

# MODEL TDFM-136B

## Airborne Digital/Analog VHF FM Transceiver

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### Technisonic Analog/Digital VHF FM Transceiver

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The Technisonic TDFM-136B Project 25 (Phase I) compliant airborne VHF transceiver provides digital or conventional analog FM communications on every currently available channel (from 136 to 174 MHz) within the General Radio Service VHF/FM High Band. The TDFM-136B operate on the Common Air Interface defined in TIA/TSB102 and is capable of multi-mode operation for 25 KHz analog\*, 12.5 KHz analog, and Project 25, 12.5 KHz digital modulation on a channel by channel basis. Operational data can be entered into 230 non volatile memory positions(channels) via a front panel 12 button keypad, or downloaded from a PC via either a Serial or USB programming cable. Mode select and function control are also via the keypad. Operating frequencies, alpha numeric identifiers and other related data are presented on a 48 character, two line LED Matrix display, with NVG compatibility offered as an option. The analog modes include unique CTCSS and DCS signalling for transmit and receive frequencies, while the digital channels include both NAC and Talk Group as defined in the Project 25 SOR. This multi-mode capability enables the TFM-136B to operate within a system where both conventional analog and P25 digital systems are in use. The TDFM-136B architecture is based on Digital Signal Processor (DSP) technology and does not depend on availability of proprietary chip sets from competitive vendors.

The TDFM-136B can be operated in the Direct Entry mode by simply keying in the desired operating frequency. It can also function without restriction on any split frequency pair within the band. This radio features 230 preset memory positions, each capable of storing a receive frequency, a transmit frequency, and alpha numeric identifier for each channel, as well as DPL or DCS coded squelch information for each channel. Conventional or digital mode is selected while programming each individual channel. An upload/download function allows the operator to download channel information from a PC, or upload stored data from the transceiver to a PC using the proprietary software provided with each transceiver. Information stored in the transceiver's memory is available for instant recall by keypad entry, or by pressing the UP or DOWN buttons which will allow the operator to scroll through all preset channels. The TDFM-136B transceiver features a two channel synthesized guard receiver, a DTMF encoder for signalling during transmit and a scan function which will scan up to sixteen of the preset channels at once.

The TDFM-136B transceiver is panel mounted (standard Dzus) and completely self contained in a 8.0 x 3.0 x 5.75 inch chassis weighing just 3.5 pounds. Front panel controls are MAIN for main channel volume, GUARD for guard channel volume, a MN/GD switch for main or guard transmit select, and a G1/G2 switch which allows for selection of Guard 1 or Guard 2. Hi power is 10 Watts RF output. Lo power is 1 Watt. This transceiver offers 28 volt or 5 volt DC backlighting (software selectable), which is controlled from the aircraft dimmer bus, while display brightness is controlled from the aircraft dimmer bus with override from the front panel keypad. Mic gain and sidetone level can be adjusted in software for easy installation and set up for optimum performance. The Technisonic TDFM-136B transceiver is compliant with RTCA DO 160G categories relating to electrostatic discharge, vibration, overpressure, humidity, temperature and altitude, magnetic effect, power input, RF susceptibility, voltage spike, operational shock and crash safety, decompression, and RF emissions.

\* - 25 KHz analog operation is only enabled where permitted by statute.

## TDFM-136B General Specifications

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Frequency Range	136.000 to 174.000 MHz
Operating Modes	Project 25 conventional analog simplex or semi-duplex mode. Project 25 conventional digital mode. Conventional analog mode restricted to 12.5 KHz for use in the US.
Channel Spacing	6.25 / 12.5 / 25 KHz (230 Preset channels) *
Dimensions	Approx 8.0 x 3.0 x 5.75 inches
Weight	3.5 Pounds (1.6 Kg)
Temperature range	-45 deg C to +70 deg C
Power requirement	28VDC, Receive – 500 mA, 1 Watt transmit – 900 mA, 10 Watts Transmit – 1.7 Amps
Functionality	Clear analog voice – P25 non trunked modes in accordance with P25 CAI (IS 102BAAA) Clear digital voice (DVS1 IMBE Vocoder).
Certification	FCC and Industry Canada Type Approved
Environmental Cat	Meets or exceeds the Minimum Operational Performance Standards for the following RTCA/DO-160G environmental test categories

Category	Test Section
A2, B2, D1	Temperature and Altitude
B	Temperature Variation
A	Humidity
A	Operational Shock and Crash Safety
S, U	Vibration
Z	Magnetic Effect
B	Power Input
B	Voltage Spike
B	Audio Frequency Susceptability
AC	Induced Signal Susceptability
T	Radio Frequency Susceptability
M	Radio frequency Emission
A	Electrostatic Discharge

Guard receiver	2 channel synthesized, Project 25 (Phase I) compliant
CTCSS squelch	Encodes/decodes all 64 available tones
DCS capability	Supports all available digital squelch codes
DTMF encoder	Supports all standard DTMF tones
Audio Output	500 mw into 600 ohms
Speaker Output	2.5 Watts into 4 ohms
Backlighting	25VDC or 5VDC, software selectable
Display	48 character, two line LED matrix

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## Minimum Performance Specifications

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### Main Receiver

Sensitivity	-116dBm
Adjacent Channel	-60dB for both analog and digital channels
Spurious response	-70dB
Third order intermod	-70dB
Image attenuation	-80dB
FM acceptance	+6KHz
Hum and noise	45dB 25 KHz, 40 dB 12.5 KHz
Audio distortion	less than 5%
Antenna emissions	less than -57dBm

### Main Transmitter

RF power output	Lo power – 1 Watt, Hi power – 10 Watts
Output impedance	50 Ohms
Maximum deviation	Limited to 2.5 KHz for 12.5 KHz channels and 5 KHz for 25 KHz channels
Spurious attenuation	-90 dB below carrier level
Frequency Stability	+ 0.00025%
Microphone Circuit	Carbon or equivalent
Sidetone Output	500 mw (max) into 600 ohms
Harmonic attenuation	-65dB below carrier level
FM hum and noise	-40 dB
Audio input	-20dBm to 0dBm for full deviation

### Guard Transceiver

All specifications identical to Main transceiver