

# C-BAND RADAR TRANSPONDER

## MODEL MD400C-2



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

### DESCRIPTION

The Ultra Electronics Herley MD400C-2 Radar Transponder is a general purpose augmentation device used to enhance the tracking capability of C-band radars. Utilizable primarily for range tracking and safety functions, the MD400C-2 is suitable for use on both manned and unmanned vehicles. The transponder is applicable to aircraft, missiles, space launch vehicles, sounding rockets, and drone targets, both sea and airborne.

The design of the MD400C-2 utilizes the latest in modern devices and circuitry. It is all solid-state, except for the magnetron, to provide a reliable product with extremely long operating life.

### FEATURES

- 400 Watt minimum peak power output
- Long life magnetron transmitter
- Sensitive superheterodyne receiver
- Small, less than 43 cubic inches (705 cubic cms)
- Lightweight, less than 43 ounces (1220 grams)
- Tunable over 5.4 to 5.9 GHz
- Adjustable internal delay
- Reverse polarity power lead protection
- Single and double pulse interrogations
- Adjustable code spacing
- Built-in duplexer for single antenna operation and protection from high antenna reflections

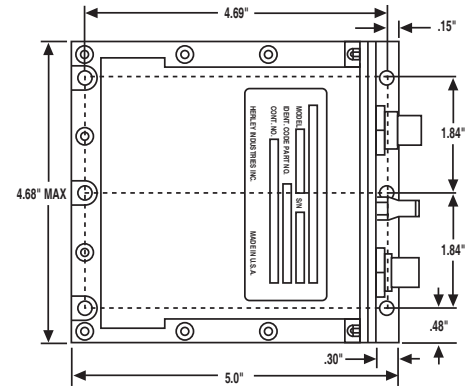
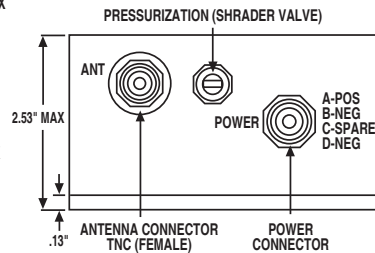
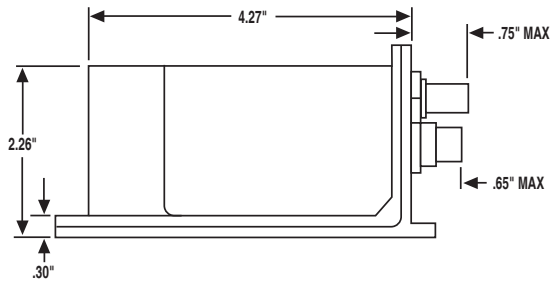


Due to U.S. Export Control Reform Ultra Electronics Herley Lancaster's Radar Transponders have transitioned from ITAR to Department of Commerce Export Administration Regulations (EAR) making them ITAR-free!



HERLEY

Ultra  
ELECTRONICS



## ELECTRICAL

- Frequency Range: 5.4 to 5.9 GHz
- Frequency Separation: 50 MHz minimum
- 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 voltage protection for transients from 50 microseconds to 0.5 seconds per MIL-STD-704
- Short and Open Circuit Protection: Built-in to provide antenna mismatch protection
- Input Voltage: 22 to 34 VDC, isolated from chassis ground
- Quiescent Current: 0.5 Amps nominal (0.65 Amps max)
- Input Current: 1.5 Amps maximum up to 2600 pps
- Recovery Time: 50  $\mu$ secs maximum
- Blanking: Built-in circuitry prevents reply during recovery time

## PHYSICAL

- Size: 5.0 x 4.65 x 2.5 inches (12.7 x 11.81 x 6.35 cms)
- Volume: 43 cubic inches (705 cubic cms) nominal displacement

## PHYSICAL (CONTINUED)

- Weight: 43 ounces (1220 gms)
- Duplexer: Built-in circulator, 4-port ferrite
- Test Points: Internal test points are provided for alignment
- Antenna Connector: TNC Female
- Power Connector: MS3113H8-4P (mates with PT06 E-8-4S)
- Pin Connections: A, +28v; B and D 28V return; C, unused
- Sealed Chassis: Gasket seal for low pressure use

## RECEIVER

- Design: Superheterodyne
- Sensitivity: -70 dBm minimum
- Frequency Tuning: One local oscillator and three preselector controls externally accessible upon removal of seal screws
- Tuning Range: 5.4 to 5.9 GHz
- Sensitivity Bandwidth:  $\pm 2$  MHz (maintains -70 dBm)
- Dynamic Range: +20 to -70 dBm
- Bandwidth (3dB): 11  $\pm 3$  MHz
- Image Rejection: 60 dB minimum
- Pulse Decoder: Single or double, internally selectable
- Pulse Width: 0.25 to 5.0  $\mu$ secs. single; 0.25 to 0.5  $\mu$ secs double
- Pulse Rise Time: 0.1  $\mu$ sec maximum, single or double

## RECEIVER (CONTINUED)

- Double Pulse Coding: Spacing adjustable between 3.0 and 12.0  $\mu$ secs
- Second Pulse Spacing: Accepts  $\pm 0.15$   $\mu$ secs. Rejects  $\pm 0.3$   $\mu$ secs
- Random Triggering: 10 pps maximum averaged over 10 minute intervals

## TRANSMITTER

- Power Output: 400 Watts peak min.
- Output Device: Magnetron
- Frequency Tuning: Single control externally accessible upon removal of seal screw
- Tuning Range: 5.4 to 5.9 GHz
- Frequency Stability:  $\pm 3.0$  MHz under all operating conditions
- Pulse Width: 0.5  $\pm 0.1$   $\mu$ sec
- Pulse Width Jitter: 0.01  $\mu$ sec. max.
- Pulse Rise/Fall Time: 0.1/0.2  $\mu$ sec. maximum (10 to 90%)
- Spectrum: The reply pulse RF spectrum bandwidth (in MHz) will not exceed 3.0/pulse width (in  $\mu$ secs) measured at the  $1/4$  power level points
- PRF: 2600 pps minimum
- Reply Delay: Adjustable from 1.5 to 6.0  $\mu$ sec
- Delay Variation: 0.03  $\mu$ sec maximum for input signal levels between 0 and -65 dBm
- Interrogation Replies: 99% minimum input signal levels between +20 and -70 dBm
- Over-Interrogation Protection: Limiting above 2600 pps

## ENVIRONMENTAL

- The transponder meets the requirements of MIL-STD-810
- Vibration Sine: Up to 25.9 g's
- Vibration Random: 18.8 grms, 225 seconds/axis
- Temperature, Operating: -40°F (-40°C) to +167°F (+75°C)
- Temperature, Storage: -80°F (-62.2°C) to +185°F (+85°C) for 3 days
- Shock: 1100g (0.5 milliseconds) 1/2 sine any axis
- Altitude: 760 mm (sea level) to 0.04 mm of mercury (320,000 feet altitude)
- Humidity: Any, up to 100% including condensation due to temperature changes
- Acceleration: 50g applied along any axis for 5 minutes
- RFI/EMI: MIL-STD-461E
- Pressurization: Maintain 20 PSI  $\pm 1$  pound for 8 hours

## PRODUCT NUMBERS

- P/N 500002-23
- P/N 500002-25 - EWR127-1 Compliant
- P/N 500002-27 - Standard unit
- P/N 500002-28 - Ruggedized to withstand 35g sine vibration and 100 g Acceleration
- P/N 500002-29 - Code spacing selection switch on front panel
- P/N 500002-31 - Transient over-voltage surge protection



making a difference

Ultra Electronics  
HERLEY LANCASTER  
3061 Industry Drive  
Lancaster, PA USA 17603  
Tel: +1 717 397 2777  
www.ultra-herley.com  
www.ultra-electronics.com  
sales@ultra-herley.com

Ultra Electronics reserves the right to vary these specifications without notice.  
© Ultra Electronics Limited 2016.  
Printed in USA  
August 2015