TDAM-1000

VHF AM TRANSCEIVER

Installation and Operating Instructions

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REVISION HISTORY
[15RE532]

REV	SECTION - PAGE -	DESCRIPTION	DATE	EDITED BY
N/C		Original Document Release.	8 Jan 2016	SM
A	All	Updated to final installation and operation for production release.	24 May 2018	SM
B	All	Updated for IC and FCC conformance.	22 June 2018	SM
C	V	Updated FCC Compliance notes	1 Nov 2018	SM

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NOTES

ESD CAUTION

This unit contains static sensitive devices. Wear a grounded wrist strap and/or conductive gloves when handling printed circuit boards.

FCC COMPLIANCE INFORMATION

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference and (2) this device must accept any interference received, including interference that may cause undesired operation.

WARNING: For compliance with FCC RF Exposure Requirements the mobile transmitter antenna installation shall comply with the following two conditions:

1. The transmitter antenna gain shall not exceed 3 dBi.
2. The transmitter antenna is required to be located outside of a vehicle and kept at a separation distance of 115 cm or more between the transmitter antenna of this device and persons during operation.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
—Reorient or relocate the receiving antenna.
—Increase the separation between the equipment and receiver.
—Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
—Consult the dealer or an experienced radio/TV technician for help.

WARNING AND DISCLAIMER

Changes or modifications not expressly approved by Technisonic Industries could void the user's authority to operate the equipment.

This manual is designed to provide information about the TDAM-1000. Every effort has been made to make this manual as complete and accurate as possible.

WARRANTY INFORMATION

The Model TDAM-1000 is under warranty for one year from date of purchase. Failed units caused by defective parts or workmanship should be returned to:

Technisonic Industries Limited
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SECTION 1: GENERAL DESCRIPTION

1.1 INTRODUCTION

This publication provides information on the installation and operation of the TDAM-1000 Transceiver.

1.2 DESCRIPTION

The TDAM-1000 VHF AM mobile transceiver (Product Marketing Name (PMN) TDAM-1000) operates in the aeronautical VHF AM band and is designed for ground vehicle installation.

1.3 SYSTEM COMPONENTS

The following components make up the system:

TDAM-1000 VHF AM Transceiver	151286-1
Microphone Assembly	181298-1
Mounting Bracket	169676
Mobile Antenna Assembly	181299-1
Power Cord	183043-1
Installation Kit	189729

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SECTION 2: INSTALLATION INSTRUCTIONS

2.1 GENERAL

This section contains information and instructions for the correct installation of the TDAM-1000 VHF AM transceiver.

2.2 EQUIPMENT PACKING LOG

Unpack the equipment and check for any damage that may have occurred during transit. Save the original shipping container for returns due to damage or warranty claims. Check that each item on the packing slip has been shipped in the container.

2.3 INSTALLATION

The TDAM-1000 is designed to be used in land mobile applications. A mounting bracket, hand microphone, power cable and antenna are supplied. The TDAM-1000 will operate on both standard 13.8 VDC or 28 VDC special purpose or military vehicle power without modification. The built in speaker is sufficient for most installations however a 7 watt external speaker output is supplied for high noise environments.

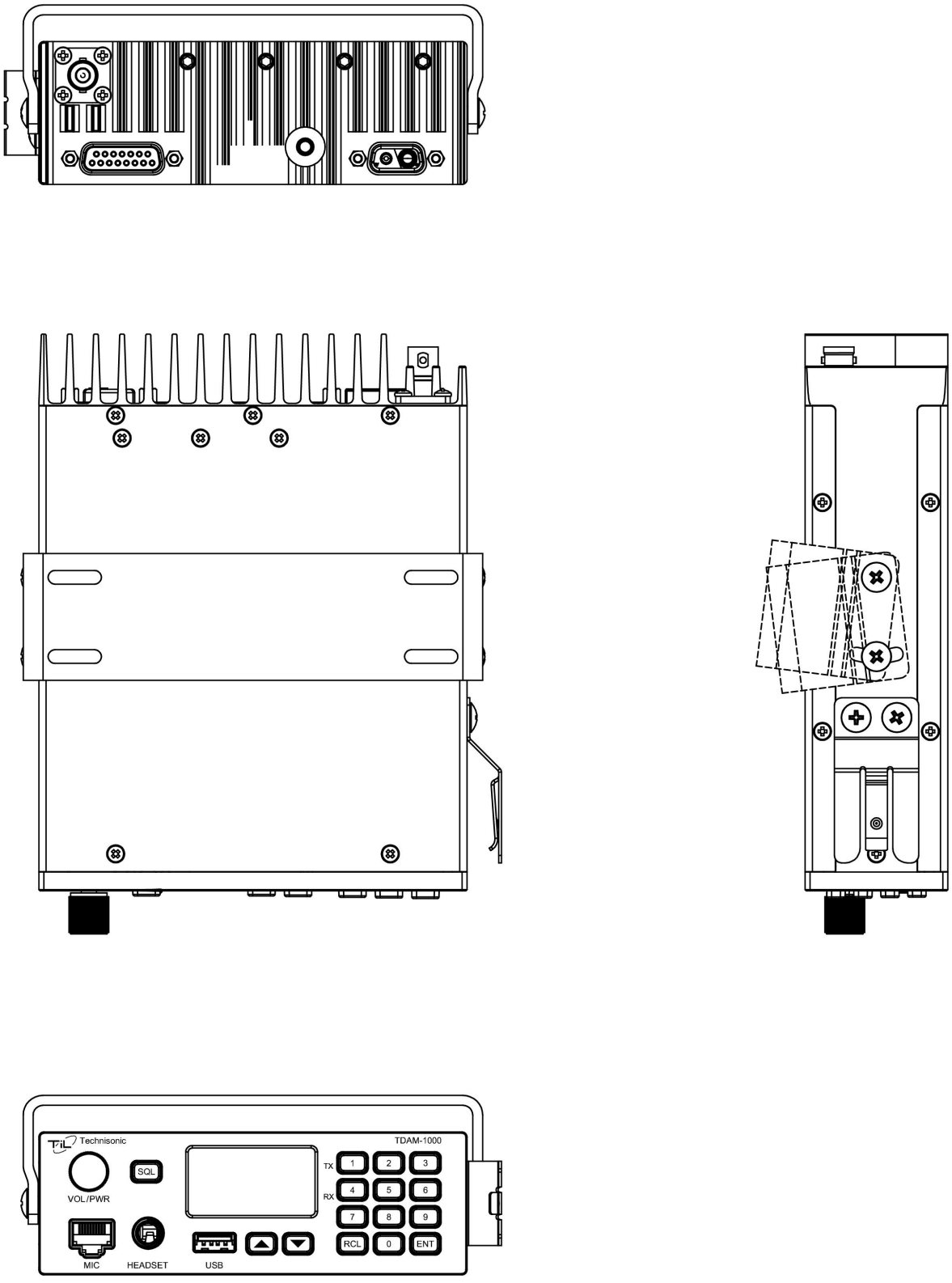


FIGURE 1 - Outline Drawing for Model TDAM-1000

2.4 INSTALLATION - CONNECTIONS

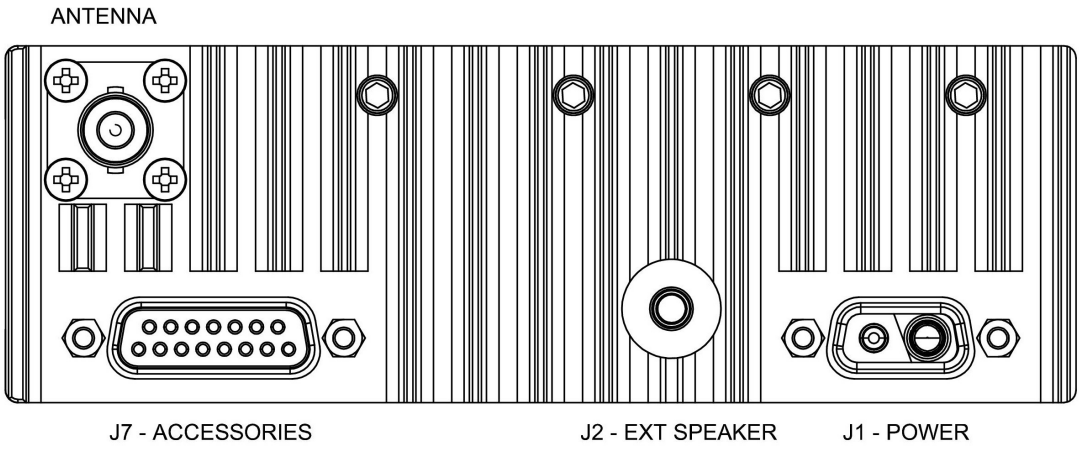


FIGURE 2 - Rear Connector View - TDAM-1000

J1 (2 Pin D Connections) - Use Plug	
Pin #	**Description**
1	Power
2	Ground

TABLE 1. Power Plug Connections

J7 (15 Pin D Connections) - Use MALE Connector	
Pin #	**Description**
1	Speaker +
2	Speaker -
3	Monitor Audio
4	Headset Audio
5	Cross Mute Out
6	Mic Audio
7	PTT
8	Ground
9	CAN Low
10	CAN High
11	Squelch
12	TX Data
13	RX Data
14	Cross Mute In
15	Ground

TABLE 2. Accessory Plug Connections

2.5 INSTALLATION - WIRING INSTRUCTIONS

For most installations, only the power connection and the antenna connection are required. However an installation of two TDAM-1000 transceivers can take advantage of the 'Cross Mute' feature available on the 15 pin D connector. The Cross Mute function will mute the other receiver whenever one of the radios is transmitting.

2.5.1 J1 PINS 1 AND 2 – MAIN POWER INPUT

Use supplied power cable to connect to vehicle accessory power source.

2.5.2 P1 PINS 1 AND 2 – SPEAKER OUTPUT

7 watt speaker output at 8 ohm impedance. The speaker output includes receive audio only. The Level is set by the volume control.

2.5.3 P1 PIN 3 – MONITOR AUDIO

Line level audio output receive and sidetone (mic) audio combined. Not affected by the volume control.

2.5.4 J1 PIN 4 – HEADSET AUDIO

0.5 watt 600 ohm audio output. Includes receive and sidetone (mic) audio. The level is set by the volume control.

2.5.5 P1 PIN 5 – CROSS MUTE OUTPUT

10 volt output during transmit and 0 volts during receive.

2.5.6 P1 PIN 6 – MIC AUDIO INPUT

Microphone audio input. Mic DC bias voltage is supplied.

2.5.7 P1 PIN 7 – PTT INPUT

Push to talk input. Radio will transmit when this line is brought to ground.

2.5.8 P1 PINS 8 AND 15 – GROUND

Ground. Connected to signal and chassis ground.

2.5.9 P1 PINS 9 AND 10 – CAN BUS INTERFACE

Do not connect.

2.5.10 P1 PIN 11 – SQUELCH OUTPUT

Squelch signal output. Open collector output which goes to ground when squelch is open.

2.5.11 P1 PINS 12 AND 13 – TX AND RX DATA

Serial RS-232 interface for base station applications. Do not connect.

2.5.12 P1 PIN 14 – CROSS MUTE INPUT

Receive audio will be muted on the speaker, headset and monitor outputs when this input is at 10 volts.

SECTION 3: OPERATING INSTRUCTIONS

3.1 GENERAL

This section contains information and instructions for the correct operation of the TDAM-1000 transceiver.

3.2 FEATURES

The TDAM-1000 supports the following features:

- 16 character LED alphanumeric display
- Backlit panel and keys
- USB port for loading and saving channel or configuration data.
- Continuous coverage from 117.975 to 138.000 MHz in 25 or 8.33 kHz steps.
- 100 programmable channels
- Split frequency pairs
- Transmit DTMF keypad
- Scanning of selected channels
- High and Low power

3.3 FRONT PANEL

Refer to figure 2 below:

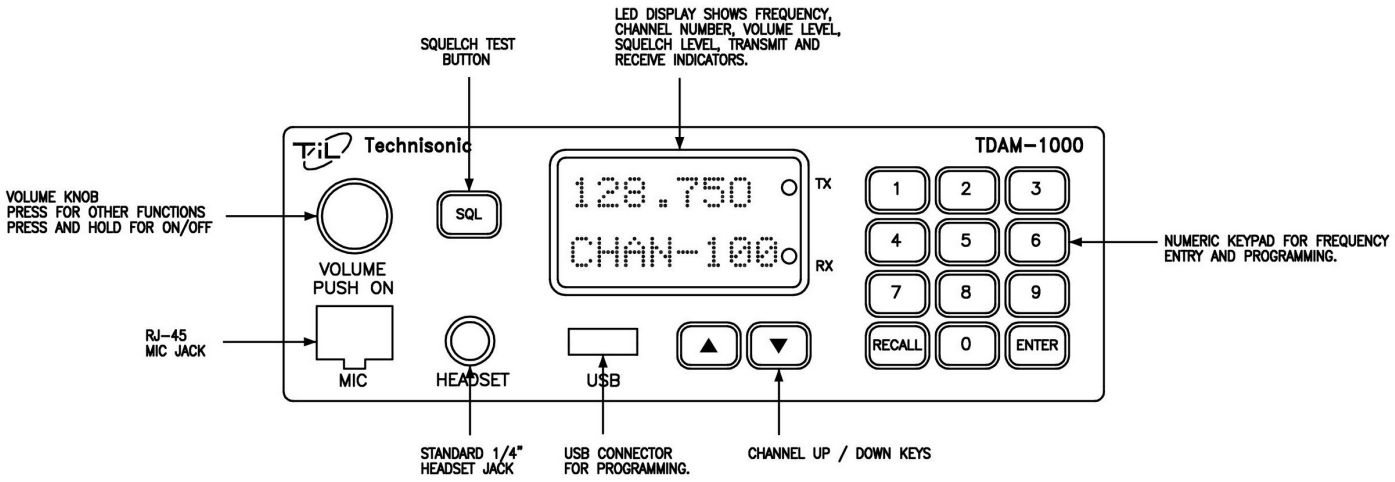


FIGURE 3. Front Panel Controls

3.3.1 VOLUME KNOB

The volume knob has a push button built in which is used to turn the radio on and off as well as select other functions for the knob. To turn on the radio, press and hold the knob until the display lights up. To turn off the radio, press and hold the knob for approximately 3 seconds until the display shows 'OFF'. Quick presses of the knob during normal operation will toggle the knob function between volume, channel, squelch and brightness modes. The default mode for the knob is volume when the radio is turned on.

3.3.2 SQUELCH BUTTON

The squelch function mutes the receiver when no signal is present so the operator does not listen to continuous receiver noise. When the knob is in squelch mode, it adjusts the muting threshold from fully open to a level where only a strong signal can be heard. Pressing the squelch button will temporarily open the squelch for as long as the button is pressed. When released, the knob is put into squelch mode for 3 seconds with the squelch level shown on the bottom line of the display.

3.3.3 LED DISPLAY

The display is a 2 line 16 character green LED type. During normal operation the frequency, channel name and/or channel number may be displayed depending on settings in the configuration menu. The display is also used during programming and menu functions. There are two LED indicators on the right of the display for transmit and receive (squelch open).

3.3.4 KEYPAD

A numeric keypad is provided to allow quick entry of frequencies or program channels.

3.3.5 CHANNEL UP/DOWN KEYS

These keys are used to select the desired channel.

3.3.6 USB CONNECTOR

The USB connector can be used to upload or download a channel list, program the radio configuration or update the radio firmware.

3.3.7 MIC AND HEADSET JACKS

The supplied hand mic is plugged into the RJ-45 type jack. Headphones if desired can be plugged into the headset jack. The internal speaker and external speaker output can be disabled (default) when the headset jack is used depending on the settings in the configuration menu.

3.4 NORMAL OPERATION

Note: The TDAM-1000 transceiver can be configured to operate in one of two modes:

1. Frequency agile mode – Any frequency from 117.975 to 138.000 MHz can be selected or programmed into any of the 100 available channels.
2. Fixed mode – Only frequencies programmed into channels can be used.

The operating mode can be set in the configuration menu. The following instructions assume frequency agile mode. Those marked with an asterisk (*) will not be available in fixed mode.

3.4.1 ENTERING A FREQUENCY*

The TDAM-1000 supports both 25 kHz and 8.33 kHz channel spacing. The channel spacing used is determined by the frequency entered. See the ICAO frequency chart in table x.x.
To enter a new frequency, type in the frequency (up to 6 digits) via the keypad and press enter. If enter is not pressed within 3 seconds or the mic is keyed, the radio will revert back to the previous frequency. For example, to enter 128.75 press:

The new frequency is ready to use. The new frequency is not saved in a channel but will remain active until another frequency or channel is selected.

3.4.2 PROGRAMMING A CHANNEL*

To program a channel, type in the frequency (up to 6 digits) via the keypad and press enter. Then enter the channel number (1-100) and press enter again. For example, to program 128.75 into channel 48, press:

The channel is programmed and the radio is ready to use on the above frequency. If the second enter is not pressed or the mic is keyed within 3 seconds, the new frequency will not be saved in a channel.

3.4.3 RECALLING A CHANNEL

A channel can be recalled in one of 3 ways:

1. Rotating the volume knob while in channel mode.
2. Using the channel up/down keys.
3. Using the recall key and number keys.

3.4.4 RECALLING A CHANNEL WITH THE VOLUME KNOB

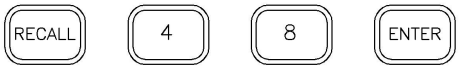
Press the volume knob until the lower line of the display shows CHAN. Rotate the volume knob until the desired channel is displayed. Only channels which have been programmed will be displayed.

3.4.5 RECALLING A CHANNEL WITH THE CHANNEL UP/DOWN KEYS

Press the up or down channel key until the desired channel is displayed. If the previous frequency was not in a channel, the channel number will start with that last channel used.

3.4.6 RECALLING A CHANNEL WITH THE RECALL FEATURE

Press the recall key followed by the channel number (1, 2 or 3 digits). Press enter within 3 seconds. For example, to recall channel 48, press:



The radio is ready to use on channel 48. If channel 48 was unprogrammed, the radio will stay at the channel it was on.

3.4.7 DELETING A CHANNEL*

Recall the channel desired channel using one of the above methods. Press 0 and enter. The lower line of the display will read ‘DELETE?’. Press enter again to confirm. For example, to delete channel 48, press:

The radio will then tune to the next lower channel number available

3.5 FUNCTION MENU

The Function Menu is invoked by pressing the enter key. The display will respond with 'Menu #'. Press one of the following keys for the associated function:

Begin entry of transmit frequency. Current channel will be modified with new transmit frequency, receive frequency will remain unchanged allowing for split frequency operation.

Enable or disable scanning for the currently selected channel.

Enable or disable transmit for the selected channel. Allows for receive only channels to be defined.

Edit the text name for the currently selected channel. Rotate knob or use up/down keys to select character under cursor. Press the knob or ENT key to proceed to the next character. Text will be saved after the last character is set.

Toggle seek mode on or off. Channels enabled in function 2 will be scanned until an active channel is encountered at which point the seek mode will set to off and normal operation will resume.

Toggle scan mode on or off. Channels enabled in function 2 will be scanned until an active channel is encountered. The radio will stay on that channel for a time programed in the configuration menu. Transmit is possible during scanning, the frequency depends on the mode programed in the configuration menu. Scanning will continue indefinitely until function 6 is selected to toggle scan mode off.

Toggles transmit power low or high. (1 watt or 10 watts)

Copy current channel to a new specified channel. The radio will prompt you for the new channel number. The current channel will remain unchanged.

Adjust display and back lighting brightness. When selected, the knob becomes the brightness control.

Enter configuration menu. See **3.6 CONFIGURATION MENU**.

Read channel or configuration data from USB storage device into radio.

Save channel or configuration data to USB storage device from radio.

3.6 CONFIGURATION MENU

The Configuration Menu is invoked by pressing the 0 key in the function menu. The display will respond with 'Config'. Turn the knob to select the desired item and press the knob to edit the item. Configuration menu items include:

Mem Disp	Allows the format of the display for programmed channels to be selected: Freq — Displays the frequency on the top line only. Freq-# — Displays the frequency on the top line and the channel number on the bottom line. Freq-Name — Displays the frequency on the top line and the name of the channel on the bottom line. Name-# — Displays the channel name on the top line and the channel number on the bottom line.
AlwaysOn	Power switch configuration: No — Knob must be used to turn the radio on and off. Yes — Radio is always on when power is applied.
Comp Lvl	Microphone compression level. Turning the knob will adjust (range 0 – 1023) the maximum gain of the microphone input.
Ext Spkr	External speaker operating mode: Off — External speaker output is off at all times. Rx Only — External speaker outputs receive audio only. Rx & Tx — External speaker outputs receive and transmit audio.
Ext Vol	External speaker volume mode: IntSpkr= — External speaker volume is equal to the internal speaker. Separate — External speaker volume is separately adjustable.
FrqAgile	Frequency agile mode: No — Only programmed channels can be selected. Yes — Programming and direct frequency entry is allowed.
HdstMute	Headset mute mode: No Spkr — Neither speaker is muted when the headset plug inserted. Int Spkr — Only the internal speaker is muted when the headset plug is inserted. Ext Spkr — Only the external speaker output is muted when the headset plug is inserted. BothSpkr — Both internal and external speakers are muted when the headset plug is inserted.
Mod Lvl	Modulation level. Adjusts the transmit modulation level. (range 0 – 2250)
Mon Vol	Monitor volume. Adjusts the level of the monitor output. (range 0 – 255)
Scan Mon	Scan monitor time. Adjusts the number of seconds (0 – 90) the radio will remain on an open frequency during scanning.
ScanRply	Scan reply time. Adjust the number of seconds (0 – 90) the radio will stay on a frequency after the squelch has closed before resuming scanning.
ScanRvrt	Scan revert mode: Selected — All replies are transmitted on the frequency selected before scanning was enabled. Contacted — All replies are transmitted on the frequency of the last channel received.
Tx Timer	Transmit timer. Selects the transmit timeout timer between Off, 30, 60 or 90 seconds.

3.7 25 AND 8.33 kHz CHANNEL SPACING

The TDAM-1000 is capable of both 25 and 8.33 kHz channel spacing. Selecting the desired channel spacing is achieved during the frequency entry procedure. The TDAM-1000 uses the ICAO standard where 5, 10 or 15 kHz is added to the 25 kHz channel frequencies to represent the additional 8.33 kHz channel steps:

Frequency Entered	*Actual Frequency*	*Channel Spacing*
118.000	118.000 MHz	25 kHz
118.005	*118.000 MHz*	*8.33 kHz*
118.010	*118.00833 MHz*	*8.33 kHz*
118.015	*118.01666 MHz*	*8.33 kHz*
118.025	118.025 MHz	25 kHz
118.030	*118.025 MHz*	*8.33 kHz*
118.035	*118.03333 MHz*	*8.33 kHz*
118.040	*118.04166 MHz*	*8.33 kHz*
118.050	118.050 MHz	25 kHz
118.055	*118.050 MHz*	*8.33 kHz*
118.060	*118.05833 MHz*	*8.33 kHz*
etc	etc	etc

SECTION 4: SPECIFICATIONS

4.0 DIMENSIONS

Width	5.4 inches (137 mm)
Height	1.8 inches (46 mm)
Depth	7.7 inches (196 mm)
Weight	2.8 lbs (1.27 kg)

4.1 GENERAL SPECIFICATIONS

Frequency Band	117.975 – 138.000 MHz
Modulation	AM (A3E)
Channel Spacing	25 kHz and 8.33 kHz
Frequency Stability	+/- 1 ppm (0.0001%)
Operating Temperature	-20 to +55 °C
Storage Temperature	-40 to +70 °C
Power Consumption Transmit High Power Receive Standby	 < 65 Watts < 15 Watts < 10 Watts

4.2 RECEIVER SPECIFICATIONS

Sensitivity	< 1µV for 12dB SINAD
Selectivity 25 kHz Channel Spacing 8.33 kHz Channel Spacing	 > 65 dB @ ±25 kHz, < 6 dB @ ±8.5 kHz > 60 dB @ ±8.33 kHz, < 6 dB @ ±2.5 kHz
Adjacent Channel Rejection	> 60 dB
Spurious Attenuation	> 70 dB
Blocking for 1 MHz Frequency Offset	> 80 dB
Signal to Noise Ratio	< 45 dB
Frequency Stability	1 ppm (0.0001%)
Intermodulation Immunity	> 70 dB
Image Frequency Rejection	> 100 dB
Intermediate Frequency Rejection	> 95 dB
Conducted Spurious	< -70 dB
Cross Modulation Rejection	> 70 dB @ 100kHz Frequency Offset
Squelch	Adjustable 0 to 25 µV
Scanning	20 Channels per Second
Audio Response 25 kHz Channel Spacing 8.33 kHz Channel Spacing	 300 to 3400 Hz, +1 dB, -2dB 350 to 2500 Hz, +1 dB, -2 dB
Audio Distortion	< 5% THD
Audio Output Power	> 7 Watts

4.3 TRANSMITTER SPECIFICATIONS

RF Output Power	Selectable 1 or 10 Watts
Modulation Depth	Up to 95%
VSWR	1:Infinity
Hum and Noise	> 40 dB @ 90% Modulation
Distortion	< 5% @ 90% Modulation
Frequency Stability	±1 ppm (0.0001%)
Intermodulation Attenuation	40 dB @ 150 kHz Offset
Keying Time	< 20 ms
Release Time	< 10 ms
Speech Processor	35 dB Dynamic Range

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IMPORTANT
WARRANTY

All communication equipment manufactured by Technisonic Industries Limited is warranted to be free of defects in Material or Workmanship under normal use for a period of one year from Date of Purchase by the end user.

Warranty will only apply to equipment installed by a factory approved and/or authorized facility in accordance with Technisonic published installation instructions. Equipment falling under the following is not covered by warranty:

- Equipment that has been repaired or altered in any way as to affect performance,
- Equipment that has been subject to improper installation,
- Equipment that has been used for purposes other than intended,
- Equipment that has been involved in any accident, fire, flood, immersion, or subject to any other abuse.

Expressly excluded from this warranty are changes or charges relating to the removal and re-installation of equipment from the vehicle. Technisonic will repair or replace (at Technisonic's discretion) any defective transceiver (or part thereof) found to be faulty during the Warranty Period.

Faulty equipment must be returned to Technisonic (or its authorized Warranty Depot) with transportation charges prepaid. Repaired (or replacement) equipment will be returned to the customer with collect freight charges. If the failure of a transceiver occurs within the first 30 days of service, Technisonic will return the repaired or replacement equipment prepaid.

Technisonic reserves the right to make changes in design, or additions to, or improvements in its products without obligation to install such additions and improvements in equipment previously manufactured. This Warranty is in lieu of any and all other warranties express or implied, including any warranty of merchantability or fitness, and of all other obligations or liabilities on the part of Technisonic.

This Warranty shall not be transferable or assignable to any other persons, firms, or corporations.

For warranty registration, please complete the online Warranty Registration Form found at www.til.ca.