

# C/TT-505 Transceiver

Command Telemetry Transceiver designed to meet the needs of many different types of space systems that require command and telemetry capabilities. The C/TT-505 UHF transceiver provides a full duplex wireless RF command, telemetry, and data link between two spacecraft.

This transceiver incorporates the CCSDS Proximity-1 protocol, providing error free communication by employing an error detection and retransmission service. Additionally, the Proximity-1 protocol provides an automatic link establishment feature, that allows the primary transceiver to reconfigure the secondary transceiver, with no intervention from the secondary spacecraft.

The design of the transceiver is flexible enough to accommodate many mission scenarios where a data link is needed between two spacecraft, such as planetary and lunar orbiter/lander spacecraft, formation flying interferometry spacecraft and asteroid or comet fly-by spacecraft.

The spacecraft interface utilizes an RS-422 serial command and status interface. This allows the spacecraft to control or reconfigure the transceiver and get extensive insight into the current configuration, link status and health of the transceiver.



## Other Features Include

A PSK modulator and demodulator using 60-degree phase modulation and Bi- $\phi$ -L encoding/decoding. Convolutional encoding (rate=1/2, k=7) and Viterbi decoding are selectable for PSK mode. The FSK modulator and demodulator are also selectable with V.35/V.36 encoding and decoding. A one-way and two-way Doppler measurement system is also available.



**communications**  
Cincinnati Electronics

# Specifications

## C/TT-505

**FREQUENCY RANGE**      **FREQUENCY SOURCE**  
 UHF 400-500 (factory preset)      Low-phase noise PLL synthesizer

**MODULATION**                      **DATA RATES**  
 FSK (NRZ-L)                              8, 32, 128 and 256 kbps  
 PSK (Bi-φ-L, 60° phase  
 modulation with residual carrier)

### RECEIVER SENSITIVITY (BER ≤ IE-6)

FSK, 128 kHz deviation, no coding  
 -103 dBm max., -103.5 typ. (128 kbps)  
 -109 dBm max., -110.0 typ. (8 kbps)  
 FSK, 8 kHz deviation, no coding  
 -112 dBm max., -113.5 typ. (8 kbps)  
 PSK with no coding  
 -101 dBm max., -103.0 typ. (256 kbps)  
 -104 dBm max., -106.5 typ. (128 kbps)  
 -110 dBm max., -113.0 typ. (32 kbps)  
 -116 dBm max., -119.0 typ. (8 kbps)  
 PSK with rate = 1/2, k = 7 coding  
 -106.5 dBm max., -108.0 typ. (256 kbps)  
 -109.5 dBm max., -112.0 typ. (128 kbps)  
 -115.5 dBm max., -118.0 typ. (32 kbps)  
 -121.5 dBm max., -124.0 typ. (8 kbps)

### MGS MR SENSITIVITY - LANDER

RC1 and TC tone detection = -125 dBm typ.

### RECEIVER 3RD ORDER INTERCEPT

-20 dBm

### CONNECTORS

Ref Number	Part Number	Description
J1	2052-1352-02 (M/A-COM)	SMA
J2	2052-1201-02 (M/A-COM)	SMA
J3	207252-2 (Amp)	9-pin D-subminiature (pin)
J4	M83513/04-D11N	25-pin Micro D (socket)
J5	M83513/03-D11N	25-pin Micro D (pin)
J6	2052-1352-02 (M/A-COM)	SMA

### RF OUTPUT POWER

+40 dBm min. (10 watts) +41.4 dBm typ. (13.8 watts)

### POWER REQUIREMENTS

Primary power in Receive and Transmit mode =  
 60 watts max., 45.5 watts typ.  
 Primary power in Receive mode only =  
 6 watts max., 4.9 watts typ.

**OPERATING VOLTAGE**      **WEIGHT**  
 22-36 Vdc                              2.07 kg max., 1.85 kg typ.

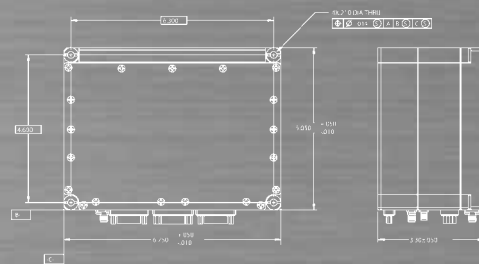
**MECHANICAL**                      **RF INPUT RANGE**  
 6.75 x 5.05 x 3.65 inches              -130 to -70 dBm, +10 dBm max.

### INPUT CHARACTERISTICS

External Reference                      0 to +10 dBm  
 Command Data                              RS-422  
 Command Clock                              RS-422  
 TX Data    RS-422  
 TX Clock    RS-422  
 Ext. Ref. Enable                              Opto-isolated discrete  
 Doppler/Canister Strobe                      Opto-isolated discrete

### OUTPUT CHARACTERISTICS

Status    RS-422  
 RX Data    RS-422  
 RX Data Clock                                  RS-422  
 Receiver Bit Sync Lock                          RS-422  
 Buffer Full FIFO Flag                              RS-422  
 Buffer Half FIFO Flag                              RS-422  
 Buffer Empty FIFO Flag                              RS-422  
 Signal Strength TLM                              0 to 5 volts analog  
 Baseplate Temp. TLM                              0 to 5 volts analog  
 Output Power TLM                                  0 to 5 volts analog  
 Ref. Osc. Temp. TLM                                  Thermistor, 300 ohms nominal



C/TT-505 Outline Drawing

