

MODEL TDFM-136

Airborne Digital/Analog VHF FM Transceiver



Technisonic Analog/Digital VHF FM Airborne Transceiver

The Technisonic TDFM-136 Project 25 (Phase I) compliant airborne VHF/FM 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-136 operates on the Common Air Interface described in 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 200 non-volatile memory positions (channels) via front panel 12 button key pad, or downloaded from a PC. Mode select and function control are also via the keypad. Operating frequencies, alpha numeric identifiers, and other related data are presented on a 96 character, four line LED matrix display, which is available in either red or green with NVG (AN/AVIS 6) compatibility offered as an option. The analog modes include unique CTCSS and DCS signaling for transmit and receive frequencies while the digital channels include both NAC and Talk Group as specified by Project 25. This multi-mode capability enables the TDFM-136 to operate within a system where both conventional analog and Project 25 digital communications systems are in use. TDFM-136 architecture is based on Digital Signal Processor (DSP) technology and does not depend on availability of proprietary chip sets from competitive vendors. This approach allows for future encryption signaling, and trunking capabilities to be added to the radio at a later date by simple software flash via an internal connector. No costly hardware upgrades will be required. The radio is capable of DES single bit cypher feedback encryption to enable operation with existing systems and is flash upgradeable to Project 25 DES output feedback and OTAR for future encryption. Up to 16 encryption keys are available to the user for multiple user group applications. Project 25 trunking will be offered as a future upgrade.

The TDFM-136 can be operated in the Direct Entry or Simplex mode by simply keying in the desired operating frequency. It can also function without restriction on any split frequency pair within the band. This unit features 200 preset memory positions each capable of storing a receive frequency, a transmit frequency, a separate CTCSS tone for each receive and transmit frequency, an alpha numeric identifier for each channel, as well as DPL or DCS coded squelch information for each channel. Conventional or Digital mode operation is selected while programming each individual channel, with Digital modulation being available only in the narrow band (12.5 kHz) mode. 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 supplied 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 allows an operator to scroll through all preset channels. The TDFM-136 transceiver features a two channel synthesized guard receiver, a DTMF encoder for signaling during transmit, and a scan function which will scan any or all of the channels stored in the preset memory positions.

The TDFM-136 transceiver is panel mounted (standard Dzus) and completely self contained in a 8.0 x 3.00 x 5.75 inch chassis weighing just 3.1 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 output (adjustable down to 100 mW). This transceiver offers 28 volt DC back lighting as standard, which is controlled by the aircraft dimmer bus while display brightness is controlled from the front panel keypad. External access for mic gain and sidetone level adjust provides for easy installation and setup for optimum performance. The Technisonic TDFM-136 Transceiver is compliant with RTCA DO-160D categories relating to Electrostatic discharge, Vibration, Overpressure, Humidity, Temperature and Altitude, Magnetic Effect, Power Input, Radio Frequency Susceptibility, Voltage Spike, Operational Shock and Crash Safety, Audio Frequency Susceptibility, Decompression, RF Emissions (Cat D) as well as with the more stringent DO-160C, Part 21, Category Z with respect to RF Emissions.

TDFM-136 General Specifications

Frequency Range	136.000 MHz to 174.000 MHz in 2.5 kHz increments
Operating Modes	Project 25 CAI and conventional analog simplex or semi duplex as per TSB-102 12.5/25 kHz Conventional Analog 12 KBPS FSK, 9.6 KBPS C4FM
Channel spacing	2.5/5/6.25/12.5/20/25/30 kHz (120 preset channels)
Dimensions	Approx 8.0 in x 3.00 in x 5.75 in
Weight	3.5 Lbs (1.6 Kg)
Temperature range	-45°C to + 70° C
Power requirement	28 VDC, Receive - 300 mA, 1 Watt transmit - 1.3 amps, 10 Watts transmit - 3 amps
Functionality	Clear analog voice – P-25 non trunked modes in accordance with P-25 CAI (IS102BAAA) Clear digital voice (DVSI IMBE Vocoder), Clear digital data, DES Encrypted CVSD Voice
Enhanced Modes (Future Software upgrades)	P-25 Trunking, DES Encrypted Digital Voice (DVSI IMBE Vocoder) DES Encrypted Digital Data
Certification	FCC and DOC Type Approved
Environmental Category	RTCA DO-160D (B2D1)XBAA[S(MB)U(FF1)]XXXXXXABBA[UUU]M[XXXX]XXA RTCA DO-160C, RF Emissions, Part 20, Category Z
Guard receiver	2 channel synthesized, Project 25 (phase 1) compliant
CTCSS squelch capability	encodes/decodes all 64 available tones
DPL/DCS capability	All available digital squelch codes
DTMF encoder	All standard DTMF tones supported
Audio output	500 mw into 600 Ohms
Speaker output	2.5 Watts into 4 ohms
Back lighting	28V (standard) or 5V (specify)
Display	Green (standard), red (optional) NVG optional

Minimum Performance Specifications

Main receiver

Sensitivity	-116 dBm
Adjacent channel	-60 dB for both analog and digital channels
Spurious response	-70 dB
Third order intermod	-70 dB
Image attenuation	-80 dB
FM acceptance	± 6 kHz
Hum and noise	48 dB 25/30 kHz, objective 45 dB min 42 dB 12.5 kHz, objective 40 dB min
Audio distortion	Less than 5%
Antenna emissions	Less than -57 dBm

Guard receiver

All specifications identical to main receiver.

Transmitter

RF power output	Lo power - 100 mW to 1 W (internal adjustment), 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	-65 dB below carrier level
FM hum and noise	-40 dB
Audio input	50 mV at 2.5 kHz into 200 ohm circuit for ±5.0 kHz deviation (25 kHz mode), adjustable 50 mV at 2.5 kHz into 200 ohm circuit for ±2.5 kHz deviation (12.5 kHz mode), adjustable
Audio distortion	Less than 5%

Data capabilities	12 KBPS Synchronous (25 kHz Channels) Internal data rate adapter 300 to 4800 BPS 12.5 kHz Channels 300 to 9600 BPS 25/30 kHz Channels
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TDFM-136 Rev: 3

Note: Specifications are subject to change without notice
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