision is made for using the tuning capacitors in the KX3 to resonate an external loop type aerial for medium wave directional reception.

<table>
<thead>
<tr>
<th>Frequency range</th>
<th>Functions</th>
<th>Number of bands</th>
<th>Input and output impedance</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 KHz-30 MHz</td>
<td>10 KHz-500 KHz L.P.F.</td>
<td>8</td>
<td>50-600 ohms</td>
<td>220 x 66 x 154 mm</td>
</tr>
<tr>
<td>500 KHz-30 MHz</td>
<td>Pi match</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Both coaxial and wire aerials can be connected to the KX3.

**KX3 RECEIVER ANTENNA TUNING UNIT £42.50 inc. VAT.**

**AF 606K**

**AUDIO FILTER £63.25 carr. £2.00**

From Diawa yet another aid to operating. In addition to the notch, SSB and CW filters, the AF606K is equipped with a PLL tone decoder; when the tone frequency of the CW signal and the free running frequency of the PLL tone decoder are the same a locked signal is generated. This locked signal keys an audio oscillator which then reproduces the received CW signal. However, there is a tremendous difference between the produced signal and the received one — no noise and, of course, no fading. **ANOTHER PIECE OF EQUIPMENT TO ENHANCE YOUR LISTENING.**

**DK 210**

**ELECTRONIC KEYER £47.00 inc. VAT carr. £2.25**

With so many electronic keys and keyers on the market, it’s hard to describe one that is better than the rest. Inevitably it is a matter of “feel”, and the feel of the New Daiwa DK210 is superb. Being Daiwa, the quality of design and construction has to be of the best, but it’s in use that the DK210 is so impressive. Designed to be used with an external paddle, to give greater personal choice, the DK210 is otherwise self contained, even to being battery powered (PP3): It offers a speed range of 10 to 50 w.p.m., built in sidetone, facilities for semi auto, or fully auto keying, and a tune position for adjusting your transmitter, but the outstanding feature is the adjustable “weight” control. This control gives an amazing improvement in the character of the sending, and completely removes that mechanical sounding “electronic morse” characteristic. Those experienced CW users who have tried out the DK210 have all said how good it sounds — and have usually purchased one. So will you if you try it out.

DK210 from DAiwa — A truly nice keyer.

**LOWE ELECTRONICS IN THE NORTH EAST**

A huge free car park, a shopping complex which has within it a large supermarket, a wine and spirits shop, a bistro restaurant and convenient banking facilities has nothing at all to do with amateur radio. However, as all these facilities are to be found across the road from our new amateur radio shop in the North East of England, then you will appreciate that we take great care in positioning the Lowe Electronic shops to help both you and other members of your family. The shop is in Darlington, 56 North Road, that is on the A167 road to Durham, only a few minutes from the town centre. Darlington is a delightful market town with extremely good links to the A1 north or south and to the west and east. Indeed, Darlington is easy to get to from towns such as Sedgefield, Darlington, York, Harrogate, Penrith and Carlisle. To the fortunate Radio Amateurs of the North East, then you have Lowe Electronics in your own backyard.

A Lowe Electronics’ shop means the opportunity to browse, to try out, without sales pressure, a new or second hand piece of equipment before you buy it. And not only that, the shop will stock all the usual accessories, aerials, SWR meters, cables, rotators, tuning units, plugs, sockets, etc. All equipment bought from the Darlington shop will carry the now well-known Lowe after sales service. It is a fact that today’s equipment, although very reliable, is extremely complex and although not beyond the amateur, the expensive test equipment required for the repair leave most of us in the hands of the person who sold us the rig.

With Lowe Electronics not only are the hands helpful but technically able.

RING FOR OPENING DETAILS

**LOWE IN LONDON**  Open monday to saturday, six days a week lower sales floor, Hepworths, Pentonville Rd, London. telephone 01.837.6702

**LOWE IN GLASGOW**  Open tuesday to saturday
4,5 Queen Margarets Rd, Glasgow. telephone 041.945.2626
TR3500

COMPACT SIZE AND LIGHT WEIGHT
Measures only 66W x 168H x 400Rh with a weight of 540grams including Ni-Cd battery pack.

LCD DIGITAL FREQUENCY READOUT
Easy to read in direct sunlight, or in the dark. Visually no current drain (much less than LED's). Displays transmit and receive frequencies and memory channels. Display includes four “Arrow” indicators: “F. LOCK” (Frequency Lock), “REV” (Repeater Reverse), “PROG. S” (Programmed Scan), “MS” (Memory Scan).

TEN CHANNEL MEMORY
Nine memories may be operated in simplex mode, or with transmit frequency offset permitting access to repeaters.

LITHIUM BATTERY MEMORY BACK-UP
No loss of memory in case of complete discharge (or removal of the Ni-Cd batteries). Current (approximately 1 microampere) to maintain memory supplied by built-in separate lithium battery, with estimated life of more than 5 years.

MEMORY SCAN
Scans only those channels in which frequency data is stored. Stops on “Busy” channel, resumes scan automatically after 2 seconds after signal goes off, or when “MS” key is pressed. The “STOP” key or the PTT switch may be used to cancel the scan function. LCD displays memory channel number and “MS” arrow while memory scan in use.

PROGRAMMABLE BAND SCAN
Scan bandwidth (lower and upper frequency limits) and scan steps of 5kHz and larger (10, 15, 20, 25 kHz, etc.) may be programmed. Scan automatically locks up on busy channel and resumes approximately 2 seconds after signal goes off or when “PROG. S” key is pressed. “STOP” key or PTT switch cancels scan function.

UP/DOWN MANUAL SCAN
UP/DOWN manual scan in 5kHz steps.

FREQUENCY COVERAGE
Cover 430.00 - 439.995 MHz in 5kHz steps.

TONE BURST SWITCH
The TONE BURST switch activates the 1,750 Hz repeater access tone oscillator.

TX OFFSET SWITCH
Selects simplex or repeater operation (operator pre-programmes repeater OFFSET MAX ± 9,995 MHz).

HIGH POWER SELECTION
HIGH power output switch allows operation at 1.5W or, for extended battery life, 300mW.

REVERSE OPERATION
“REV” switch shifts the receiver to the transmit frequency, and the transmitter to the receive frequency. Useful for checking signals on the input of a repeater, to determine if you are within simplex range.

AUTO/MANUAL SQUELCH
Selector switch on threshold control allows selection of automatic or manual squelch operation.

BATTERY INDICATOR
LED battery condition indicator flashes when battery charge level approaches nominal discharged battery potential.

TWO “LOCK” SWITCHES
“F. LOCK” switch prevents accidental loss of chosen frequency when in “LOCK” position. “TX. STOP” switch prevents accidental transmission if PTT switch is accidentally pressed in handling.

BNC ANTENNA TERMINAL
Allows antenna changeover to be quick and easy.

ACCESSORIES INCLUDED
- Flexible rubberised antenna with BNC connector.
- 400mAH Ni-Cd battery pack.
- AC charger.
- Plug for external microphone and speaker.
- Hard strap.

“compatible”

the two metre & seventy centimetre handhelds from Trio.

TR2500 £232.53 inc. VAT, carr. £5.00
TR3500 £250.70 inc. VAT, carr. £5.00

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WELZ SP 15M £ 35.00

MORSE EQUIPMENT

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<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
<th>PRICE</th>
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<tbody>
<tr>
<td>MX30</td>
<td>S.S. Paddle</td>
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<td>HK73</td>
<td>UP/DOWN Key</td>
<td>10.75</td>
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<td>IC32A</td>
<td>Matching Side Tone Monitor</td>
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<td>EL50</td>
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SPEAKERS

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CABLES

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ADAPTERS

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<td>TV23</td>
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DUMMY LOADS

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<tr>
<td>FL2</td>
<td>25W F.M. Transceiver</td>
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TRIO TS 430 £ 736.00

Amateur band transceiver/General coverage receiver

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<tr>
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SWR-PWR METER H.F./2M 20Kw

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<td>TR107</td>
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TEST EQUIPMENT

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<td>150W SWR-PWR Meter</td>
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<td>200W SWR-PWR Meter</td>
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MICROWAVE MODULES

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<td>TR112</td>
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<td>TR113</td>
<td>2M Amplifier</td>
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OTHER

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<tr>
<td>TR114</td>
<td>Matching Side Tone Monitor</td>
<td>15.00</td>
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<tr>
<td>TR115</td>
<td>LCD Display</td>
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D70 MORSE TUTOR £ 56.35

DATALOGS

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<th>DESCRIPTION</th>
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<tr>
<td>PC</td>
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<tr>
<td>FL</td>
<td>Very Low Frequency Converter</td>
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<tr>
<td>FL2</td>
<td>Multi-mode Audio Filter</td>
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<td>FL3</td>
<td>Audio Filter</td>
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<td>ASPB</td>
<td>Auto LF Speech Clip</td>
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<tr>
<td>ASB</td>
<td>Auto HF Speech Clip</td>
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E & O E.
KEEP AHEAD WITH THE YAESU FT-102!

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 100 dB. 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 a totally unique circuit design, gives an infinite choice of bandwidths between 2.7 kHz and 500 Hz, 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 455 kHz 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 versatility.

Commercial Quality Transmitter
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 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. 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.

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.

FT-102 1.2 KW ANTENNA COUPLER
1.2 KW band-switched L-C pi-network antenna coupler. In-line wattmeter with three ranges (20, 200, and 1200 watts full scale), and "peak hold" system.

FV-102DM SYNTHESIZED, SCANNING EXTERNAL VFO
FT-290R/790R 2m & 70cm PORTABLES
10 memories, 2 VFO's, LCD display, C size battery, easy car mounting tray.

FT-208R In-line wattmeter (incorporates speech compressor).

FT-230R/730R 2m & 70cm FM MOBILES
Two independent VFO's, 10 memories, Priority function, Memory and band scan (12.5/25KHz steps (25/100KHz FT-730R))

FT-480R/780R 2m & 70cm MOBILES
The most advanced 2 metre and 70 cm mobiles available today — USB, LSB, FM, CW full scanning with priority channel, 4 memory channel, dual synthesized VFO system.
This incredible new transceiver incorporates the highest level of microprocessor control ever offered in an HF all-solid-state radio. Including a general coverage (0.15-30.0MHz) receiver with its own, separate front end, this amateur transceiver offers a new dimension in frequency control: whereby frequencies can be entered by either front panel keypad or tuning dial, and then scanned in selectable steps either freely or between any two programmable limits. Twelve memories include four with special protection, and two large digital displays allow full flexibility and control for split frequency operation while two meters allow full transmitter information.

Additional controls include IF Width and Shift on concentric controls, AMGC (Automatic Mic Gain Control) to set microphone input threshold, RF Speech Processor, ALC Meter Hold function, IF Notch Filter, Audio Peak filters, Transmission Noise Blanker and CW Full Break-in. Controls are also provided for FM Squelch and CW Keyer Speed when the optional FM and Keyer Units are installed.

The most important feature of the FT-980 is that practically all of the above features can be controlled by the user's separate personal computer; when connected through an optional interface, also available from Yaesu. Where up to now the few amateur transceivers that offered any kind of computer interfacing at all permitted only frequency control, the FT-980 permits almost total control of all functions from a separate microcomputer, including Mode; IF Width and Shift; Scanner Step, Speed and Limits; and switching of most other functions. (Microcomputers are not available from Yaesu.)

Combining all of the best features from Yaesu HF and V/UHF transceivers, the FT-726R opens a new world of operating ease and flexibility for FM, SSB and CW on the 50 MHz, 144 and 440 MHz amateur bands. The design of the FT-726R integrates the individual operating requirements of each of the three operating modes into one unit, and the user can then select which of the optional plug-in band modules he desires. The VFO-A/B scheme has ten programmable memories, and can be tuned in 20Hz steps for CW and SSB operation, or in selectable steps for FM. FM tuning is accomplished by an indented tuning knob. IF Width and Shift controls are provided for CW and SSB operation, while both preset standard and user programmable repeater offsets can be selected for all modes. An optional Satellite Unit makes the FT-726R into a full duplex cross-band satellite transceiver.

For full details of these new and exciting models, send today for our latest SHORT FORM CATALOGUE. All you need to obtain the latest information about these exciting developments from the World's No.1 manufacturer of amateur radio equipment is to send £3p in stamps and an added bonus you will get our credit voucher value £3.60—a 10 to 1 winner!
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Carriage charges apply to mainland only. All prices include VAT

Perfect for your radio or phone or write and leave the rest to us.

**Simple phone or write and leave the rest to us.**

<table>
<thead>
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<th>Antennas</th>
<th>Various/Accessories</th>
<th>H41</th>
<th>14.7 ohm yagi 2.7m 7W nom 15W max</th>
<th>C3</th>
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<td>3W 20m to 1m converter</td>
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<td>2W 40m to 1m converter</td>
<td>H8</td>
<td>2W 70cm to 2W converter</td>
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<td>MF</td>
<td>Meters</td>
<td>H10</td>
<td>2W 70cm to 2W converter</td>
<td>H11</td>
<td>2W 70cm to 2W converter</td>
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<td>2W 70cm to 2W converter</td>
<td>H13</td>
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<td>H16</td>
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<th>C3</th>
<th>Vertical 14/15/20/24m</th>
<th>GM4</th>
<th>Mini beam vs. 15m 14.7 ohm</th>
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<th>5-20W in 160W+ out</th>
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<td>364MHz N type converters</td>
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South Wales Communications Ltd

LARGEST STOCKS OF AMATEUR RADIO EQUIPMENT IN WALES

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G3LJD GW4NVO GW6MKI GW4SWC

THEY MICRODICT

This amazing British made RITTY / C W Terminal represent incredible value for money, all you need in one unit, eliminating the clutter on those contest expeditions. Full details on request:

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FT102

Continuing a tradition of excellence from the Yeasu Musen stable.

Price £785.00

Learning Morse? Here’s the answer - facilities include repeat last letter, continuous Morse, group of five random letters, speed & space control, practice oscillator, built-in P.S.U.

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20cm 17/4 coil 1.5db base £21.90 £2.00 p&p

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20cm + 3/2 coil in base £20.90 £2.00 p&p

20cm + 3/2 coil in mobile £16.40 £1.80 p&p

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10m d/t 1/2 wave £14.20 £1.50 p&p

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6m d/t 1/4 wave £14.80 £1.50 p&p

5m d/t 1/8 wave £14.60 £1.50 p&p

5m d/t 1/8 wave £14.60 £1.50 p&p

4m d/t 1/16 wave £14.40 £1.50 p&p

4m d/t 1/16 wave £14.40 £1.50 p&p

3m d/t 1/32 wave £14.20 £1.50 p&p

3m d/t 1/32 wave £14.20 £1.50 p&p

2m d/t 1/64 wave £14.00 £1.50 p&p

2m d/t 1/64 wave £14.00 £1.50 p&p

1.8m d/t 1/128 wave £13.80 £1.50 p&p

1.8m d/t 1/128 wave £13.80 £1.50 p&p

1.5m d/t 1/256 wave £13.60 £1.50 p&p

1.5m d/t 1/256 wave £13.60 £1.50 p&p

1.3m d/t 1/512 wave £13.40 £1.50 p&p

1.3m d/t 1/512 wave £13.40 £1.50 p&p

1.2m d/t 1/1024 wave £13.20 £1.50 p&p

1.2m d/t 1/1024 wave £13.20 £1.50 p&p

0.9m d/t 1/2048 wave £13.00 £1.50 p&p

0.9m d/t 1/2048 wave £13.00 £1.50 p&p

0.6m d/t 1/4096 wave £12.80 £1.50 p&p

0.6m d/t 1/4096 wave £12.80 £1.50 p&p

0.5m d/t 1/8192 wave £12.60 £1.50 p&p

0.5m d/t 1/8192 wave £12.60 £1.50 p&p

0.4m d/t 1/16384 wave £12.40 £1.50 p&p

0.4m d/t 1/16384 wave £12.40 £1.50 p&p

The above quantities are ordered please allow 14 days for delivery. Other sections available are antenna, bar, channel, half round.

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IN ASSOCIATION WITH THE HASTERRY LTD GROUP OF ENTERPRISES

April, 1983
TONE SQUEAL UNIT

MODEL PTS-1
Model PTS-1 is ideal for Raynet groups, club nets, or groups of friends who wish to monitor for each others signals over long periods.

Designed to work in to the microphone and loudspeaker lines of existing FM or AM transceivers. Model PTS-1 provides a second independent squelch system. The squelch operates only when the incoming signal carries a prearranged tone of precisely the correct frequency. Thus two transceivers, each fitted with Model PTS-1, will respond only to each others transmission protecting the user from undesired interruptions.

Sixty-four tones in the range from 1747 to 2330 Hz are selectable by a DIL switch and a built-in notch filter removes the tone from received signals.

PTS-1 £39.99 with VAT £45.99

AUDIO FILTERS

MODELS FLZ, FL3, FL2/A
Model FL3 represents the ultimate in audio filters for SSB and CW. Connected in series with the loudspeaker, it gives variable extra selectivity better than a whole bank of expensive crystal filters. In addition it contains an automatic notch filter which can in effect create a "tuner-upper" all by itself. Model FL2 is exactly the same but without the auto-notch.

Any existing or new FL2 can be up-graded to an FL3 by adding Model FL2/A conversion kit, which is a Fully tested auto-notch module in P.C.B. Form.

Datong filters frequently allow continued copy when otherwise a QSO would have to be abandoned.

Prices: FLZ £78.00 with VAT £89.70, FL3 £112.50 with VAT £129.35, FL2/A £34.00 with VAT £39.67

MORSE KEYBOARD

MODEL MK
As well as looking terrific, Model MK brings some very useful features to enhance your CW operating. Its four 64-character memories allow auto-repeat and any number of programmed pauses per message. It includes all normal characters (including accents) and the "merge" key lets you make up words one letter at a time and move them about.

Apart from adding the "merge" key, the MK keyboard is very similar to the PC1. Both have individual click action switches beneath a tough wipe-clean surface operated. Its four 64-character memories allow auto-repeat and any number of programmed pauses per message. It includes all normal characters (including accents) and the "merge" key lets you make up words one letter at a time and move them about.

Any number of programmed pauses per message. It includes all normal characters (including accents) and the "merge" key lets you make up words one letter at a time and move them about.

Prices: MK £119.50 with VAT £137.42

GENERAL COVERAGE RECEIVER CONVERTER MODEL PC1

Once upon a time it was the norm to use a two metre receiver to receive the two metre band. Now, large numbers of special purpose two metre SSB rigs are in use and conversion of the other way becomes a very attractive possibility.

With the addition of Model PC1 each of these two metre SSB rigs becomes a really good general coverage receiver (from 50 kHz to 30MHz).

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With the addition of Model PC1 each of these two metre SSB rigs becomes a really good general coverage receiver (from 50 kHz to 30MHz).

PC-1 £119.50 with VAT £137.42

COMPACT RECEIVING ANTENNAS

MODELS AD270, AD370
Datong Active Antennas solve the age-old problem of finding space for a top quality commercial receiving station. The performance specifications achieved by the Datong AD270, AD370 are very close to those of "professional" active antennas selling for ten times the price - a point which is not lost on our many professional customers.

The enhanced design ensures two things: that you don't miss signals through inadequate sensitivity and that the antenna does not invert signals which are not there. Datong Active Antennas represent an advanced solution to a common problem and so far as we know have no serious competition in terms of performance at the price. (Reviewed in Rad. Com June 1982)

AD270 £41.00 with VAT £47.15
AD370 £58.00 with VAT £64.40

HIGH PERFORMANCE 2 METRE CONVERTER MODEL DC144/28

Again strong signal performance is the key to the design of Model DC144/28. Where conventional converters use a dual gate MOSFET as a mixer, the Datong uses a balanced pair of Schottky diodes fed with nearly 10 mW of local oscillator at 116 MHz. Where other converters use open wound coils, the Datong coils are in screening cans on a plated through board.

The result: an unusual freedom from spurious signals and overload effects together with a spurious-free dynamic range of 90dB.

As the Rad. Com. reviewer wrote "With a 3db noise figure and 90dB dynamic range the Datong DC144/28 is one of the best 144 MHz converters currently available". Rad. Com. April 1982.

Model DC144/28 is available either as a tested PCB module, as illustrated, or fully cased in a diecast aluminium box.

DC 144/28 £34.50 with VAT £39.67

Prices

<table>
<thead>
<tr>
<th>Model</th>
<th>Price</th>
<th>VAT Price</th>
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<tr>
<td>FLZ</td>
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<td>FL2/A</td>
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<td>AD270</td>
<td>41.00</td>
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</table>

Data sheets on any products available free on request - write to Dept S.W.
Earning the title “The Communicators” in the amateur, commercial and marine fields was not gained easily, and we guard our reputation as jealously today, as we did a quarter of a century ago. Maintaining our reputation requires service with a capital ‘S’. We require as jealously today, as we did a quarter of a century ago.

Offering free Securicor delivery on major equipment, take Access and

Maintaining our reputation requires service with a capital ‘S’. We offer free Securicor delivery on major equipment, take Access and Barclays card, or a UK call sign and you bring your licence with you, or it appears in the call book, it’s INSTANT.

SMC, your single stop source.

We are proud to be the largest representative in Europe of Yaesu Musen of Japan who produce the most diverse line of amateur radio equipment in the world. With them, communications is their only business not a sideline, thus they provide you with premium products at the forefront of technology.

We are also proud to be chosen as UK representatives by such fine manufacturers as The Japan Radio Company, KDK, Nag, Hansen, Kenpro, TTE, Lense, Televend, Dengineer, Comet, Fitlay, and Hokushin of Japan, plus HyGain, CDE, Gem Quartz, Channel Master, Mirage, ETO, Dentron, MFV, Van Gordon and KLM from the Americas.

The items illustrated here form only a tiny fraction of our range: 200 stock lines of Yaesu Musen equipment, 600 different antennas, masts, rotators, coaxes, etc., etc., plus 300 general items of communications equipment, selected as offering the best value in the world from: Jaybeam, Mini Beam, GA2M, Musley, G-Whip, Bantex, Ascot, Strumeb, Microwave Modules, JIR, Bearcat, Delica, Ashidavo, Hi Mound, ICS, Datong, RSG publications amongst others.

We trust the outline of our services, recommendations from another amateur (aspiring or veteran) or a visit to your nearest SMC store will convince you to give us a chance to serve.

**SMC SERVICE:** FREE FINANCE—FREE CREDIT COVER—GUARANTEE

On many regular priced items for an invoice over £120 we provide free finance, 20% down (balance over 6months) or 50% down and the balance over a year; you pay no more than the cash price. Where this service is not available we have taken the worry out of finance—enter a personal loan agreement — remember the deposit can be as low or lower than your monthly instalments — for 12 months to 3 years (at a typical APR rate of 31.8%) and in the event of sickness, accident, compulsory redundancy or death your credit is covered by SMC. If you have Access, Barclay or Bankers credit is covered by SMC. If you have Access, Barclay or Bankers

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

FT77 Transceiver 100W output £475.00
FT77S Transceiver 10W output £399.00
MARK7 Crystal Marker board £7.65
FMU77 FM Unit £23.75
XFB 9HC(N) 600Hz or 300Hz (N) £24.90
FV707DM Digital Memory VFO £203.15
FC700 Antenna Tuner £92.60
FP700 Mains P.S.U. £125.00
FTV707 Transvertor, frame only £90.00
Modules: 432...£186, 144...£100, 70...£80.00

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 PEP 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.
Clariifer (RIT) switchable on Tx, Rx or both.
Low level transvertor drive output facility.
Universal power supply 110-234V AC and 12V DC*.

SPECIAL OFFER
Buy any FT101 and get a free FV101Z worth £112.00.
Limited Offer

160-10 metres including new allocations.
Variable IF bandwidth 2.4kHz down to 300Hz.
Audio Peak and independent notch controls.
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Instant write in memory channel.
Tune button (10 sec. of full power).
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350 or 600 Hz CW, 6kHz, AM filters included!
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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.
**FT230R £239 inc.**

- **144-146 MHz (extensions possible).**
- 25W RF output, 3W on low.
- 25 and 12½ kHz steps provided.
- ±600 kHz repeater splitter, 1750 kHz burst.
- Tx: 5A, Rx 300mA (standby).
- ±430-434MHz (440-445MHz possible).
- 10W RF output, 1W on low.
- 25 and 100 kHz steps provided.
- ±1.6 kHz repeater splitter, 1750 kHz burst.
- Tx 3A, Rx 300mA (standby).

**FT730R £285 inc.**

- **144-146 MHz (144-148 possible).**
- 2.5 W PEP, 2.5W RMS/300mW out.
- FM: 25kHz and 12.5kHz steps.
- SSB: 1kHz and 100kHz steps.
- ±600 kHz repeater splitter, 1750 kHz burst.
- Integral telescopic antenna.
- Built in condenser microphone.
- Auto scan restart. 1.750kHz tone burst.
- built in condenser microphone.
- 25kHz step in/external speaker.
- ±600kHz standard repeater split.

**FT480R £369 inc.**

- **144-146MHz (143.5-148.5 possible).**
- ±600kHz standard repeater split.
- Excellent dynamic range and sensitivity.
- FM: 25kHz and 12.5kHz steps.
- SSB: 1kHz and 100kHz steps.
- ±600kHz standard repeater split.
- FM: 10kHz and 25kHz steps.
- SSB: 1kHz and 100kHz steps.
- ±1.6MHz shift with input monitor.
- 1750kHz burst.
- Tx: 20mA squelch, 150mA max. AF.
- 2.5 or 0.3W RF output.
- ±600kHz standard repeater split.
- FM: 1kHz and 25kHz steps.
- SSB: 1kHz and 100kHz steps.
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- 2.5 or 0.3W RF output.
- ±600kHz standard repeater split.
- FM: 1kHz and 25kHz steps.
- SSB: 1kHz and 100kHz steps.
FT726R £649 inc VAT @ 15% & SECURICOR

- 160-10m (inc WARC) plus standard service Rx.
- SSB, CW, FSK, 100 W output adjustable.
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AUTHOR’S MSS

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

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Of Good Manners and Sound Sense

Many holders of VHF licences complain that they are treated as second-class citizens by the Class-A types. Perhaps they forget that generally a man is judged on what he is and what he does. If he is a lousy operator, why does he get angry at being regarded as a bit of an idiot?

However, equally hard words could be aimed at the many holders of ‘A’ licences who indulge in the same sort of anti-social operating practices. Whether he holds an ‘A’ or a ‘B’ licence, anyone who sits on a repeater from the home station using it as a chat channel to the exclusion of mobiles, for whom it was originally installed, and who tells a mobile that he is an intruder on ‘their’ channel deserves all he gets. That is not to say that a base station should not use a repeater — far from it — but that mobile operators should always be given priority.

Band-plans are voluntary in this country, thank goodness; but too much of this particularly selfish behaviour will lead us headlong into enforced band-plans and barred frequencies on shared bands. The whole basis of our licensing is on self-policing, which in turn means self-discipline. The slogan “use or lose” should be altered to “use properly or lose” — and if a few hotheads had their licences revoked then sense would rapidly come to the others.

National Amateur Radio Convention

With an attendance of around 10,000 people over the two days, the first National Amateur Radio Convention to be held at the N.E.C. in Birmingham on March 5th and 6th, organised by the RSGB, must be judged a considerable success from every point of view. Facilities were excellent, as indeed they should be at a modern purpose-built exhibition centre, with many expressions of satisfaction from both visitors and traders; the lectures were all of high standard and well attended. The only general criticism being voiced was that it should have been held over three days rather than two. Without doubt the light and airy Hall 6, with its wide gangways between stands, created a pleasant and positive atmosphere; altogether a welcome change when compared to most of the other venues of which we have all had experience.

Perhaps we have reached a situation where just one national exhibition/convention should be held each year. It would certainly make a lot of sense.

“Magazine” Prizewinner

The prize of £85 for the best article in Volume 40 of Short Wave Magazine goes to — no surprise, perhaps — Rev. George Dobbs, G3RJV, for his really splendid series “Plug In Your Soldering Iron and Begin Here”. This series introduced many a radio amateur to home-construction for the first time, as well as encouraging others to have another go at it; indeed, we know that it even brought some people back into amateur radio.

The current trend of a return to home-building is due in no small measure to G3RJV’s enthusiasm for his other ‘gospel’ of kitchen-table technology. As winner of this annual prize for the second time, congratulations, George, and thank you!

Deciding on a winner can often be a difficult task which only means, of course, that we greatly value the work of all our contributors. In other words, thank you to everyone who has written for us during the past year.
VHF BANDS

NORMAN FITCH, G3FPK

Award News

C ongratulations to Jim Rabbitis, G8LFB, from Whetstone in north London, who is the 24th member of the 2m. QTH Squares Century Club, his certificate being issued on March 1. His 100 QSLs revealed 86 tropo contacts, 11 via Aurora and 3 via E’s. The station consists of an Icom IC-202S, Microwave Modules 25 watts amplifier, Datong automatic speech processor and 16-ele. Tonna Yagi aerial at 10m. a.g.l. The site is 80m. a.s.l.

Another reminder concerning the Annual VHF/UHF Table that there are 104 counties in the British Isles. They comprise the 78 administrative ones in England, Scotland, Wales, Ulster, the Isle of Man and the Channel Islands, together with the 26 in the Irish Republic. The countries are the DXCC ones, plus Shetlands (GM) and Sicily (IT9). You can work them on any mode and by any “natural” propagation, which latter means repeater and satellite QSOs are not acceptable.

Contest Notes

Full details of the rules for the 9H Falcon Contest, organised by the VHF/UHF/SHF Group in Malta have now been received from Henry Souchet, 9H1CD. The dates are from 0001 on June 1, through 2400 on June 15 and the single band is 144-146 MHz. All propagation modes are valid except satellites and repeaters. All competing stations must log a minimum of ten 9H stations, but the same station may be logged more than once, provided the rates are different. Contest exchanges to be RST plus serial number starting at 001, and QTH locator. Only QSOs over 500 kms. in your own country count, but all contacts over borders can be included. (E.g. A QSO between a London “G” and a fellow in the End’s End would not count, but one between a “G” in Bristol and a “GW” in Cardiff would.)

The entries go to:— The Contest Manager, 9H Falcon Contest, P.O. Box 144, Valletta, Malta, to reach there by July 1. Logs must show:— date, GMT, callsign of station worked, both reports and serial numbers, QTH locators and QRB points claimed, the latter at one point per kilometre. The winner will receive a trophy and diploma, the runners up diplomas. So, work as much DX as possible in that fortnight and look for Sporadic E openings at the peak of the E’s “season”.

Henry, 9H1CD, told your scribe there about 30 Maltese stations on 2m., so, given one or two good E’s openings, some U.K. stations could well qualify to enter. If any reader would like a copy of the rules, please send an s.a.e. to the office address marked “9H Contest”.

Repeater News

After more than two years, the Home Office issued the first new VHF and UHF repeater licences in mid-February. These comprise 12 on VHF (Phase 5) and 10 on UHF (Phase 6). About half were operational when this was being edited. The full list, with channels where known, is:— 2m. GB3AE, Barnoldswick; GB3AM (R6) and GB3BX (R2) both with coverage relays in Birmingham; GB3ES (R7) Hastings; GB3EV (R4) Appleby; GB3HG, N. Yorks; GB3LM (R5) Lincoln; GB3MB, Manchester; GB3PW, Newton, Powys; GB3RD (R3) Reading; GB3TY, Hexham and GB3WB on Dartmoor.

On 70cm, GB3FN (RB15) Farnham; GB3GC, Goole; GB3HA, Hornsea; GB3HB, St. Austell; GB3HD, Huddersfield; GB3PD, Peterhead; GB3UL (RB2) Belfast; GB3WP, Manchester; GB3WU (RB15) Wakefield and GB3XX (RB15) Daventry.

The North Cambridgeshire 70cm. Repeater Group has submitted a proposal to the RWW for a Fenland repeater to cover the Wisbech, March and Chatteris area. Further details from Mr. J. P. Arnold, G4NPH, 5 Princes Road, Wisbech, Cambs.

Beacon Notes

A change of frequency for the 70cm. Angel beacon is imminent due to a slight problem with the Perth repeater, according to a recent GB2RS news item. The new QRG will be 432.980 MHz, the frequency previously earmarked for GB3NEB.

Auroral Studies

As everyone knows, the polar auroras have both visual and radio effects and in this feature we are concerned only with the latter. The reports readers send in form part of the overall data eventually processed by Charlie Newton, G2FKZ, of the RSGB’s Propagation Studies Committee. Similar work is being done by the Auroral Observations Group of the British Astronomical Association, the co-ordinator of which is Mr. R. J. Liveyse, whose efforts were brought to your scribe’s attention by George Grzebieniak, G6GGE.

The intention now is that we co-operate with Ron Liveyse by exchanging information for the mutual benefit of both groups. Accordingly, Ron would like to receive copies of readers’ reports on radio events for comparison with solar, visual aurora and magnetic storm data. The required reporting format would be the same as for the radio reports, i.e. dates, times, locations of stations worked and any relevant comments on the events. All reports will be acknowledged and data would be included in the B.A.A’s auroral analysis which is published annually in their Journal. Any reader wishing to correspond directly with Mr. Liveyse can do so by writing to:— 46 Paidmyre Crescent, Newton Mearns, Glasgow, G77 5AQ.

VHF Down Under

Steve Mahony, VK5AIM, is a reader of the Magazine. He lives in South Australia and wrote after reading about the 6m. U.K. band. As there is Band 1 TV still in Australia, their band is 52-54 MHz which makes working DX very difficult. In the summer, there are E’s contacts on SSB across the continent, the southern VKs work into New Zealand and the northern folk into Japan. During the winter, it is mostly local FM activity. Most stations run 10w. from transceivers or transverters with 4-ele. Yagis but some have 100w. amplifiers and 8-ele. long Yagis. However, the latter combination in a city area is “asking for trouble”, due to the problem of RFI with home video equipment.

On 2m., there are repeaters in the 146-148 MHz part of the band which give continuous coverage from north Queensland, down the east coast, through Melbourne and across to Adelaide. Repeaters account for two-thirds of the 2m. activity and there are many local FM nets. SSB is confined to the first 200 kHz of the band with a “No-man’s Land” up to the 145.8-146.0 MHz satellite part. The SSB calling QRG is 144.100 MHz and the latter combination in a city area is “asking for trouble”, due to the problem of RFI with home video equipment. 70cm. activity seems rather sparse and “natural” propagation, which latter means repeater and satellite QSOs are not acceptable.

Four Metres

Syd Harden, G2AXI, (Hants.) was on for the second and third legs of the Cumulatives which provided four more counties for this year’s score. Arthur Breese, GD2HDZ, was on for the Feb. 13
session and worked G3JXN in London and G3BPM in Surrey, for best DX. Other new ones for the 1983 Table were, G3NP1 (Bucks.), G4FRO (Avon), G3UKV (Shropshire), and G30IC (Herefordshire & Worcs.).

Dave Robinson, G4FRE, is now settled in Felixstowe and is QRV on several bands, including 4m., where he uses a Tri-TS-120v, home built transverter and PA. The aerial is a 3-ele. Yagi. At 10m. a.g.l. Best DX so far, during the Cumulatives, is G4APA (Cheshire) but Dave wonders, "Does anyone deliberately beam towards the east coast?" Dave Lewis, GW4HBK, (Gwent) heard GM3MOX at 2222 in the Ar of Feb. 4, but failed to work him. The next day's Ar brought QSOs with G4BAO at 1625 and GM3TAL at 1809, the latter again worked in a second phase at 0015 on the 6th.

Welcome to Denis Jones, G3UVR, from the Wirral (Merseyside) who leaps into first place in the Table. The Fixed Contest on the 16th of Jan. and the Cumulatives account for his 28 counties and six countries already. He has 50w. output and a 4-ele. Yagi on the band with 38 squares and nine countries since Jan. 1980. He transverts from 10m. with a home built unit.

Six Metres

Paul Turner, G4IJE, (Essex) has now worked 13 of the other 39 6m. licensees and has been busy with many tests. The converter he sent to DJ5MS arrived in Peter's letter box very quickly and they had a 6m./2m. cross-band MS QSO on Feb. 27, completed in one hour, with DJ5MS getting four bursts from Paul, using a 20m. dipole. OK1OA has built a 6m. converter and, using a dipole taped to a window, completed a cross-band MS QSO with G4JIE in 50 mins. Just as it was being written, G4IJE reported another 6m./2m. test with CT1WW (WB) on Mar. 5 when confirmation from Tiago was still awaited.

GW4HBK put out his first call on 6m. at 0605 on Feb. 2, with no luck. G6XM (Dorset) was heard at 0733 on CW on Feb. 21, and Dave's only QSO up to Feb. 25 with G4GLT (Leics.) at 0037 on the 24th of Feb. 4, and which was a very difficult contact. His QSO with G4GLT (Leics.) at 0037 on the 24th of Feb., and which was a very difficult contact. His QSO with G4GLT (Leics.) at 0037 on the 24th of Feb. 4, but failed to work him. The next day's Ar brought QSOs with G4BAO at 1625 and GM3TAL at 1809, the latter again worked in a second phase at 0015 on the 6th.

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Fortunately, many Class B licensees are adopting a positive approach by doing a lot of listening on 6m. Their reception reports on various propagation modes will be just as useful as the QSOs reported by the lucky 40, during this trial period.

Two Metres

Dave Sellers, G3PBV, (Devon) reports generally poor tropo. conditions in February, but he did catch the Auroras on Feb. 4 and 5. The one on the 4th was at 1715 and was still going on at 0010. G3 in AL square were quite loud, along with BS and Ps. GM4IJS (YR) and GM6PZ (XQ) at 1945 and 2019, the former on the key, the latter on SSB, provided a couple of new squares. On the 5th, Dave noticed the Ar at 1305, but did not get on till 1515 when G3, G1 and GM signals were heard. At 1530, G14ONL (WO) was worked on CW and the event faded at 1900. G3UVR is already up to 21 countries this year, even though Denis does not use MS mode. He has 400w. output from a home built transverter and PA with an 8-ele. Yagi. Tim Raven, G4ARI, (Leics.) added 22 more counties for the year. The rarer ones listed on the 4th are obviously 4m. QSOs and later in the month, there were tropo. contacts in with such as GW6DDB (Gwynned) and GW8TBG (W. Glam.). Mar. 1 brought G6CGY in Co. Cleveland.

On Mar. 2 there was another Ar that started soon after lunch and lasted for some time. In the south, it was not very spectacular, but the DX was there for those with 'good ears'. G4IJE worked seven GMS, along with OZ and DL. Paul reported that GM3WCS worked a couple of OKs at a QTF of 80° which suggests it was a rather southerly event. Ian Parker, G6DFT, (Herts.) heard five new squares in this event but did not work any stations therein.

Jon Stow, G4MCU, (Essex) missed an hour of the Feb. 4 Ar, but did get RQ2GAG (MQ) for new square and country, and GM4FZH (YS) around the 1900 period. SM6AQQ (GR) and SM6CMU (FR) were worked around 2100, all at QTFs between 5 and 15 degrees. He missed the events on the 5th and 6th, but worked OZ9EYE (FQ) at 1524 and GM6PZ (XQ) at 1559 on the 7th. Feb. 18 saw good tropo. conditions, but Jon's aerial rotor decided to go on strike, so he did not work anything.

For anything radio you want to buy, sell, or exchange, use the Readers' Advertisement columns in "Short Wave Magazine"
Tony Collett, G4NBS, (Berk.s.) was a little more active on 2m. In February and mentions ON1BCG (BK) on the 22nd and GM6MJY/A (YR) on CW the next day Adrian Chamberlain, G4ROA, (Coventry) worked GM6PQE (Tayside) in the Ar on the 4th then decided to take a holiday from work enabled Derrick to have a go on CW. He heard the GMs working ONS and PAs he could not copy. Mick Cuckoo, G6ECM, (Kent) operated in the Feb. Ar for three hours from 1800. He lists EI2BBB (VM) in Limerick, G8YWF (ZO), G6DQC (XO), GM3JJJ (WS) in the Western Isles, GM4JCM (YQ) and GM6PBF (YQ) along with several Gs in YM and YN. The next day, between 1300 and 1600, Mick's best DX were:— G6AGB (XO), GM4NHI (YR), GM6PLE (YQ), GM8VRU (YP) and SM7LVX (GP). That is a good tally for SSB mode. On the 18th, G8M8BP (YQ) was heard calling "CQ" at 0100 and a quick QSO resulted before he faded into the noise. Later that day, many D, ON and PAs were worked, the best being D9QQT (EL), DJI SU (FM), DJ5KB (EL) and OZ1DPR (EP).

Russell Coward, G6HRI, (Blackpool) hopes to have two 10-ele. Parabeams at 34ft. a.g.l. by now. In the Feb. 5 Ar, G4RNL and G6DNP (XO) were worked at a QTF of 30° but no other stations were heard. On the 7th, in another Ar G16ATZ (XO) and G4RQG/GA (Staffs.) were contacted. Ray Cox, G8FMK, (Oxon.) got several GM and GI stations in the Feb. 4 and 5 Ar's, GI4OUN (Tyrone) and GM3ZXE (Tayside) being new, all-time counties. In the Feb. 4 Ar, Martyn Jones, G8CXQ, (Warks.) added a new square, thanks to GM3JJJ in WS.

Derrick Dance, GM4CXP, (Borders) rarely misses an Ar and his lists show the difference in areas workable from YP square, compared with what can be heard from more southerly latitudes. At 2317 on the 4th, a visual Ar alerted Derrick to switch on the radio and between 2232 and faded-out at 2300, nine QSOs were made at QTFs 45° to 55° with DF1ZE (EI), OZ1AZZ (FR), OZ1HWS (GQ), GM6PZ (XQ), EI4ACL (WN), G4MXW (WO), GW3DLH (YN), LA7KQ (FU) and LA9BM (EU). On the 5th, a "phone call at 1330 from GW3DLH alerted him to another event, the first contact being with ‘LDH (YN) at 1405. 23 stations were worked up to 1532 when he switched off including 10 Germans, mostly on the EJ and EM squares, PAs and ONS in BK, CK and CL, F5SE (CJ), LA8AK (DS) and SM7GEP (HR). QTFs were from 45° to 80°.

Another affair was in progress at switch-on the 6th at 1520, which brought GM4AIQ (YR), PA2VST (CM) and G8XVJ (YN) before switch-off at 1624. The QTF was 45° during this event.

A holiday from work enabled Derrick to be QRV during a fine tropo, spell on Feb. 17 and 18, during which many Scandinavians and Germans were worked on SSB, OZ1CSI (HP) was a new square.

Andy Steven, GM4IPK, (Edinburgh) took full advantage of the Feb. 4, 5 and 6 Ar's and worked no less than 233 stations, adding another nine squares. These were:— OY5NS (WW), F9LT (AI), LA1K (FX), G3DAO (AK), UP2BKH (KP) a new country, too, F5SE (CJ), SM1BSA (JR), OH1ZAA (KV) and EI8EV in UO70e. Andy also lists SM5DF (IS), OH1ZP, OH1DP and OH1BS all in LU, and SM0BZK (IT).
... half a K2RIW to a design from DUBUS Magazine ..." and which has proved a very easy one to build and get going. He also worked the two EA1s on Jan. 23, but the best DX was OE308BC in II square, with several Ds in the F and G squares. In six days of putting up outdoor aerials, Dave notched up 11 countries and 40 squares!

G4MCU’s reluctant rotator which was stuck to the east, enabled Jon to copy the beacon OK0EA (HK18d) at S9 on Feb. 18 at 2200, while OZ2ALS (EP79c) was S2 off the side to the beam. He and John Lemay, G8KAX, suggest that, just from longer beams at great heights can be copied, it does not follow that QSOs between stations at lower altitudes are possible. For example, over the Feb. 18-20 period, GB3MLY — as it now is — was an enormous signal, whereas there was little increase in the strength of signals from northern amateur stations. This phenomenon has also been observed with HB9HBH and DL0PR on 2m.

G4NBS took his gear down to G8FUO’s QTH in Windsor for the Feb. 6 contest and they made 110 QSOs, working well to the north. Best DX was G8PN in Northumberland and the total points was about 500. From home, Tony found QTH in Windsor for the Feb. 6 contest and made contacts with WA3YQG in Pennsylvania, but did not state which satellite/mode. Russell has also worked numerous Europeans. The latest launch date for the Phase 3B “bird” is June 5 — it changes every month.

The recorded message from the University of Surrey on Mar. 8 said that UOSAT’s gravity gradient boom was successfully deployed early on Mar. 7. However, after one metre extension, a cable fouled so the remaining three metres of deployment was stopped. Even so, this one metre extension was sufficient to stabilise the satellite for two days. Hopefully, the cable will be disentangled by the time this is read.

AMSAT-UK’s A.G.M. takes place on April 9 at 1300 at London House in Mecklenburgh Square, off Guildford Street, London, W.C.1. Lunch facilities are available at this venue from midday.

Satellite News

G6HR1 is the only reader to mention any satellite activity and has had a QSO with WA2YQG in Pennsylvania, but did not state which satellite/mode. Russell has also worked numerous Europeans. The latest launch date for the Phase 3B “bird” is June 5 — it changes every month.

G4FRE plans to take down his 4m. beam at some point in the year and put up aerials for 13cm. and 23cm. On 23cm. at present, Dave has 10w. from a home built, solid state transverter with a 15-over-15 aerial on the side of the house, fixed to the east. Even so, GB3MLE, F1BUU (ZE), DL7QY (FI), and HB9AMH/DH (DI) have been heard. No QSOs were possible as his Gasfet preamp. and changeover relay had been left at work.

Satellite News

G4ROA is pleased to report very good activity on 23cm. in February, as heard from Coventry, the 19th bringing four more 1983 counties and G8TXG (YM) for a new square. In the brief tropo. event on the 18th, G8FMK closely monitored 23cm. with 15w. and 23cm. AFSK/TV soon on 70cm.

Gigahertz Bands

From Norway, LA8AK is QRV on 23cm. with 15w. to a 23-ele. beam. A 150w. PA is being assembled. G4BYV has supplied some new East Anglian microwave news. John is QRV on 13cm. and, on Jan. 22, made contacts with DJ9PC (DI), DB5KS (DL) and G8MW (ZM). G3LQR also worked DJ9PC, plus OE3LFA (II) on Jan. 23, a QRB of 1.139 kms. Bob Hope, G3AUS, (Devon) is now on 13cm. with 6w. from an NE3005 device. His gear is all home designed and built and he has worked G4LRT in ZM square.

G4FRE plans to take down his 4m. beam later in the year and put up aerials for 13cm. and 23cm. On 23cm. at present, Dave has 10w. from a home built, solid state transverter with a 15-over-15 aerial on the side of the house, fixed to the east. Even so, GB3MLE, F1BUU (ZE), DL7QY (FI), and HB9AMH/DH (DI) have been heard. No QSOs were possible as his Gasfet preamp. and changeover relay had been left at work.

Domestic Contests

The Barking Society’s 2m. event is on Mar. 27, see details on p. 42, last month. The last three legs of the 4m. Cumulatives are on Mar. 27, Apr. 10 and 24, 0900-1100 GMT. The 23cm. Trophy Contest is on Apr. 2, 1600-2400 GMT, with the 70cm. version the next day from 0900 to 1700 GMT. Both are two section affairs, Single-op. and Multi-op. with one point per kilometre on 23cm. and the radial ring scoring system on 70cm.

The Stevenage and District A.R.S. is running an FM contest on 2m. on Apr. 10, 1300-1700 GMT in the 144.500-144.845 and 145.200-145.575 MHz parts of the band. Three sections, 1) up to 25w. output; 2) over 25w. o/p; 3) S.w.l.

Information from G6NWC, 82 Lingfield Road, Stevenage, SG1 SNN on receipt of an s.a.e. The 2m. CW event is on Apr. 17, 0900-1500 GMT, again a Single-op. or Multi-op. contest, according to RadCom. (Last year it was a “classless” affair.)

Deadlines

April 6 is the next copy deadline and for June it is May 4. All your letters, etc., to:—

"VHF Bands", SHORT WAVE MAGAZINE, 34 High Street, WELWYN, Herts., AL6 9EQ. 73 de G3FPK.

“Short Wave Magazine”: devoted exclusively to Amateur Radio since 1937
A MICROPROCESSOR CONTROLLED MORSE DECODER
PART V
PETER LUMB, G3IRM

Pulse Generator

Some useful, though not essential, tests can be carried out by means of a pulse generator and a suitable circuit is shown in Fig. 10. Each time the microswitch is pressed a positive-going pulse appears at pin 11 of IC22 and a corresponding negative-going pulse appears at pin 8. Only one pulse is generated each time the switch is pressed and its length depends on the value of C12 and the position of R32. Using the values shown, the pulse width can be varied from 7mS to 400mS. The range can be altered by changing C12, and R32 should be calibrated by means of an oscilloscope. The negative-going pulse from the generator is taken to one of the Morse inputs, Y1 on the oscilloscope is connected to the oscilloscope. The negative -going pulse from the generator is taken to one of the Morse inputs, Y1 on the oscilloscope is connected to the oscilloscope.

There will always be 10 clock pulses for each dot inserted by the pulse generator unless very wide pulse variations are made. If the dot length changes from very short to very long or vice versa it takes the speed controller some time to catch up as only one correction pulse is generated by the microprocessor for each dot received. If very short pulses are inserted they will be rejected by the program and the speed of the Morse clock oscillator as shown.

C12, C14, C15, C16 = 0.01 uF
disc at various points on board
C17 = 47 uF

<table>
<thead>
<tr>
<th>Pulses</th>
<th>Meter</th>
<th>Oscilloscope</th>
</tr>
</thead>
<tbody>
<tr>
<td>made longer</td>
<td>goes lower</td>
<td>Y1 pulses shorten</td>
</tr>
<tr>
<td>made shorter</td>
<td>goes higher</td>
<td>Y1 pulses shorten</td>
</tr>
</tbody>
</table>

As in Fig. 4 the address lines have been omitted and the corresponding 'A' lines must be connected. These only involve the CRT controller IC28 and the memory IC24; no other address lines are needed. IC26 deserves a special mention as it is a ROM specially programmed to the instructions given by the CRT controller manufacturers and is required to interpret the inputs to decide whether a character is intended or one of the various cursor movements available. It can be bought ready programmed as the SFF96364 and there is a direct pk/pk signal is also taken to the connector strip for connection to the processor board. The video output, which is a standard lv signal into the aerial input of the television receiver.

Checking the Display Board

Connect the monitor and board together and supply 5v to the circuit. Do not connect the processor board at this stage but take the PB0 to PB6 lines to the monitor and connect the programmer.

Table of Values

<table>
<thead>
<tr>
<th>Fig. 11</th>
<th>Fig. 10</th>
</tr>
</thead>
<tbody>
<tr>
<td>R33, R34, R35, R36, R39, R40 = 10K</td>
<td>C18 = 200 uF</td>
</tr>
<tr>
<td>R37, R38, R42, R43, R44, R45, R46 = 1K</td>
<td>C19 = 82 pF polystyrene</td>
</tr>
<tr>
<td>R41 = 10M</td>
<td>TR3 = BC108 or similar</td>
</tr>
<tr>
<td>R47 = 3K</td>
<td>IC24 = 4118</td>
</tr>
<tr>
<td>R48 = 2K2</td>
<td>IC25 = 8212</td>
</tr>
<tr>
<td>R49, R52 = 270R</td>
<td>IC26 = see text</td>
</tr>
<tr>
<td>R50 = 68R</td>
<td>IC27 = 74LS174</td>
</tr>
<tr>
<td>R51 = 100R</td>
<td>IC28 = SFF96364</td>
</tr>
<tr>
<td>C13, C14, C15, C16 = 0.01 uF</td>
<td>IC29 = R03-2513</td>
</tr>
<tr>
<td>disc at various points on board</td>
<td>IC30 = 74LS165</td>
</tr>
<tr>
<td></td>
<td>IC31 = 74LS163</td>
</tr>
<tr>
<td></td>
<td>IC32 = 74LS04</td>
</tr>
<tr>
<td></td>
<td>IC33 = 74LS132</td>
</tr>
<tr>
<td></td>
<td>X2 = 1.088 MHz</td>
</tr>
</tbody>
</table>

The Display Circuit

This part of the circuit is a quite straightforward constructional job with nothing in the way of complications. It is based on the Thomson EFCIS CRT controller, the SFF96364. A number of designs have been published using this IC and each has closely followed the circuits shown in the data sheets produced by the manufacturers. The design used six small memories which had to be connected together, a thing the writer does not like to have to do. The published circuits all use about 18 to 20 integrated circuits, whereas the writer’s version has only 10 and provides the same facilities as the original design. Only one memory is used and the latches and gates used in the original circuits have been replaced by an 8212 input/output port manufactured by Intel and a number of other makers. The circuit diagram is shown in Fig. 11 with a board layout in Fig. 12.

As in Fig. 4 the address lines have been omitted and the corresponding 'A' lines must be connected. These only involve the CRT controller IC28 and the memory IC24; no other address lines are needed. IC26 deserves a special mention as it is a ROM specially programmed to the instructions given by the CRT controller manufacturers and is required to interpret the inputs to decide whether a character is intended or one of the various cursor movements available. It can be bought ready programmed as the ROM for “Elekterminal”; this is one of the designs published (in Elektor magazine) using the SFF96364 and is therefore programmed to the maker’s requirements. The circuit can be assembled on a piece of Veroboard the same size as the processor unit, but it only needs one 12-way Minicon for connections to the processor; the connections needed are PBO to PB6, STB and power lines. These all connect to the corresponding connector on the processor board. The video output, which is a standard 1v pk/pk signal is also taken to the connector strip for connection to the video monitor; R51 controls the width of the display. A direct connection can be made to such a monitor and this connection can be made to the video circuits of a television receiver.

Perhaps the easiest alternative to a video monitor is to add a modulator as used in TV games and home computers and feed this signal into the aerial input of the television receiver.
no connection is needed to switch 7. Connect STB to the negative-going pulse output on the programmer. ASCII data can be set up on the switches and each time the programming switch is pressed the symbol corresponding to the data will appear on the display. A list of codes in octal is given in Table 7. Also shown are the meanings allocated to some of the codes in this design though these can easily be changed by the program if so desired. There is obviously no need for a back space. It might be thought that this could be used to correct an error but the processor would not know how far to go back to make the correction!

**The Spacing Switch**

The diagram for this is given in Fig. 13. It can be built on a small piece of Veroboard and soldered on to unused tags on the switch for support. The switch is 11-way single-pole stopped down to 8 positions; these positions give spaces of 030 to 120 clock pulses (24
### Table 7

<table>
<thead>
<tr>
<th>Code</th>
<th>Holding Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>010</td>
<td>Back space</td>
</tr>
<tr>
<td>011</td>
<td>Forward one space</td>
</tr>
<tr>
<td>012</td>
<td>Line feed</td>
</tr>
<tr>
<td>013</td>
<td>Up one line</td>
</tr>
<tr>
<td>014</td>
<td>Clear display and cursor home</td>
</tr>
<tr>
<td>015</td>
<td>Clears line but cursor remains in position</td>
</tr>
<tr>
<td>016</td>
<td>Line feed</td>
</tr>
<tr>
<td>017</td>
<td>Cursor home</td>
</tr>
<tr>
<td>018</td>
<td>Carriage return</td>
</tr>
<tr>
<td>019</td>
<td>Space</td>
</tr>
<tr>
<td>020</td>
<td>Error</td>
</tr>
<tr>
<td>021</td>
<td>See text</td>
</tr>
<tr>
<td>022</td>
<td>121</td>
</tr>
<tr>
<td>023</td>
<td>Understood</td>
</tr>
<tr>
<td>024</td>
<td>041</td>
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<td>104</td>
<td>Brackets</td>
</tr>
<tr>
<td>105</td>
<td>AS</td>
</tr>
<tr>
<td>106</td>
<td>Invalid code</td>
</tr>
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</table>

### The Program — Part II

This is listed in Table 8 which shows the additions required to complete the main program together with a few amendments to the preliminary program. Once again only the addresses listed need be programmed, all others can be skipped by pressing the addressing switch only. 000 005 to 000 032 clear the monitor display and return the cursor to the top left hand corner of the screen, its home position. 000 271 to 000 276 decides if a word space has been received and if it has the program jumps to 001 070 to insert a space. This part between 001 070 and 001 114 also counts the number of characters and word spaces printed out on each line of the display and stores the count in register ‘L’. It also checks ‘L’ to see if the count is 065 or more; if it is, the carriage return and line feed are initiated at 001 150. In this way a line nearly always ends in a complete word.

One of the faults of the earlier display built by the writer was that each line was filled before a new line was started resulting in nearly every word at the end of each line being broken between this and the next line. Very long words starting near the end of a line can still over-run on to the next line but these are few and far between particularly in amateur Morse. A program was written to insert a hyphen at the end of such lines and, although this was fairly long, it worked until it was realised that if only one letter was carried forward to the next line it could just as well have been printed in its correct place at the end of the previous line in place of the hyphen. To avoid this the program was made even longer and the whole idea was abandoned as not being worth the trouble.

The address which determines whether a space is to be inserted is 000 272, and the data at this address can be changed by the spacing switch. Some amendments have been made at 000 333 to 000 337 and the program continued to 000 373. Before the Morse holding codes can be printed out they must be changed into ASCII11 and this is done by this revised program. What is known as a ‘look-up table’ will be programmed between 002 000 and 002 377. When the processor is holding a Morse holding code it goes to the corresponding address in the look-up table where it finds the ASCII code required, which it then transfers to its ‘A’ register to print out at 000 341. This section in conjunction with 001 226 to 001 233 clears the ‘L’ register when a line of print is full, and a word carries forward to the next line so that ‘L’ can start again at zero to count characters in the new line.

000 366 enables the interrupt circuits. If the restart (interrupt) switch is pressed, this fact is remembered in IC20 and the El instruction at 000 366 transfers the program to 001 000 via 000 054 to 000 056. How the interrupt works is illustrated in Table...
Table 8

<table>
<thead>
<tr>
<th>Address</th>
<th>Data Mnemonic</th>
</tr>
</thead>
<tbody>
<tr>
<td>000 005</td>
<td>076 MVIA</td>
</tr>
<tr>
<td>002</td>
<td>120 MOVDB</td>
</tr>
<tr>
<td>006 014</td>
<td>130 MOVEB</td>
</tr>
<tr>
<td>007 323 OUT</td>
<td>311 RET</td>
</tr>
<tr>
<td>011 076 MVIA</td>
<td>323 OUT</td>
</tr>
<tr>
<td>012 007</td>
<td>201</td>
</tr>
<tr>
<td>013 323 OUT</td>
<td>076 MVIA</td>
</tr>
<tr>
<td>014 203</td>
<td>137</td>
</tr>
<tr>
<td>015 075 DCRA</td>
<td>323 OUT</td>
</tr>
<tr>
<td>016 323 OUT</td>
<td>203</td>
</tr>
<tr>
<td>017 203</td>
<td>075 DCRA</td>
</tr>
<tr>
<td>020 036 MVIE</td>
<td>323 OUT</td>
</tr>
<tr>
<td>021 000</td>
<td>203</td>
</tr>
<tr>
<td>022 123 MOVDE</td>
<td>303 JMP</td>
</tr>
<tr>
<td>023 035 DCRE</td>
<td>344</td>
</tr>
<tr>
<td>024 032 JNZ</td>
<td>001 045 000</td>
</tr>
<tr>
<td>025 023</td>
<td>76 MVIA</td>
</tr>
<tr>
<td>026 000</td>
<td>100</td>
</tr>
<tr>
<td>027 025 DCRD</td>
<td>323 OUT</td>
</tr>
<tr>
<td>030 032 JNZ</td>
<td>102 076 MVIA</td>
</tr>
<tr>
<td>031 023</td>
<td>007</td>
</tr>
<tr>
<td>032 000</td>
<td>075</td>
</tr>
<tr>
<td>271 076 MVIA</td>
<td>175 MOVAL</td>
</tr>
<tr>
<td>272 100</td>
<td>376 CPI</td>
</tr>
<tr>
<td>273 271 CMPC</td>
<td>072 006</td>
</tr>
<tr>
<td>274 312 JZ</td>
<td>073 322 JNC</td>
</tr>
<tr>
<td>275 070</td>
<td>150</td>
</tr>
<tr>
<td>276 001</td>
<td>007</td>
</tr>
<tr>
<td>303 325</td>
<td>010</td>
</tr>
<tr>
<td>325 173 MOVAE</td>
<td>203</td>
</tr>
<tr>
<td>326 007 RLC</td>
<td>106 075 DCRA</td>
</tr>
<tr>
<td>327 202 ADDD</td>
<td>107 323 OUT</td>
</tr>
<tr>
<td>329 330 322 JC</td>
<td>110 203</td>
</tr>
<tr>
<td>331 030</td>
<td>111 054 INRL</td>
</tr>
<tr>
<td>332 001</td>
<td>112 303 JMP</td>
</tr>
<tr>
<td>333 137 MOVEA</td>
<td>113 073</td>
</tr>
<tr>
<td>334 345 PUSHH</td>
<td>114 000</td>
</tr>
<tr>
<td>335 046 MVIB</td>
<td>115 076 MVIA</td>
</tr>
<tr>
<td>336 002</td>
<td>116</td>
</tr>
<tr>
<td>337 135 MOVLE</td>
<td>117 236 OUTF</td>
</tr>
<tr>
<td>340 176 MOVAM</td>
<td>118 310</td>
</tr>
<tr>
<td>341 323 OUT</td>
<td>119 075 DCRA</td>
</tr>
<tr>
<td>342 201</td>
<td>120 323 OUT</td>
</tr>
<tr>
<td>343 076 MVIA</td>
<td>121 203</td>
</tr>
<tr>
<td>344 007</td>
<td>122 075 DCRA</td>
</tr>
<tr>
<td>345 323 OUT</td>
<td>123 323 OUT</td>
</tr>
<tr>
<td>346 203</td>
<td>124 075 DCRA</td>
</tr>
<tr>
<td>347 075 DCRA</td>
<td>125 323 OUT</td>
</tr>
<tr>
<td>350 323 OUT</td>
<td>126 323 OUT</td>
</tr>
<tr>
<td>351 203</td>
<td>127 075 DCRA</td>
</tr>
<tr>
<td>352 341 POPH</td>
<td>001 164 000</td>
</tr>
<tr>
<td>353 054 INRL</td>
<td>128 026 MVID</td>
</tr>
<tr>
<td>354 076 MVIA</td>
<td>129 005</td>
</tr>
<tr>
<td>355 077</td>
<td>130 035 DCRE</td>
</tr>
<tr>
<td>356 275 CMPL</td>
<td>131 302 JNZ</td>
</tr>
<tr>
<td>357 312 JZ</td>
<td>132 167</td>
</tr>
<tr>
<td>360 226</td>
<td>133 001</td>
</tr>
<tr>
<td>361 001</td>
<td>134 025 DCRD</td>
</tr>
<tr>
<td>362 006 MVIB</td>
<td>135 302 JNZ</td>
</tr>
<tr>
<td>363 000</td>
<td>136 075 DCRA</td>
</tr>
<tr>
<td>364 120 MOVDB</td>
<td>137 323 OUT</td>
</tr>
<tr>
<td>365 130 MOVEB</td>
<td>200 012</td>
</tr>
<tr>
<td>366 373 EI</td>
<td>201 323 OUT</td>
</tr>
<tr>
<td>367 000 NOP</td>
<td>202 201</td>
</tr>
<tr>
<td>370 000 NOP</td>
<td>203 076 MVIA</td>
</tr>
<tr>
<td>371 303 JMP</td>
<td>204 007</td>
</tr>
<tr>
<td>372 250</td>
<td>205 323 OUT</td>
</tr>
<tr>
<td>000 373 000</td>
<td>206 075 DCRA</td>
</tr>
<tr>
<td>001 000 333 IN</td>
<td>207 323 OUT</td>
</tr>
<tr>
<td>002 206</td>
<td>208 323 OUT</td>
</tr>
<tr>
<td>003 360</td>
<td>209 323 OUT</td>
</tr>
<tr>
<td>004 017 RRC</td>
<td>210 323 OUT</td>
</tr>
<tr>
<td>011 202</td>
<td>211 203</td>
</tr>
<tr>
<td>012 036 MVIE</td>
<td>212 006 MVID</td>
</tr>
<tr>
<td>213 000</td>
<td>214 026 MVID</td>
</tr>
</tbody>
</table>

9. Port C is read which inputs the switch codes. The lowest four bits are mask out to zeros and the data rotated right producing the octal numbers listed. The number selected is then transferred to 000 272 to determine the length of the next space detected. The interrupt is then disabled at 001 017. Registers B, C, D and E are cleared and the program returns to where it left off at 000 370, followed by a jump back to the space input. As mentioned earlier, 001 150 to the end of the program are to initiate line feed and carriage return.

The look-up table is given in Table 10 and fills the whole of the third section of the memory, 002 000 to 002 377. All the addresses must be programmed, all those not listed being programmed as 137 — the code for a dash on the line in ASCII. All data held as a Morse holding code must lie between 000 and 377 and those which correspond to a valid symbol are listed in the look-up table. Should any other data be present it will be one of the codes represented by a dash so that any invalid code will initiate a dash print out on the line. If letters are inadvertently joined the number produced by the ADDD instruction at 000 327 can be over 377 and, if this happens, what is known as a ‘carry flag’ is set in the microprocessor. This carry is detected at 000 330 and the program jumps to 001 030 to insert an invalid symbol; this is a slight modification made after the preliminary program was written and ensures that all invalid codes are detected. (In the preliminary program some of the very long ones were missed and an incorrect symbol printed).

A small complication arises when an erase is received. The holding codes are 077, 177 and 377 depending on whether 6, 7 or 8 dots are received. Should a string of 9 or more be received the register overflows and produces a wrong print-out. In all the time the writer has used a decoder this has never occurred. In fact many amateurs send a series of the letter E when they mean erase and this prints out accordingly; the additional alterations to the program to avoid this were not considered worthwhile.

Final Wiring

The interconnections between the various units can now be made from Fig. 9, the programmed memory board inserted on its

Table 9

<table>
<thead>
<tr>
<th>Interrupt coding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switch</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td>6</td>
</tr>
<tr>
<td>7</td>
</tr>
<tr>
<td>8</td>
</tr>
</tbody>
</table>

X = don't care
The first appendix is called, "1982-85 Radio Amateurs' Examination Syllabus and Objectives", which says it all, and lists the subjects the R.A.E. candidate needs to know before enrolling for the examination. The next appendix lists forty sample R.A.E. questions and gives the answers, while the last appendix, "Safety Pointers", is a brief one suggesting how best to avoid injury and death in pursuance of the hobby. The book has a useful two page index.

A Guide to Amateur Radio is published by the Radio Society of Great Britain and is a paperback of 160 pages, in 246 x 184mm. format. It can be well recommended to all would-be radio amateurs as a first-class reference book. It is available from Short Wave Magazine Publications Department at 34 High Street, WELWYN, Herts., AL6 9EQ, for £3.40, including postage and packing.

N.A.S.F.
THE "WHITFIELD" SSB/CW/QSK TRANSCEIVER, PART II
AN EASY-TO-BUILD, 5 WATTS OUTPUT, MODERN DESIGN COVERING 160 METRES, 80 METRES, AND 3–3.5 MHz
IAN KEYSER, G3ROO

We start this month with the main interconnection diagram, Fig. 2. It can be difficult to know where to put this in a series article: some would say at the end, but I think it will provide the prospective constructor with some insight into the finished project. Also, references will have been made to it while explaining the various sections of the rig.

The Receiver Section
This time we are going to cover the main receiver PCB and SSB generator. This is starting at the back-end and working towards the aerial, but the PCB will be described in the opposite direction — the signal in towards the loudspeaker. The complete diagram is given in Fig. 3. It looks a lot to take in at one go, but really it's not too bad. This PCB includes receiver mixer, filter, IF strip, AF preamp., AF filter, and audio output stage; in addition there is the Tx microphone amplifier, the balanced modulator and the SSB IF amplifier.

The signal in from the RF preselector (or RF amplifier if used) is fed into pins 12 and 13 of IC1. This device is a high level mixer from Plessey, the SL6330, having characteristics which approach those of diode ring mixers when run under optimum conditions; this section, along with the IF amplifier, is identical to Peter Chadwick's design. The mixer current, and so its operating conditions, is set by R1001, and C1004 decouples the programming current input, pin 11; pin 4 of this device is the supply input and is decoupled by C1003, the mixer output being on pin 3. The signal load is a 1mH RF choke, RFC1001, capable of push-pull output if required; however, this is not needed in this application and so the second output is taken to the supply rail from Reg 1001, C1005 serving the dual function of decoupling the output of Reg 1001 and the mixer unused output on pin 14.

The decoupling capacitors throughout the rig have been set, wherever possible, at 0.01 μF for the sake of simplicity, as the only requirement for these components is that their reactance at the frequency present at a point is less than one-tenth of the impedance of the circuit at that point and so act as a short-circuit to the RF/IF signal. In the majority of cases this also applies to the coupling capacitors in the set.

The local oscillator signal is coupled by C1006 into pin 5 of the mixer, and the signal out of pin 3 is coupled to the filter FL1001 via C1007; R1007 is set to the input impedance of the filter to ensure the flattest possible response of its passband. The output of the filter is the 455 kHz difference signal resulting from the subtraction of the input signal from the local oscillator signal. This filter has a bandpass of about 3 kHz, adequate for SSB and a very good stop-band figure; the slope of the filter is perhaps not quite as good as one might wish, but when the cost is taken into consideration it is more than adequate for the job in hand.

The IF amplifier integrated circuit, IC1002, is the Plessey SL6700, which includes two IF amplifiers, AGC detector and the SSB balanced demodulator. The two IF amplifiers are capacitively coupled by C1008 and the output of the second amplifier, on pin 6, is connected to the tap on the primary of IF transformer T1001; C1009 is used to block the DC component,
Fig. 3 The "WHITFIELD" Receiver and SSB Generator

T1001 is used to transform the impedance of the output to match the relatively low input impedance of the two detector inputs (the AGC detector and the balanced demodulator). Pin 13 has a DC component and C1010 prevents this from shorting out via the secondary of T1001. The BFO or C10 (carrier insertion oscillator) signal from the output of the emitter of Q1004 is coupled into the balanced modulator on IC1002's pin 9 via C1011, and the SSB audio is available on pin 8 — R1005 acting as the collector load for the balanced modulator.

The supply for IC1002 is five volts from Reg 1002, the output of which is decoupled by a small 100 µF electrolytic capacitor. C1012 decouples the AGC detector on pin 14, and C1013 decouples the output of the detector on pin 15; pin 15 also has an audio component which can be used for AM detection if required. To mute this IF amplifier on transmit it is possible to use the AGC line by shorting out the AGC decoupling point on pin 16. This is not done directly but by a transistor, the reason for this being that it is unwise to trail wires from RF sensitive points throughout the set when it is not necessary. Q1001 acts as the switch, and its base as the control which is well and truly decoupled by C1014, C1015 and R1004. By increasing the voltage on the mute input the gain of the IF strip steadily decreases.
Before going on to the AF stages I will cover the CI0 circuit. There are two oscillators, Q1002 and Q1003, one for lower sideband and the other for upper sideband. The circuits of these oscillators are very straightforward and hardly need any explanation. To enable one or other oscillator the supply is switched by the mode switch shown on Fig. 2. When in CW mode either oscillator can be used according to which one gives the best tone, and this depends on the frequency of the CW oscillator in the transmitter. The outputs from these two oscillators are fed to the base of Q1004 which is an emitter-follower stage. The emitter load is made up of two miniature presets, one for the receiver balanced demodulator and the other for the transmitter balanced demodulator, enabling the levels to be set independently.

Now for the audio stage. IC1003 is a 741 op. amp., something that everyone must have used at one time or another! Its function here is as a high-gain AF amplifier with frequency-dependent feed back C1016, C1017, R1005 and R1006; this gives a roll-off at about 6 kHz. An eight volt supply is provided by Reg 1003 and decoupled by C1018, an electrolytic. The output from pin 6 is DC blocked by C1019 to feed the volume control. C1020 is a DC block to preserve the DC levels in the filter circuitry.

Ah, now the AF filter! Here I will reserve the right not to go too
deeply into the circuit having tried to find a way of describing it without becoming too verbose — and it's just not possible! I think that it is sufficient to say that in the notch mode IC1004a, in conjunction with the IC1004b, c, and d loop, provides an amplifier with unity gain at all frequencies except at resonance; in the peak mode IC 1004a does nothing, and the conventional loop filter comprising IC1004b, c, d takes over. I have used this filter for years with the 741 but they are much too bulky to be included in this circuit. Instead I have used a Norton amplifier (LM3900), though not quite as the manufacturers intended (that's amateur radio!). The problem was trying to keep the component count down, and allowing proper biasing would have meant a lot of extra components. By running the device at reduced supply voltage (6 volts from Reg 1004) and due to the very low audio level — tens of millivolts — there is no audible distortion.

At this point, a few words on using the filter in notch mode could be useful. At first it will appear that the filter is not working: this is due to the fact that the 'Q' is very high and you're tuning through the tone you wish to reject. The trick is to switch to the peak mode and peak the undesired signal, then switch to the notch mode and adjust the filter tuning to give maximum rejection.

IC 1005 serves as the audio output stage, this device developing 1 watt of audio into 8 ohms with a 12 volt supply. C1023 is the input coupling capacitor, valued at 0.1 µF. A word here about these low value audio coupling capacitors: we are used to using in audio circuits values of 1 to 10 nF for audio coupling, but in these instances the impedances are high. Considering C1023, for example, the output impedance of IC1004a or IC1004b (depending on the filter mode) is low, in the region of 500 ohms or so, the input impedance of IC1005 is very high — in excess of 100K at a guess. Now, the reactance of a 0.1 µF capacitor at 1 kHz is only about 1.5K ohms, so if you look at the equivalent circuit the amount of signal lost is minimal. The output of IC1005 is on pin 4 — the RFC in the output is for stability and is called for in the application notes; however I have, in the past, left it out and not noted any instability.

### The SSB Generator

The microphone signal is amplified by IC1006, an SL1630. C1026 and C1027 are RF filter capacitors of 0.001 µF; these are

---

### Table of Values

<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1001, C1019, R1020</td>
<td>220R</td>
</tr>
<tr>
<td>R1002, R1005</td>
<td>1K</td>
</tr>
<tr>
<td>R1003, R1004</td>
<td>1M</td>
</tr>
<tr>
<td>R1009</td>
<td>4K7</td>
</tr>
<tr>
<td>R1006, R1010</td>
<td>220K</td>
</tr>
<tr>
<td>R1008, R1012, R1021, R1024</td>
<td>47K</td>
</tr>
<tr>
<td>R1011, R1013, R1017, R1018</td>
<td>2K7</td>
</tr>
<tr>
<td>R1014</td>
<td>10K</td>
</tr>
<tr>
<td>R1015, R1016</td>
<td>470R</td>
</tr>
<tr>
<td>R1012, R1025</td>
<td>470K</td>
</tr>
<tr>
<td>R1023, R1026</td>
<td>100R</td>
</tr>
<tr>
<td>R1027, R1028</td>
<td>33K</td>
</tr>
<tr>
<td>C1001 to C1007, C1011, C1033 to C1038, C1040 to C1045</td>
<td>0.01 µF d/c</td>
</tr>
<tr>
<td>C1008 to C1010, C1013, C1014, C1026, C1027, C1039, C1048</td>
<td>10000 µF d/c</td>
</tr>
<tr>
<td>C1015, C1016, C1019, C1020, C1023, C1029, C1030, C1032, C1051</td>
<td>0.1 µF, C280</td>
</tr>
<tr>
<td>C1017</td>
<td>220 pF d/c</td>
</tr>
<tr>
<td>C1018, C1031</td>
<td>1 µF, 16v. elec.</td>
</tr>
<tr>
<td>C1021, C1022</td>
<td>0.033 µF, C280</td>
</tr>
<tr>
<td>C1024</td>
<td>10 µF, 16v. elec.</td>
</tr>
<tr>
<td>C1012, C1025</td>
<td>10 µF, 16v. elec.</td>
</tr>
<tr>
<td>C1028</td>
<td>0.0047 µF, d/c</td>
</tr>
</tbody>
</table>

Note: all resistors are 1/4-watt; semiconductors and presets available from Ambit International.
sufficient to keep RF problems to a minimum, providing that screened leads are used for the microphone. There is only one external component of note associated with this device, and that is C1028 which sets the roll-off frequency of the amplifier; I have it set at about 5 kHz. C1030 decouples the incoming 12 volts on Tx supply, and C1029 is a 1 µF capacitor for DC blocking to couple the amplified audio signal to the balanced modulator, IC1007. No external balancing of the carrier signal is required as the device itself provides over 20dB; that combined with the 20dB or so of the filter is quite sufficient. C1031 and C1032 are decoupling capacitors for the internal bases of the balanced modulator, and as there are both audio and radio frequencies present I have used values of 1 µF and 0.01 µF to cover the whole spectrum; the internal inductance of the 1 µF capacitor would not enable it to be an efficient decoupler at RF.

IC1007, an SL1640, has internal output load and so C1034 is used for DC blocking. R1019 reduces the loading effect of the output of the balanced modulator on the modulator in the filter circuit, so losing gain in the receiver; R1020 serves the same purpose but is not so important. The reason for this is that the input impedance of IC1008, an SL1610, is relatively high and so the loading effect is minimal. The SL1610 is a wideband RF amplifier with a gain of 10dB and is interchangeable with the SL1611 and SL1612, which have gains of 20dB and 34dB respectively; thus if there is insufficient gain it is possible to replace this IC to compensate for losses. Pin 7 on this device is for AGC purposes and is brought to the board edge in case it is required or ALC at a later date. The SSB output signal of 455 kHz has an amplitude of about 200mV, sufficient to drive the Tx mixer. With that, the description of this PCB is ended!

**PCB Construction Notes**

The PCB foil side is given in Fig. 4, and the component side in Fig. 5. The PCB uses double-sided board, the top side for the groundplane and the underside for the interconnections. Actually, with careful drawing, it is possible to get all the earth connections on the underside, but it is tight and not really necessary. One point to note is that prior to putting any components on the board at least one interconnection from top to bottom for each groundplane island should be drilled and soldered to prevent any problems of DC continuity later on.

The board should be cleaned using an abrasive — I find that one of those green pan scrubbers is ideal — then washed in hot water and dried thoroughly. The board is then placed under Fig. 5 and, using a sharp point such as a scribe, all the holes are marked. Drill the holes with a 0.8mm. drill and remove the burrs with fine emery paper; this makes marking the pads with the pen very simple. Carefully draw all the tracks, and if mistakes are made use an ink-rubber to remove the fault before re-drawing.

Finally, using the pen, fill-in as much groundplane as possible. To save painting the top side of the copper PCB float it in ferrite chloride; however this is an optional idea as it really only saves a few minutes painting. Next take a 3/16th drill and clean the copper away on the top side of the PCB around the holes that take the component wires to the tracks — not those to the groundplane. After completing and testing the PCB these earth points are soldered on both sides of the board.

*to be continued*
REPEATER SHIFT FOR THE ICOM ICB1050 AFTER CONVERSION TO 10-METRE OPERATION

P. OSBORNE, G4RPF

HAVING modified the Icom ICB1050 CB rig as per G3XSE's instructions (S.W.M. February 1983), the pleasures of 10 metre FM contacts soon revealed themselves. There was, however, one slight problem; many contacts could be heard being made through repeaters on 29.62 MHz and 29.64 MHz (channels 27 and 29 for those of you without calculator brains). At times these signals registered end-stop on the converted rig, which considering the set is slightly deaf anyway thrilled me to bits. (Note the ex-G8 enthusiasm). After enquiring as to the input frequencies of these marvellous boxes and being told that they lie 100 kHz lower than the output, I proceeded to play with 'XSE's patented wrist action. Basically this involves whipping the channel selector down 10 channels from the repeater output, transmitting, and then returning to the output again to receive. This is a super method for the first few overs but does cause the wrist to become somewhat limp and in need of refreshment (not by the famous lager as this causes channel inaccuracies to creep in and creates more limpiness in other parts).

It's Got to be Easier

There just had to be an easier way of getting repeater shift apart from obtaining another converted CB rig (must remember to wash my mouth out with best bitter). In fact three alternatives exist. The first is to obtain an assistant, a young lady if you like, to flash through the channels. This could prove more costly than the other two alternatives as a training session is required and possibly a bit of buttering-up/persuasion (a meal or a pint) and then some tipping afterwards. The second method is to go the whole hog and fork out for a mixer crystal to be switched in for the transmitter repeater frequency shift, i.e. a 16.86125 MHz crystal. This may cost over £6 (anything over £1 is out with me) and involves a hell of a wait. Finally there is the logical approach achieved by subtracting or adding 100 kHz (10 channels) on the synthesiser address lines. This should work out the cheapest.

As it is binary coding we are working with, the shift of 100 kHz (10 channels) is easier to add than subtract from the original address, although I did try to find ways round this as a means of imitating the standard method of selecting the repeater output and shifting down from that to transmit. Original ideas used a handful of resistors, diodes, 4011 and 40106 integrated circuits, which were cheap if not to be found in a junk box. These ideas all failed to pass the final theoretical check before putting solder, components and board together. On the verge of giving up the idea of solving the problem logically and shelling out for the crystal instead, I made a final dive into a large CMOS data book in which I tumbled upon the solution — a four-bit full adder. This chip combined with previous ideas produced the circuit shown in Fig. 1.

Circuit Description

Fortunately, whilst the microphone incorporates the four-wire system which many CB sets use, such that without the microphone the audio output is muted, the ICB1050 only uses three of these wires (i.e. mic., PTT and ground). The fourth wire is grounded during receive-only, is not used, and lent itself nicely to the modification. An additional switch had to be added to this line, though, because otherwise the repeater shift cannot be switched out. We will deal with this part of the modification later. When the repeater shift mode is selected the base of TR1 is held low in receive. This causes the collector to rise to almost 5 volts, hence placing the binary count of 0101 onto pins 15, 6, 4 and 2 in that order. The count of 0101 is in fact 10 when looked at in relation to the full binary code word applied to the synthesiser chip, and as the channel spacing is 10 kHz we have a shift of 10 x 10 kHz = 100 kHz. Therefore, the receiver is listening 100 kHz higher than the channel selected and shown on the channel display. If we now go to transmit the base of TR1 goes high pulled up by R1. The collector goes low to 0V and now the binary count to be added to the synthesiser address is 0000 (i.e. a big fat zero channel adjustment); so, the transmitter frequency is that selected and shown on the channel display.

Table of Values

<table>
<thead>
<tr>
<th>R1 = 10K, 1/4W 10%</th>
<th>TR1 = BC109 or similar</th>
</tr>
</thead>
<tbody>
<tr>
<td>R2 = 47K</td>
<td>IC1 = CD4001 or MC14001, or equiv.</td>
</tr>
<tr>
<td>R3 to R6 = 100K</td>
<td>IC socket = 16-pin DIL</td>
</tr>
</tbody>
</table>

Also Veroboard or PCB, as preferred.
Now you are ready to fit your board. Start by removing the wires from pins 13, 14, 15 and 16 on the synthesiser chip (IC 20A in the manual). Place these into the holes or onto the pins of your board (make sure they are in the correct order as per Fig. 1).

You're on the final leg now. Take your replacement wires and put them into the holes where you ripped the others out. The power supply leads need to be taken behind the board and soldered to pins 1 and 18 on the track side of the board. The wire to pin 3 does just that, although you may want to insert your switch at this point as previously discussed.

Now it's your turn to do a little bit of thinking. Where are you going to put this board? Three suggestions (apart from in the set) are:—

1) Use some good insulating material and twin-stick tape to adhere the board to the inside of the speaker-lid cover.

### Construction

The circuit is very simple and components could be easily mounted on a piece of Veroboard, as mine were initially. However, there are those of you with the need to have things extra neat on a PCB; the design for the PCB is shown in Fig. 3 and should be easy either to copy photographically or using a good artistic hand and a Dalo pen.

Having obtained your board vero or otherwise remember the construction rates which especially apply to CMOS devices that is, resistors and transistor first, chip last. A chip holder may be a good idea allowing you the ability of gauging the size of board required and where you are going to place components in relation to the chip without actually handling the chip.

### Fitting

Get your rig out and open it up (no — not with a sledge hammer). You will see that pin 3 of the mic. socket has been grounded, along with pin 2. So next lift the wire and the capacitor from pin 3 and transfer them to pin 2. This now leaves pin 3 free for the repeater modification.

You can now insert your switch in the scheme of things; this can be any single-pole single throw switch which will inhibit ground from pin 3 reaching the repeater shift board. Without this vital item you will not be able to obtain simplex working any more. You can fit the switch anywhere in the line between the microphone and the board. On my set I modified the microphone wiring as shown in Fig. 4 and placed the switch on the back of the microphone, making it easier to use under mobile conditions. Alternatively, the switch can be placed inside the set between the mic. socket and the repeater shift board. There just so happens to be a hole spare on the front backing panel, in line with the power switch, so the front panel could be drilled and the switch fitted there. Someone suggested that the Hi-Lo power switch itself could be used, providing you don’t require that option. (Good idea, huh!)
THE SHORT WAVE MAGAZINE

April, 1983

To Mic insert

PTT switch

SPST switch

Fig. 4 MODIFICATION TO MICROPHONE

To Mic plug

Black wire removed from PTT switch and taken to SPST switch. From the SPST switch take a wire to the pin of the PTT switch from where the black wire was removed.

(2) Mount the board using standoffs and screws to the speaker-lid cover.

(3) Glue the board (if it’s small enough) to the main PCB near to the ‘S’ meter.

Before your take up any mounting option check the board for solder bridges because you won’t be pleased to get the unit together and find it doesn’t work, or, worse, you’ve done the synthesiser chip a mischief.

THE LIGHT-EMITTING GaAsFET

A LOOK AT AN IMPORTANT BRITISH DEVELOPMENT

JOHN WILKINSON, G4HGT

Introduction

SEMICONDUCTOR technology is moving at a fast pace — sometimes advances are made but their applications are not developed fully. The light-emitting GaAsFET, developed by Silliconex Ltd., is one such specimen. By combining the high gain-bandwidth product of the GaAsFET with the usefulness of a light-emitting diode on the same chip, a multiplicity of uses can be thought up. It is hoped that this article will encourage the reader to make use of this interesting transistor. First, let us take a look at the two devices separately before describing the finished product.

The Light-Emitting Diode

A light-emitting diode consists of a forward-biased p-n junction. Within the structure, close to the junction, holes and electrons will be recombining, that is, the energy possessed by unbound free electrons will be transferred to another state. This results in the emission of the excess energy, usually as heat but occasionally as photons. The percentage of energy emitted as light depends on the material used; for silicon and germanium junctions the amount is insignificant but gallium arsenide based devices produce considerable amounts of visible radiation.

Gallium arsenide (GaAs) has a bandgap of 1.45eV (electron-volts) which results in radiation at about 850nm, in the infra-red region. By adding phosphorus, to produce gallium arsenide phosphide (GaAsP), the bandgap is increased and the wavelength of the radiated light is reduced. The optimum ratio of arsenic to phosphorus is around 60:40 resulting in red light of 650nm wavelength.

Increasing the proportion of phosphorus further results in a reduction in light intensity but fortunately the human eye is more sensitive to green than red light so the reduction in light emission is countered by an increase in eye sensitivity. Gallium phosphide (GaP) produces green light while using nitrogen as an extra dopant (GaAsP:N) results in orange radiation.

The construction of an LED is shown in Fig. 1. The GaAsP layer is grown by vapour phase epitaxy as an n-type layer on a single crystal GaAs substrate. The light-emitting areas are defined by the deposition of a silver nitride layer into which windows are etched by conventional photolithographic techniques; diffusion from zinc vapour produces p-type regions limited by the windows in the nitride layer. Aluminium contacts are then added by evaporation and power can be applied. Light is emitted through the thin (1-2µm) p-type region. To maximise the amount of light passing out of the window a substrate of GaP may be used and in this situation a reflective back contact increases light output.

Testing and Operation

With your super repeater shift board embodied in the set you can switch on. (Tune your nose for maximum sensitivity — no smoke? — good.) If you have a friend (some people haven’t, you know) with a 10m. FM set get him to put a carrier up on 29.6 MHz (i.e. channel 25). Check you can hear it on channel 25. Now switch in the repeater shift and re-dial to channel 15; you should be able to hear the carrier, because you’re listening to channel 25 really (amazing!). Still on channel 15, press the PTT (caution: a dummy load is necessary) and get someone to monitor for you on channel 15.

These tests are conclusive proof that your repeater shift will work on demand — so go get ‘em! Your set is now worth approximately £1.00 more and can do almost anything the purpose-built 10 metre FM sets can do. OK, so it’s not too brilliant on receive and the channels are limited but if you’re a broke G4 like me it’s a super way of getting started on 10 metres FM.

Finally, I would like to thank G3XSE for his bent ear and explanations.
The GaAs MESFET

Most microwave FETs are constructed on GaAs instead of silicon due to the former's higher electron bulk mobility and greater maximum electron drift velocity. The GaAs MESFET is easier to fabricate for microwave use due to its simpler construction.

The structure of a MESFET is shown in Figs. 2 and 3. The GaAs substrate is produced by doping pure GaAs with chromium. An intermediate semi-insulating buffer layer can be grown onto the substrate; this will give improvements in noise and gain performance. Then a very thin (≈1μm) n-type layer (GaAs doped with either sulphur or tin) is grown onto the buffer layer using vapour or liquid phase epitaxy.

The source and drain areas are formed on the surface of the n-type layer and sintered to form low resistance ohmic contacts. The gate control electrode is a Metal-to-Semiconductor (hence MESFET) contact onto the n-type layer. For optimum microwave performance the source-gate spacing and the gate length should be small, and using standard photolithography a gate length of 0.5μm can be achieved.

Electrons flow from the source to the drain through the thin n-type layer when a positive drain to source voltage VDS is applied. With the gate shorted to the source (VG = 0) and a small VDS applied, a depletion layer is formed restricting the electron flow. For small values of VDS the n-type layer will act as a linear resistor; as VDS is increased, the critical electric field is reached and the electron flow starts to saturate. When VDS is made negative enough, the depletion layer reaches the semi-insulating substrate and device is cut off. This is summarised in Fig. 4.

Combination of the Devices

It can be seen by comparison of Figs. 1 and 2 that the LED and GaAsFET are very similar in construction. This has led to the production of a four terminal device, the Gallium Arsenide Fet Incorporating Extra Light-emitting Diode (or GaAs FIELD), Fig. 5. The light-emitting junction is positioned between the gate and drain terminals of the transistor and the LED is forward biased by application of a positive voltage VLS. The chip size must be made larger to accommodate the LED and this has a detrimental effect on performance at high frequencies.

The principle of operation can be considered in three ways:
(a) VDS applied; VLS = 0V.
   The device behaves exactly as a GaAsFET with the LED section reverse biased, hence inoperative.
(b) VLS applied; VDS = 0V.
   In this situation the LED will operate with the gate terminal voltage VGS controlling the current and hence brightness of the LED. Since the input impedance at the gate terminal is very high (∼100MΩ at DC, reducing at UHF), control of the light source is achieved by voltage variation only, i.e. little current is taken from the driving source so the resultant power gain is very high.
(c) VLS and VDS applied.
   The performance of the device is determined by the difference between the voltages VLS and VDS. The device will amplify as normal but the intensity of the light output will depend on the level of the input signal. For a fixed VLS, increasing the current flow IDS by means of VDS will cause the voltage drop across the p-n junction to increase so eventually the p-n junction will become forward biased, causing light to be emitted. In this way the switch-on point of the LED can be selected by choosing the correct values of VGS, VDS and VLS.

Applications

Flashing Light Multivibrator. The light emitting GaAsFET can be used to reduce the component count in toys, etc. The transistors and indicator bulbs in an astable multivibrator can be completely replaced by the new device which is mounted on the front panel of the equipment in a similar manner to conventional LEDs.

Audio Amplifiers. Although not really suited for audio purposes, using the new device in the preamplifier/tone-control circuits of an audio amplifier can produce a primitive sound-to-light convertor. As explained earlier, changes in doping levels can change the colour of the emitted light. Thus using different transistors in the bass and treble circuitry will give the desired effect. It is thought that Mullard Ltd. used a similar technique on their early germanium transistors marked with red and white spots.

Receivers and Transmitters. By using the principles outlined in an earlier section, a signal strength meter can be incorporated in the preamplifier of any amateur receiver. Since the switch-on voltage V1Sm is usually measured in millivolts, only stations using high power will be detected. From path loss and antenna gain calculations, stations running above 10kW e.r.p. (400W and 14dB antennas) should be detectable up to half a mile away on a dipole. This approach has been used in a design which is published in this month’s issue of the German magazine Dubious.
COMMUNICATION and DX NEWS

E. P. Essery, G3KFE

DURING the last month, the highlight has been the pleasure of finding both ends of my aerial halyard at ground level, thanks to number one son who clambered up aloft to recover it; in other words, I have to admit to rather a low in activity since last putting pen to paper for this column.

Sunspots and things, too, haven't been all that encouraging, though as this comes to be written there are the first signs of the spring 'lift' about, albeit the forecast for the immediate future as to conditions is one of unremarkable gloom.

Another hazard we have now to cope with is the mad sweep of the infernal videotape recorder, as mentioned elsewhere in last month's issue. Yet another design from the drawing-board of Satan, specially arranged to receive TVI from radio amateurs — as if we save up TVI to throw at the poor thing. There are hundreds of thousands of them now, all with this marvellous bit of design which says that when they are switched off the TV aerial is connected to the TV by way of the videocorder; and they have a little amplifier in the VTR to help the signal struggle through as far as the TV set. . . . Has anyone got a proof-tested blunderbuss with full instructions?

Ten Metres

Still, thank Heaven, has its devotees. G2ADZ (Chesington) wrote a nice letter with some DX and beacon reports, and wondered what had become of his old friends G2XC and G5BY. Both we know to be still about, so perhaps they might rise to 55 feet, and first impressions are of well-warmed-up. Who should complain of the 'shack' is the thirty-foot mast which holds-up the TV aerial trying its hardest to struggle through as far as the TV set. . . . Have you got a proof-tested blunderbuss with full instructions?

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MHz shared as secondary users and the requirement to avoid 1.870 MHz, ±4 kHz.

G2HKU (Sheppey) hasn’t been 100% fit of late and so his activity has fallen off a little, but he managed SSB with OK1KSO, OH2BPN, PA0PN, G43HFN, OH1MA, and LX1PD, while CW was used to tackle EK3B1/L, EA6JD, and UT5AB.

G3ZGC/8P6 came on for part of the CQ WW 160m. contest, and noted no other 8P6 stations around before his CQ caused a king-sized pile-up, the more so as the contest had already run for 24 hours. He worked FG7AM, V2AAM, HH2VP, VE3BMV, VE1AAT, and NP4A, plus numerous Ws. A few days later Richard was signing G3ZGC/J6L, and a turn around Top Band yielded absolutely nothing, although there is some weird effect which has that it from Castries, St. Lucia, 80m. may be well open to Europe but nothing whatever will be heard on Top Band — an effect requiring investigation, we suspect.

Nearer to home, we turn to G4AKY (Harlow) who says he has been a little less active due to preparing his talk on Top Band DX for the Bishops Stortford club. However, Dave still manages to get on, and his log includes VE1BVL, UH8DC (at which time YB5AES was just as audible, peaking at 2240z), Ud6DKW, NP4A, KV4FZ, EZ9MAZ (followed by a hearing of NA5R in Texas), W1FC, HH2VP, V2AAM, EA9KQ, UL7BAK, VE1BVL again, G40NL, WA2SL, KA1PE, N4IN, N4SU, W1JBB, W2KFG, W1HND, W2FJ, W2QD, OK1HBT, UA9KBO, UL7NC, G3HFN, GD4BEG, VE1BVL again, K2GNC, JY8AA, HB9AQS all worked with the G4AKY QRP rig, El1DA, and of course the usual Gs and Es.

Eighty

Here we start with G3ZPF (Dudley) who says he has been surgically separated from his Apple-2 micro, albeit the wound -down FT-101B was certainly the recipient of a report from G4RAR up in Derbyshire. However, Derrick says he feels that winding his '101 down in this way is slightly undignified and so he is setting to play with as well. The band, however, is a bit of a Cinderella at night because of the Asiatic signals, but during the day it gets used for local nattering, and of course dawn and dusk see DX opening aplenty.

Asiatic signals, but during the day it gets used for local nattering, and of course dawn and dusk see DX opening aplenty. Again the cry arises from VK - "we can call our heads off, but you lot won't answer!"

Final entry for this band comes in from G3BDQ, who found CW worked well to QSO with VK3AHU, U99COT, VK3VJ, and ZS2AM, the latter at 2000z.

Forty

Much neglected by many of us. However, for those with older rigs there is little doubt that the noise is daunting. G41TL changed his rig for a TS-830S a couple of weeks ago and has been quite amazed to find just how much more is audible on the new box — his old one just did not have the dynamic range to cope with the band after dark.

G3D0OK took his key and waved under the noses of the following successfully: CN8CY, EA6EJ, HK3DDD, HZ1AB, J37AE, KL7Y, LX2BQ, OY7ML, TF3YH, VK0JS, K4FW/V2PK, VP9DR, XE10X, YV4DGT, ZL1AEG, ZL2UW, 4Z4DX, 9H1BB, plus JA5s some mornings and lots of PYs at night.

The letter from VK5AIM indicates that the VK band is 7-0-7.1 MHz exclusive, but they also have a shared 7-1.7-3 MHz to play with as well. The band, however, is a bit of a Cinderella at night because of the Asiatic signals, but during the day it gets used for local nattering, and of course dawn and dusk see DX opening aplenty. Again the cry arises from VK — "we can call our heads off, but you lot won't answer!"

The New Bands

VK5AIM reports that the VKs have now got their segments at 10, 18 and 24 MHz. G3BDQ says he tried the band with his TS-530S — for which he has organised himself an outboard VFO to make split-frequency working a mite easier — and worked VK3MR, VK3YD, VK7RY, VK4C1 and sundry Ws. A few CQs from G3ZGC/J8 yielded interesting QSOs, as it appears the other islands in the Windwards group don’t yet have the band. CW contacts are noted with G3AAE, G3RFS, G6Z0, G3YYF, G3JFF, G4FBS, G3DLSF, G4GZQ, G3LIK, G5CPL, VE3JWP, G2TA, DJ9GD, GM4KJG, and G4LNA, all on February 1 and 2.

Finally GM4CXP; Derrick reckons this ‘new contraption’ was good enough for his CW to raise KA1XN, VE2LI, VE1ASJ.
KV4CI, and DL2GG/Y5V5, with the worst report being 559 from YV55-land.

Nothing at all in the way of reports on the other two bands, although we have heard the odd signal ourselves.

**Snippets**

By the time this reaches you, chances seem pretty fair that an expedition to Spratly will have come and gone; the calls,Widthstand will have been 151SI and 153N, the former on CW and the latter SSB, starting March 22 or 23 for five days; the QSLs for this one will go to DK9KD.

Later this year or maybe in the early part of 1984, we hear, a DX-pedition to Clipperton is on the cards, with a team of eight FO8s, six Americans and maybe a couple of JAs.

The proposal for a Bangladesh operation seems to have come to nought at the time of writing. 5X5FS, who is on pretty regularly, says he has been operational from Uganda for over 30 years!

If you seek Rodrigues, then look out for 388DA/389, who is due to remain there until the end of May.

The Heard Island DX-peditions both came off, but both were bedevilled by the poor band conditions, and spent the greater part of their time on Twenty or just twiddling their thumbs; however, they still managed to run up a formidable total of QSOs before 'army interference' didn't quite come to nought - 0700Z.

There was just one QSO on the band for G4LDS, but like most of us if you want the DX you have to use it sometimes! This meant SSB contacts with VE3FED, VE3LJX, Europeans, EK9C/0, F8HB/EA6, HV3SJ, KA8JHD, W9FZ, and W2RWE.

The only 14 MHz activity noted by G4BUE was his CW QSO with VKOCW.

GD30OK used CW to contact FK8CE, FY7BO, KL7GNP, TA2BO, Vks and W17E.

Coming to the G2HKU report, on SSB it was just the ZL skeds with ZL3FV, and ZL3RS, while a switch to CW came up with UA9CQS, JA6GU, HL4XM, FY7YE, GZ6Y/EA6, 9H1CH, 5V0AA, F08FW, and VK3XB.

The band for G3BDQ was a matter of Vks on CW, plus SSB contacts with 6YSIC, JW4GN (Bear Island) around 2000z and 14190 kHz.

**Fifteen**

Last over before stumps are drawn for this month!

G3ZGC/J8 was the magnet that, as already mentioned, resulted in a call from SP9PT looking for the VK0s, and another contact that same session was with T42AMC, a special from Cuba.

"Patchy but not completely dead" says G3NOF, who proves it by working North Americans as early as 1230 and as late as 2130z. The Middle East was often in evidence around 1700 GMT, and SSB contacts were made with A92Z, K7MX, KW7Y, LU5ZI (S. Shetlands), V55HP, V57EY1, VQ9CI, YN5JAR, W6RTN, W6RU, W6XH, XO2JCG (Canadian Winter Games station), ZS2RJ and 5Z4W.

Fifteen for G4LDS was SSB with 388EQ, 9U5J, TF5GM, W6BDEU, and K81YD.

Most of the G4BUE activity on 21 MHz was CW, in between playing with aerials and work. It took the QRQ rig to raise FB8ZQ, and also K4FW/VP2K and ON66C/C9.

For GD30OK it was CW all the way and on 21 MHz this mode netted him KC7UU/S6N, LA8UX/OD5, LU3ZI, SV2QR, and S24C.

There was just one QSO on the band for G2HKU, namely the CW one with ZY5XFR.

It was, on the other hand, SSB that managed ZD9BV for G3BDQ, his QSL going via W4FRU; in addition there were, as John puts it, lesser fry not worth a mention!

**Finis**

That's it for another time. The deadline for next time will be found in the 'box', and is for arrival, addressed to your scrive, "CDXN", SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts. AL6 9EQ. Meantime, have fun!
A BEARING PLOTTER FOR D/F WORK IN THE FIELD

J. GLANVILLE, G3TZG

ONE of the problems during radio fox hunts, and direction finding competitions in the field is laying off the radio bearing on to the map. Generally one has to support the map board whilst juggling with a protractor, ruler, and pencil. It is a situation which often occurs in amateur radio where a third humanoid hand would be useful. To overcome some of the difficulties of angle measurement in the field the author has developed an instrument which remains stationary on the map board, and will offer the facilities of indication of relative angles and distances from the transmitter site. Also bearings can be marked on the map, or "laid off" without recourse to a separate ruler, or scale.

Basically the device consists of a 360° protractor with a magnet inserted in the centre; the magnet supports a spindle around which an acrylic cursor rotates. Distance scales are marked on the cursor which also has a central slot to enable a pencil to be inserted for the purpose of laying off bearings. A map board with a steel backing or a board made entirely of sheet steel is of course required.

A general view of the instrument is shown in Fig. 1. This depicts the device magnetically held to the map board with the centre lying over the transmitter position. The drawing illustrates the manner in which bearings may be laid off. One hand steadies the tip of the rotary cursor, whilst the other hand enscribes the bearing by means of a pencil inserted into the central slot of the cursor. A sectional drawing showing the basic construction is shown in Fig. 2.

**Construction**

The construction is quite straightforward, but some care in marking out, and assembly is required if best results are to be achieved. A Rolinx 150mm. diameter 360° protractor was chosen for the prototype. Having chosen the basic protractor the next step is to cut a circular hole in the centre to insert the magnet.

The magnet chosen was a "Shallow Pot Magnet No. 826", marketed by James Neill Tools, Sheffield, under the "Eclipse" label. This pot magnet has an approximate diameter of 19mm. so the central hole in the protractor should be expanded to a diameter such that the magnet can be fitted centrally with a firm, but not excessive, push fit. Magnets of the 826 type have a central hole, and into this hole is inserted a 4BA countersunk head machine screw. This screw with suitable spacers acts as the central spindle.

Fig. 2 shows the method of mounting the central knob, which on the prototype was formed from the plastic cap of a shampoo bottle; such caps are about 25mm. diameter and 17mm. high. (This type of bottle cap has a serrated outer surface which is useful for digital operation!) A hole is drilled into the centre of the bottle cap. This hole may be drilled undersize, and opened out with a needle file to locate as centrally as possible on the 4BA screw. A spacer of about 10mm. diameter is mounted on the central screw; over this is placed a plain washer of about 15mm. diameter. The bottle cap is then placed on the screw, and over this is placed a plain washer of about 10mm. diameter; this is secured by two 4BA nuts, one of which acts as a lock nut. The dimensions of the knob assembly may be varied to suit the particular bottle cap chosen, but accuracy with regard to rotation about the central point must be maintained.

Next the cursor is constructed, the material for this component being acrylic sheet (Perspex) of about 3mm. thickness. Fig. 3 shows the outline dimensions of the cursor; the diameter of the central hole will depend upon the particular bottle cap chosen. First form the outer shape of the cursor, then cut the pencil slot somewhat undersize. Drill a pilot hole in the boss of the cursor, and carefully increase the diameter of this hole until it is a firm push fit over the bottle cap knob. If the knob has a serrated outer surface then serrating the cursor hole to match may facilitate a firmer assembly.

Mount the cursor temporarily on the knob, and ensure that it rotates evenly around the central point of the protractor. Having ensured that the cursor is centrally located it is now necessary to mark out the radial line to enable the accurate cutting of the pencil slot. Initially this may be accomplished by marking the acrylic surface with a fine pointed fibre or felt tip pen. Place the assembly on a flat surface with the circular magnet keeper removed. Align the cursor along the 90° radial on the protractor, and with a straight edge mark a line with the pen. Rotate the cursor to the 270° point and check that the alignment matches. Check also at 0° and 180° that the alignment of the ink line is reasonable. If the alignment is unsatisfactory then a probable cause is positional error of the central hole in the bottle cap knob; in this case a fresh cap should be obtained. When the cursor alignment is satisfactory scribe a light line on the upper surface...
with a tool such as an engineer's striking knife. This line is the radial to which the pencil slot must be accurately aligned by careful filing and polishing. The cursor is removed from the knob for this operation. Having formed the slot a radial line may also be marked on the undersurface of the cursor in addition to the line on the upper surface; this will help to avoid parallax errors when the instrument is later in use.

At this point the distance scales can be mounted. On the prototype the author fitted two distance scales, one at five miles to the inch, and the other to match the Ordnance Survey 1:50,000 scale. The scales were drawn on thin white card and fixed to the underside to the cursor with transparent tape. Gaps in the distance scales were left in the area of the graticules and degree figures on the protractor. The cursor is then carefully re-fitted to the central knob.

Alignment may be checked by placing the instrument on a blank sheet of paper on the map board. Mark off three bearings at 0°, 120°, and 240°, with a pencil. Remove the instrument from the board and extend the pencil lines until they cross. The three lines should cross at the same point, or should exhibit a very small triangle or 'cocked hat'. If thecocked hat is reasonably small the final assembly can commence.

Remove the cursor and the knob. Cement the magnet in place with a small amount of epoxy resin such as Araldite. Place the knob on the spindle, and tighten and lock the nuts to give a satisfactory stiffness; a small portion of Araldite may be applied to the top of the lock nut at this stage. Then apply a thin layer of Araldite to the outer surface of the lower part of the knob and refit the cursor. Having ensured that the cursor rotates satisfactorily a toothpaste tube cap may be affixed to the top of the knob in order to cover the spindle and lock nuts. Assembly is now complete.

Any thin flat sheet of steel will serve as a map board. The author's board was made from the outer skin of a washing machine that had gone "silent key". Remove all sharp edges from the board for it will be used in close contact with fingers. Thin brass 'U' clips will hold the map in place, and a thin sheet of acrylic of the type sold by art shops may be placed over the map if required.

**Use**

To establish the device on a given position on the map draw feint lines passing through the required position running north/south and east/west. These lines should be long enough to extend beyond the protractor diameter. Then remove the keeper from the magnet and align the 0° mark of the protractor along the north/south line. Align the 90°/270° protractor line along the east/west line on the map. The instrument is now centred, and bearings can be laid off. To lay off a bearing first set the bearing number with the central knob, hold the tip of the cursor with forefinger and thumb of the left hand, insert the pencil in the cursor slot, and draw a line by running the pencil along the left hand side of the slot.

If the instrument is constructed with a reasonable amount of care it should enable bearings to be laid off to within an accuracy of a degree or so. This should be quite adequate for the average fox hunt, for it must be remembered that a Class-A commercial radio bearing is classified as having a tolerance of within ± 2 degrees.

Having constructed the device the question arises — what do you call it? After all it is not exactly a protractor. An angle measuring device is a goniometer. You can have crystal goniometers, and radio goniometers, so since this instrument is secured with a permanent magnet what about "Magnetic Goniometer"? That seems sufficiently grandiose!

I can just visualise the scene on a hectic field day! "By George! We are having a good field day. Hand me the magnetic goniometer old man. I want to lay off the true bearing of the VK I’ve just QSO’d on 70cm. simplex."

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"Short Wave Magazine" is independent and unsubsidised and now in its 41st volume
BASICS FOR THE S.W.L. AND R.A.E. CANDIDATE, PART X

SUGAR-COATED THEORY

L\ast time around we looked firstly at how an aerial radiates — the electric field along the line of the wire, and the magnetic field around the wire, remember? — and then we went on to talk in general terms about transmission lines.

Let us now imagine we have a longish piece of fifty-ohm twin-feeder. If you've never seen this stuff, it looks for all the world like the flat twin plastic mains wire often used with a table lamp. We know that if this length of feeder is open circuit at one end, and energised with RF at the other, we will see a point of high voltage at the end, and a point of low voltage at a quarter-wave back from the end; and we will see standing waves aplenty if we look for them. Now, let us take this feeder, and open it out from the end for a quarter-wave length, and hang it up in free space; we will have a horizontal top of half-wave length over-all, with twin feeder at the middle to energise it. We have made ourselves, to a first approximation at least, a half-wave dipole.

If now we had some means of measuring the resonant frequency (don't ask just how, for the moment) we would expect to find our dipole would want to resonate exactly at our chosen frequency. Alas, it wouldn't — due to some minor effects we didn't take into account — but it would nonetheless be pretty close. Bring it down out of 'free space' into our back-yard or loft and we might find the picture a bit different, though still we would be pretty close. In fact, if we are talking about a wire dipole and HF, we can say that the half-wave length of wire, in feet, is given by 468/f(MHz). Thus for, say, 14.1 MHz, 468/14.1 = 33.2 feet. If you are one of the disadvantaged who can't calculate in feet, then use length in metres = 143/f(MHz) in the same way and get the answer out in your pet units. Both formulae take into account the proportion of aerial you can see, taking the power at right angles to the aerial line as, say, unity. If you are looking at a horizontal half wave dipole in free space, and you sketch out the angles to the aerial line as, say, unity, you can calculate the length of the aerial in feet by 468/f(MHz). Thus for, say, 14.1 MHz, 468/14.1 = 33.2 feet.

To give you some sort of 'feel' for how much objects can radiate, provided your ATU can match its claims to do, and we like to know that we have it 'perking' just-so. Well, most of us like to make or own something that does what it says on the tin, and hang 'em up with no more ado. Hot us — we're not that daft!

Now, let's imagine we have our half-wave dipole in free space and we want to know to where it will radiate. To a close approximation you can do this by circulating the aerial and noting the proportion of aerial you can see, taking the power at right angles to the aerial line as, say, unity. If you are looking at a horizontal half wave dipole in free space, and you sketch out the result of your efforts, you will see you have drawn a vertical doughnut shape with the aerial wire poking through either side of the hole in the doughnut's middle. Lo! — we are in agreement with the Book of Words! There are, however some Practical Types who will say 'my half-wave dipole radiates off the ends for sure — I work Joe Bloggs in that direction every Sunday morning, so sky-wave can't come into it!' Truly, Practical Man confuses himself, and us, all the time! We were talking about our dipole in free space. His aerial, on the other hand, is near ground, and there are other reflecting or refracting objects within range of the aerial.

To give you some sort of 'feel' for how much objects can disturb things, here is a short anecdote. The writer used to work, years ago, on an aerial development job; some of the work could be done in the lab, but for the rest we had to have a clear test site. This was a field, some twenty acres in size and as near as dammit a square. In the middle, we had a mast with a rotator up on top; at the bottom of the mast was a box with mains power so we could supply a signal generator and feed RF as required up aloft. In one corner of the field was a hut fitted out with mains power and lighting, and a receiving aerial. A couple of hundred yards to one side was a house in the garden of which was a large apple tree. In a line from the mast, through the receiving aerial and on behind the latter was a valley with a railway line running across. We found that when the tree came into blossom and leaf in the summer it put a quite definite and noticeable lopsidedness into any 'polar diagram' measurements, while a train coming out from behind the valley would instantly upset our gain measurements, sometimes by over two dB!

To revert to our low practical aerial, if we imagine the aerial sitting over a mirror, and look along the end of the wire, we can see not the end of the aerial but some of its reflection in the mirror. Now, mention of the mirror brings us to the matter of the vertical quarter-wave of 'Marconi' aerial (our dipole is a 'Hertzian' one). Now, the Marconi is only half an aerial; its other half is its reflection in the ground. Without the reflection, it wouldn't — it can't — work.

Imagine for a moment a mirror laid on its back and stick a pin upright on it with a dab of Blu-Tack or such. Now sight along the mirror surface and always you will see the reflection of the pin. If you scrape off the silvering from the mirror back, the image disappears. Repeat the experiment with a smaller mirror; this time you will notice that as you get your eye down to the plane of the mirror, so the image of the pin in the mirror gets nearer the edge of the mirror and disappears off it. This is a useful analogy when trying to understand the quarter-wave vertical aerial — which needs a good earth, and that ideally that good earth should extend several wavelengths all round the feedpoint of the aerial. While you can buy good verticals, you can't buy a kit of parts for a good earth — you have to create such by the sweat of the brow and swear-words, not to mention blistered hands and thirsts raised and quenched. Such is the real nature of DX!

To return to our horizontal half-wave aerial in free space. We discovered that if we plotted the strength of radiation from it we ended up with a thing like a doughnut. This is rather in the nature of a three-dimensional polar diagram, but what we generally mean (always, unless clearly stated otherwise) by the words 'polar diagram' is a graph of field strength at a distance 'X' from the aerial, as one circulates round the aerial, and plotted on 'polar' graph paper, where zero is the centre, and the other axis radiates out from the centre by degrees — see Fig. 2. What our polar diagram actually shows us is a slice, or section, through the three-dimensional doughnut; and so for our horizontal dipole, a horizontal slice through level with the aerial would give us a pattern like a figure-eight with the dipole sticking out of the middle.

Now, why do we keep on talking about half-wave dipoles, or quarter-wave aerials with a reflection in the ground? Is there a magic about them? Your old-timer will growl from behind his pint glass, 'you can make anything radiate, provided your ATU can match it to the transmitter!' And he's dead right! So — why all the fuss? Well, most of us like to make or own something that does what it claims to do, and we like to know that we have it 'perking' just so. When we talk aerials we have a pretty limited range of test equipment to hand, and most of that is hardly of precision nature. In this case, if we make a design that can be expected to give certain SWR readings in return for certain dimensions, then we
can look at the SWR and ‘prune’ until we get it right, and then reasonably assume that the aerial is ‘on the nose’.

The old-timer had even less test-gear than we have (even the GDO is a post-war invention!) and so his aim was to get the beast to radiate as best he could regardless. If the RF didn’t go to VK and he wanted the club's HQ then he pulled it down and put another one up, until he found one that would raise the Vks. A simple field-strength meter at the bottom of the garden, a pair of binoculars, and lots of ‘suck-it-and-see’ would, in many cases, bring our OT to the conclusion that the easy option was to stick up a half-wave dipole, but not before he had learned that RF can be got out and away from some very unpromising places and set-ups provided one isn’t too fussy about where it goes and possesses an ATU that will match anything you hang on its output terminals to whatever the transmitter wants to see. However, the above statement doesn’t alter the basic fact that if you are using a system requiring an earth (Marconi feed) then the more work you can do on the earth the better.

A summary so far: there are two basic types of aerial, namely the half-wave dipole, and the quarter-wave Marconi which can only resonate by virtue of the ‘image’ of itself in the ground and which therefore needs a ground connection. However, the old-timer can take an old bit of wire, string it up, and persuade it to radiate.

Clearly, then, if we now cast off the shackles of ‘length’ as part of our thoughts, we should still be able to obtain radiation or reception. Thinking about the dipole for a moment, let us take it down from free-space and pull it open further until the feeder has split down to give us a half-wave either side of centre. Each side will present an open-circuit to the end of the feeder it is connected to, so the SWR will be pretty alarming. The practical result might be that if we put much power up the feeder it would flash-over, or, to, so the SWR will be pretty alarming. The practical result might be that if we put much power up the feeder it would flash-over, or, if at all possible, we might make use of something the ATU finds easier. No, ‘pruning the feeder’ doesn’t mean we are changing the SWR; it means we are changing the impedance presented to the ATU to something a bit more amenable, usually in the reactance term. To put it bluntly, this is ‘grope-and-hope’ for most of us moderns. The old-timers often used open-wire feed (polythene wasn’t invented, co-ax was both expensive and lossy, so open-wire feeder was a very much better bet) and they discovered that if a multi-band aerial was Zepp-fed with open-wire feeder, then on some bands it would need a series-tuned circuit in the ATU and on others a parallel-tuned arrangement. This was a bore for multi-band ops, so experimentation led to the observation that certain feeder lengths made it possible to get away with the preferred method of tuning on, for instance, all bands but one. They didn’t have to do, 18, 21 or 24 MHz though!

If we adopt the modern scheme and arrange things so our feeder operates with low SWR, then we don’t, in theory, need an ATU. In practice, though, especially with solid-state PA lacking any tank circuit, one would find an ATU worth while. If, on the other hand we just hang up a wire and work it against earth, particularly if we do lots of grafting on the earth arrangements, then with an ATU we might do as well, particularly if the idea is to work all bands. It is probably a fair bet that most of the world will be covered on one band or another, so you will have to get to know your own system by lots of listening. Another good reason for being an SWL!

Next time we’ll take a look at directional aerials.

to be continued

CLUBS ROUNDUP

By "Club Secretary"

We must come back to this question of updating your club’s details at regular intervals. The situation is just this: we know from our experience that a change of a fundamental nature can happen overnight — a club HQ burns down, or a major personality clash occurs, or the sudden death of a guiding hand in club affairs — and our records, made as they must be of history, are out of date. A new chum writes in, we say to him “join the local club” and give him the now out-dated details, and he goes away to find for himself. If he succeeds in making contact, the incorrect data he was given doesn’t exactly give him confidence in the club officers (or, indeed, in us!) and if he isn’t ‘taken up’ very actively on his first visit he will probably be lost as a member. In the worst case, of course, he just fails to make contact and is surely lost to the club.

Hence our firm rule: we expect the data to be updated, at least quarterly, on venue, Hon. Sec. name and address, telephone number, and meeting routine, and we take this information on to a card-index system here. If our information is older than that, the lot goes out as being no longer recent enough for publication.

Reports
Abergavenny have a weekly berth in Pen-y-fal Hospital, Abergavenny, above Male Ward 2, every Thursday evening. Their RAE courses are at Nevill Hall Hospital, most Tuesday evenings, in the Seminar Room.

At the AGM of Acton, Brentford & Chiswick they talked about putting MCC back on the calendar — we would if there were firm indications of support from enough clubs. Their next session at Chiswick Town Hall is on April 19, for a discussion of members problems.

Down in Axminster, the “Cavalier Inn” is the home of the Axe Vale crowd, on the first Friday of each month. They also have an RAE class. More details from the Hon. Sec. — see Panel.

A new Hon. Sec. appears in the Panel for Aylesbury Vale, and she tells us they are now to be found at the Stone Village Hall, Stone, near Aylesbury on every fourth Tuesday. The next date noted is April 19 for a surplus equipment sale, with G4JFZ as auctioneer.

Over to GI now, and the Bangor crew. They are booked in at
the Sands Hotel, Bangor, Co. Down, on the first Friday of each month, where new members and visitors are always welcome. Details from the Hon. Sec. — see Panel.

We notice that Basingstoke have just celebrated their first 21 years of life. We hear that they have moved their club address to the British Legion Hall, Crown Lane, Old Basing, Basingstoke, on the second Tuesday in each month. In addition they have RAE and Morse tuition as needed.

April 6 is AGM time for the Bath gang. This will be, as usual, at the ‘Englishcombe Inn’, Englishcombe Lane, Bath, where they normally foregather on alternate Wednesdays.

Over at Biggin Hill, they will have a demonstration station at the Spitfire Youth Centre on April 9, and on 19th the meeting will be a constructional evening with a competitive element. Ian Daniels leading the doings. The venue for this is at Biggin Hill Memorial Library.

If you are in the Bolton area, try a look in at Horwich Leisure Centre on a Wednesday evening; although details are not available, we understand they have quite a varied and interesting routine and lots of members.

Turning to Bournemouth, we are in need of some up-dated information. As far as we know they are still in Kinson Community Centre on first and third Fridays.

A similar situation applies at Braintree where we believe that they still have their place at the Community Association, next door to the town’s bus station, on first and third Monday evenings.

Turning now to Bristol we see they have the quarterly business meeting on April 5, projects evening on 12th, RTTY on April 19th, and on 26th the computer group have their bite, with a general natter later; all are at the YMCA, Park Road, Kingswood, Bristol.

B.A.R.T.G. is synonymous with RTTY, whether by way of mechanical or electronic teleprinters or home computers. Details of membership from the Hon. Sec. — see Panel.

Bromsgrove have the second Friday in every month at Avoncroft Arts Centre, with a QRP meeting on the fourth Friday, also at the Avoncroft venue. For April the Construction Contest is to be judged.

First!

Bury recently had a quiz contest against Warrington, at which both clubs were ‘at home’! The trick was turned by the use of TV links; Warrington transmitted in colour, and Bury in b/w, the arrangements at Bury being handled by G8GTP; the path was one of 18 miles, and picture quality very good both ways. As for the result, Warrington won by the proverbial gnat’s whisker. Find the general natter later; all are at the YMCA, Park Road, Kingswood, Bristol.

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Changes

The Cheltenham change of venue to the Stanton Room, in the Branch Library at Charlton Kings also means a change of routine; they now foregather on first and third Fridays evenings, except that as Good Friday falls on one of their April dates, for that month only they have the second and fourth Fridays. The new place lies behind the church, and there is a car park alongside, which is handy. More details from the Hon. Sec. — see Panel.

For details on the Chesham, club, we are advised to refer you to the Hon. Sec. — see Panel for his name and address.

Church Room, Church Lane, Wormley is the home of the Cheshunt club every Wednesday evening. April 6 is down for a talk on the “BBC Micro and Amateur Radio” by G3TIK, with a slide show of the members’ shacks organised by G8LNM on April 20. April 13 and 27 both natter nites, with some RAE revision on the latter date.

Down in Chichester the Hq is at the Green Room, Fernleigh Centre, 40 North Street, Chichester, on the first Tuesday and the third Thursday of each month. April 5 seems to have been undecided at the time of their letter, and on April 21 they will be having the AGM.

April 21 is the date for Colchester at Colchester Institute, Sheepen Road, when they will be told all about the design and production of printed circuit boards by Bev Clues.

It’s AGM time for Cornwall on April 7, the venue as ever being the SWEB Clubroom, Pool Camborne. At Crawley it seems to be the fourth Wednesday in the month, at Trinity Church Hall, Ifield, Crawley. They also have informal meetings which are rotated among the various member’s homes.

April 7 and 21 are the dates for Cray Valley at Christchurch Centre, High Street, Eltham. The former date is the AGM, and on the latter one there is the Constructional Contest.

Turning to Crystal Palace, they have their sessions on the third Saturday evening of every month, the details of the April meeting being still ‘in the works’ at the time of their writing. The venue for this one is the All Saints Parish Room, Upper Norwood, which lies at the junction of Beulah Hill and Church Road, just opposite the old ITA mast.

Dartford Heath D/F are next on the list, and they have their meeting at the ‘Malt Shovel’, Eynsford, Kent, on April 6; these are usually arranged for the Wednesday before a Sunday hunt event, and so for any other dates we must refer you to the Hon. Sec. — see Panel for the details.

April 13 seems to be the main date for Denby Dale, where they will be welcoming Lowe Electronics to their Hq at the Pie Hall, Denby Dale. For other meeting details, we suggest you contact the Hon. Sec. — see Panel for his statistics.

At Derby they have the top floor of 119 Green Lane, and they use it every Wednesday evening. Thus for April 6 there is a bring and buy sale, on 13th a rig marking session with a UV pen — a good idea in case the rig is pinched — and on 20th they will be visited by “Evots Communications of 119”, leaving just 27th to mention for a talk on energy and nuclear power by a member of the CEGB.

Derwentside continue to inhabit their Hq at the R.A.F.A. Sherburn Terrace, Consett; for the other details we must refer you to the Hon. Sec. — see Panel.

At the end of January, Bury and Warrington radio societies held an inter-club quiz with a two-way video link on 70cm. Here we see the Bury team, with video from Warrington being received: left to right, G4GSY (‘home’ question master), G3RSM, G8HBF, G8XUR and G8OVT. Warrington team members were G3NFB, G4JYP, G8HYP and G6AWD — and they won by two points! The mostly home-built video equipment at Bury was provided and operated by G8GTP, and for the quiz he ran 30 watts peak sync. output on 70cm. to an 18-ele. Parabeam.

Photo by G3VNQ
The first Monday in every month is the one for the Droitwich group, in the Scout Hq, Station Road.

Over to Dudley, and here the venue is the Central Library, on the second and fourth Tuesday. April 12 is down for G3JRJ of the G-QRP Club to give his chat about QRP working.

The East London RSGB Group are one of the few Sunday clubs — find them on April 17 at 3 p.m. in Wanstead House, Wanstead, Ilford, Essex. The entertainment will be a talk on Cable TV.

The Echelford arrangements are to gather in the Hall, St. Martin’s Court, Kingston Crescent, Ashford, Midddx, on the second Monday and the last Thursday of each month. For the rest, we have to refer you to the Hon. Sec. — see Panel.

On April 14, members (only) of the Edgware group will be making a visit to the Lowe Electronics shop at Kings Cross, while on 28th they will be back at Hq for an informal session, at 145 Orange Hill Road, Burnt Oak, Edgware.

A new Hon. Sec. reports in for Exmouth; they foregather on alternate Wednesdays at the 6th Exmouth Scout Hut, Marpool Hill, Exmouth. The programme details and any other information desired will be passed on with pleasure by the Hon. Sec. — see Panel.

Nice to hear again after a long time from the Fareham lads, still based on Portchester Community Centre, on Wednesday evenings. April 6 is down for a talk on RTTY, April 20 is a talk on making your own PCBs, with natter evenings on the remaining April 13 and 27 dates.

Turning to the Farnborough programme, we see a bring-and-buy sale on April 13, while the details of the April 27 entertainment were still not finalised when they wrote. The Hq is at the Railway Enthusiasts Club, Access Road, off Hawley Lane, near the M3 bridge, Farnborough.

A change of venue is reported for the Fylde group, to the Kite Club, Blackpool Airport, where they foregather on the first and third Tuesday of each month. On April 5 G4AHZ will be talking about aircraft instrumentation, while the April 19 evening is an informal.

Up in GM land the Glenrothes crowd will be foregathering at Provosts Land, Leslie, on April 17 for their main meeting, but we understand they also have informals each week — doubtless the Hon. Sec. will be pleased to put you in the picture.

We turn now to the G-QRP Club, where the accent is on QRP operating, whether on transmit or receive, and of course, it follows, of home-construction. With 1500 members in all continents, it just has to have something! To find out more, contact the Hon. Sec. — see Panel for his details.

Nowadays, the Grafton group is to be found on second and fourth Fridays of every month, at the “Five Bells” in East End Road, Finchley. At the time of writing we don’t have the programme details for April, for which we must refer you to the Hon. Sec. — see Panel.

A restricted number of the Greater Peterborough gang will be paying a visit to a power signal box on April 28. For details of the club, contact the Hon. Sec.

Since January 13 the Grimsby club is to be found fortnightly on Thursdays at Cromwell Social Club. April 8 and 22nd for the AGM is the Guildford routine, at the club house of the Guildford Model Engineers in Stoke Park, Guildford.

The normal weekly meeting routine for Harrow is interrupted on April 1. However, they will be together again on April 8 for an informal, with a colour SS/TV demo. As ever, the Hereford group are still meeting at the County Control, Civil Defence Hq, Gaol Street, Hereford. Here they are to be found on the first and third Friday of each month. Programme details from the Hon. Sec. — see Panel.

Over in East Anglia, Ipswich are to be found at the Rose and Crown, at the junction of the A45 Norwich Road and Bramford Road, on the second and last Wednesdays in each month; there is often Morse available on the other Wednesday evenings too. April 6, the club room is closed, but on 13th they have a talk on Ignition Interference Suppression instead; then on April 27 the essential matter of the AGM is tackled.

If there is anything you want to know about Amateur Radio in El-land, or the clubs around the country, we suggest you get in touch with the Hon. Sec. of I.R.T.S. On a different note, we see that they have the AGM down for Sunday, April 24, at the Grand Hotel, Malahide, Co. Dublin, at 2.30 p.m. The previous evening is the Annual Dinner at the same venue, and on the Sunday morning there will be a Trade Show.

The GD lads have their Isle of Man club Hq at the Keppel Hotel, Creg-ny-Ba, every Monday evening, alternating between social and activity evenings. Visitors to GD are welcome, and doubly so if they can spare time to give the gang a talk; get in touch with the Hon. Sec. at the address in the Panel.

This month we seem to have solved the mystery of the clubs in Jersey. First we take the Amateur Radio Society; they have Hq at Le Hocq Tower, St. Clements on Friday evenings and Sunday mornings. The Amateur Electronics Club has its base at Quennevais Communicare Centre on the second Wednesday of the month. Other details from the Hon. Sec. at the appropriate address in the Panel.

New Club

This one is at Keighley, and they meet on the last Tuesday in each month at the “Globe Inn”, Parkwood Street, Keighley. We understand that on April 26 Bill Cost will talk about the “Techniques of the Cinema”.

It is the second Monday in each month for Leyland Hundred, at Astley Park Social Club, Chorley, Lancs.

Litesold announce the introduction of the SK18 soldering/de-soldering kit for the electronics hobbyist. The kit is centred around an 18-watt mains iron fitted with a 3.2mm. bit, and includes two alternative bits (1.6 and 2.4mm.), a 3-metre reel of 18 s.w.g. flux-cored solder, stainless steel tweezers, three double-ended soldering aids and a reel of de-soldering braid. Providing all that is required for soldering and de-soldering by beginner or expert, the SK18 kit comes in a PVC wallet and is available direct from Litesold at the special mail-order price of £14.55 inc. postage and VAT. Further details and order form from: Light Soldering Developments Ltd., 97/99 Gloucester Road, Croydon, Surrey CR0 2DN. (Tel: 01-689 0574.)
Over now to Lincoln, where the group, as for so long, foregathered at the City Engineer's Club, Central Depot, Waterside South, Lincoln. On April 13 they have a talk on contest preparation by members of a local contest club, and on 27th G3SZJ will be giving a talk and slide show about the RSGB.

The Lothians club, is based in Edinburgh, at the Drummond High School, on second and fourth Thursdays. April 14 is an operating night, and on 28th they start with D/F Hunt preparation, and follow that with the Construction Contest.

Maltby club has just held its AGM, so we don't have any programme details for April; however, we can say you can find them on Fridays at the Methodist Church Hall, Blyth Road, Maltby.

Talking of AGMs it is time for that event at Meirion on April 7. The venue is the Nannau Country Club, Llanfachreth, two miles north of Dolgelau.

April 19 at Midland down for the final discussion on their Drayton Manor commitments, at 294A Broad Street, Birmingham, opposite the Repertory Theatre. We understand they do have other informal meetings at the same venue, and no doubt their Post Boy, G8GAZ, will tell you if you call him on S17 anytime between 1000 and 2200, or contact the Hon. Sec. at the address in the Panel.

A new Hon. Sec. takes over at Mid-Warwickshire, and she says they are still to be found at 61 Emscote Road, Warwick, on first and third Tuesdays. April 19 is down for a talk on electronics in medicine.

April at Newark is down for G4MDV and a Workshop and Construction project. The venue is the Palace Theatre, Appleton Gate, and the date the first Thursday of each month.

Norfolk's AGM is down for April 6 at Crome Centre, Telegraph Lane East, Norwich. On April 13 they have one of their short meetings, on 20th they go to Anglia TV, and on 27th they are at the short meeting game again.

Oddly enough, April 6 is also the AGM for Northern Heights, while on 20th G4DAX talks about RSGB; both are at the Bradshaw Tavern, Bradshaw, Halifax. A busy lad is G4DAX; he also appears on the North Wakefield list on April 14. This group foregather weekly at Carr Gate Working Men's Club, on Thursdays.

Nottingham have a Forum on the first Thursday of each month, when they talk over the committee work; the second Thursday of the month is a talk, the third Thursday they put the club station on the air, and there is again a lecture on the fourth Thursday. Should there be a fifth Thursday in any month, then they 'play it by ear'.

Turning now to Pontefract, we have it that they are in the club rooms at Carleton Community Centre in that town every Thursday evening, the Hq being on the top floor.

If you know of anyone interested in our hobby, but blind or disabled, you should put them in contact with R.A.I.B.C. which exists to get them going as may be needed; and of course there is always help given by clubs by way of donations or other activities. Details of R.A.I.B.C from the Hon. Sec. — see Panel.

April 12 at Reading is a demonstration by SMC, and on 26th the VHF Contest Committee of RSGB, in the person of G2HIF, will be explaining their raison d'etre. Both at the 'White Horse', Emmer Green, Reading.

April 19 is the AGM of the Reigate group, and will be held at the Constitutional and Conservative Club, Warwick Road, Redhill, starting at 8 p.m.

At Rhyl they have a base at the 1st Rhyl Scout Hq, Tynewydd Road, Rhyl, on second and fourth Thursdays, the first meeting in each month being the informal, with club station on the air, and the second one the 'set piece' session, with lecture, films or whatever.

Anyone associated with the Royal Navy, either past or present; can join the club, as can folk from the Merchant Navy or foreign navies. All the details from the Hon. Sec. — see Panel for his vital statistics.

On to St. Helens; this means the Conservative Rooms, Boundary Road, St. Helens. On April 6 they have a talk by G4LHL on receivers, and on 13th there is a talk on an 'unknown subject' by G3WOH; but it does look as if the club gathers every week.

Salisbury had just had their AGM when we last heard; they foregather every Tuesday at Grosvenor House, Salisbury, where help with RAE and Morse is available as required.

It is some time since we last heard from Seton, who are still to be found at the Liverpool Prison Officers Association Club in Hornby Place, Hornby Road, Walton, Liverpool 4, on alternate Wednesdays as from February 23 last.

Thursday evenings it as for the Sheffield crowd, at the Church Hall, Ampthill Road, Sheffield. For the other details we must refer you to the Hon. Sec.

April 5 seems to be the date for the South Dorset crowd, at the Army Bridging Camp, Wyke Regis, Weymouth. Other details from the Hon. Sec. — see Panel.

On to Southdown, serving the area around Eastbourne; they usually have the first Monday of the month at Chaseley Home, South Cliff, Eastbourne, but for April the date is April 11 for a talk by Ron Lobeck, the local TV weatherman.

S. E. Kent (YMCA) is the name of the club serving the Dover area, the name obviously being a statement of the Hq which in fact is at Dover YMCA, Godwynelhurst, Leybourne Road. April 6 is down for the AGM, but they are to be found every Wednesday evening.

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Deadlines for “Clubs” for the next three months —

May issue—March 25th
June issue—April 29th
July issue—May 27th
August issue—June 24th

Please be sure to note these dates!

Spalding have a talk on SSB/TV by G3CCH on April 8, at Maples Room, White Hart Hotel, Spalding.

Next we come to Stevenage, and their Hq at TS Andromeda, Fairlands Valley Park, Shephall View, Stevenage — and if you have a vision of a Leander-class frigate on dry land you've got it wrong! April 5 is "to be confirmed" and on April 19 likewise; they have Morse classes before every meeting and there is always something teed up on the night.

Stourbridge have a problem with the Hq, as the pub is being modified (to increase the power of the PA?); so we must refer you to the Hon. Sec. for the latest position.

The Hq is the brewery with no beer at Sunderland; the opening hours are Monday and Thursday evenings from 7-9 p.m., and Sunday mornings from 10-12.30 p.m. Find the spot in Westbourne Road, Sunderland.

April 11 is the AGM for Surrey, and on 25th they have an RAE revision session. The Hq is at TS Terra Nova, 34 The Waldrons, South Croydon, on the first floor mess deck.

A natter night is down for April 11, and on 25th the Sutton Coldfield lads have the Spring Clean Junk Sale. Both are at the club Hq at the Central Library, Sutton Coldfield.

Some rather elegant note-paper advises us that the Swale crowd are to be found at Nina's Restaurant, 43 High Street, Sittingbourne, every Monday evening. It is also understood that this month they are hoping to start both RAE and Morse classes — get the details by turning up at a meeting.

The Caernarvon Trophy of Thames Valley is being awarded on April 5, after a construction contest for a 10 MHz QRP transmitter. This one is at Thames Ditton Library meeting-room, Watts Road, Giggis Hill, Thames Ditton.
April in Thanet shows us meetings at Birchington Village Hall on April 8 for a talk on propagation by G3MOO, and on VHF contesting by G4DCV on 22nd. In addition they have a special-event station, GB2TH, running at Thanet Marathon.

Torbay mourn the loss of two local stalwarts in G2BNNT and G3BHL. The club meets on Friday evening at Bath Lane, rear of 94 Belgrave Road, Torquay for informalss each week; and on April 30 they have the AGM, for their Saturday evening formal, at the same place.

The University of Kent at Canterbury foregather on Mondays from 7.30 p.m. at the club shack; listen out on S15 for talk-in, or get in touch with the Hon. Sec. — see Panel.

There is a junk sale in store for the Vale of White Horse members on April 5, at the “White Hart” in Harwell village, with an informal on 19th too.

We hear that there are moves afoot to change the venue for the Verulam formal meetings, and so we feel it best to refer you to the Hon. Sec. — see Panel for his details.

Next we come to WACRAL, the club comprising those who feel themselves to be dedicated Christians as well as amateurs or SWLs; details from the Hon. Sec.

April 5 at Wakefield is a Questions Night, at Holmfield House, Denby Dale Road, Wakefield; on 19th they have the AGM, at the same venue.

Just one meeting is noted for West Kent, namely the AGM on April 29, at the Adult Education Centre, Monson Road, Tunbridge Wells. In addition they have informalss at the Drill Hall in Victoria Road; details from the Hon. Sec. at the address in the Panel.

The Wirral crowd have a place at Irby Cricket Club, where they are to be found on April 13 for a demonstration by Sota Communications; on 27th they have a talk on passive D/F, tips and wrinkles by G8UZZ and others. In between, there is the informal on April 6 at the Railway Hotel in Meols, and on 20th at “The Harp” in Neston.

One week later than usual, the Worcester meeting at the “Old Pheasant” in New Street is on April 11, for the Construction Contest. April 25 is down for an informal at the same venue.

Yeovil have moved to Millford Recreation Centre, Millford Park, Yeovil; on April 7 G3KSK talks about the half-wave dipole, and on 14th G3MYM takes over to talk about aerial height. April 21 is down for a talk by an SWL member on his home-built delta-loop aerial, and on 28th there is a natter evening.

They would welcome visitors or new members at York, where the gang foregather every Friday evening at the United Services Club, 61 Micklelegate, York. To judge by G3WVO’s letters each month they sound a really nice crowd there.

**Finale**

That’s it for another bumper month; the deadlines for the next few months are in the ‘box’, and are for arrival at Welwyn; address to your scribe, SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts. AL6 9EQ.

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**Radio Amateur’s Examination**

The periodic review of the syllabus for the Radio Amateur’s Examination is now due and the City and Guilds R.A.E. Subject Committee has established a working party for this purpose.

The principal objective of the Examination is to ascertain the candidate’s ability to operate an amateur station within the terms of the licence and not necessarily to test expertise in particular aspects of the Amateur Service. Suggestions for alterations or amendments to the existing syllabus would be welcome and should be sent to Mr. S. D. Allison, City and Guilds of London Institute, 46, Britannia Street, London WC1X 9RG

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**Mobile Rallies, 1983**

April 10, Swansea A.R.S. Rally in the Patti Pavilion (next to St. Helens County Cricket Ground) on the A4067 Swansea-Mumbles road, 10.30 to 5 p.m., talk-in on S22 by GB2SWR, trade stands, local repeater groups, bring-and-buy, RSGB bookstall, operational HF/VHF stations, licensed bar and refreshments. Further details from Roger Williams, GW4HSH, QTHR (tel: Swansea 404422).

April 10, Lough Erne A.R.C. Rally at the Killyhevlin Hotel, Enniskillen, from 1 p.m., talk-in on S22, trade stands, bring-and-buy, family attractions. Details from A. Sammon, 0365-4821 working hours. May 1, Maidstone A.R.S. Rally at the YMCA Sports Centre, Melrose Close (off Cripple Street), Maidstone, Kent, 11 to 5 p.m., admission 50p, talk-in on S22 by GB2YSC, trade stands, bring-and-buy, family attractions, ample parking. Full details from D. Wilcox, G4FOE, QTHR.

May 4, Lincoln Hamfest at the Lincolnshire Showground (4 miles North of Lincoln on the A15), starts 11 a.m., talk-in on 144 MHz (S22) and 432 MHz (SU8), facilities for the disabled, family attractions, refreshments, licensed bar, ample parking. Further details from Pam Rose, GB8RJ, c/o City Engineers Club, Central Depot, Waterside South, Lincoln.

May 15, Northern Mobile Rally at the Great Yorkshire Showground, Harrogate, from 11 a.m. to 3.40 p.m., talk-in, trade stands, bring-and-buy, family attraction, family attractions, bar and refreshments, ample parking. Details from J. Annakin, 25 Ashfield Place, Otley, Leeds LS21 3JN.

May 15, Swindon and District A.R.C. Radio and Electronics Rally at Park School, Marlowe Avenue, Swindon, Wilts., doors open at 10 a.m., admission 50p, trade stands, talk-in on 2m (S22) and 70cm (SU8), family attractions, refreshments, ample free parking. Further details from K. Saunders, G8FSM, QTHR.

May 22, B.A.T.C. Exhibition of Amateur Television at the Post House, Leicester, doors open at 10 a.m., demonstrations of fast-scan, slow-scan and narrow-bandwidth television, plus the B.A.T.C. outside broadcast unit, trade stands, full range of Club books, bar. Full details from T. Brown, G8CJS, QTHR (tel: 0532-670115).

May 29, East Suffolk Wireless Revival at the Civil Service Sportsground, The Hollies, Straight Road, Ipswich, from 10 a.m., trade stands, transceiver clinic, aerial testing range, ‘fleamarket’, ‘car boot’ sale, family attractions, licensed bar. Full details from J. Tootill, GH1F, QTHR (tel: 0473-446499).

May 29, Plymouth R.C. Rally at Tamerton High School, Paradise Rd, Stoke, Plymouth, starts 10 a.m., many trade and general interest stands, refreshments and bar, talk-in on SU22 and SU8. Full details from D. Whitbread, G6EQM, QTHR (tel: 0753-20224).

June 12, Elvaston Castle Mobile Rally at Elvaston Castle Country Park (5 miles S.E. of Derby on the B5010), all the usual attractions with full on-site catering, opens 10 a.m., talk-in on 144 and 432 MHz by GB2ECR, admission free, 35p car park charge levied by local authority. Further details from Ian Cage, G4CTZ, QTHR.


More mobile rally dates will appear in subsequent issues. If you have not yet notified us of your rally, now is the time to do it! Send the information to our Club Secretary, marking the envelope “Mobile Rally”. And don’t forget we are always glad to receive photographs of rally events for possible publication.
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If you read GBLEF's article in October's SWM you'll appreciate that fitting one of our FT221/225 front-end boards in a 211 or 251 is quite an involved operation! To simplify this we've custom designed a front-end board for the Icom transceivers which incorporates all the features required for (relative!) simple installation and superb performance.

The rf circuitry is an updated version of that used in our outstandingly successful FT221/225 front-end whilst an on-board antenna change-over relay minimises losses ahead of the rf amplifier.

Solid state dc switching allows easy interface with the Icom circuitry.

For those with doubts about their ability with a soldering iron we've also negotiated a fitting service at extra charge.

RPCB251ub £69.90 etc VAT

The Best Got Better!

Over the years there have been many claims of 'less than 1dB noise figure' from the less reputable manufacturers of 144MHz equipment. Although the gullible may have been taken-in, we suspect that most people rightly dismissed these claims as advertising hyperbole! The situation has changed! After secretly supplying our SLNA144 series of preamps with sub-dB noise figures land checking our production measurements rather carefully! we're pleased to announce that we are now supplying our 144MHz preamps with a typical noise figure of 0.9dB! We've done this by careful attention to our production engineering and by giving the 3SK88 the order of the boot! The new device is the BF981, which has both better dynamic and noise performance at 144MHz than the '88 or any consumer gasfet we've tried (now watch our competitors!).

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PRICE: £415 inc. VAT + £2 p+p: SAE for further details of this and other AEA products.

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All quad antennas have glass fibre booms and supports for strength and less corrosion and less affect on performance.

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Helix range uses glass fibre booms and comes complete with ‘N’ plug and socket. All Helix antennas have a 50ohm feed impedance suitable for satellites, tropo, FM repeaters and ATV.

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**May issue date**
April 14th.
**READERS ADVERTISEMENTS**

**For Sale:** Yaesu FT-707 HF transceiver with 11 metres, £350 for quick sale.—Ring Hatton, Derby 372696.

**For Sale:** Eddystone EC-10 communications receiver in good working order, £45.—Ring Bassnett, 041-632 9250.

**Selling:** Yaesu FT-101ZD(FM) Mk.III transceiver, as new, boxed with handbook, £535. Yaesu FRG-7700 receiver, as new, boxed with handbook, £230. Yaesu YS-2000 SWR/Power meter, 1.8-60 MHz. Dummy load, 3.5-500 MHz, offers.—Ring Taylor, 0452-721508 after 6 p.m. or weekends.

**Selling:** Trio R-1000 receiver, almost new, mint condition, with manual, bargain £195 cash.—Ring Howard, Thanet 601041 after 6 p.m.

**Wanted:** Heath HW-7 or HW-8 QRP Tx/Rx. (Lancs)—Box No. 5785, Short Wave Magazine, 34 High Street, Welwyn, Herts. AL6 9EQ.

**Sale:** Sony ICF-2001 synthesized LCD receiver, new and boxed, under guarantee, £100 cash.—Ring Gosling, 021-360 5429.

**For Cash Sale:** National Panasonic Model RF-4800 communications receiver, FM/LW/MW/SW, unscratched, little used, £185. Buyer collects.—Ring Lippincott, Crewkerne 72082 after 6 p.m.

**For Sale:** Realistic DX-200 receiver, excellent condition, £105 or near offer.—Mehta, 32 Blenheim Road, Gloucester GL1 4ER.

**Wanted:** K.W. Vespa or Viceroy, or similar HF SSB Tx. for mint Grundig Satellit 3400 or Zenith R7000. Spares for 680X.—Ring Taylor, 0452-721508 after 6 p.m. or weekends.

**Selling:** Eddystone EC-10 communications receiver, £35. All items delivered for cost of petrol.—Ring 01-699 4413 after 6 p.m.

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**Selling:** Yaesu FT-708R 70cm. hand-portable, complete with extension mic., 12v. adaptor and mobile mount, very good condition, £150. Home-brew LPF, 1kW, £3. —Ring Hamer, 041-632 9250.

**For Sale:** Yaesu FT-101ZD(FM) Mk.III transceiver, as new, boxed with handbook, £535. Yaesu FRG-7700 receiver, as new, boxed with handbook, £230. Yaesu YS-2000 SWR/Power meter, 1.8-60 MHz. Dummy load, 3.5-500 MHz, offers.—Ring Taylor, 0452-721508 after 6 p.m. or weekends.

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