STR450
UHF RECEIVER
OPERATING INSTRUCTIONS

These operating instructions are intended to provide the user with sufficient information to install and operate the unit correctly.

The Wood & Douglas STR450 is a single channel synthesized UHF receiver. The unit is intended to fulfil the numerous OEM applications by virtue of its highly flexible design approach, miniature size and cost-effective performance. The unit complies with MPT1329 and as such does not require an operating licence in the UK. It is also approved to various EC specifications.

INSTALLATION

The STR450 is intended to fit easily and with minimum space requirements into the user's own equipment housing. The complete module is housed in a tin-plated enclosure and a bracket allows the module to be fitted in one of two planes using two screws.

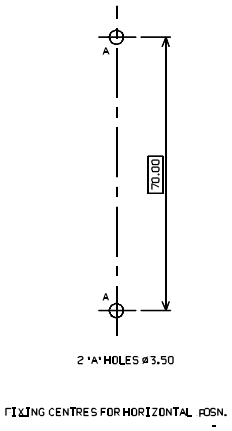

Figure 2

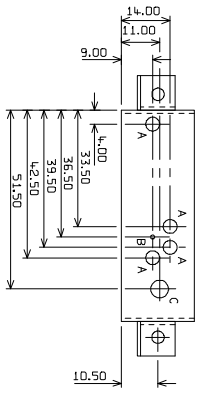

Figure 1

CONNECTION

The type of radio antenna connector (via **RF**) is determined by the letter designator as follows:

S - SMB miniature coaxial connector
A - flying lead with a BNC connector
P - PTFE (bush) feedthrough

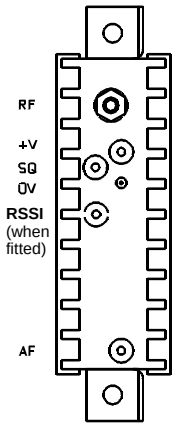

Figure 3

The audio output **(AF)**, squelch output **(SQ)** and DC supply **(+V)** connections are made via feedthrough pins. These pins incorporate RF filtering, thus ensuring compliance with the spurious radiation levels required by MPT1329 and similar specifications. The squelch output **(SQ)** is an NPN open collector transistor driver. Connecting the anode of a LED to the input supply rail and the cathode to the squelch output, via a suitable current-limiting resistor, will provide an LED that is illuminated when no RF signal is present.

RSSI Option

An 'S' meter output is always available for set-up purposes on the internal test point TP1. Depending on the version specified this signal may be wired to an extra feedthrough pin, or it may replace the SQ output (the squelch mute will still operate in this instance)

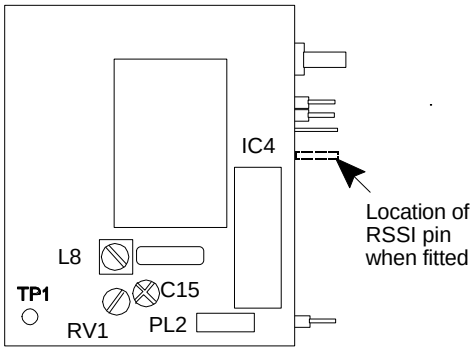

Figure 4

USER ADJUSTMENTS

It is possible to adjust the level at which the squelch circuit operates using RV1. This adjustment can be accessed by carefully removing the fingered lid. Refer to Figure 4 for location of RV1. When adjusting RV1 take care not to adjust the adjacent L8 or C15.

FREQUENCY PROGRAMMING

The STR450 has an internal memory which can store up to 128 RF channels (16 randomly programmed and 112 sequentially programmed).

The frequency and set-up information is programmed into the unit by a series of 8 byte data packets over a 1200 baud RS232 interface. Each packet includes a 16 bit sync code and an 11 bit checksum to eliminate the possibility of spurious reprogramming.

The software supplied with the STR450 receiver is the STRPRG.exe program, which can be run on a PC with the serial port connected to PL2 of the STR450 receiver via a suitable lead as shown in Figure 5. If the read-back function is desired, then the squelch flag output of the receiver must be connected to pin 2 of the PC serial port, with a 1k pull-up resistor to +5V provided.

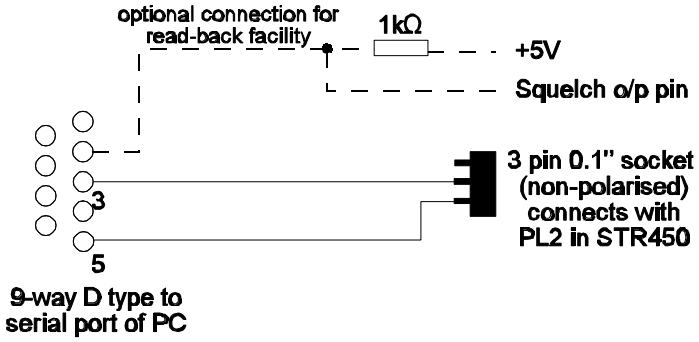

Figure 5 Programming lead

RUNNING THE SOFTWARE

1. Connect STR450 to a suitable supply and to the PC using the programming lead.

2. Insert the STRPRG disk into drive A and type:

   A:STRPRG <return> then type:

3. The user is then prompted to enter the serial port number of his PC which is used to communicate with the STR450 receiver. Enter 1 or 2.

After the software has successfully loaded the main menu screen is displayed as shown in Figure 6. The screen shows the default settings which are entered at factory set-up. These default settings will be displayed whenever the STRPRG software is run.

Please note that mouse operation is not supported with this program.

```
STR450  Programmer
                          Synth.   step freq.  12.5 KHz
Chan  0    458.5          MHZ <<
Chan  1    458.5125       Mhz        Ref. (TCXO) freq.  8  MHz
Chan  2    458.525        Mhz        Intermediate freq. 21.4    MHz
Chan  3    458.5375       Mhz
Chan  4    458.55         Mhz        Serial channel selected: 0
Chan  5    458.5625       Mhz
Chan  6    458.575        Mhz        COMMANDS:
Chan  7    458.5875       Mhz
Chan  8    458.6          Mhz             F2     : copy Ch 16-31 to Ch 0-15
Chan  9    458.6125       Mhz             F5     : read from unit
Chan  10   458.625        Mhz             F6     : program unit
Chan  11   458.6375       Mhz             F8     : Select channel
Chan  12   458.65         Mhz
Chan  13   458.6625       Mhz             F9     : set synth. step freq.
Chan  14   458.675        Mhz             F10    : set TCXO freq.
Chan  15   458.6875       Mhz             F11    : set Intermediate freq.
                                           F12    : QUIT
Start table   458.7       MHZ
Max. Freq.  458.95        Mhz        Sequential frequencies, Chan. 16 to 127
Table step  1   x 12.5     Khz
```

Figure 5 Screen Display

NOTES:

1. The synthesizer step frequency, the reference (TXCO) frequency and the intermediate frequency are non-programmable.

2. Functions F9, F10 and F11 are not enabled.

3. Function F5 is only enabled when a read-back programming lead is used, (refer to Figure 4). This function displays the current frequency table of the connected STR450 receiver.

4. A value for each parameters has to be entered.

5. Only channel 0 to 15 frequencies can be displayed by this software

Serial channel selection

Selecting the F8 function key prompts the user to enter the new serial channel number which is then displayed in 'Serial channel selected'.

Programming random channels

Random channels between 0 and 15 can be entered using the Up ↑ and Down ↓ arrow keys and then entering the required operating frequency. The entered value must be an integer multiple of 12.5kHz otherwise an 'invalid' message is displayed.

Programming sequential channels

To generate a new frequency table the following parameter values must be entered:

start frequency
the maximum frequency
the table step as a multiple of 12.5kHz.

The maximum frequency is calculated from the start table frequency and the table step.. Therefore if the calculation exceeds the maximum frequency then this parameter will be increased automatically.

When the frequency table has been generated the user then selects F6 to program the unit.

The function key F2 can be used to copy the contents of channel 16-31 to channel 0 - 15 to ease sequential programming.

Programming from customer equipment

In the event of a customer wishing to program the STR450 receiver from his own equipment then the following data sequence must be used allowing 5ms between the characters in the data stream:

1200 baud, RS232 interface, 1 start bit - 8 bit data - no parity - 1 stop bit

BE (decimal 190) synchronising code
7 bit channel 0 - 127 (bit 7 = 0)
C5 (decimal 197) confirmation byte

Further details on this aspect of programming are available from Wood & Douglas, please contact the Sales Office at the address given at the end of this instruction.

RANGE INFORMATION

The following table gives an indication of the typical ranges to be expected between a transmitter and receiver that have simple end-fed dipole antennas.

The following assumptions have been made in the calculations:

line-of-sight between antennas
0dB gain for the transmitter and receiver antennas
0dB loss for connectors and cables between the antenna and the radio connector
20dB fade and environmental margin
-100dBm received signal strength, allowing for digital and analogue signals

Range versus TX power			
Frequency (MHz)	**Power (mW)**	**Power (dBm)**	**Range (km)**
458.5	1mW	0	0.5
458.5	10mW	10	1.7
458.5	100mW	20	5.3
458.5	500mW	27	11.9

TECHNICAL SPECIFICATIONS

Frequency range	:	430 - 450 MHz, 450 - 470 MHz
Switching bandwidth	:	5MHz
Frequency stability	:	+/-1.5kHz
Number of RF channels	:	1 of 128 (16 randomly programmed, 112 sequential), serial select/reprogram 1200 baud RS232
Supply voltage	:	5.5 - 15V DC -ve earth
Supply current at 7.2V	:	<12mA
Channel switching delay	:	<50mS across switching bandwidth
Channel spacing	:	12.5kHz/20kHz/25kHz available
Modulation type	:	F1D.F2D/F3D
Sensitivity	:	<-115 dBm for 12dB SINAD
Image/spurii	:	>60dB
Intermodulation response rejection	:	>50dB
Blocking	:	>80dB
Intermediate frequencies	:	21.4 MHz and 455 kHz
Adjacent channel selectivity	:	>60dB for 12.5kHz channel spacing >70dB for 25kHz channel spacing
Audio response	:	9Hz to 6kHz at -3dB
Recovered audio level	:	200mV p-p typ into 10k ohms
Spurious emissions (conducted & radiated)	:	in accordance with ETS/CEPT specifications
Interface connections	:	Solder terminals
RF connection	:	SMB bulkhead male
Operating temperature	:	-10^{o}C - +55^{o}C
Storage temperature	:	-30^{o}C - +70^{o}C
Size overall	:	-62 x 60 x 25 mm
Weight	:	110g
Type approval	:	MPT 1329
Squelch type	:	Noise operated open collector output
General facilities	:	RSSI output (0 to +3V nominal) option

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1.1/October 1998. 1892 1207