

T4000 RF Module

P/N167552-x

Users Guide

DOCUMENT NO: 166673
REVISION:
DATE OF ISSUE: JUNE 26, 2016



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INTRODUCTION

The T4000 RF module is a Tri Band transceiver assembly that operates in 136 – 174, 380 – 520, and 764-870 MHz ranges. The T4000 RF module is a modified Motorola APX 8000 Tri Band portable radio.

The outer casing, top controls, front display and keypad are removed. The RF chassis is slightly machined but all electronic circuits are unmodified from the original APX 8000 radio.

The transceiver is designed to be installed and operated in a Technisonic Multiband Airborne Radio TDFM 9000 platform. All external power and antenna connections are provided by the TDFM 9000 as well as controls are via the front panel and display from the TDFM 9000.

The RF module is capable of operating on Analog FM, Wide and Narrow and Project 25 Phase 1 conventional and P25 Trunked Phase 1 and 2 systems.



FIGURE 1: Overall view of the T4000 RF Module

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 90 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.

TECHNICAL CHARACTERISTICS

Specification

Product Model Number:
Physical Dimensions:
Operating Temperature Range:

Characteristic

T4000 RF Module
Approx. (L) 5.1" x (W) 2.1" x (H) 0.85"
-30° C to +60° C

Power Requirement:

Voltage: 7.8 VDC \pm 15%
Current: 325 mA minimum / 2.4A maximum
Audio Output Power: 500 mW into 600 Ω

FCC ID: IMA-T4000
IC: 120A-T4000

RF Output Power: 1 to 6 Watts (VHF)
1 to 5 Watts (UHF)
1 to 2.5 Watts (700 MHz)
1 to 3 Watts (800 MHz)

Frequency Range

VHF Band: 136-174 MHz TX
136-174 MHz RX

UHF Band: 380-520 MHz TX
380-520 MHz RX

700 MHz Band: 769-775, 799-805 MHz TX
764-776 MHz RX

800 MHz Band: 806-824, 851-869 MHz TX
851-870 RX

No. of channels per band: 3000 pre-programmable channels

Transmitter Section

	VHF	UHF	700	800
FM Hum and noise in dB (Narrowband):	-51	-47	-47	-46
Audio Distortion:	1%	1%	1%	1%
Frequency Stability in ppm:	\pm 1.0	\pm 1.0	\pm 1.0	\pm 1.0
Modulation Limiting:	\pm 2.5kHz	\pm 2.5kHz	\pm 2.5kHz	\pm 2.5kHz

Receiver Section

	VHF	UHF	700	800
Sensitivity in μ V:				
*Digital 1% BER (12.5kHz)	0.25	0.30	0.32	0.32
*Digital 5% BER (12.5kHz)	0.15	0.16	0.22	0.22
**Analog with 12dB SINAD	0.25	0.25	0.35	0.30

Selectivity in dB:				
25 kHz Channel	82	80	79	78
12.5 kHz Channel	77	74	72	72
Intermodulation * **	82	80	81	80

*Measured in digital mode per TIA / EIA IS 102.CAAA under nominal conditions.

** Measured in analog mode per TIA / EIA 603 under nominal conditions.

INSTALLATION

The T4000 module should be installed in the TDFM 9000 in accordance with TIL document 126556 "TDFM-9000 FINAL ASSEMBLY SSP".

FCC ID LABELS

The T4000 RF module is a modified Motorola APX 8000. Part of the modification requires removal of the original Motorola FCC ID label. After all modifications are done the new Technisonic FCC/IC ID label is applied.



FIGURE 2: APX 8000 FCC ID (Left), Right T4000 Module with new FCC ID applied

The FCC/Industry Canada label is shown below. It is mounted on the top near the front of the module.

IC: 120A-T4000	
FCC ID: IMA-T4000	
VHF/UHF/700/800 RF MODULE	
HVIN: T4000	
167552-	<input type="text"/>
P-	<input type="text"/>
S/N:	<input type="text"/>
FLASH CODE:	<input type="text"/>
TECHNISONIC INDUSTRIES LTD.	
169662A	

FIGURE 3: T4000 FCC/Industry Canada Label



FIGURE 4: FCC/Industry Canada Label placement on the T4000 Module

The T4000 is intended to be mounted in the TDFM 9000 chassis and is not visible. Therefore, a second label must be applied to the outside of the TDFM 9000 that contains the following text:

“TDFM 9000 Multiband Transceiver. Contains Module: FCC ID IMA-T4000”.

In addition, external labeling for Industry Canada shall be applied to the TDFM 9000 to include the following text: “Contains IC: 120A-T4000”.

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 T4000 RF Module. Every effort has been made to make this manual as complete and accurate as possible.

WARRANTY INFORMATION

The Model T4000 Transceiver is under warranty for one year from date of purchase. Failed units caused by defective parts, or workmanship should be returned to:

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