

ULTRAMINIATURE C-BAND RADAR TRANSPONDER

MODEL MD2000C-1



SUPPLYING HIGH PERFORMANCE FLIGHT INSTRUMENTATION, RF/MICROWAVE ASSEMBLIES, POWER AMPLIFIERS, IFF AND DATA ACQUISITION SYSTEMS FOR SEVERE ENVIRONMENTS.

DESCRIPTION

The MD2000C-1 Radar Transponder is an ultraminiature precision augmentation device used to enhance the capability of C-band radars. Utilized primarily for range safety functions, the MD2000C-1 is suitable for use in both manned and unmanned vehicles. This transponder is applicable to precision tracking of aircraft, sounding rockets, missiles, UAVs and drone targets, both sea and airborne. Through the use of a state-of-the-art RF-to-video detection receiver, typical IF down conversion components such as the local oscillator, mixer, and IF amplifier are eliminated. The reduced parts count leads to increased overall unit reliability.

The design of the MD2000C-1 utilizes the latest in modern devices and circuitry. It is all solid-state, except for the triode transmitter, to provide a reliable product with extremely long operating life.

Due to U.S. Export Control Reform Ultra Electronics Herley Lancaster's Radar Transponders have transitioned from ITAR to Department of Commerce Export Administration Regulations (EAR) making them ITAR-free!



FEATURES

- 50 to 150 Watts peak, minimum power output, factory set
- Long life triode cavity oscillator transmitter
- Sensitive direct RF-to-video detection receiver
- Small, less than 14 cubic inches (357 cubic cms)
- Lightweight, less than 15 ounces (425 grams)
- Tunable over 5.4 to 5.9 GHz

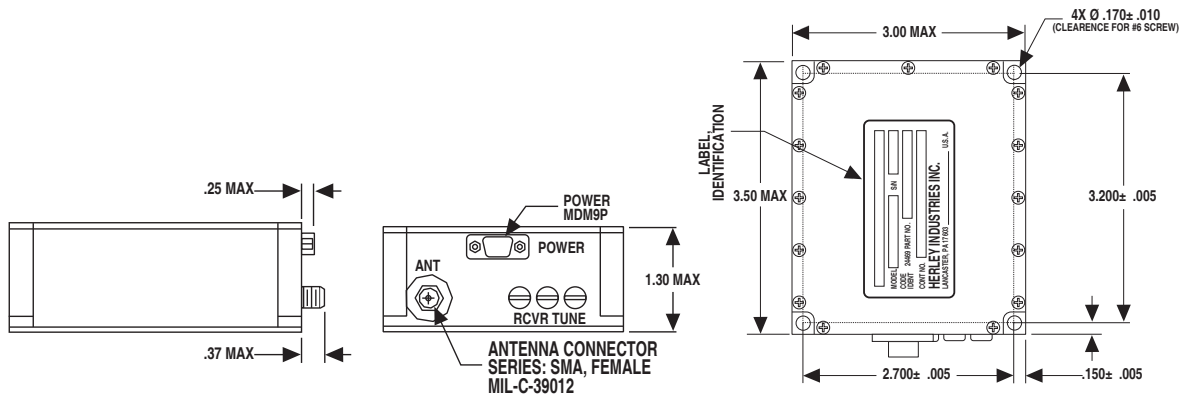
FEATURES

- Adjustable internal delay
- Reverse polarity power lead protection
- Single and double pulse interrogation settings
- Adjustable code spacing
- Built-in duplexer for single antenna operation and protection from high antenna reflections



HERLEY

Ultra
ELECTRONICS



ELECTRICAL

- Frequency Range: 5.4 to 5.9 GHz
- Frequency Separation: 50 MHz min
- Impedance, Input/Output: 50 ohms nominal
- Reverse Polarity Protection: Built-in series diode protection against damage from DC input power reversal
- Voltage Transient Protection: Internal power supply stabilizes transients to the normal operating voltages
- Short and Open Circuit Protection: Built-in to provide antenna mismatch protection
- Input Voltage: 22 to 32 VDC, floating from ground
- Input Quiescent Current: 0.30 Amps, maximum
- Input Operating Current: 0.80 Amps maximum to 2600 pps @ 22VDC; 0.60 Amps maximum at 1000 pps @ 28VDC
- Recovery Time: 50 µsecs maximum
- Blanking: Built-in circuitry prevents reply during recovery time

PHYSICAL

- Size: 3.55 x 3.0 x 1.3 inches (9.0 x 7.6 x 3.3 cms)
- Volume: 13.8 cubic inches (351 cubic cms)
- Weight: 15 ounces, maximum (425 gms)

PHYSICAL (CONTINUED)

- Duplexer: Built-in circulator/isolator, (ferrite 4-port)
- Antenna Connector: SMA Female
- Power Connector: M83513/04-A03N
- Pin Connections: #1, +28v; #6, 28v return. (Standard unit)

RECEIVER

- Sensitivity: -70 dBm minimum
- Frequency Tuning: Three preselector controls externally accessible upon removal of seal screws
- Tuning Range: 5.4 to 5.9 GHz
- Sensitivity Bandwidth: Greater than -70 dBm over ± 3 MHz around assigned frequency
- Dynamic Range: +10 to -70 dBm
- Bandwidth (3dB): 11 ± 5 MHz
- Image Rejection: Non-existent image frequency (no local oscillator)
- Pulse Decoder: Single or double, internally selectable
- Pulse Width: 0.25 to 5.0 µsecs. single; 0.25 to 1.0 µsecs. double
- Pulse Rise Time: 0.1 µsec. maximum single or double
- Double Pulse Coding: Spacing adjustable between 3.0 and 15.0 µsecs
- Second Pulse Spacing: Accepts ± 0.15 µsecs. Rejects ± 0.3 µsecs
- Random Triggering: 10 pps maximum

TRANSMITTER

- Power Output: 50 to 150 Watts peak, minimum power output, factory set
- Output device: Triode cavity oscillator (Limited operating life of 200 hours minimum, which includes all periods of DC power applied to the transponder.)
- Frequency Tuning: Single control externally accessible upon removal of seal screw
- Tuning Range: 5.4 to 5.9 GHz
- Frequency Stability: ± 5.0 MHz
- Pulse Width: 0.5 ± 0.1 µsec
- Pulse Width Jitter: 0.01 µsec. maximum
- Pulse Rise/Fall Time: 0.1/0.2 µsec. max. (10 to 90%)
- PRF: 100 pps to 2600 pps typical
- Reply Delay: Adjustable from 2.0 to 6.0 µsec, (2.5 µsec typical)
- Delay Variation: 0.03 µsec. maximum deviation from -30 dBm value for input signals levels between 0 and -60 dBm
- Delay Jitter: 0.02 µsec. maximum 0 to -55 dBm, 0.05 µsec maximum -55 to -65 dBm
- Interrogation Replies: 99% minimum for input signal levels between +10 and -65 dBm
- Duty Cycle: Up to 0.002 (0.2%)
- Overinterrogation Protection: 3200 pps typical

ENVIRONMENTAL

The transponder meets the requirements of MIL-STD-810

- Vibration Sine: 5 to 10 Hz, 0.20 inch double amplitude; 10 to 18 Hz 1g; 18 to 81 Hz 0.06 inch double amplitude; 81 to 2000 Hz, 20g
- Vibration Random: 16.9g rms, $0.008g^2rms/Hz$ at 20 Hz, $0.20g^2rms/Hz$ from 100 Hz to 1000 Hz, $0.05g^2rms/Hz$ at 2000 Hz
- Temperature, Operating: -40°F (-40°C) to +160°F (+71°C) standard, (-54°C to +85°C available)
- Temperature, Storage: -80°F (-62°C) to +185°F (+85°C)
- Shock: 100g (6 milliseconds) in any axis, sawtooth, 120g (4 milliseconds) in any axis, sawtooth
- Altitude: 760 mm of mercury (sea level) to 0.04 mm of mercury (230,000 feet altitude for limited time)
- Humidity: Any, up to 100% including condensation due to temperature changes
- Acceleration: 50g applied along any axis for 1 minute
- RFI/EMI: MIL-STD-461, tested per MIL-STD-462
- Pressurization: 15 psi bubble leak test

PRODUCT NUMBERS

- PIN 510001-2 - 150 Watts minimum peak power output and two telemetry outputs (shaped video and processor output)
- PIN 510001-3 - 50 Watts minimum peak power output
- PIN 510001-4 - 100 Watts minimum peak power output
- PIN 510001-5 - 150 Watts minimum peak power output with external double/single pulse switch



making a difference

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