

VHF/AM MOBILE TRANSCEIVER MODEL TiL-90-6R

**7 WATT MOBILE SYSTEM NO 860605
(TMS-100)**

Installation and Operating Instructions

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SECTION 1

GENERAL DESCRIPTION

1.1 INTRODUCTION

VHF/AM Mobile Transceiver System 860605 (TMS-100), manufactured by Technisonic Industries Limited, is a low power VHF/AM Transceiver, complete with Mounting Bracket, Power Input Cable, Microphone and Antenna.

1.1.1 PURPOSE OF THE SYSTEM

- (1) Intended Purpose and Use - The system is intended for installation in airport service vehicles, such as cars, snowploughs, and grass cutters, to allow ground control over such vehicles while they are negotiating aircraft manoeuvring areas.
- (2) Brief Description of System Units - VHF/AM Mobile Transceiver System 860605 (TMS-100) consists of the following items:

- (a) Transceiver Model 90-6R, Part Number 861605-2, Series 1, is a low power VHF/AM transceiver which operates in simplex on six pre-programmable frequency synthesized channels, with 25kHz channel spacing in the frequency range of 117.975MHz to 138.000MHz. The transceiver operates from a 12 volts dc nominal vehicle power supply (negative ground only). An optional extra cost dc to dc convertor P/N 863118-1 can be installed in the transceiver to allow operation from an input supply from 10.8 to 30.0 Vdc. A general view of the transceiver is given in Figure 1-1. The transceiver is normally located under the dashboard of a vehicle using a mounting bracket and mounting hardware.
- (b) Mounting Bracket, Part Number 913053-1, is a U-shaped aluminum alloy bracket which, together with items of hardware included in Mounting Hardware Kit P/N 869024-1, is used to mount the transceiver under the dashboard of a vehicle.

A view of the transceiver with mounting bracket is given in Figure 1-2.

- (c) Power Input Cable Assembly, Part Number 863701, is a three-metre length of two-core cable terminated at one end by a two-pin, female contacts, connector, which mates with the two-pin, male contacts, connector located at the left-rear of the transceiver. The unterminated end of the cable is connected to the 12Vdc vehicle power supply negative-ground during installation.

A view of the cable assembly is given in Figure 1-3.

- (d) Microphone Assembly, Part Number 961070-1, consists of a Microphone and a mounting bracket, P/N RK6MB.

A general view of the microphone assembly is given in Figure 1-4.

The microphone is a rugged hand-held microphone housed in a high impact plastic case which includes a rear case hang-up button for storage on the mounting bracket. The dynamic microphone is a noise cancelling type with a pre-amplifier, press-to-talk switch, and a retractable three-cord cable terminated by a three-pin male contacts, connector which mates with the MIC/PTT connector located on the front panel of the transceiver.

The microphone dc supply for the microphone is supplied by the transceiver. The mounting bracket, provided with the microphone, should be mounted in a convenient location near the transceiver. A small screwdriver which can be used for releasing the modular plug located in the microphone head is supplied with the microphone.

A replacement plug-in microphone cord, P/N 963299-1 is available for this microphone. This cord is supplied with a modular microphone plug on one end and a three-pin DIN connector on the other to mate with the Model 90-6R Transceiver.

- (e) Antenna Assembly, Part Number 861910-1, is supplied complete as a kit which includes the following items: Antenna Base, which includes a mounting pad, together with a pad, braid nut, sleeve and clamp for termination of the antenna RF cable. The Antenna Rod is supplied with an Allen Wrench for adjustment of its set screws. The Antenna RF Cable is a ten-metre length RG58/U coaxial cable terminated at one end by an UHF, male contact, connector which mates with the UHF, female contact, antenna connector located at the right-rear of the transceiver. The antenna may be mounted on any flat surface, roof, cowl, fender or rear deck of a vehicle, however, rooftop mounting is recommended for best performance. A general view of the antenna assembly is given in Figure 1-5.

1.1.2 MODES OF OPERATION

The transceiver may be operated in either of two modes; transmit or receive, as selected by the Press-to-Talk (PTT) switch on the microphone:

- (1) Transmit Mode - When the PTT switch on the microphone is depressed, the transceiver will operate in the transmit mode. The PTT signal line is grounded by the microphone switch via the microphone lead and the MIC/PTT connector to the transceiver. The Tx ON yellow LED will go ON, indicating that the transmitter is activated.

Transmission will occur on one of the six preset channel frequencies, determined by the setting of the CHANNEL SWITCH. The appropriate CHANNEL INDICATOR green LED 1, 2, 3, 4, 5 or 6, will be ON, indicating the channel selected.

- (2) Receive Mode - When the PTT switch on the microphone is released, the transceiver will operate in the receive mode. The Tx ON yellow LED will go OFF, indicating that the transmitter is de-activated. Reception on one of the six preset channel frequencies, as selected by the CHANNEL SWITCH will occur.

The appropriate CHANNEL INDICATOR green LED 1, 2, 3, 4, 5, or 6, will be ON, indicating the channel selected. The setting of the SQUELCH CONTROL determines the squelch threshold level. When the SQUELCH CONTROL is adjusted in the counter- clockwise direction, the SQUELCH INDICATOR green LED will go ON, indicating that the squelch circuit is connecting the demodulated audio to the VOLUME CONTROL. The setting of the VOLUME CONTROL determines the audio level produced from the internal loudspeaker. When the VOLUME CONTROL is adjusted in the clockwise direction, the audio level will increase.

NOTE:

In certain installations, either an external loudspeaker or headphone may be fitted and connected to the SPEAKER/PHONE jack of the transceiver.

When the connector of the external loudspeaker or headphone is connected to the transceiver SPEAKER/PHONE jack, the internal loudspeaker is disconnected and the VOLUME CONTROL will control the audio level applied to the external loudspeaker or headphone, as applicable.

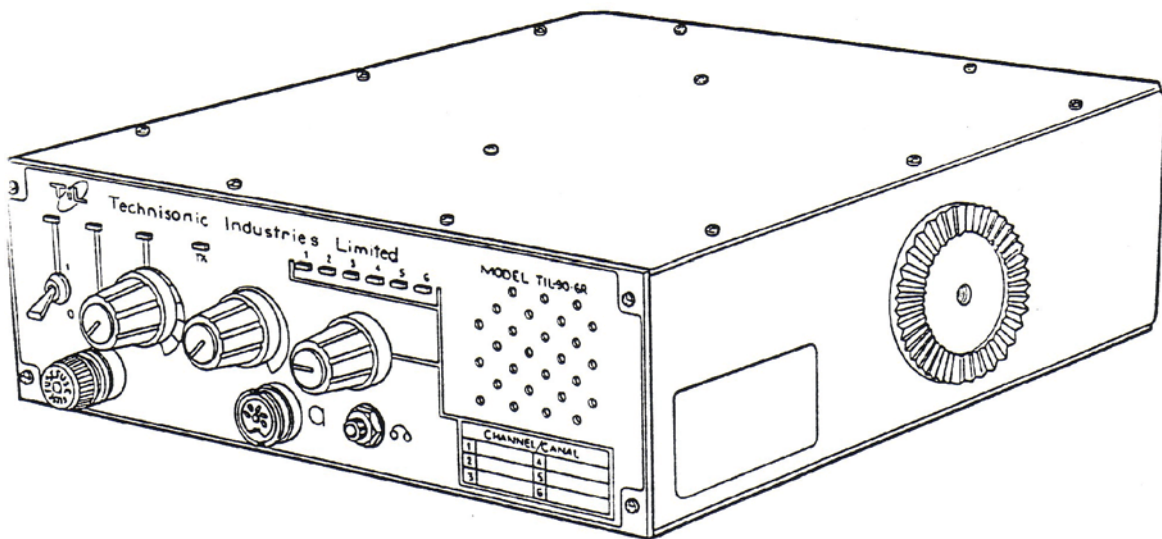


Figure 1-1 Transceiver - General View

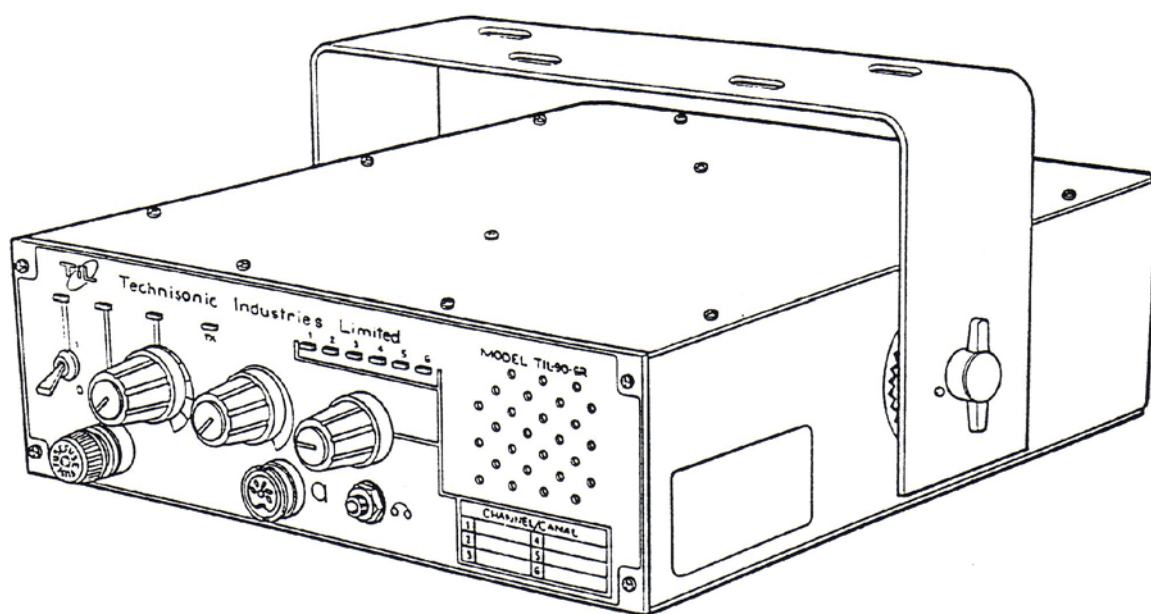


Figure 1-2 Transceiver with Mounting Bracket - General View

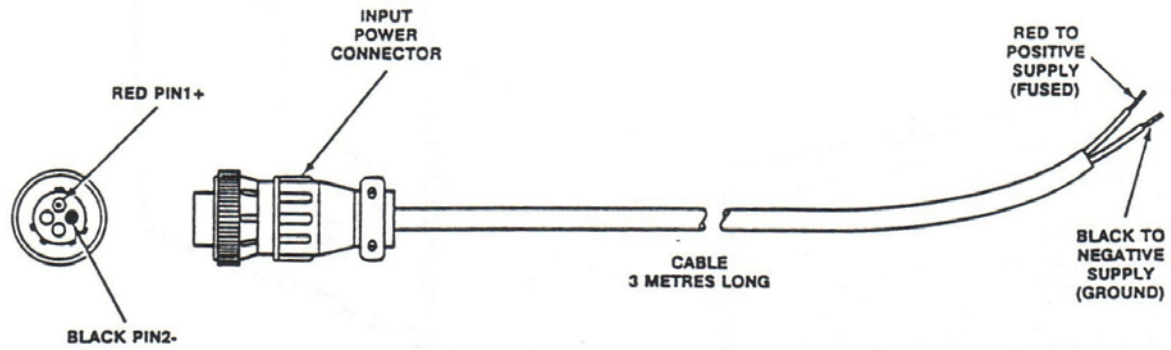


Figure 1-3 Power Input Cable Assembly - General View

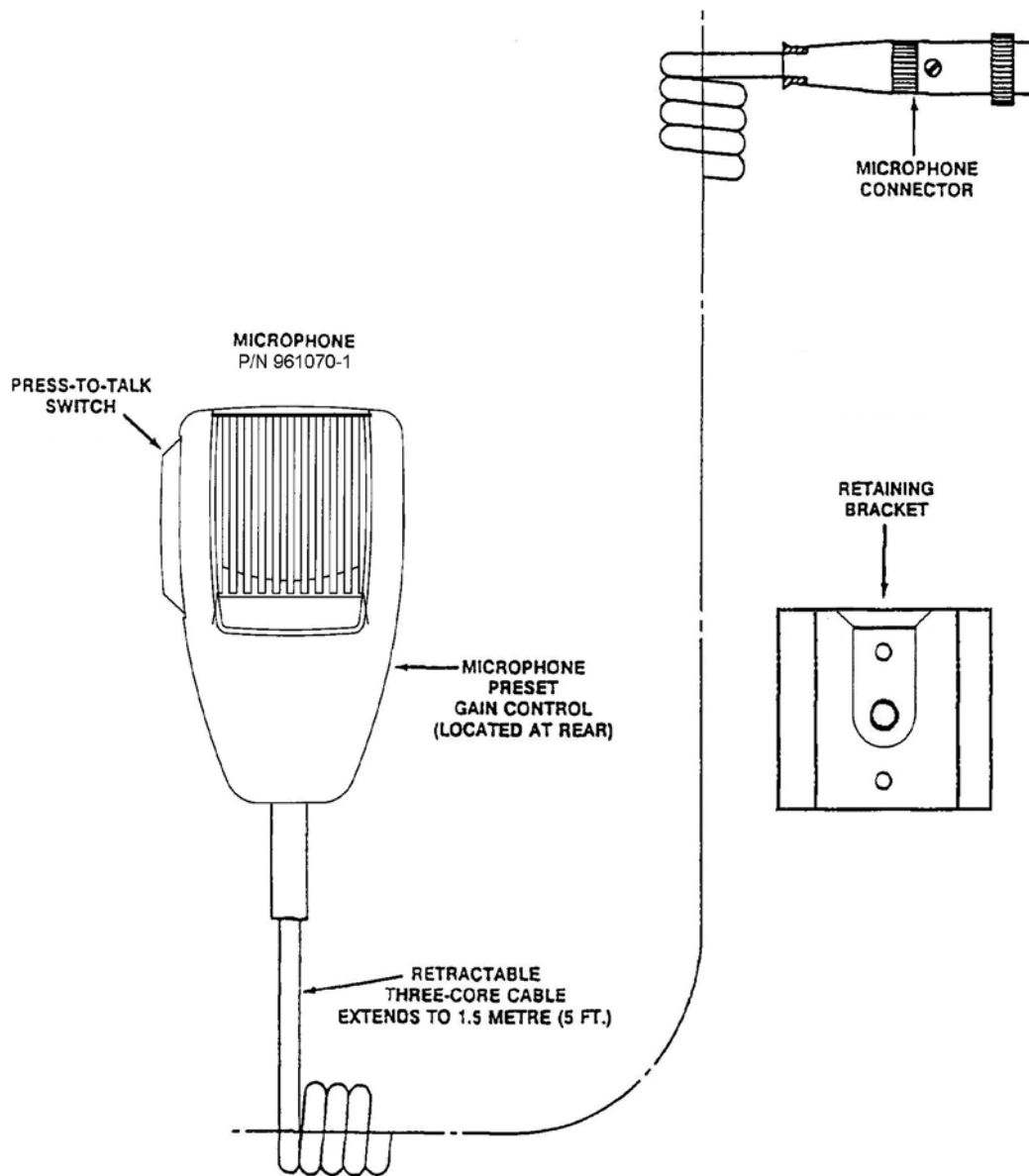


Figure 1-4 Microphone Assembly - General View

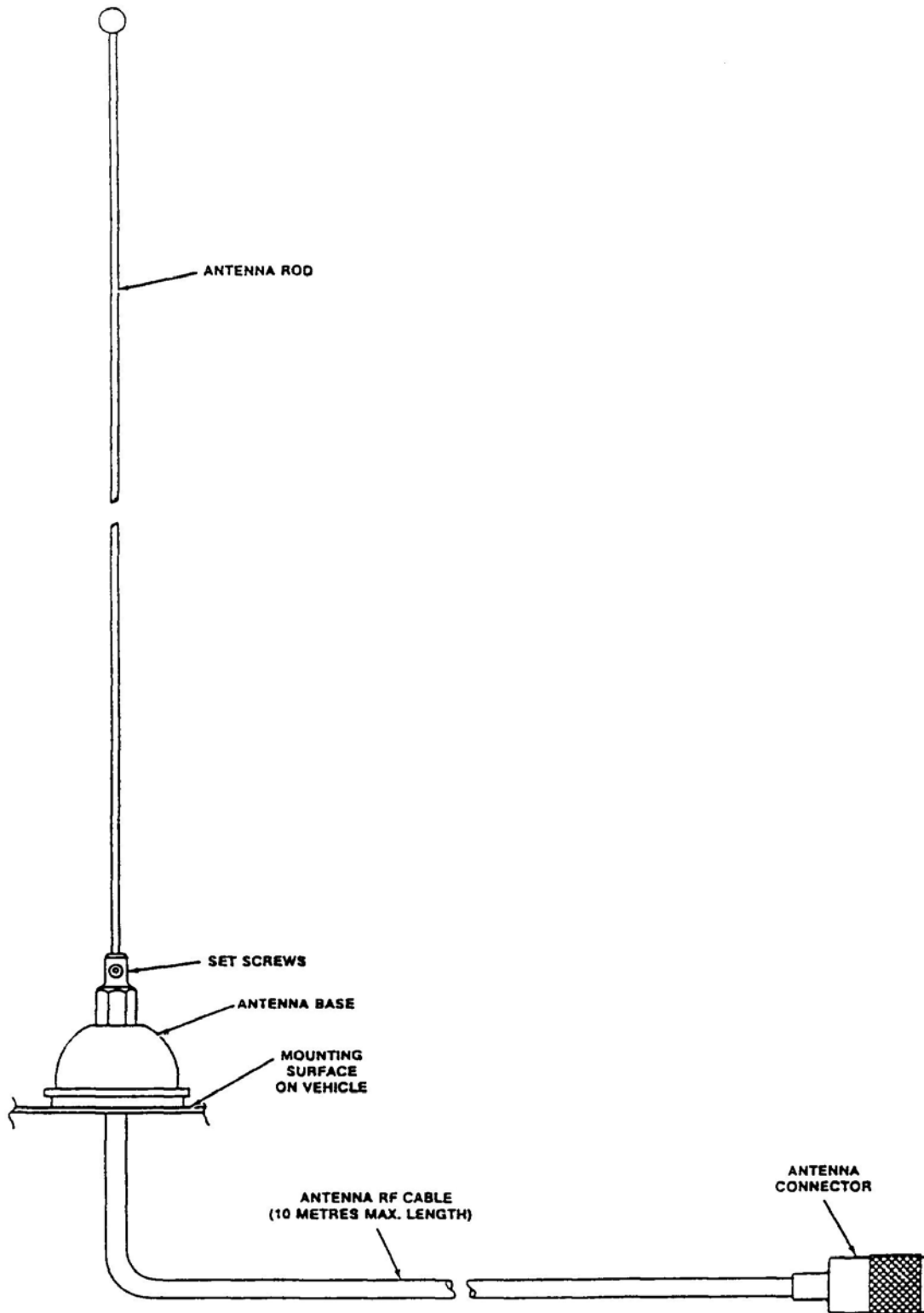


Figure 1-5 Antenna Assembly - General View

1.2 TECHNICAL SUMMARY

A summary of the relevant electrical, operational, mechanical and physical characteristics of the transceiver are given in Table 1-1, Leading Particulars.

TABLE 1-1 LEADING PARTICULARS	
TRANSCEIVER MODEL 90-6R:	
Power Source Requirements:	
DC Voltage (Negative Ground).....	13.75Vdc Nominal
Input Current:	
Transmit Mode.....	5.0A maximum
Receive Mode.....	1.5A maximum
Frequency Range.	117.975MHz to 138.000MHz
Channel Spacing:	
Narrowband (Normal).....	25kHz
Frequency Selection.....	Six Preset Channels
Duty Cycle.....	One Minute Transmit/Four Minutes Receive
TRANSMITTER CHARACTERISTICS:	
Power Output.....	.5 to 10 Watts
Output Power Stability After One Minute.....	±1 Watt
VSWR	4:1
Carrier Stability (-40EC to +55EC).....	±1,000Hz maximum
Incidental FM and PM Due to Modulation.....	±100Hz max.
Rise Time to 90% of Rated Power.....	100milliseconds max.
Audio Input	50millivolts to 2Vrms
Speech Processor Dynamic Range.....	35dB minimum
Modulation Capability	Up to 95%
Audio Distortion (with 90% modulation).....	10% maximum
Audio Frequency Response.....	300Hz to 2,500Hz, +1-3dB
Spurious Emissions	60dB below carrier
Hum and Noise Level.....	45dB below modulated carrier
RECEIVER CHARACTERISTICS:	
RF Input Circuit:	50-ohms unbalanced, VSWR 2:1 maximum
Sensitivity (12dB SINAD) 1kHz, 30% modulation.....	2microvolts
Selectivity, 25kHz Channel Spacing:	
Bandwidth at 6dB Points.....	More than 15kHz
Bandwidth at 60dB Points.....	Less than 40kHz
Adjacent Channel Selectivity.....	At least 80dB
Pass Band Symmetry.....	15% maximum
IF Band Pass Ripple Between -6dB Points.....	2dB maximum
Spurious Response Attenuation.....	At least 90dB
Frequency Stability (-40EC to +55EC).....	±1,000Hz max.
AGC Characteristics With RF Input Signal	
5 microvolts to 1 volt.....	Audio Level: ±3dB

TABLE 1-1 LEADING PARTICULARS (CONTINUED)

RECEIVER CHARACTERISTICS (Continued)

Intermodulation: Levels of Interference Signals Are Shown To Produce Resulting SINAD of Not Less Than 6dB:

Ultimate Sensitivity (12dB) SINAD).....	67dB
30microvolts, Input Signal.....	45dB
300microvolts, Input Signal.....	30dB
Unwanted Radiation.....	Less Than 80microvolts into 50-ohms
Hum and Noise With 1mV RF Signal, 30% modulation at 1kHz:	
Ratio of Rx Audio Output to Residual Output with 0% modulation.....	At least 40dB
Interference Suppression.....	SINAD 6dB minimum
Audio Output Power and Distortion:	
Loudspeaker Output.....	At least 3 Watts
Speaker Phone Output.....	100mW into 600-ohms
Distortion with RF Input, 1mV, 30% modulation.....	Less than 5%
Distortion with RF Input, 1mV, 90% modulation.....	Less than 10%
Audio Output Limiting.....	Less than 1dB, 30 to 100% modulation
Audio Frequency Response 300Hz to 2,500Hz.....	+1-3dB Audio
Acquisition Time.....	Within 100milliseconds
Audio Squelch Characteristic:	
Squelch Type.....	Carrier Operated
Carrier Operated Squelch.....	Adjustable from 2 to 15microvolts

ENVIRONMENTAL AND SERVICE CONDITIONS:

Operating Temperature Range:

Full Performance..... -40EC(-40EF) to +55EC(+131EF)

Slightly Degraded Performance..... -41EC(-41.8EF) to -55EC(-67EF)

Storage Temperature Range..... -55EC(-67EF) to +65EC(+149EF)

Ambient Relative Humidity..... Up to 100%

SECTION 2

CHANNEL FREQUENCY SELECTION AND INSTALLATION

2.1 INTRODUCTION

Transceiver Model 90-6R, Part Number 861605-2 as shipped from the plant, has Channel 1 operating frequency preprogrammed at 121.9000MHz. Other channels are not preprogrammed. Before programming any other frequencies, perform an operational check, on Channel 1 at 121.9000MHz, as outlined in paragraph 2.6. If there is any operational deficiency or equipment malfunction, the transceiver is to be returned to the manufacturer Technisonic Industries Limited, under warranty. Before installation in a vehicle, it is necessary to pre-program the operating frequency for each channel to be used at the particular airport.

2.2 FREQUENCY RANGE

The transceiver may be programmed for up to six frequencies over the frequency range 117.9750MHz to 138.000MHz with 25kHz channel spacing.

2.3 PREPARATION

Frequency Set-Memory Module A5 must be removed from the transceiver to allow frequency preprogramming as follows:

- (1) Place the transceiver on a bench with the top cover of the transceiver located on the bench and the bottom cover exposed.
- (2) Remove and retain twelve Philips Pan Hd Screws 4-40 X 1/4in. lg and No.4 Lockwashers securing the bottom cover to the main chassis of the transceiver.
- (3) Remove and retain the bottom cover.

NOTE:

A folded ribbon cable is laid across the Frequency Set Memory Module A5. Carefully move this cable to one side while handling the Frequency Set-Memory Module A5.

- (4) Remove and retain four Philips Pan Hd Screws 4-40 X 1/4in. lg and No.4 Lock washers securing the Frequency Set-Memory Module A5.
- (5) Gently pull, with a rocking action, the Frequency Set-Memory Module A5 in an upwards direction until its male pin connector A5J1 is disengaged from its mating connector A2J2 on Audio Synthesizer Module A2.

Remove Module A5 from the transceiver.

2.4 PREPROGRAMMING OF CHANNEL FREQUENCIES

Determine the number of channels to be used and the specific frequency of each channel for the particular transceiver being worked on. Prepare a list of channel number and frequencies to be preprogrammed, then proceed as follows:

2.4.1 FREQUENCY SELECTION MHz

Having ascertained the desired operating frequency for a particular channel, refer to Table 2-1 Frequency Selection MHz.

Using the OPERATING FREQUENCY (MHz) column, find the desired frequency in MHz. Cross-refer to the DIODE LOCATION column, and record the locations in which diodes are to be installed, as indicated by a "1" entry.

2.4.2 FREQUENCY SELECTION kHz

When the desired operating frequency includes kHz, refer to Table 2-2, Frequency Selection kHz.

Using the OPERATING FREQUENCY kHz column, find the portion of the desired frequency in kHz. Cross-refer to the DIODE LOCATION column, and record the locations in which diodes are to be installed, as indicated by a "1" entry.

Note:

Channel 1 operating frequency is already preprogrammed for 121.9000MHz. It will be necessary to remove existing diodes if changing Channel 1 from 121.9000MHz.

2.4.3 INSTALLATION OF DIODES

Using the required number of diodes as determined during FREQUENCY SELECTION MHz and FREQUENCY SELECTION kHz, install each diode in its applicable location CR1 through CR72 for each channel to be used.

Ensure that each diode is installed using correct polarity, as shown in Figure 2-1, using Multicore Solder SN63, 1mm, or equivalent, and appropriate soldering iron. Trim leads on underside of printed wiring board and remove solder flux residue.

TABLE 2-1 FREQUENCY SELECTION MHz						
OPERATING FREQUENCY (MHz)	DIODE LOCATION					
	20 Mhz	10 MHz	8 MHz	4 MHz	2 MHz	1 MHz
117	0	1	0	1	1	1
118	0	1	1	0	0	0
119	0	1	1	0	0	1
120	1	0	0	0	0	0
121	1	0	0	0	0	1
122	1	0	0	0	1	0
123	1	0	0	0	1	1
124	1	0	0	1	0	0
125	1	0	0	1	0	1
126	1	0	0	1	1	0
127	1	0	0	1	1	1
128	1	0	1	0	0	0
129	1	0	1	0	0	1
130	1	1	0	0	0	0
131	1	1	0	0	0	1
132	1	1	0	0	1	0
133	1	1	0	0	1	1
134	1	1	0	1	0	0
135	1	1	0	1	0	1
136	1	1	0	1	1	0
137	1	1	0	1	1	1
138	1	1	0	0	0	0

LEGEND: 0 = NO DIODE REQUIRED
 1 = DIODE TO BE INSTALLED

TABLE 2-2 FREQUENCY SELECTION KHz						
OPERATING FREQUENCY (KHz)	DIODE LOCATION					
	800 KHz	400 KHz	200 KHz	100 KHz	50 KHz	25 KHz
000	0	0	0	0	0	0
025	0	0	0	0	0	1
050	0	0	0	0	1	0
075	0	0	0	0	1	1
100	0	0	0	1	0	0
125	0	0	0	1	0	1
150	0	0	0	1	1	0
175	0	0	0	1	1	1
200	0	0	1	0	0	0
225	0	0	1	0	0	1
250	0	0	1	0	1	0
275	0	0	1	0	1	1
300	0	0	1	1	0	0
325	0	0	1	1	0	1
350	0	0	1	1	1	0
375	0	0	1	1	1	1
400	0	1	0	0	0	0
425	0	1	0	0	0	1
450	0	1	0	0	1	0
475	0	1	0	0	1	1
500	0	1	0	1	0	0
525	0	1	0	1	0	1
550	0	1	0	1	1	0
575	0	1	0	1	1	1
600	0	1	1	0	0	0
625	0	1	1	0	0	1
650	0	1	1	0	1	0
675	0	1	1	0	1	1
700	0	1	1	1	0	0
725	0	1	1	1	0	1
750	0	1	1	1	1	0
775	0	1	1	1	1	1
800	1	0	0	0	0	0
825	1	0	0	0	0	1
850	1	0	0	0	1	0
875	1	0	0	0	1	1
900	1	0	0	1	0	0
925	1	0	0	1	0	1
950	1	0	0	1	1	0
975	1	0	0	1	1	1

LEGEND: 0 = NO DIODE REQUIRED
1 = DIODE TO BE INSTALLED

2.5 INSTALLATION OF MODULE A5

After frequency selection has been completed, Frequency Set-Memory Module A5 shall be installed in the transceiver as follows:

- (1) Locate Frequency Set-Memory Module A5 in position, engaging its male pin connector A5J1 into its mating connector A2J2 on Audio Synthesizer Module A2. Gently push Module A5 downwards until it is correctly located.
- (2) Secure Module A5 using four Screws and Lockwashers retained during disassembly. Tighten Screws. Reposition the folded ribbon cable across the module.
- (3) Install the bottom cover on the main chassis of the transceiver utilizing Screws and Lockwashers retained during disassembly. Tighten Screws.
- (4) On the front panel label of the transceiver, mark the channel designation label with the appropriate frequency against each channel preprogrammed.

2.6 OPERATIONAL CHECK

Connect the transceiver to a test bench, and perform an operational check of the transceiver in both transmit and receive modes of operation, checking each channel in use.

2.7 INSTALLATION - INTRODUCTION

This section gives the basic installation information for units of VHF/AM Mobile Transceiver System 860605 in a typical airport service vehicle. As there are many types of vehicles in use, some may require "tailor made" installation information.

2.8 TRANSCEIVER LOCATION

The first consideration when planning an installation in a vehicle is the location of the transceiver. The transceiver is normally located under the dashboard of a vehicle with the transceiver supported under the mounting bracket, as shown in Figure 1-2. Where space under the dashboard is limited, the transceiver could be supported above the mounting bracket, the reverse of Figure 1-2.

Consideration should also be given to allowing sufficient space behind the transceiver for the length of the antenna connector and the power supply connector when they are mated to the transceiver connectors.

2.9 VEHICLE POWER SUPPLY

Having determined the location of the transceiver, the point of connection to the vehicle power supply may be chosen. The transceiver will operate from a 12 or 24 volts dc nominal power supply with negative ground, which must be taken from a fused power source with a minimum of 5-ampere fuse in circuit. The transceiver will tolerate an input voltage over the range 11.0 to 15.0 Vdc.

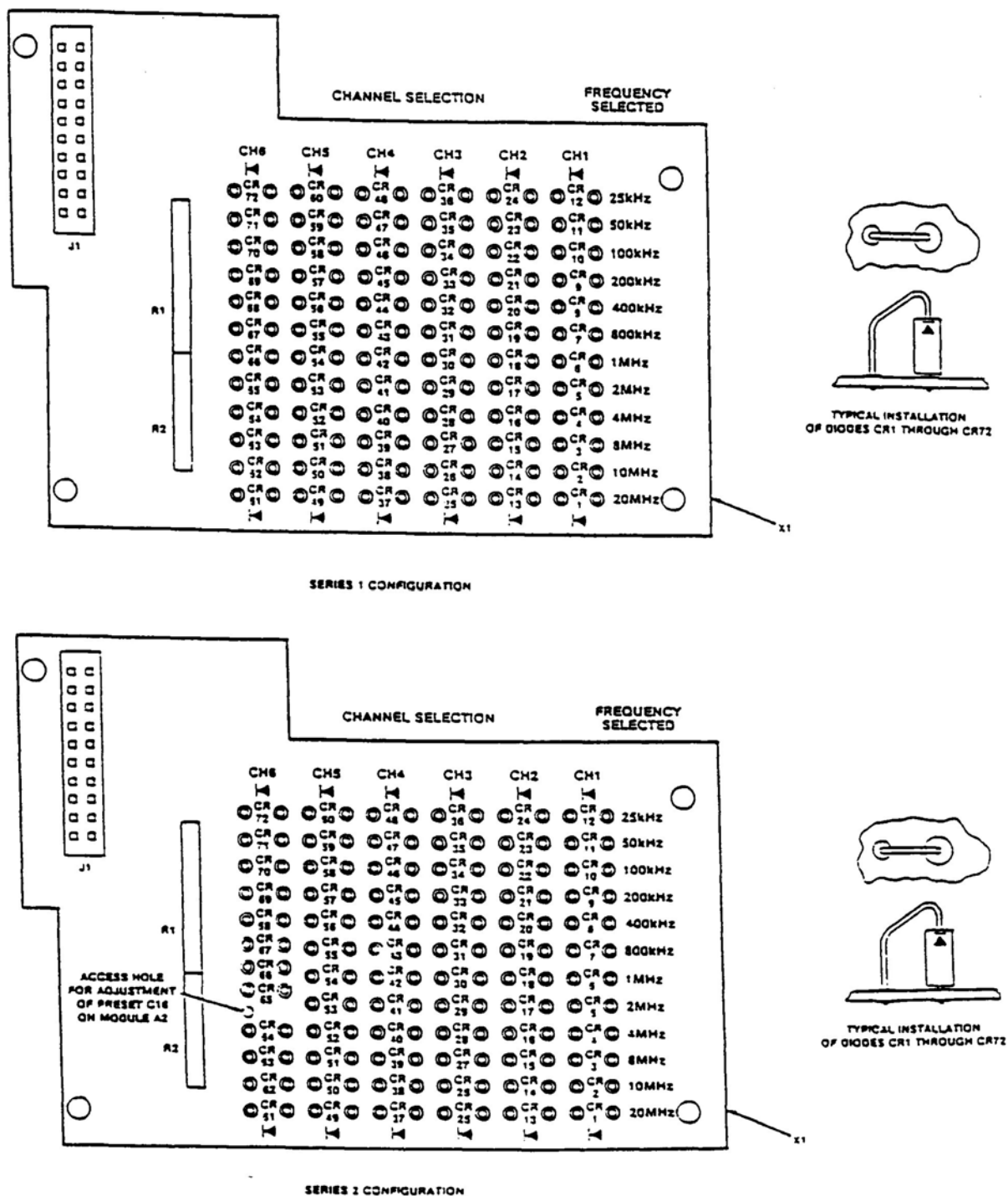


Figure 2-1 Frequency Set-Memory Module A5 - Component Layout

2.10 POWER INPUT CABLE ASSEMBLY

Using Power Input Cable Assembly, Part Number 863701, as shown in Figure 1-3, route the unterminated end of the cable from the transceiver location to the point of connection to the fused vehicle power supply. The three-metre cable may be cut to length as required. Coiling of excess cable is NOT recommended. Strip the outer covering from the end of the cable, prepare the individual wire ends, and fit suitable terminals. Connect the red wire to the positive supply (fused), and connect the black wire to the negative supply ground.

2.11 ANTENNA ASSEMBLY

Antenna Assembly, Part Number 861910-1, is supplied as a kit which includes an installation leaflet. The antenna is shown assembled in Figure 1-5.

2.12.1 ANTENNA LOCATION

The antenna location is a very important factor in determining the performance of the system. The antenna may be mounted on any flat surface, roof, cowl, fender or rear deck of the vehicle, however, rooftop mounting is recommended for best performance.

2.12.2 ANTENNA INSTALLATION

Having determined the location of the antenna, route the unterminated end of the antenna RF cable from the transceiver location. Using the antenna installation leaflet, follow the step-by-step instructions, and install the antenna. Any excess length of antenna RF cable should be cut-off before connection to the antenna.

2.13 MOUNTING BRACKET INSTALLATION

Mounting Bracket, Part Number 863801-1, should be installed in the transceiver location using Qty 4 Screws, Self-Tapping, Hex Hd with slot and shoulder No. 12 x 3/4in. included in Mounting Hardware Kit, Part Number 869024-1. Refer to Figure 1-2 for a view of the transceiver with mounting bracket.

Using the mounting bracket as a template; on the mounting surface, mark the centre of each of the four slotted mounting holes, and drill a pilot hole using a No. 19 drill or equivalent (actual pilot hole size depends on the thickness of metal of mounting surface). Locate mounting bracket in position, and secure using the screws provided.

2.14 TRANSCEIVER INSTALLATION

Locate the transceiver in its approximate position, connect the antenna connector, and power cable connector to the appropriate connectors located at the rear of the transceiver.

Locate the transceiver into mounting bracket, and screw to bracket using two wing screws and nylon washers included in Mounting Hardware Kit, Part Number 869024-1. Adjust angle of transceiver as required, before tightening the two wing screws.

2.15 MICROPHONE INSTALLATION

Refer to Figure 1-4 for a general view of the microphone and retaining bracket. Determine a suitable and convenient location for Retaining Bracket and secure it using appropriate hardware (not provided). Connect the connector of Microphone, Part Number 961070-1 to the MIC/PTT connector located on the front panel of the transceiver.

2.16 OPTIONAL EXTERNAL LOUDSPEAKER OR HEADPHONE

Provision is made for connection of either an external loudspeaker or headphone to the SPEAKER/PHONE jack of the transceiver, as shown in Figure 4-1.

2.16.1 EXTERNAL LOUDSPEAKER

When an external loudspeaker is to be installed, an 8-ohm nominal impedance loudspeaker should be used. The loudspeaker cable should be terminated by a 1/4 in., 3-pole telephone plug (male), with the loudspeaker connected between tip and sleeve (ground). The External loudspeaker connector should be connected to the SPEAKER/PHONE jack located on the front panel of the transceiver. When the external loudspeaker connector is connected to the transceiver SPEAKER/PHONE jack, the internal loudspeaker is automatically disconnected.

2.16.2 HEADSET

When a headset is to be used, the headset impedance should be 150- to 600-ohms. The headset cable must be terminated by a 1/4in., 3-pole telephone plug (male), which mates with the SPEAKER/PHONE jack located on the front panel of the transceiver. When connected, the internal loudspeaker is automatically disconnected. The headset may be connected as detailed in (1) for receiver audio with no transmit sidetone audio.,or (2) for receiver audio with transmit sidetone audio.

(1) HEADSET WITH NO TRANSMIT SIDETONE AUDIO

When receiver audio only with no transmit sidetone audio is required, the headset should be connected between the tip and sleeve (ground) of the telephone plug.

(2) HEADSET WITH SIDETONE AUDIO

When receiver audio with transmit sidetone is required, the headset should be connected between the tip and sleeve (ground) with a resistor (located inside the plug) connected between the tip and ring of the telephone plug. The function of the resistor is to reduce the transmit sidetone audio level to a suitable listening level. The value of the resistor is determined by the headset impedance and desired listening level. When a 600-ohm impedance headset is used, the value of the resistor should be approximately 10 kilohms. For headsets with lower impedance the resistor value may be different but must not be less than 240-ohms.

2.17 OPERATIONAL CHECK

Perform an operational check of the transceiver, checking each channel in use in both the transmit and receive modes of operation, using the Operating instructions given in Section 3 of this document and the appropriate specified operating procedures during transmission.

SECTION 3

OPERATING INSTRUCTIONS

3.1 INTRODUCTION

This section includes a functional description of each switch, control, indicator and connector located on the front panel of the transceiver, together with the PRESS-TO-TALK switch included on the microphone, together with operating instructions.

3.2 OPERATOR'S SWITCHES, CONTROLS AND INDICATORS

A view of the transceiver front panel is given in Figure 3-1. Front panel controls are identified by pictograms. Each pictogram shows the function performed by the control. These pictograms are translated into words by the annotations of the illustration.

A functional description of each of the operator's switches, controls and indicators, together with the microphone PRESS-TO-TALK switch, is given in Table 3-1, Operator's Switches, Controls and Indicators.

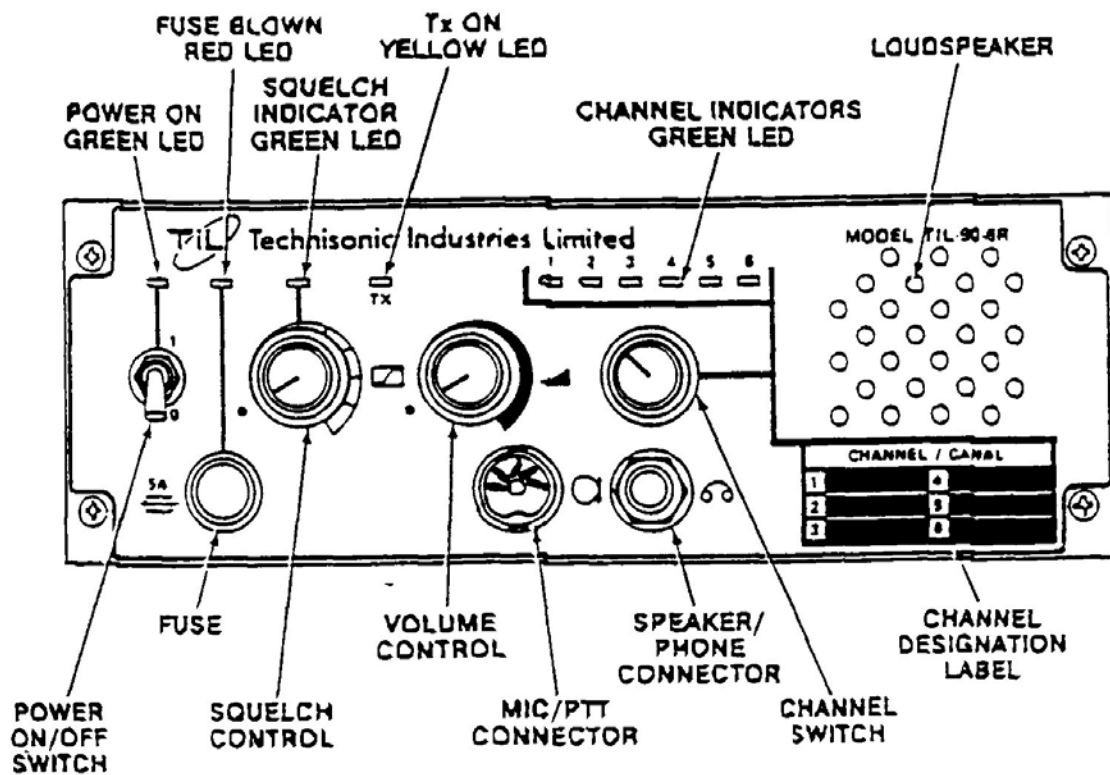


Figure 3-1 Transceiver Front Panel Layout

TABLE 3-1 OPERATOR'S SWITCHES, CONTROLS AND INDICATORS	
SWITCHES, CONTROLS AND INDICATORS	FUNCTIONAL DESCRIPTION
POWER ON/OFF SWITCH	<p>A two-position toggle switch which controls the application of the 12 volts nominal power supply to the transceiver.</p> <p>Position 1, toggle UP, the transceiver is switched ON.</p> <p>Position 0, toggle DOWN, the transceiver is switched OFF.</p>
POWER ON LED INDICATOR	A green LED which is ON when the POWER ON/OFF switch is set to Position 1, and the vehicle power supply is applied to the transceiver.
FUSE	A 5-ampere fuse which protects the 12/24 volts nominal power supply line. As part of reverse polarity protection, the fuse will "blow" when polarity of the vehicle supply line is reversed.
FUSE BLOWN RED LED INDICATOR	A red LED which is ON when the 5-ampere fuse is "blown", and the vehicle power supply is applied to the transceiver.
SQUELCH CONTROL	A linear potentiometer, which is operative when the transceiver is operated in the receive mode, determines the squelch threshold level. When the SQUELCH CONTROL is adjusted in the counter-clockwise direction, the SQUELCH green LED indicator will go ON, indicating that the squelch circuit is connecting the demodulated audio to the VOLUME control.
SQUELCH INDICATOR GREEN LED	A green LED which is ON when the squelch circuit is connecting the demodulated audio to the VOLUME control.
Tx ON YELLOW LED INDICATOR	A yellow LED which is ON when the microphone PRESS-TO-TALK (PTT) switch is depressed, and the transceiver is operated in the transmit mode. When the microphone PTT switch is released, the Tx ON yellow LED goes OFF, and the transceiver is operated in the receive mode.
VOLUME CONTROL	<p>A logarithmic potentiometer, which is operative when the transceiver is in the receive mode, determines the audio level applied to the internal loudspeaker.</p> <p>When the SPEAKER/PHONE connector is in use the VOLUME CONTROL determines the audio level applied to the external loudspeaker or headphone, as appropriate, and the internal loudspeaker is disconnected.</p>

TABLE 3-1 OPERATOR'S SWITCHES, CONTROLS AND INDICATORS (Continued)	
SWITCHES, CONTROLS AND INDICATORS	FUNCTIONAL DESCRIPTION
MIC/PTT CONNECTOR	<p>A 5-pin connector which performs two functions, one as the microphone/PTT connector, secondly as a test connector.</p> <p>(1) It accepts the 3-pin connector of the microphone carrying the following:</p> <p>Pin 1 - PTT Signal Line Pin 2 - Microphone Signal Ground Pin 3 - Microphone Signal and Microphone DC Supply Line</p> <p>(2) It accepts a 5-pin test connector, for use during bench testing. The additional pins provide the following test points:</p> <p>Pin 4 - AGC test voltage Pin 5 - Squelch test voltage</p>
MICROPHONE PRESS-TO-TALK SWITCH	<p>When connected via the MIC/PTT CONNECTOR to the transceiver, the PRESS-TO-TALK (PTT) switch determines the operating mode of the transceiver.</p> <p>When the PTT switch is depressed, the transceiver will operate in the transmit mode.</p> <p>When the PTT switch is release, the transceiver will operate in the receive mode.</p>
CHANNEL SWITCH	A 6-position rotary switch which is used in both the transmit and receive modes to determine which one of the 6 preselected channels is in use.
CHANNEL INDICATORS GREEN LED	Six green LED's identified 1 through 6. The appropriate LED goes ON, indicating which channel has been selected by the CHANNEL SWITCH.
CHANNEL DESIGNATION LABEL	The CHANNEL DESIGNATION LABEL is used to record the operating frequency that was preselected for each channel during frequency selection, performed before installation of the transceiver.
LOUDSPEAKER	<p>An 8-ohm internal loudspeaker, which is operative in the receive mode, reproduces the audio line output. The audio line is disconnected from the internal loudspeaker when the transceiver is operated in the transmit mode.</p> <p>The audio line is also disconnected from the internal loudspeaker when the SPEAKER/PHONE connector is in use.</p>

TABLE 3-1 OPERATOR'S SWITCHES, CONTROLS AND INDICATORS (Continued)	
SWITCHES, CONTROLS AND INDICATORS	FUNCTIONAL DESCRIPTION
SPEAKER/PHONE CONNECTOR	<p>A 3-pole connector which may be used in certain installations to provide interconnection to either an external loudspeaker or headphone.</p> <p>When used, the internal loudspeaker is disconnected, and the VOLUME control will control the audio level applied to the external loudspeaker or headphone, as applicable.</p>

3.3 PREPARATION FOR USE

To prepare the transceiver for use:

- (1) Remove the microphone from its mounting bracket, and ensure that the microphone connector is connected to the MIC/PTT connector of the transceiver.
- (2) Set the SQUELCH control in the fully counter-clockwise (CCW) position.
- (3) Set the VOLUME control in the 12 o'clock centre position.
- (4) Set the POWER ON/OFF switch to position 1, toggle-up "ON" position.
- (5) Verify that the FUSE BLOWN red LED is OFF.
- (6) Verify that the POWER ON green LED is ON.
- (7) Set the CHANNEL switch to the desired operating channel 1 through 6.
- (8) Verify that the appropriate CHANNEL INDICATOR green LED is ON.
- (9) Proceed to operation in the transmit mode, paragraph 3.4, or operation in the receive mode, paragraph 3.5, as appropriate.

3.4 OPERATION IN THE TRANSMIT MODE

To operate in the transceiver transmit mode, proceed as follows:

- (1) Hold the microphone in one hand, with the upper edge of the microphone as close as possible to the upper lip.

This technique is necessary because the noise cancelling feature of the microphone favours sound close to the microphone and discriminates against sounds only 1/2 inch (12.7mm) or more away from the microphone.

- (2) Depress and hold the PRESS-TO-TALK switch of the microphone during transmission.
- (3) Ensure that the Tx ON yellow LED is ON.
- (4) Speak slowly and distinctly into the microphone using specified operating procedures during transmission.
- (5) When the message is ended, release the PRESS-TO-TALK switch of the microphone.
- (6) The transceiver is now operating in the receive mode.
- (7) Verify that the Tx ON yellow LED is OFF.

3.5 OPERATION IN THE RECEIVE MODE

To operate the transceiver in the receive mode, proceed as follows:

- (1) Ensure that the PRESS-TO-TALK switch on the microphone is NOT depressed, and verify that the Tx ON yellow LED is OFF.
- (2) Verify that the CHANNEL switch is set to the desired operating channel 1 through 6, and verify that the appropriate CHANNEL INDICATOR green LED is ON.
- (3) Adjust the SQUELCH control to suit location reception conditions. When the SQUELCH control is rotated in the clockwise direction, the SQUELCH indicator green LED will go ON, indicating that the squelch circuit is connecting the demodulated audio output to the VOLUME control.

Further adjustment of the SQUELCH control determines the squelch setting.

- (4) The VOLUME control can then be adjusted in a clockwise direction to increase the audio level, or in a counter-clockwise direction to decrease the audio level which can be heard on the internal loudspeaker.

NOTE:

When an external loudspeaker or headset is connected to the SPEAKER/PHONE jack of the transceiver, the internal loudspeaker is automatically disconnected. The VOLUME control will now control the audio level applied to the external loudspeaker or headset, as applicable.

- (5) To change the operating channel, set the CHANNEL switch to the desired channel 1 through 6, and verify that the appropriate CHANNEL INDICATOR green LED is ON.

3.6 SWITCHING OFF

To switch off the transceiver:

- (1) Set the POWER ON/OFF switch to position 0, toggle down OFF position.
- (2) Verify that all indicator LED's on the front panel are OFF.