T6R Receiver User Guide

Issue 1

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Handbook Amendment Record

Amendments to this handbook, originated by Park Air Electronics, are listed in the following table.

Amendment Number	Date	Brief Details	PAE Change Note Number

Equipment Modification Record

Modifications to the T6R receiver are detailed in the following table.
The equipment's modification label shows all modifications embodied in the equipment.

Modification Number	Date	Brief Details	PAE Change Note Number

List of Abbreviations

The following abbreviations are used in this user guide:

A	amp
AM	amplitude modulation
BIT	built-in test
dB	decibel
DSP	digital signal processing
ETI	elapsed time indicator
ICAO	international civil aviation organisation
kg	kilogram
kHz	kilo Hertz
LCD	liquid crystal display
mA	milliamp
MARC	multi-access remote control system
MHz	mega Hertz
mm	millimetre
ppm	parts per million
PSK	phase shift keying
rms	root mean square
RSSI	receiver signal strength indication
V	volt
VFP	virtual front panel
VHF	very high frequency

T6R Receiver User Guide

Section 1

General Information

Section 1 Contents

Chapter 1. Overview

This chapter provides an introduction to the T6R receiver, briefly describes the features, and shows how the radio is configured for operational use.

INTRODUCTION TO THE T6R RECEIVER

Park Air Electronics (PAE) T6R is a VHF multi-mode air traffic control receiver compatible with analogue (AM) and digital (D8PSK) modulation modes. Current models are supplied programmed for AM voice operation in the frequency range 118 to 136.975 MHz using 25 kHz or 8.33 kHz channel spacing. Future software upgrades will allow D8PSK operation.

A multi-channel feature of the receiver allows up to 100 channels to be stored, and recalled by channel number. Channel designation and all operational settings can be selected from the front panel, or by using the virtual front panel (VFP), or through a compatible control and data system such as the PAE multi-access remote control (MARC).

The receiver is designed to be fitted in an industrial 19 inch (483 mm) equipment rack. Operation is from either a standard ac mains supply, or from a low voltage dc supply. When both input supplies are connected, the dc supply acts as a back-up if the mains supply fails.

Comprehensive continuous and interruptive Built-In Tests (BIT) provide confidence of the receiver's serviceability.

T6R HANDBOOKS

This user guide describes the T6R receiver and gives complete installation and setting up procedures. The user guide is split into sections as follows:

Section 1. Section 1 (this section) provides general information that is common to all operating modes.

Section 2. Section 2 provides information that is specific to operating the T6R receiver in AM-voice mode.

Section 3. Section 3 onwards will, when available, describe the digital operating modes.

A maintenance kit (PAE part number 70-6100MKIT) is also available. A maintenance handbook, included in the kit, contains fault finding guides to module level and details VFP operation. The VFP can be used for setting up, maintenance purposes, and for loading new software.

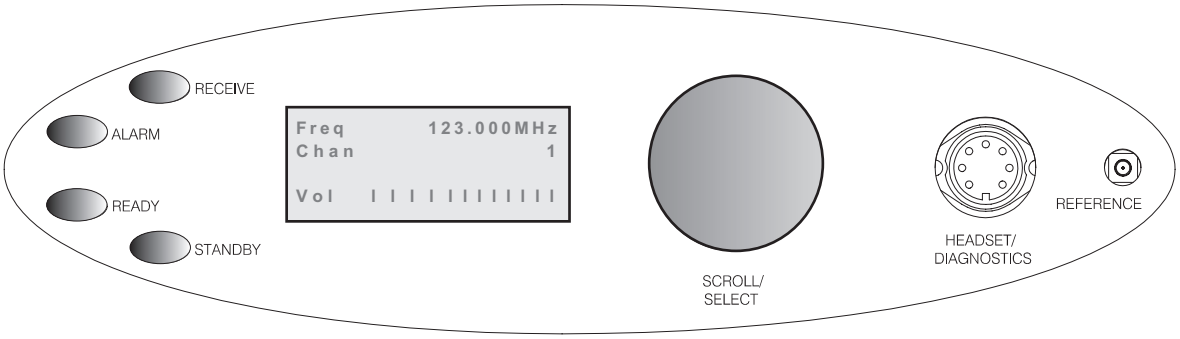
T6R receiver maintenance should not be attempted without reference to the maintenance handbook

The maintenance kit includes a CD-ROM containing the VFP software, and a lead for connecting the radio to a Personal Computer (PC). The CD-ROM also contains the software as loaded into the T6R at the time of sale. This enables the original software to be re-loaded if the receiver's Digital Signal Processing (DSP) module is ever replaced.

Both the user guide and maintenance handbook are available on CD ROM. Contact PAE for details.

OPERATIONAL SETTINGS

Operational settings for the T6R receiver are configured at the front panel, through the VFP, or through an associated MARC system (or compatible control and data system). At the receiver, operational settings are selected and displayed using the front panel Scroll/Select switch and the LCD.



The settings are selected through a series of menus. Full details are given in the section of this user guide applicable to the operating mode. Two example selection menus, Set Frequency menu and Channel Storage menu, are shown below.

```
      121.500MHz


Cancel              OK
```

```
Ch100  121.500MHz
Cancel
Store
Store and End
```

During normal receiver operation, the Main screen, shown below, is displayed. The screen shows the operating frequency, the channel number (if the channel store facility is used), and displays a graphical representation of volume.

```
Freq    123.000MHz
Chan              1

Vol
```

Virtual Front Panel

As an alternative to setting up the receiver from the front panel, the T6R's virtual front panel (VFP) software can be used. To use the VFP, an IBM™ compatible PC must be connected to the receiver (see Fig. 1-1). Using the VFP offers several advatages over setting up from a receiver's front panel. These are:

- ❑ When set up using the VFP, a profile of the receiver's operational settings can be created. The profile can then be used to automatically set up other radios within a system, or to reset a radio should the DSP module ever be replaced.
- ❑ After setting up from the VFP, the receiver's front panel can be locked. This means that a receiver's settings cannot inadvertently be changed by tampering with the front panel controls.
- ❑ A print-out of a receiver's profile (all the operational settings) can be made from the VFP.

Instructions on VFP usage is outside the scope of this user guide. Reference, therefore, should be made to the T6R maintenance kit that includes a CD-ROM containing the VFP software.

BUILT-IN TESTS

The receiver continuously self monitors key internal parameters without affecting normal operation. If a BIT fault is detected, the front panel Alarm indicator lights, the Ready indicator becomes unlit, and the receiver becomes inoperable.

Apart from continuous monitoring, an interruptive BIT test can be initiated locally at the front panel, or remotely. When initiated, test signals are injected into the receiver's RF circuit allowing parameters to be monitored in their active state.

The results of continuous monitoring, and of interruptive testing, are available at the front panel LCD. When the receiver is used with a MARC system (or other compatible data and control system) the results are also sent, in the form of a data message, to the monitoring facility. A full description of the BIT facilities is given in the section of this user guide applicable to the operating mode. The following illustration shows an example front panel BIT display.

CONFIGURING THE T6R RECEIVER

Fig. 1-1 shows the signal connectors fitted to the receiver's front and rear panels. The connectors used to configure the receiver depend on the required operating mode. The purpose of each connector is briefly described in the following paragraphs and fully detailed in chapter 3.

Antenna Connector	Used in all operating modes to connect the 50 ohm antenna feeder cable.
Headset/Diagnostics Connector	This is a dual purpose connector. A headset can be connected to enable local AM-voice operation. Alternatively, a PC can be connected to allow use of the VFP, to set the receiver's operational settings, or to download new software.
Reference Connector	Used in all operating modes to check and reset the receiver's reference frequency.
Facilities Connector	Used primarily to connect remote signals when using AM-voice mode when the receiver does not form part of a MARC system. Some auxiliary signals available at this connector, for example the 24 volt (nominal) unregulated output supply, can be utilized irrespective of the operating mode.
MARC Port	The MARC port is used to connect remote signals when the receiver forms part of a MARC system, or other compatible control and data system.
Computer Port	The computer port is used in digital communication modes to connect the receiver to a control computer.

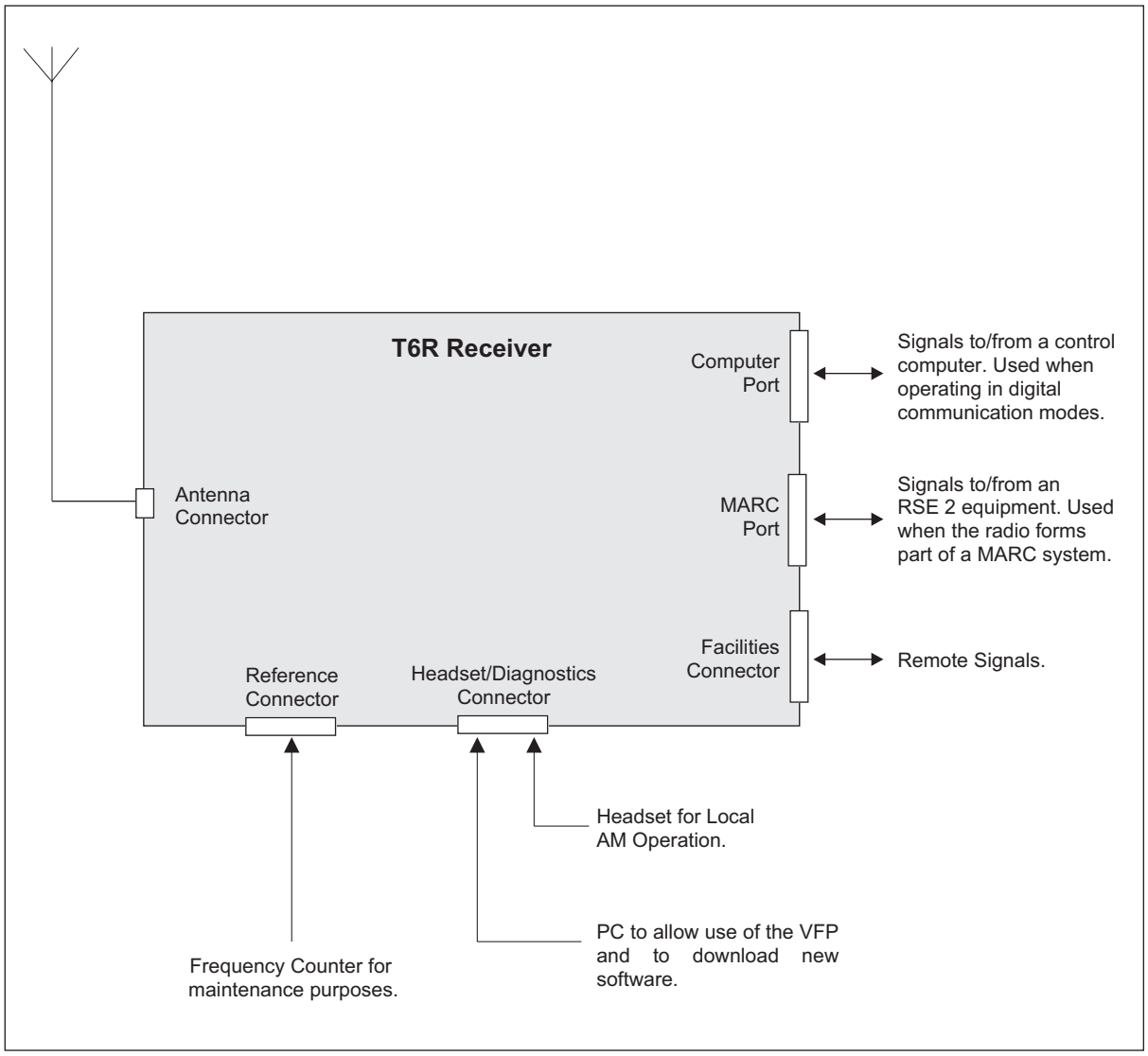


Fig. 1-1. T6R Receiver Configuration

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Chapter 2. Specification

This chapter contains the T6R receiver's specification that is common to all operating modes. Specifications relevant to specific operating modes are contained in the section applicable to the required operating mode.

DIMENSIONS AND WEIGHT

The dimensions and weight of the T6R receiver are:

Width	483 mm (19 inches).
Height	88.9 mm (3.5 inches). The height occupies 2U of equipment cabinet space.
Depth (front panel to rear panel)	430 mm (16.9 inches).
Weight	5.8 kg (12.8 pounds).

RF CHARACTERISTICS

Frequency range	118 to 136.975 MHz.
Number of channels	The receiver has a multi-channel capability. 100 channels can be stored and recalled.
Frequency accuracy	Better than 1 ppm.
Maximum RF input	The receiver can withstand an input at the antenna connector of: 5 V rms continuous. 15 V rms for 20 seconds.
Unwanted signal suppression	The first and second IF image rejection is greater than 80 dB. For other frequencies, spurious signals are suppressed by more than 100 dB.

ENVIRONMENTAL

Temperature range	The receiver operates to specification at temperatures between -20 and +55°C and at a relative humidity between 5% and 90% (non-condensing).
Warm up time	The receiver is fully operational 5 seconds after switch on.
Storage	The receiver can be stored at temperatures between -30 and +70°C without causing damage.

POWER REQUIREMENTS

The receiver operates from an ac input supply, or a dc input supply. When both supplies are connected, the dc input acts as an automatic backup supply for the ac mains.

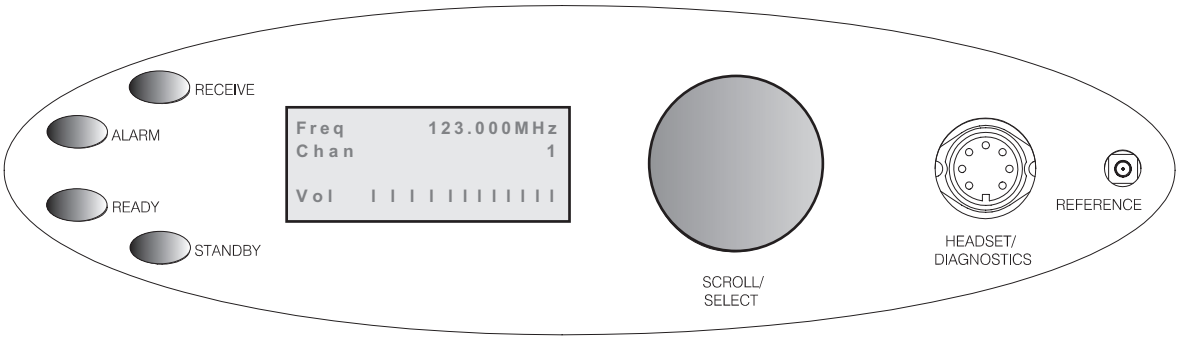
ac input supply	The receiver operates from a 48 to 62 Hz single-phase ac supply, and automatically adjusts to operate from any supply voltage between 99 V ac and 264 V ac.
ac power consumption	Typically 75 VA.
dc input supply	Between 21.6 and 32 V.
dc supply current	At 28 V current is typically 700 mA. 1 amp maximum.

Chapter 3. Controls, Indicators, and Connectors

This chapter details the purpose of all controls, indicators, and connectors fitted to the receiver's front and rear panels.

FRONT PANEL

The front panel's controls, indicators, and connectors are shown below and described in the following paragraphs.



Receive Indicator

An amber indicator that lights when a signal is received that is above the squelch threshold. Additionally, this indicator is lit when the receiver's squelch facility is switched off (squelch defeated).

Alarm Indicator

A red indicator that either lights, or flashes, when a BIT fault has been detected. BIT indications are classified as either warnings or faults.

When a fault is detected, the Alarm indicator lights and the Ready indicator becomes unlit; the receiver cannot be used.

If a warning is detected, the Alarm indicator flashes, the Ready indicator remains lit, and the receiver remains operational.

Ready Indicator

A green indicator that lights when the receiver is ready for use and no BIT faults have been detected.

Standby Indicator

A red indicator that lights when the receiver is in standby mode. When in standby mode, most of the receiver's circuits are inactive, and the front panel LCD is blanked; the receiver is inoperable until standby mode is deselected.

Standby mode is selected and deselected using the front panel Scroll/Select switch and LCD, by initiating an instruction through a MARC system, or through the VFP. Details of front panel selection and deselection are given in the section of this user guide applicable to the particular operating mode.

Reference Connector

An SMB jack socket that allows a high impedance frequency counter to monitor the receiver's reference frequency. This connector is used only for maintenance purposes. The instructions for checking and adjusting the reference frequency are given in the T6R maintenance handbook.

Headset/Diagnostics Connector

A dual purpose connector that allows either a headset or a PC to be connected to the receiver. The connector is a 7-pin self locking DIN socket.

A headset can be fitted to this connector to enable the receiver to be operated in AM local mode. The connections are detailed in Table 1-1. A PC can also be connected to allow the VFP to be displayed. Using the VFP is detailed in the T6R maintenance handbook. The connections at the receiver are shown in table 1-2.

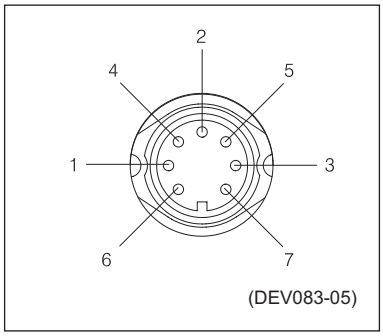


Fig. 1-2.
Headset/Diagnostics Connector Pin-Out

Table 1-1. Microphone/Headset Connections

Headset/Diagnostics Connector Pin Number	Signal	Notes
1	Ground	0 volt.
5	Headset drive	Maximum = 3 volt peak-to-peak. 200 ohm output impedance.

Table 1-2. Diagnostics PC Connections

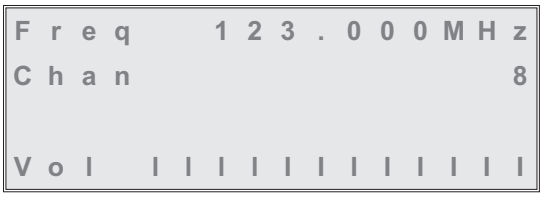
Headset/Diagnostics Connector Pin Number	Signal	Notes
2	Transmit data	RS232
4	Receive data	RS232
7	Ground	0 volt

Scroll/Select Switch and LCD

The Scroll/Select switch is used in conjunction with the LCD to select most of the receiver's operational settings. Use of the switch and LCD is fully detailed in the section of this user guide relevant to the particular operating mode. During normal operation, the LCD shows the operating frequency, the channel number (if the channel store facility is used) and displays a graphical representation of volume.

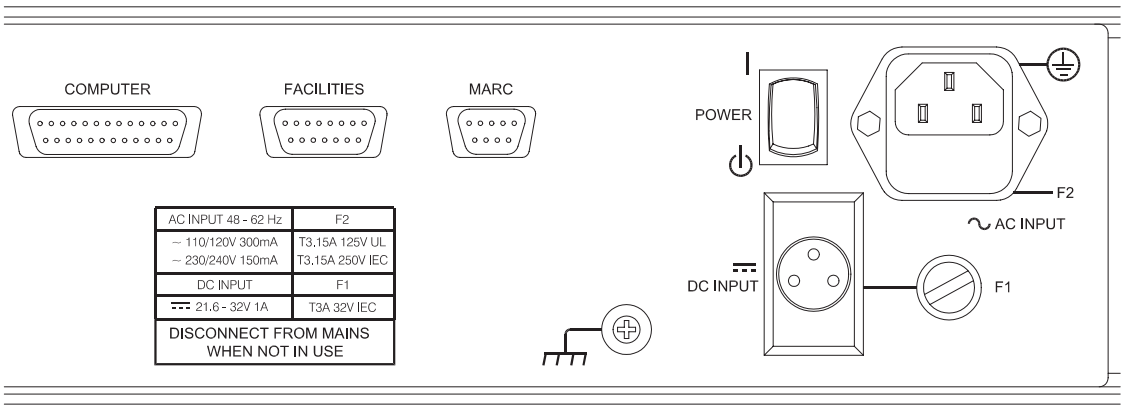
The example LCD screen below shows the receiver operating on 123.000 MHz; the frequency has been preset as channel 8.

During normal receiver operation, when the main screen is displayed, the Scroll/Select switch acts as the volume control.



REAR PANEL

The rear panel's controls, indicators, and connectors are shown in Fig. 1-3 and described in the following paragraphs.



DEV083-11a

Fig. 1-3. Rear Panel

Power Switch

A 2-way rocker switch used to switch on, and switch off, power to the receiver's circuitry.

I = On ⏻ = Off

WARNING!

When the POWER SWITCH is set to the Off position, lethal voltages are still present in the receiver's internal power supply circuitry. To ensure safe working, the ac and dc input supplies must be disconnected from the receiver.

AC Input Connector

A 3-pole IEC chassis plug for connecting the ac input supply. The plug has an integral 20 mm fuse (F2) that protects the Line (L) input circuit. The fuse is rated at 3.15 amps (see page 22 for further detail). Detailed instructions for connecting the ac supply are given in the installation chapter on page 24.

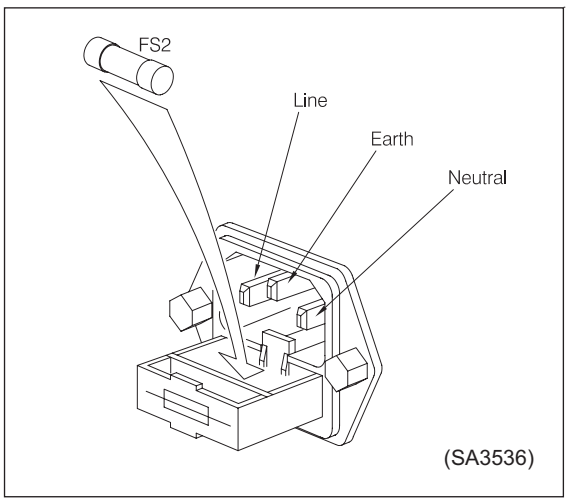


Fig. 1-4. AC Connector

DC Input Connector

A 3-pole chassis plug for connecting the dc input supply. Detailed instructions for connecting the dc supply are given in the installation chapter of this handbook on page 25.

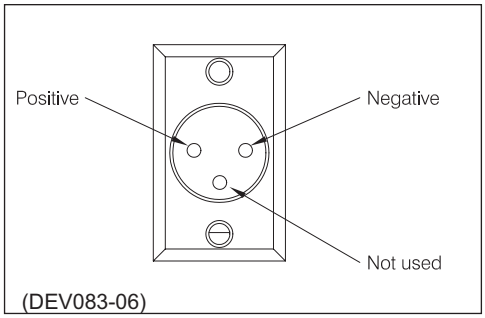


Fig. 1-5. DC Connector

Fuse F1

Fuse F1 protects the dc input positive supply circuit. It is a size 0 fuse rated at 3 amps. The PAE part number of the fuse is: 29-11100202.

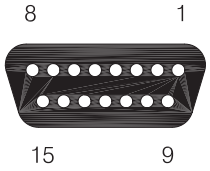
Chassis Stud Connection

The chassis stud is used to provide a common earth point between the receiver and the associated equipment rack, or the receiver and the user's system earth. ***The stud must not be used as a safety earth.*** Connection details are given on page 24.

Facilities Connector CN5

A 15-way D-type socket used primarily to connect remote signals when the receiver operates in AM-mode and does not form part of a MARC (or similar) system.The pin-out of this connector is given in table 1-3 on page 17.

Apart from allowing connection of remote signals, this connector makes some auxiliary signals available to the user. For example, a 24 volt (nominal) unregulated output supply. The auxiliary signals can be employed by the user as and when required, irrespective of the operating mode.

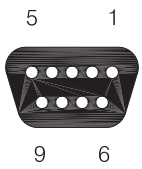


Facilities connector CN5 as seen when looking at the rear panel. Connections should be made using a 15-way D-type plug PAE part number: 20-01150100 (plug), and 20-09150101 (cover). These are supplied with the receiver as Item 3 (see page 22).

Fig. 1-6. Facilities Connector CN5 Pin-Out

MARC Port CN6

A 9-way D-type socket used to connect remote signals to a MARC system or other compatible control and data system. The pin-out of this connector is given in table 1-4 on page 18.

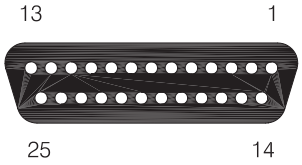


MARC connector CN6 as seen when looking at the rear panel. Connections should be made using a 9-way D-type plug PAE part number: 20-01090100 (plug), and 20-09090101 (cover).

Fig. 1-7 MARC Port CN6 Pin-Out

Computer Port CN7

A 25-way D-type socket used to connect the receiver to a control computer when the receiver is operated in digital communication modes. The pin-out of this connector is given in table 1-5 on page 19.



Computer port CN7 as seen when looking at the rear panel. Connections should be made using a 25-way D-type plug PAE part number: 20-01250100 (plug), and 20-09250101 (cover).

Fig. 1-8 Computer Port CN7 Pin-Out

Antenna Connector

An N-type 50 ohm coaxial socket used to connect the antenna's feeder cable.

Table 1-3. Facilities Connector CN5 Pin-Out

Pin Number	Signal Name	Description
1	Ground	0 volt
2 3	Line Out (+) Line Out (-)	Pins 2 and 3 are a 600 ohm balanced audio output. The output level is adjustable between -30 and 0 dBm.
4	Squelch Defeat	An input signal to the receiver that, when active, disables the receiver's squelch circuits. This is a TTL input pulled-up to 5 V. The active polarity is set from the front panel.
5 6	Squelch Relay Common Squelch Relay Output	Pins 5 and 6 are a relay circuit that operates when a signal, above the squelch threshold, is received. This circuit can switch voltages in the range -50 to +50 V (100 mA maximum) and can be configured, at the front panel, to be normally open or normally closed. Note that the configuration follows the polarity of the squelch indication signal (see table 2-5 on page 28 of section 2 for more detail).
7	Squelch Indication	This grounding output, when active, indicates a signal above the squelch threshold is being received. The active polarity is set from the front panel.
8	Ground	0 volt
9	Unregulated Supply	A dc output supply between 21.6 and 32 volt (nominally 24 volt). The supply is fused at 500 mA.
10	Rx Disable	An input signal that, when active, disables the receiver's audio output. When a receiver is configured with an associated transmitter to form a base station, this signal can be used to disable the receiver's audio output when the transmitter is keyed. This is a TTL input pulled-up to 5 V. The active polarity is set from the front panel.
11	BIT Interruptive Test	An input signal that initiates a BIT interruptive test. This is a TTL input pulled-up to 5 V. The active polarity of this signal is set from the front panel. The input signal must be active for a minimum of 300 ms; the signal cannot then be activated again for at least 3 seconds.
12	RSSI	An analogue Receiver Signal Strength Indication that varies between 0 volt and 10 volt. For a received signal of 1 μV the output is less than 2 volts. For a received signal of 100 μV the output is greater than 6 volts. The output impedance is 10 ohm. RSSI can be used to provide relative indications when two receivers are configured as a main and standby pair, when using receiver voting, or when associated transmitter field strength monitoring is required.
13	Ready Output	This output is active when the radio is ready to receive and no faults have been detected by the BIT circuitry. It is a grounding output. The active polarity is set from the front panel.
14	Tape Output	An audio output for connection to a recording system. The output is nominally -10 dBm into 100 ohm.
15	Not Used	-

Table 1-4. MARC Connector CN6 Pin-Out

Pin Number	Signal Name	Description
1	Ground	0 volt.
2	Line Out (+)	Pins 2 and 3 are a 600 ohm balanced audio output. The output level is adjustable between -30 and 0 dBm.
3	Line Out (-)	
4	Squelch Indication	This output, when active, indicates a signal above the squelch threshold is being received. The active polarity is set from the front panel.
5	Unregulated Supply	A dc output supply between 21.6 and 32 volt. The supply, which is fused at 500 mA, is used as the power source for the MARC RSE 2 equipment.
6	Data In (+)	RS422 data line.
7	Data In (-)	RS422 data line.
8	Data Out (+)	RS422 data line.
9	Data Out (-)	RS422 data line.

Table 1-5. Computer Port CN7 Pin-Out

CN7 Pin Number	Signal Name	Level	Input or Output
1	Ground	0 volt	
2	Serial 0 TXA	RS422	Output
3	Serial 0 TXB	RS422	Output
4	Serial 0 RXA	RS422	Input
5	Serial 0 RXB	RS422	Input
6	Serial 0 CLA	RS422	Output
7	Serial 0 CLB	RS422	Output
8	Serial 1 TXA	RS422	Output
9	Serial 1 TXB	RS422	Output
10	Serial 1 RXA	RS422	Input
11	Serial 1 RXB	RS422	Input
12	Serial 1 CLA	RS422	Output
13	Serial 1 CLB	RS422	Output
14	Input A	RS 232	Input
15	Input B	RS232	Input
16	Input C	RS232	Input
17	Input D	RS232	Input
18	Output A	RS232	Output
19	Output B	RS232	Output
20	Output C	RS232	Output
21	Output D	RS232	Output
22	Ground	0 volt	-
23	Not used	-	-
24	Not used	-	-
25	Not used	-	-

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Chapter 4. Installation Procedures

This chapter details the installation procedures for a T6R receiver that are necessary irrespective of which operating mode is to be used.

WARNING. LETHAL VOLTAGES!

The instructions given in this chapter involve connecting lethal voltages to the receiver. The instructions detailed in this chapter must be carried out only by suitably qualified personnel.

WARNING. UNAUTHORIZED MODIFICATIONS!

Changes or modifications made to this equipment that are not expressly approved by Park Air Electronics, or parties authorized by Park Air Electronics, could void the user's authority to operate the equipment.

CAUTION. ESSDs!

The T6R receiver's circuitry contains Electrostatic Sensitive Devices (ESSDs). Personnel must be aware of the precautions necessary to prevent damage to such devices. During installation all precautions necessary to prevent ESSD damage must be taken.

INTRODUCTION

The procedures in this chapter describe how to install a T6R receiver. The procedures necessary during installation are listed in table 1-6 and should be completed in the order shown.

Table 1-6 Installation Procedures

Procedure		Reference
1	Perform an initial inspection of the receiver.	Page 22
2	Fit the correct ac input fuse.	Page 22
3	Fit the receiver into an equipment rack.	Page 23
4	Connecting remote facilities.	Page 23
5	Connect the chassis stud to the rack or system earth.	Page 24
6	Connect the ac input supply (if applicable).	Page 24
7	Connect the dc input supply (if applicable).	Page 25
8	Connect an antenna.	Page 25

INITIAL INSPECTION OF THE RECEIVER

On receipt of the receiver from PAE, remove all transit packaging and check that there is no transit damage. If damage is evident, contact PAE immediately and retain the original transit packaging.

The following items should be included with the receiver:

Item 1. One copy of the T6R user guide (this handbook).

Item 2. An unterminated IEC mains connector.

Item 3. An unterminated 15-way D-type plug (for use with the rear panel Facilities connector CN5).

FITTING THE CORRECT AC INPUT FUSE

The mains input fuse F2 is an integral part of the rear panel ac connector (the connector and fuse are shown in Fig. 1-4 on page 14). The fuse type must be correct for the local mains supply. Check the fuse fitted conforms to that detailed in table 1-7.

Table 1-7 Input AC Fuse Rating

Mains Input Supply	Fuse	PAE Part Number
110/120 V	T3.15A UL	29-01470102S
220/230/240 V	T3.15A 250 V IEC 127 HBC	29C01100102S

FITTING A RADIO INTO AN EQUIPMENT RACK

CAUTION!

It is essential that the chosen mechanical installation provides adequate support along the depth (front to rear) of the unit. The receiver must not be supported by the front panel; doing so can cause damage.

The receiver can be installed on telescopic slides, or on fixed runners, within a standard 483 mm (19 inch) equipment rack. M4 tapped holes, each 10 mm deep (see Fig. 1-9) are provided on each side of the equipment to accept the slides. Details of suitable telescopic slides and fixed runners are available from PAE.

When fitted in the rack, the receiver's front panel must be secured to the racks chassis using four M6 x 16 mm screws and plastic washers.

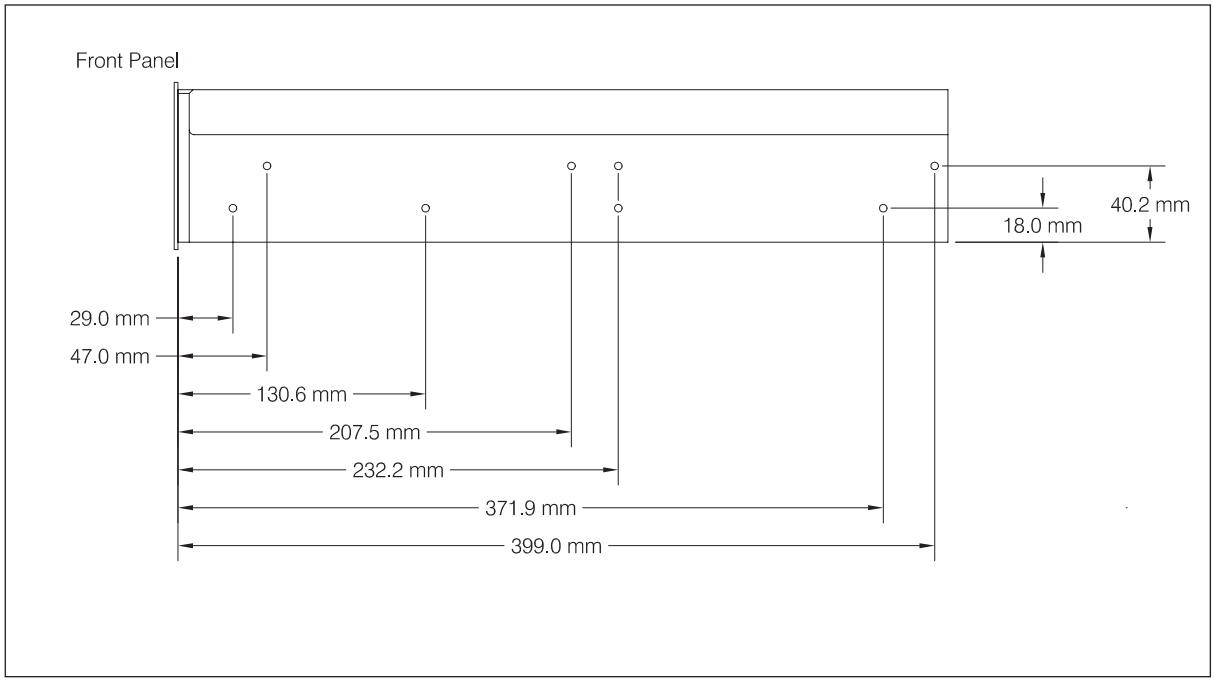

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Fig. 1-9. Telescopic Slide Fixing Points

CONNECTING REMOTE FACILITIES

Remote facilities connections depend on the receiver's operating mode. To determine the required remote connections, refer to chapter 3 of the section applicable to the operating mode.

CHASSIS STUD CONNECTION

WARNING. CHASSIS EARTH!

A chassis stud is fitted to the receiver's rear panel. This stud is used to connect the equipment to the equipment rack, or to the user's system earth point. The stud must not be used as the safety earth.

In order not to compromise the receiver's Electromagnetic Compatibility (EMC) the chassis stud, marked ⏚ and fitted to the rear panel (see Fig. 1-3 on page 14) must be connected to the equipment rack (if a rack is being used) or to the user's system earth point. The connection should be made using a single tri-rated, green-and-yellow cable having a cross-sectional area of 2.5 mm^2. The cable should have CSA and UL1015 approval, and be connected to the chassis stud through an M6 eyelet (for example, PAE part number 20-08010103).

Failure to comply with this instruction could result in non-compliance with the European Commission EMC Directive 89/336/EEC.

AC SUPPLY CONNECTION

WARNING. LETHAL VOLTAGES!

The equipment is permanently connected to the mains supply when the mains connector is attached. Switching the rear panel Power switch to off does not isolate all internal circuits from the mains supply. For this reason, a mains isolating switch should be fitted close to, and easily accessible from, the receiver's position.

WARNING. EARTH CONNECTION!

This equipment must be earthed. The earth terminal of the AC connector should be used as the safety earth.

An ac input connector (see Fig. 1-4 on page 14) is fitted to the equipment's rear panel. The cable used to connect between the equipment and the user's ac power source should be 3-core (to IEC 227) rated 250 V ac at 8 amps, and have a minimum cross-sectional area of 1.0 mm^2 per core. PAE recommends the use of polyvinyl chloride (PVC) insulated cable. The cable must be fitted with the IEC approved equipment connector (PAE part number 20-02030102) supplied with the receiver, and conform to the following specification:

- ❑ If PVC insulated, be not lighter than ordinary polyvinyl chloride sheathed flexible cord according to IEC publication 227 (designation H05 VV-F, or H05 VVH2-F).
- ❑ If rubber insulated, be of synthetic rubber and not lighter than ordinary tough rubber-sheathed flexible cord according to IEC publication 245 titled 'Rubber Insulated Cables of Rated Voltages up to and Including 450/750 V (designation H05 RR-F)'.

The T6R receiver is a Class 1 equipment. The ac supply cable should have a green-and-yellow protective earthing conductor electrically connected to the protective earthing terminal of the equipment connector and the mains plug. PAE recommends the ac supply cable is colour coded in accordance with the electrical appliance (colour code) regulations for the UK. That is:

- ❑ The core that is coloured green-and-yellow must be connected to the terminal in the plug that is marked with the letter E or by the earth symbol ⏚ or coloured green-and-yellow.
- ❑ The core that is coloured blue must be connected to the terminal that is marked with the letter N or coloured black.
- ❑ The core that is coloured brown must be connected to the terminal that is marked with the letter L or coloured red.

DC SUPPLY CONNECTION

The receiver operates from either an ac, or a dc input supply. When both ac and dc are connected, operation from the ac supply takes priority; automatic change-over to the dc supply occurs if the ac supply fails. On restoration of the ac supply, the equipment reverts to ac operation.

A dc input supply connector (see Fig. 1-5 on page 15) is fitted to the equipment's rear panel. The recommended minimum rating of the dc supply cable is: 2-core having a cross-sectional area of 1.5 mm² per core. The supply cable should be fitted with an XLR3 connector (PAE part number 20-01030106).

CONNECTING AN ANTENNA

The antenna feeder cable connects to the receiver’s rear panel N-type antenna connector (see Fig. 1-3 on page 14).

SWITCHING ON

When the installation is complete, the receiver should be switched on at the rear panel Power switch (see page 14).

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T6R Receiver User Guide

Section 2

AM-Voice Mode

Section 2 Contents

Chapter 1. AM-Voice Mode Overview

This chapter provides an introduction to using the T6R receiver in AM-voice mode.

INTRODUCTION TO AM-VOICE MODE

In AM-voice mode the T6R receiver operates in the frequency range 118 to 136.975 MHz using 25 kHz or 8.33 kHz channel spacing. An internal loudspeaker, or headphones plugged into the front panel, allows the receiver to be used in local mode. Alternatively, rear panel connectors provide the interfaces for remote operation.

The majority of operational settings can be selected from the front panel, or through a compatible control and data system such as the PAE multi-access remote control (MARC). A multi-channel feature of the receiver allows up to 100 frequency channels to be stored and recalled by channel number.

OPERATIONAL SETTINGS

Operational settings for the T6R receiver are configured at the front panel, through the VFP, or through an associated MARC system (or compatible control and data system). At the receiver, operational settings are selected and displayed using the front panel Scroll/Select switch and the LCD. The settings that can be selected are:

- ❑ Operating frequency
- ❑ Channel allocation and recall
- ❑ Setting the squelch level
- ❑ Setting audio AGC to on or off
- ❑ Setting the LCD backlight
- ❑ Setting the MARC baud rate
- ❑ Setting the disable signal polarity
- ❑ Setting the BIT initiate signal polarity
- ❑ Setting standby mode to on or off
- ❑ Selecting front panel frequency step size
- ❑ Setting the line level
- ❑ Setting squelch defeat to on or off
- ❑ Setting the loudspeaker volume
- ❑ Setting receiver disable on or off
- ❑ Setting squelch indication signal polarity
- ❑ Setting the squelch defeat polarity
- ❑ Setting the ready out signal polarity

BASIC CONFIGURATION

Fig. 2-1 shows the basic T6R receiver connections for AM-voice operation. If the receiver is part of a MARC system, or other compatible control and data system, refer to ‘Configuration for Operation with MARC’ on page 6.

Local Operation

In its simplest configuration, the receiver can be operated in local mode. This involves using the built-in loudspeaker, or connecting a headset to the front panel Headset/Diagnostics connector. All operational settings are then selected using the Scroll/Select switch.

Remote Operation

For remote operation signals are connected from the receiver's rear panel Facilities connector, through a suitable communication link, to the control equipment. Essential connections are the receiver's audio output and a squelch indication (a choice of squelch indication signals are available). Other remote signals can be connected to suit the particular application. The remote signals are fully described in section 1 on page 17.

In the basic configuration, the rear panel MARC and Computer Port connectors are not used. The front panel Reference connector is used to check the receiver's internal reference frequency during scheduled maintenance. The front panel Headset/Diagnostics connector is used to connect a PC for maintenance purposes, or to use the VFP.

Maintenance using a PC connected to the Headset/Diagnostics connector is outside the scope of this user guide. Full information is contained in the T6R maintenance handbook.

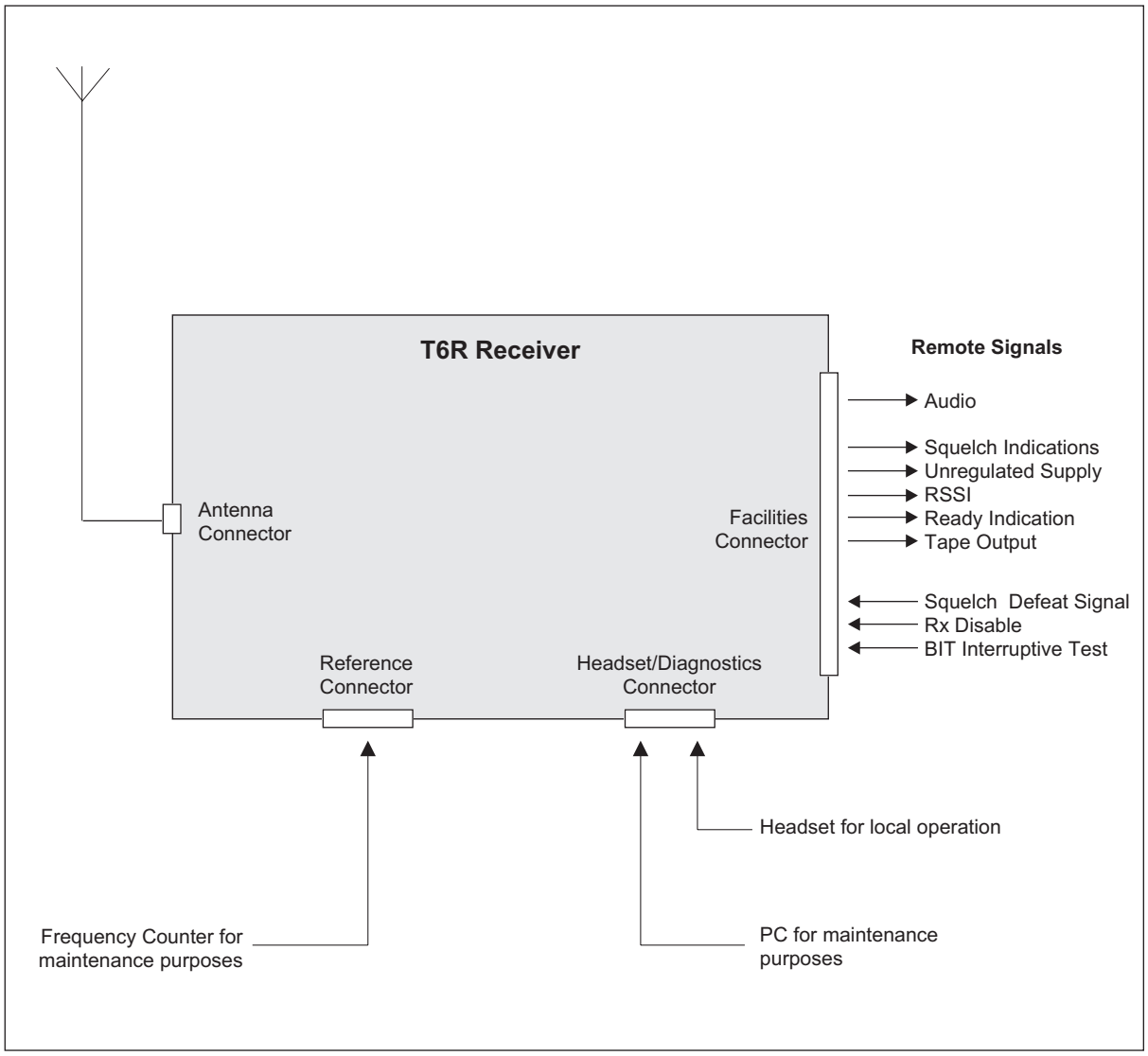

Fig. 2-1. T6R Receiver - Basic Configuration

CONFIGURATION FOR OPERATION WITH MARC

When the T6R receiver is used with a MARC system or other compatible control and data system, the remote signals are connected through the rear panel MARC connector (see Fig. 2-2). In this configuration, the rear panel Facilities and Computer Port connectors are not used unless some auxiliary signals available at the Facilities connector are required.

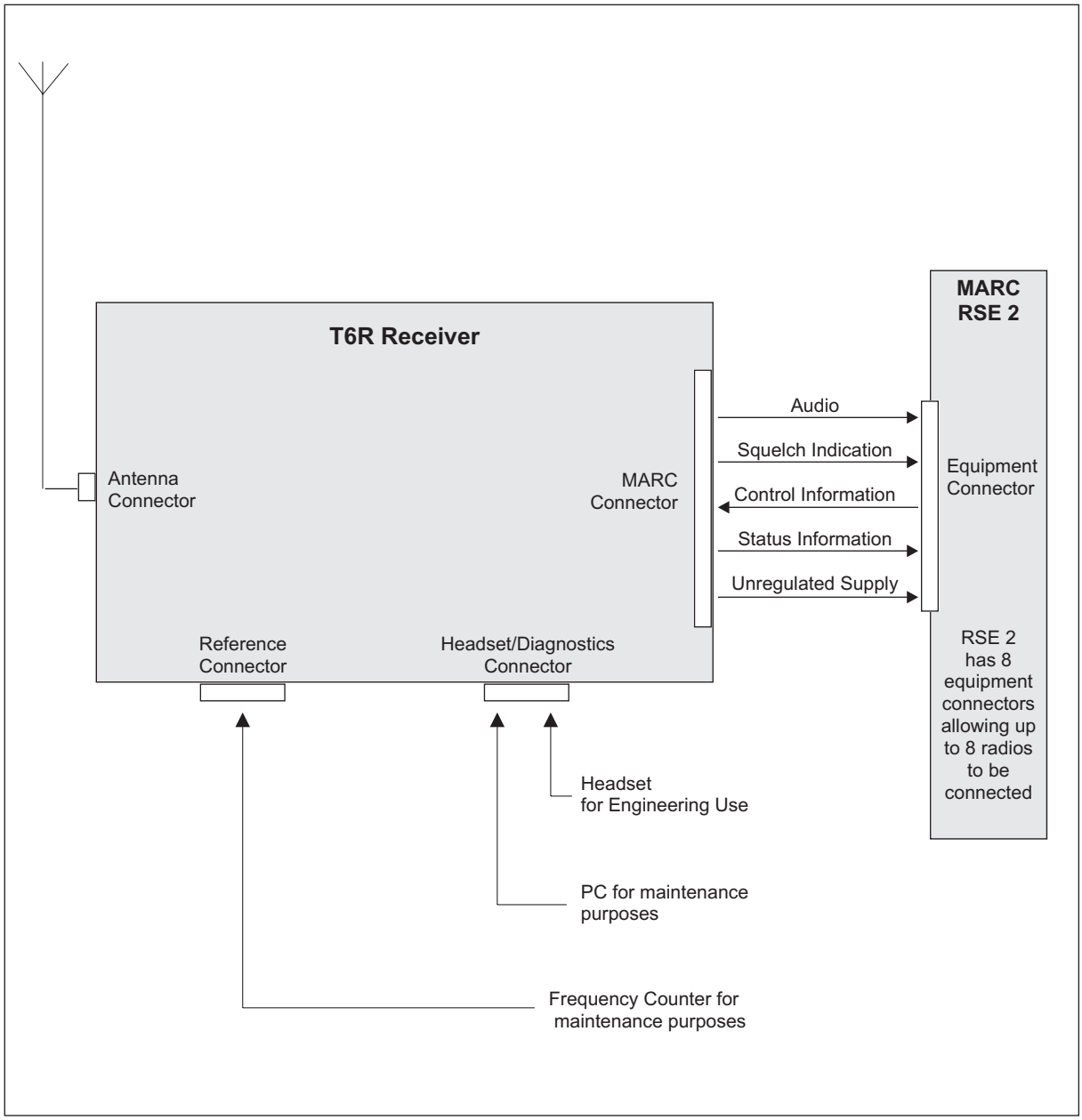

Fig. 2-2. T6R Receiver - Configuration for Use with MARC

Chapter 2. Specification

This chapter gives the receiver's specification applicable to AM-voice operation.

RF CHARACTERISTICS

Channel spacing	25 kHz, or 8.33 kHz across the frequency band 118 to 136.975 MHz.
Sensitivity	Better than 1 μV PD (-107 dBm) for 10 dB (S+N)/N, or 12 dB SINAD ratio; both with ITU-T recommendation P.53 weighting.
IF selectivity	For 25 kHz channel spacing: At ± 11 kHz from the centre frequency, the signal is not attenuated by more than 6 dB. At ± 25 kHz from the centre frequency the signal is attenuated by more than 80 dB. For 8.33 kHz channel spacing: At ± 3.5 kHz from the centre frequency, the signal is not attenuated by more than 6 dB. At ± 8.33 kHz from the centre frequency, the signal is attenuated by more than 70 dB. At ± 25 kHz from the centre frequency, the signal is attenuated by more than 80 dB.

MODULATION CHARACTERISTICS

Frequency response	For 25 kHz channel spacing, the variation in frequency response with reference to a 1 kHz signal, is within +2 dB, -3 dB across the frequency range 300 to 3400 Hz. The response is better than -10 dB at 100 Hz, and better than -30 dB at 5 kHz. For 8.33 kHz channel spacing, the variation in frequency response, with reference to a 1 kHz signal, is within +2 dB, -3 dB across the frequency range 350 to 2500 Hz. The response is better than -10 dB at 100 Hz, and better than -30 dB at 5 kHz.
Hum and noise	With a -47 dBm RF input, the receiver's hum and noise is more than 45 dB below the signal level for a carrier modulated by a 1 kHz signal with a modulation index of 0.9.

Distortion	For RF input signals between -47 dBm and +10 dBm, the total harmonic distortion is less than 5% due to signals with a modulation index of 0.8 and within the frequency range 300 Hz to 3400 Hz.
AGC	For received signals between -107 dBm and +10 dBm there is less than 3 dB change in audio output. The AGC attack time is less than 15 ms and the decay time is less than 50 ms.
Squelch	The receiver has a noise compensated carrier operated squelch with an adjustment range of -114 to -60 dBm, and provides greater than 60 dB of quieting. Attack time is <50 ms for a signal rising 10 dB above the squelch setting. Release time is <50 ms for a signal falling 10 dB below the squelch setting. Hysteresis 2 to 4 dB.
Level control	An audio AGC ensures there is less than 1 dB change in audio output level when the modulation index is increased from m = 0.3 to m = 0.9. The audio AGC can be switched off from the front panel, through MARC, or the VFP.

Chapter 3. Installation

This chapter details the installation procedures that are applicable only to AM-voice operation.

WARNING. LETHAL VOLTAGES!

The instructions given in this chapter involve connecting lethal voltages to the receiver. The instructions detailed in this chapter must be carried out only by suitably qualified personnel.

WARNING. UNAUTHORIZED MODIFICATIONS!

Changes or modifications made to this equipment that are not expressly approved by Park Air Electronics, or parties authorized by Park Air Electronics, could void the user's authority to operate the equipment.

CAUTION. ESSDs!

The T6R receiver's circuitry contains Electrostatic Sensitive Devices (ESSDs). Personnel must be aware of the precautions necessary to prevent damage to such devices. During installation all precautions necessary to prevent ESSD damage must be taken.

INTRODUCTION

The procedures in this chapter that allow a T6R receiver to be installed for AM-voice operation are:

- ❑ Connecting remote facilities in non-MARC applications
- ❑ Connecting remote facilities to a MARC (or a compatible control and data system).

CONNECTING THE REMOTE FACILITIES

If the receiver is being used in the 'Basic Configuration' (see Fig. 2-1 on page 5) remote signals are terminated on the rear panel Facilities connector CN5. For configurations where the T6R receiver is being used with a MARC system, or other compatible data and control system, this procedure should be ignored; instead, refer to 'Connecting to MARC Equipment'.

The remote facilities available at CN5 are listed in section 1 on page 17. Essential connections, unless the receiver is being used only in local mode, are the audio output (pins 2 and 3) and, usually, a squelch indication output.

Make any other connections to CN5 as required.

When making connections to the Facilities connector CN5, and in order not to compromise the receiver's Electromagnetic Compatibility (EMC) users must:

- ❑ Use a D-type connector that has a screened cover
- ❑ Use screened multi-way cable, with the cable's screen connected to the Facilities connector's shell or body.

Failure to comply with this instruction could result in non-compliance with the European Commission EMC Directive 89/336/EEC

CONNECTING TO MARC EQUIPMENT

If the receiver is being used with a MARC system, or compatible control and data system, remote connections are made through the rear panel MARC connector CN6 (see Fig. 2-2 on page 6).

The pin-out of CN6 is shown in section 1 on page 18. If connecting to a MARC RSE 2 equipment, the connections between CN6 and one of RSE 2's Equipment Connectors is pin-to-pin as shown in table 2-1.

When making connections to the Facilities connector CN6, and in order not to compromise the receiver's Electromagnetic Compatibility (EMC) users must:

- ❑ Use a D-type connector that has a screened cover
- ❑ Use screened multi-way cable, with the cable's screen connected to the Facilities connector's shell or body.

Failure to comply with this instruction could result in non-compliance with the European Commission EMC Directive 89/336/EEC

Table 2-1 MARC Connector CN6 to RSE 2 Equipment Connector

T6R Receiver			RSE 2 Equipment Connector	
Pin Number	**Signal Name**		**Pin Number**	**Signal Name**
1	Ground		1	0 Volt
2	Line Out(+)		2	Audio Line L1
3	Line Out (-)		3	Audio Line L2
4	Squelch Indication		4	Mute
5	Unregulated Supply		5	Unregulated Supply Input
6	Data In (+)		6	Data Out (+)
7	Data In (-)		7	Data Out (-)
8	Data Out (+)		8	Data In (+)
9	Data Out (-)		9	Data In (-)

Note ...

The squelch indication signal from the receiver connects to the RSE 2's mute connection.

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Chapter 4. Operational Settings

This chapter details how the T6R receiver is set up for AM-Voice operation from the front panel. It also details how to set the receiver in and out of standby mode.

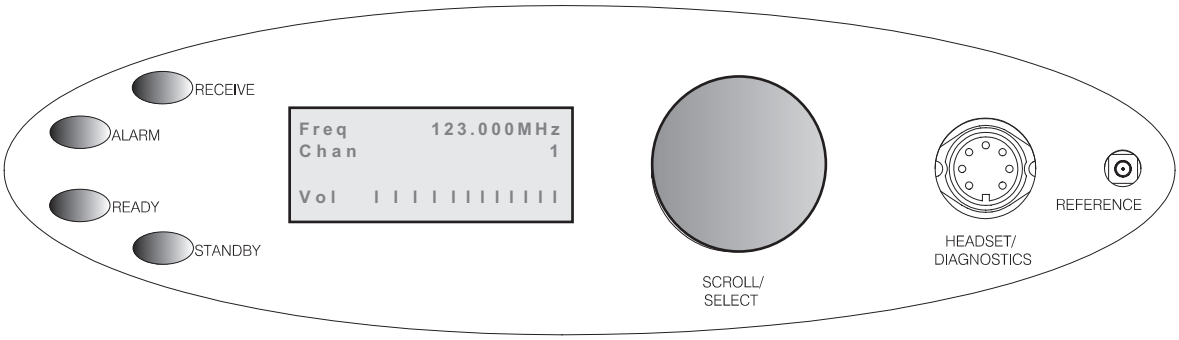
The receiver can also be set up through a MARC system, or by using the VFP. Both of these methods are outside the scope of this handbook; users should refer to the MARC User Guide and the T6R Maintenance Handbook.

INTRODUCTION

Selecting most of the receiver's operational settings is carried out using the front panel Scroll/Select switch and the LCD (see the illustration below). Table 2-2 on page 15 shows a list of the operational settings. No attempt to set up the receiver should be made until it has been installed as per the Installation Procedures given in section 1 of this user guide.

Normal Operation

During normal operation, the LCD displays the Main screen. This screen shows the operating frequency, the channel number (if the channel store facility is used) and displays a graphical representation of volume. The receiver's loudspeaker and headset volume can be adjusted by rotating the Scroll/Select switch. If the receiver has been set to Standby mode, which is shown by the front panel STANDBY indicator being lit, the LCD is blanked.



Using the Scroll/Select Switch

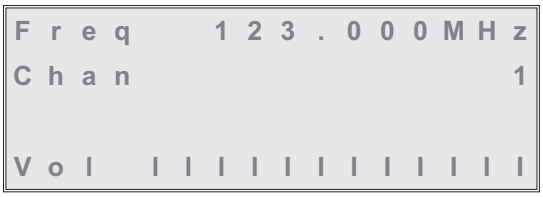
The SCROLL/SELECT switch (referred to throughout this chapter as the ‘Switch’) is used to exit the Main screen and display the Options menu. Further use of the Switch displays various selection menus and allows the required parameters to be set. The switch has three actions: it can be turned clockwise, anti-clockwise, or momentarily pushed in.

Note that during normal receiver operation, the Scroll/Select switch acts as a volume control.

SCREEN PROTOCOL

The following protocol is applicable to all screens described in this chapter.

Main Screen During normal receiver operation, the Main screen, an example of which is shown below, is displayed.



Switch Refers to the front panel Scroll/Select switch. The switch is turned clockwise to scroll through fields from left to right, and from top to bottom. The switch is turned anti-clockwise to scroll through fields from right to left, and from bottom to top. The switch is pressed to make a selection.

Timeout If during any setting up procedure the Scroll/Select switch is not operated for 30 seconds, the display returns to the Main screen. If editing any parameter has not been completed, the receiver stays on the original setting.

>> Indicates more fields are available other than those currently displayed. To access those fields, turn the switch clockwise through the last displayed field.

<< Indicates more fields are available other than those currently displayed. To access those fields, turn the switch anti-clockwise through the first displayed field.

Back When Back is selected, you are returned to the previous menu.

Exit When Exit is selected, you are returned to the Main screen.

Table 2-2 Operational Settings

Parameter	Adjustment Range	Factory Default Setting	Further Reference
Menu lock screen	Locked or unlocked	Unlocked	Page 16
To enter Standby mode	On or Off	Off	Page 19
To exit Standby mode	-	-	Page 20
Set mode of operation	AM-voice	AM-voice	Part of 'AM Voice Settings Procedure' starting on page 21.
Squelch level	-60 dBm to -114 dBm	-107 dBm	
Squelch defeat	On or Off	Off	
Audio AGC	On or off	On	
Front panel frequency step size	8.33, 25 kHz, or both	25 kHz	
Loudspeaker volume	0 to 100%, or Off	30%	
LCD backlight timeout	15 s to 120 s, Off, or On	30 s	Part of 'General Receiver Settings Procedure' starting on page 25.
Receiver disable	On or off	Off	
Line level	-30 dBm and 0 dBm	-13 dBm	
MARC port baud rate	300 to 9600 baud	9600 baud	
Squelch output signal polarity	Positive or Negative	Pos	
Disable input signal polarity	Positive or Negative	Pos	
Squelch defeat input signal polarity	Positive or Negative	Pos	
BIT initiate input signal polarity	Positive or Negative	Pos	
Ready output signal polarity	Positive or Negative	Pos	
Selecting the operating frequency	118.000 to 136.975 MHz	118.00 MHz	Page 29
Store frequency channels	1 to 100	-	Page 30
Recall frequency channels	1 to 100	-	Page 31
Initiate a BIT test	-	-	Page 32
View BIT pages and advise screens	-	-	Page 33
Elapsed time indication	-	-	Page 34
Display internal reference frequency screen	-	-	Page 35
Software versions	-	-	Page 36

MENU LOCK SCREEN

A security facility available only from the VFP allows the receiver's front panel to be ‘locked’. When this facility is active, **no operational settings can be made from the front panel until an ‘unlock’ command is sent from the VFP**.

The following screen is displayed when ‘lock’ is active, and the front panel switch is pressed.

To exit the system lock screen:

- Turn the switch to highlight OK, then press the switch. You are returned to the main screen.

  or,

- Wait for the 30 second timeout to expire. You are returned to the main screen.

NOTES FOR SETTING UP THE RECEIVER

The following notes should be read before setting up the receiver. They advise on the special frequency display when using 8.33 kHz channel spacing, and give guidance on the optimum line level.

Front Panel Display for 25 kHz and 8.33 kHz Channel Spacing

When setting the operating frequency of the receiver and 8.33 kHz channel spacing is selected, the displayed frequency differs from the actual channel frequency. Table 2-3 shows the pattern used for 25 kHz and 8.33 kHz spaced channel frequencies from 118.000 MHz to 118.1916 MHz. The pattern is the same for any frequency within the receiver's frequency range. The display conforms to ICAO convention for 8.33 kHz operation.

Table 2-3 25 kHz and 8.33 kHz Channel Spacing Displays

Actual Frequency (to 4 decimal places)	Channel Spacing	Displayed Frequency at Receiver's Front Panel
118.0000 MHz	**25 kHz**	**118.000 MHz**
118.0000 MHz	8.33 kHz	118.005 MHz
118.0083 MHz	8.33 kHz	118.010 MHz
118.0166 MHz	8.33 kHz	118.015 MHz
118.0250 MHz	**25 kHz**	**118.025 MHz**
118.0250 MHz	8.33 kHz	118.030 MHz
118.0333 MHz	8.33 kHz	118.035 MHz
118.0416 MHz	8.33 kHz	118.040 MHz
118.0500 MHz	**25 kHz**	**118.050 MHz**
118.0500 MHz	8.33 kHz	118.055 MHz
118.0583 MHz	8.33 kHz	118.060 MHz
118.0666 MHz	8.33 kHz	118.065 MHz
118.0750 MHz	**25 kHz**	**118.075 MHz**
118.0750 MHz	8.33 kHz	118.080 MHz
118.0833 MHz	8.33 kHz	118.085 MHz
118.0916 MHz	8.33 kHz	118.090 MHz
118.1000 MHz	**25 kHz**	**118.100 MHz**
118.1000 MHz	8.33 kHz	118.105 MHz
118.1083 MHz	8.33 kHz	118.110 MHz
118.1166 MHz	8.33 kHz	118.115 MHz
118.1250 MHz	**25 kHz**	**118.125 MHz**
118.1250 MHz	8.33 kHz	118.130 MHz
118.1333 MHz	8.33 kHz	118.135 MHz
118.1416 MHz	8.33 kHz	118.140 MHz
118.1500 MHz	**25 kHz**	**118.150 MHz**
118.1500 MHz	8.33 kHz	118.155 MHz
118.1583 MHz	8.33 kHz	118.160 MHz
118.1666 MHz	8.33 kHz	118.165 MHz
118.1750 MHz	**25 kHz**	**118.175 MHz**
118.1750 MHz	8.33 kHz	118.180 MHz
118.1833 MHz	8.33 kHz	118.185 MHz
118.1916 MHz	8.33 kHz	118.190 MHz

Line Level Setting

The line level setting displayed on the front panel is equivalent to the average speech level with a peak-to-average ratio of 13 dB. This corresponds to the level specified for the lines.

When testing the receiver using a signal generator with sine wave modulation, the line output level will be 10 dB above the line level setting.

Table 2-4 Relationship between Line Level, Output Levels with Average Speech and Sine Wave

Line Level Setting (Front Panel Setting) (dBm)	Output Level with Average Speech (dBm)	Output Level with Sine Wave (dBm)
0	0	+10
-5	-5	+5
-10	-10	0
-15	-15	-5
-20	-20	-10
-25	-25	-15
-30	-30	-20

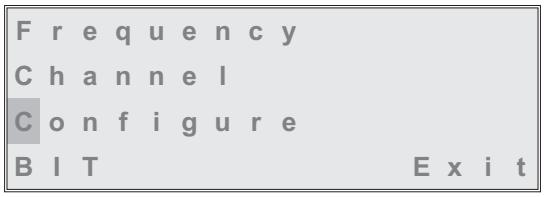
TO ENTER AND EXIT STANDBY MODE

Standby mode is a power saving feature that can be used for non-operational receivers. When in standby mode, most of the receiver's circuits are inactive, the LCD is blanked, and there is no audio output.

To Enter Standby Mode

To put the receiver into standby mode, use the following procedure.

1. From the Main screen, press the switch to display the Options menu. Ensure that Configure is highlighted. Press the switch.



2. Ensure the Configure menu is displayed. Turn the switch until Standby is highlighted, then press the switch.

3. Check that the Standby menu is displayed. Turn the switch until Yes is highlighted, then press the switch. [To abandon this procedure, select No instead of Yes and then press the switch.]

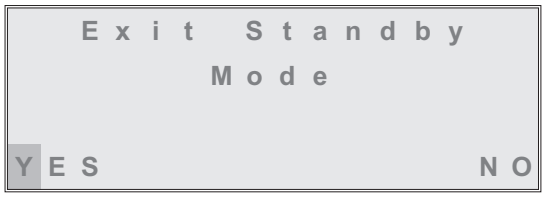
4. Check that the LCD blanks, and the front panel STANDBY indicator lights.

5. The receiver is now in standby mode. To exit standby, see the next procedure.

To Exit Standby Mode

Standby mode is indicated by the front panel STANDBY indicator being lit and the LCD being blanked. To exit this mode, use the following procedure.

1. Press the switch and check that the Exit menu is displayed.



2. Turn the switch until YES is highlighted, then press the switch. [To abandon this procedure, select No instead of Yes and then press the switch.]

3. Check that the Main screen is displayed and that the front panel STANDBY indicator is unlit.

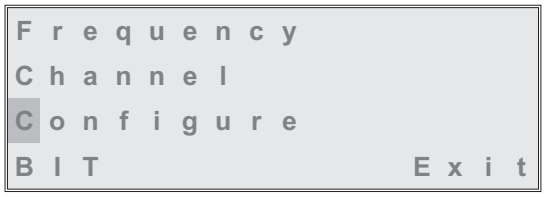
4. The receiver is now ready for normal use.

AM-VOICE SETTINGS PROCEDURE

During this procedure, the following parameters, applicable to AM-voice operation, will be set:

- ❑ Mode of operation
- ❑ Squelch defeat on or off
- ❑ Front panel frequency step size
- ❑ Squelch level
- ❑ Audio AGC on or off
- ❑ Loudspeaker volume

1. From the Main screen, press the switch to display the Options menu. Turn the switch until Configure is highlighted. Press the switch.



Options Menu

2. Ensure the Configure menu is displayed. Turn the switch until Settings is highlighted, then press the switch.

Configure Menu

3. Check that the Function menu is displayed and turn the switch until Mode is highlighted. Press the switch.

Function Menu

4. **Selecting AM-Voice Operation**.

   Check that AM Voice is displayed. If any other mode is displayed, press the switch until AM Voice is shown.

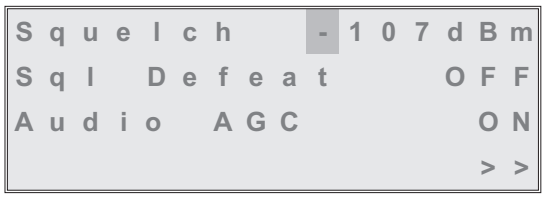
   Turn the switch clockwise until Settings is highlighted. Then press the switch to display the mode specific Settings menu.

5. **Setting the Squelch Level**.

[Factory default setting: -107 dBm]

The receiver's squelch level can be set between -60 dBm and -114 dBm.

To set the squelch level, ensure Squelch is highlighted. Press the switch. Turn the switch clockwise or anti-clockwise to increase or decrease the value. When the required value is displayed, press the switch. Turn the switch clockwise to highlight Sql Defeat.



Mode Specific Settings Menu

6. **Setting Squelch Defeat to On or Off**.

[Factory default setting: Off]

The receiver's squelch facility can be switched on or off.

Ensure that Sql Defeat is highlighted. Press the switch to toggle between On and Off.

On = Squelch Defeated. The receiver's squelch circuit does not operate and the front panel Receive indicator stays lit.

Off = Squelch facility enabled. An audio output is heard only when a signal greater than the squelch level is received.

When the required setting is highlighted, turn the switch clockwise to highlight Audio AGC.

7. **Setting the Audio AGC.**

[Factory default setting: On]

The receiver's Audio AGC facility can be switched On or Off.

When set to on, the audio output level remains constant for received signal modulation depths greater than 30%.

When set to off, the audio output level is proportional to the received signal modulation depth.

To make the required setting, ensure Audio AGC is highlighted. Press the switch to toggle between On and Off.

When the required setting is highlighted, turn the switch clockwise to highlight Channel Spacing.

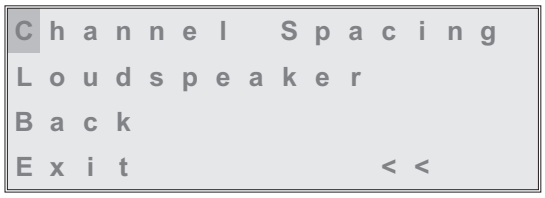
8. **Setting the Front Panel Frequency Step Size.**

[Factory default setting: 25 kHz]

The receiver's channel spacing can be 25 kHz, or 8.33 kHz. The radio automatically sets the correct channel spacing for the frequency that is entered at the front panel. This setting, which is only for the user's convenience, alters front panel frequency step size.

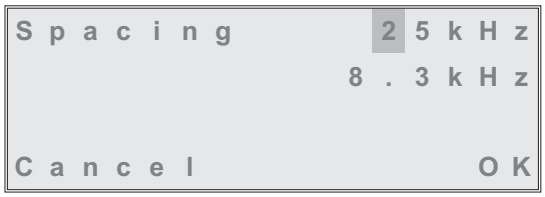
- ❑ If all channels to be selected or stored are 25 kHz spaced channels, then 25 should be selected.
- ❑ If all channels to be selected or stored are 8.33 kHz spaced channels, then 8.3 should be selected.
- ❑ If a mixture of the two are required, both 25 and 8.3 should be selected.

To select the required spacing, ensure that Channel Spacing is highlighted and press the switch.



Check that the Channel Spacing menu is displayed and that Spacing is highlighted.

Press the switch to change between 25 kHz, 8.3 kHz, and both. When the required value is displayed, turn the switch to highlight OK, then press the switch again. You will be returned to the Mode Specific Settings menu.



Channel Spacing Menu (Both Selected)

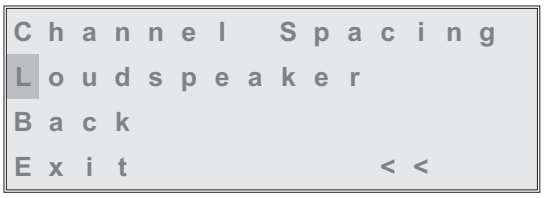
9. **Setting the Loudspeaker/Headset Volume.**

   [Factory default setting: 30% Volume; Loudspeaker On]

   The receiver's loudspeaker and headset volume can be set, and the speaker can be switched on or off during this procedure.

   Turn the switch clockwise until Loudspeaker is highlighted, then press the switch.

   Ensure that the Loudspeaker menu is displayed and that Volume is highlighted.

   Press the switch. Turn the switch clockwise to increase volume, or anti-clockwise to decrease volume. When the required value (0 to 100%) is displayed, press the switch.Turn the switch clockwise until OK is highlighted, then press the switch.

   To turn the loudspeaker on and off, highlight Speaker and press the switch to toggle between On and Off. When the required setting is displayed, turn the switch to highlight OK, then press the switch. You are returned to the Mode Specific Settings menu.

10. To exit the AM-Voice Settings Procedure, turn the switch to highlight Exit, then press the switch. You are returned to the Main screen. When this procedure is complete, go to the General Receiver Settings procedure starting on the next page.

GENERAL RECEIVER SETTINGS

During this procedure, the following parameters will be set:

- ❑ LCD backlight
- ❑ Line level
- ❑ Squelch output signal polarity
- ❑ Squelch defeat polarity
- ❑ Ready output signal polarity
- ❑ Disable on or off
- ❑ MARC baud rate
- ❑ Disable input signal polarity
- ❑ BIT initiate signal polarity

1. From the Main screen, press the switch to display the Options menu. Turn the switch until Configure is highlighted. Press the switch.

Options Menu

2. Ensure the Configure menu is displayed. Turn the switch until Settings is highlighted, then press the switch.

Configure Menu

3. **Setting the LCD Backlight.**

   [Factory default setting: 30 s]

   Check that the Settings menu is displayed and turn the switch until Display is highlighted. Press the switch.

   The LCD's backlight can be set to off, permanently on, or timed to stay on for a period between 15 and 120 seconds (adjustable in 15 second steps) after the Scroll/Select switch was last operated.

Settings Menu

   Ensure the Backlight menu is displayed and Backlight is highlighted. Press the switch. Turn the switch until the required setting is displayed, then press the switch. Turn the switch clockwise until OK is highlighted, then press the switch. You are returned to the Settings menu.

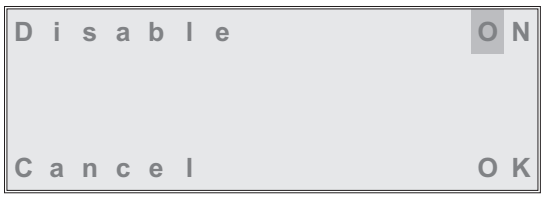
4. **Setting Disable On or Off.**

[Factory default setting: Off]

Receiver disable can be set to either On or Off. When set to on, the receiver's audio output is disabled. When set to off, audio is available through the internal loudspeaker, the headset, or through the remote audio lines.

From the Settings menu, turn the switch clockwise until Disable is highlighted, then press the switch.

Check that the Disable menu is displayed and Disable is highlighted. Pressing the switch toggles between On and Off. When the correct setting is displayed turn the switch clockwise to highlight OK, then press the switch. You are returned to the Settings menu.



5. **Setting the Line Level.**

[Factory default setting: -13 dBm]

The audio line output level can be set to any value between -30 dBm and 0 dBm. Some notes regarding the optimum line level are given on page 18.

From the Settings menu, turn the switch clockwise until Line Level is highlighted, then press the switch.

Check that the Line Level menu is displayed and that Line Lvl is highlighted, then press the switch.

Turn the switch clockwise or anti-clockwise to increase or decrease the value. When the required value is displayed, press the switch. Turn the switch to highlight OK and then press the switch. You are returned to the Settings menu.

6. **Setting the MARC Baud Rate.**

[Factory default setting: 9600]

The baud rate must be set when the T6R receiver is connected to a MARC system (or other compatible data and control system). The rate can be set to 300, 600, 1200, 2400, 4800, or 9600 baud.

From the Settings menu, turn the switch clockwise until MARC is highlighted, then press the switch.

Ensure that the MARC menu is displayed and that Baud Rate is highlighted.

Press the switch. Turn the switch until the required value is displayed, then press the switch. Turn the switch clockwise until OK is highlighted, then press the switch. You are returned to the Settings menu.

7. **Polarity Settings.**

The polarity of the following input and output signals is set using the Polarity menu:

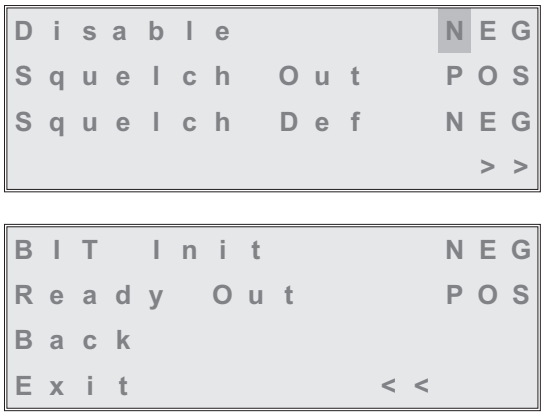
- ❑ Squelch output signal
- ❑ Disable input signal
- ❑ Squelch defeat input signal
- ❑ BIT initiate input signal
- ❑ Ready output signal.

To establish the required polarity for the input and output signals, refer to table 2-5.

From the Settings menu, turn the switch until Polarity is highlighted. Then press the switch to display the Polarity menu.

To set the required polarity, turn the switch to highlight the required parameter, then press the switch to toggle between NEG and POS.

When all polarities have been set, highlight Back, and press the switch to return to the Settings menu.



Polarity Menu

Table 2-5 Signal Polarities

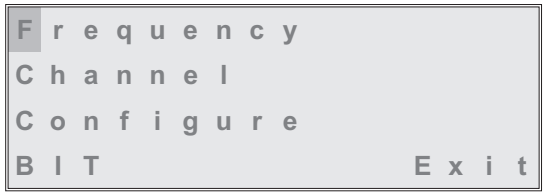
Signal	Description	State when Polarity is set to NEG	State when Polarity is set to POS
Squelch	This grounding output, when active, indicates a signal above the squelch threshold is being received.	Output is 0 V during no signal condition, and high impedance when a signal is received.	Output is high impedance during no signal condition, and 0 V when a signal is received.
Disable	An input signal that, when active, disables the receiver's audio output. This is a TTL input pulled-up to 5 V.	A 5 V input disables the receiver.	A 0 V input disables the receiver.
Squelch defeat	An input signal to the receiver that, when active, disables the receiver's squelch circuits. This is a TTL input pulled-up to 5 V.	A 5 V input defeats the squelch function.	A 0 V input defeats the squelch function.
BIT initiate	An input signal that initiates a BIT interruptive test. This is a TTL input pulled-up to 5 V. The input signal must be active for a minimum of 300 ms; the signal cannot then be activated again for at least 3 seconds.	A 5 volt input initiates a BIT test.	A 0 volt input initiates a BIT test.
Ready output	This output is active when the radio is ready for use and no faults have been detected by the BIT circuitry. It is a grounding output.	Output is a high impedance when the receiver is ‘ready’, and 0 volt when not ‘ready’.	Output is 0 volt when the receiver is ‘ready’, and a high impedance when not ‘ready’.
Squelch relay	The squelch relay circuit operates when a signal, above the squelch threshold, is received. This circuit can switch voltages in the range -50 to +50 V (100 mA maximum) and can be configured to be normally open or normally closed. The configuration follows the polarity of the squelch indication signal as follows: When the squelch indication polarity is POS, the squelch relay is configured as normally open. When the squelch indication polarity is NEG, the squelch relay is configured as normally closed.		

8. To exit the General Receiver Settings procedure, turn the switch to highlight Exit, then press the switch. You are returned to the Main screen. When this procedure is complete, go to Setting the Operating Frequency procedure starting on the next page.

SELECTING THE OPERATING FREQUENCY

To set the receiver's operating frequency, use the following procedure. If a frequency is to be stored as one of the 100 available preset channels, ignore this procedure and go to 'Allocate Channel Numbers to Specified Frequencies' on page 30. Before setting the operating frequency, the required front panel frequency step size should be set (see page 23).

1. From the Main screen, press the switch to display the Options menu. Ensure that Frequency is highlighted. Press the switch.



2. Ensure the Set Frequency menu is displayed and that the MHz digits are highlighted. Press the switch.

3. Turn the switch clockwise to increase frequency, or anti-clockwise to decrease frequency. The MHz value increments/decrements in 1 MHz steps. Stop when the required value is shown. Press the switch.

4. Turn the switch clockwise to highlight the kHz digits and press the switch. Turn the switch clockwise to increase frequency, or anti-clockwise to decrease frequency (note that continuous scrolling of the kHz value will increment or decrement the MHz value). Stop when the required value is shown. Press the switch. Note that if 25 kHz channel spacing is selected, the kHz value increments/decrements in 25 kHz steps; if 8.33 kHz channel spacing is selected, the kHz value increments/decrements in the pattern detailed in 'Table 2-3, 25 kHz and 8.33 kHz Channel Spacing Displays' on page 17. If both is selected, the display shows the 25 kHz and 8.33 kHz channels.

5. Turn the switch clockwise until either Cancel or OK is highlighted. Then press the switch. If cancel is selected, the new frequency entered in this procedure is ignored. If OK is selected, the receiver operates on the new frequency.

ALLOCATING CHANNEL NUMBERS TO SPECIFIED FREQUENCIES

Up to 100 frequency channels can be stored in the receiver. Use the following procedure to allocate frequency channels.

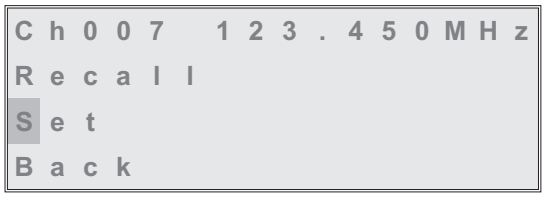
The process of allocating frequency channels can be simplified by using the VFP. The VFP software is contained in the T6R receiver's maintenance kit.

To Store Channel Frequencies

Use the following procedure to allocate frequency channels.

1. From the Main screen, press the switch to display the Options menu. Turn the switch until Channel is highlighted. Press the switch.

2. Ensure the Channel menu is displayed. Turn the switch until Set is highlighted. Press the switch.



3. Ensure the Channel screen is displayed and turn the switch until the channel number is highlighted. Press the switch, then turn the switch until the required channel number is displayed. When it is, press the switch.

4. Turn the switch to highlight the MHz value, the press the switch. Turn the switch until the required value is displayed, then press the switch. Repeat for the kHz value.

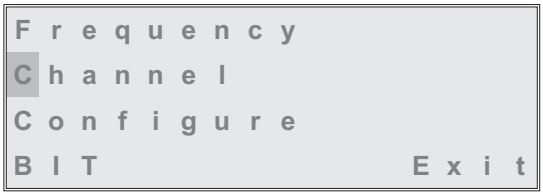
5. When the correct frequency for the displayed channel number is displayed, turn the switch until Store is highlighted, then press the switch.

6. Repeat steps 3 to 5 for all frequency channels that are to be stored. When the required number of frequency channels have been stored, highlight Store and End and press the switch. You will be returned to the Main screen.

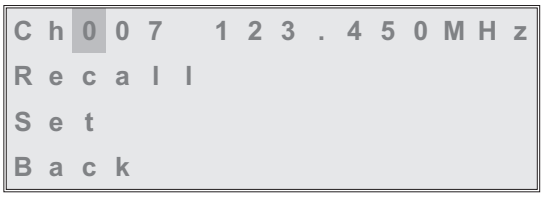
To Recall Channel Frequencies

Frequency channels that have been stored in the receiver can be recalled by channel number as follows.

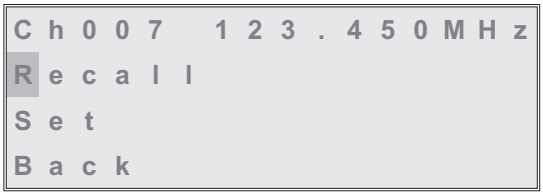
1. From the Main screen, press the switch to display the Options menu. Turn the switch until Channel is highlighted. Press the switch.



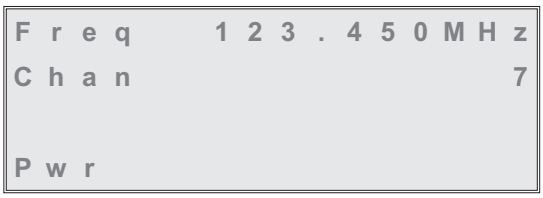
2. Ensure the Channel menu is displayed. Turn the switch until the channel number is highlighted. Press the switch. Turn the switch until the required channel number is displayed. Then press the switch.



3. Turn the switch until Recall is highlighted, then press the switch.



4. The Main screen will then be displayed showing the receiver's selected channel number and corresponding operating frequency.



TO INITIATE AN INTERRUPTIVE BIT TEST

Use the following procedure to initiate an interruptive BIT test from the receiver's front panel.

1. From the Main screen, press the switch to display the Options menu. Turn the switch until BIT is highlighted. Press the switch.

2. Ensure the BIT menu is displayed. Turn the switch until BIT Initiate is highlighted, then press the switch.

3. During the test, which takes approximately two seconds, the Testing screen is displayed.

4. When the test has finished, check that the receiver's front panel Alarm indicator is not lit. After a BIT test, BIT screens are automatically displayed. The screens are shown on the next page.

TO VIEW BIT PAGES AND ADVISE SCREEN

Use the following procedure to view the BIT page displays. Note that after a BIT interruptive test, the BIT screens are automatically displayed.

1. From the Main screen, press the switch to display the Options menu. Turn the switch until BIT is highlighted. Press the switch.

2. Ensure the BIT menu is displayed. Turn the switch until BIT View is highlighted, then press the switch.

3. A series of pages is shown displaying certain receiver parameters. Some examples are shown here.

   A full list of BIT screens along with appropriate explanations is given in the T6R receiver maintenance handbook.

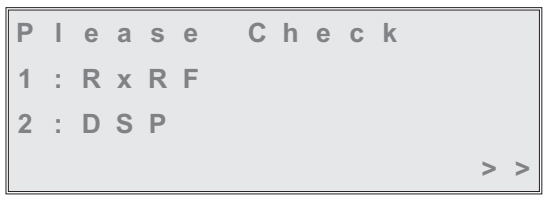
Example BIT Screen

Example BIT Screen

4. Note that the last BIT screen allows Advise to be highlighted and selected by pressing the switch. If any BIT faults have been detected, the advise screen recommends the remedial action, in order of priority, to be taken.

Last BIT Screen

   Further detail regarding the Advise screen is given in the T6R receiver maintenance handbook.



Example Remedial Advise Screen

ELAPSED TIME INDICATOR

An elapsed time indicator (ETI) shows the number of hours the receiver has been powered up since manufacture. To view the ETI:

1. From the Main screen, press the switch to display the Options menu. Turn the switch until BIT is highlighted. Press the switch.

2. ETI can be seen measured in hours and minutes.

DISPLAYING THE RECEIVER'S INTERNAL REFERENCE FREQUENCY SCREEN

Caution!

This procedure is included only for informational purposes. The reference frequency setting must not be altered unless following the procedure given in the T6R maintenance handbook. External test equipment is required to set this parameter.

Failure to comply with this caution may render the receiver inoperable.

To display the receiver's internal reference frequency screen, use the following procedure.

1. From the Main screen, press the switch to display the Options menu. Turn the switch until Configure is highlighted. Press the switch.

2. Ensure the Configure menu is displayed. Turn the switch until Settings is highlighted, then press the switch.

3. Check that the Function menu is displayed and turn the switch until Reference Freq is highlighted. Press the switch.

4. Ensure the Reference menu is displayed.

5. To exit the screen, wait for 30 seconds when the display automatically reverts to the Main screen, or select Cancel.

SOFTWARE VERSIONS SCREEN

The software versions screen allows the user to view the version of various software modules installed in the receiver. To view the software versions, use the following procedure.

1. From the Main screen, press the switch to display the Options menu. Ensure that Configure is highlighted. Press the switch.

Options Menu

2. Ensure the Configure menu is displayed. Turn the switch until S/W Versions is highlighted, then press the switch.

Configure Menu

3. Check the Software Versions screen is displayed. Select Boot, Flash, or Fills and press the switch to display the installed version. The example shows the Boot software.

Software Versions Screen

4. Select OK, then press the switch to return to the Software Versions screen. View the other software modules as required.

Boot Version Screen