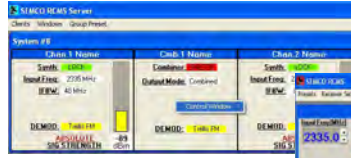
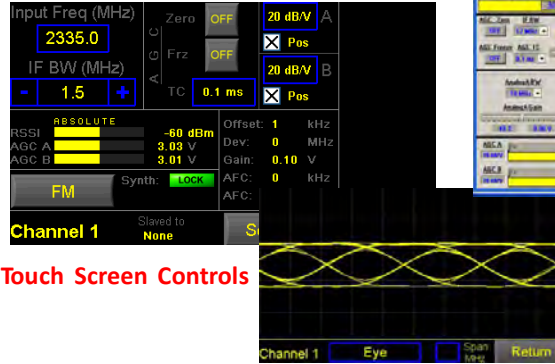




# TRT400A TELEMETRY REPEATER



RCMS Network Software



Touch Screen Controls



**DESCRIPTION** - SEMCO's TRT400A Telemetry Repeater is the ideal solution for receiving and re-transmitting a telemetry data link in austere topographical environments that preclude the reception of telemetry data at a primary Telemetry Ground Station. The telemetry data link is received by SEMCO's R400A Series Telemetry Receiver, which is an IRIG 106-15 Tier II phase noise compliant receiver offering state-of the art demodulation capabilities in TM-specific RF tuning bands from 70 MHz to 5250 MHz. The R400 receives and demodulates the incoming signal and modulates an embedded Telemetry Transmitter, which then re-transmits the telemetry data link to the primary Telemetry Ground Station. Repeater antenna configurations are determined and provided based on specific reception and re-transmission challenges as well as the results of detailed link margin analyses.

Several options and configurations are offered, including digital multi-mode transmitters supporting IRIG 106-15 modulation formats, as well as custom packaging using SEMCO's 1U, 2U or 3U Receiver configurations.

### STANDARD CONFIGURATION

- Single or Dual Channel Independent Receiver CHs
- Dual Channel Pre-d Receiver Combiner
- 7" Touch Screen Controls and Display
- 1415-1585, 1650-1850 or 2185-2485 MHz Tuning
- PCM/FM and NTSC Video Demodulation
- Embedded Bit Syncs /De-randomizer (up to 3 CHs)
- Eye Pattern and Constellation Displays
- 4 User-Configurable Analog/Digital Outputs per CH
- AM and scalable AGC Antenna Tracking Outputs
- RCMS Network Software (Ethernet Remote Control)
- 2W, 5W, 10W or 15W Telemetry Transmitter (1710-1850 or 2185-2485 MHz)
- Custom Antennas based on link margin analyses

### OPTIONS

- 70 MHz, 200-1150 MHz or 4400-5250 MHz Tuning
- 5W, 10W or 20W Multi-Mode Digital Transmitter (L, S and C Band)
- Multi-Channel Spectral Sweep
- 1415-1585, 1650-1850 and 2185-2485 MHz Tuning
- PM, BPSK & A/U/S/O/QPSK Demodulation
- IRIG 106-15 Trellis FM, SOQPSK-TG & Multi-h CPM
- PM/PSK (SGLS) and FM/FM S/C Demodulation
- Adaptive Equalization
- DQE/DQM for Best Source Selector Applications
- Pre-d Record and Playback
- Multi-Channel Spectral Sweep
- Custom Packaging using 1U, 2U or 3U Receiver Configurations (TRT100, TRT200 and TRT300)

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# Specifications

## **PERFORMANCE**

|   |   |
|---|---|
| Frequency Bands                             | 70 MHz, 200-1150 MHz, 1415-1585, 1650-1850, 2185-2485 MHz, and 4400-5250 MHz  |
| Operating Environment and Controls          | SEMCO RCMS Network Software; Windows 7/10; Integrated Display/KB  |
| Dynamic Range                               | -10 dBm to Threshold  |
| Noise Figure                                | <8 dB   |
| Phase Noise                                 | IRIG 106-15 Tier II Phase Mask Compliant  |
| Maximum Safe Input Level                    | +10 dBm   |
| Image and Spurious Signal Rejection         | >60 dB  |
| IF Rejection                                | 70 dB minimum; 80 dB typical  |
| Tuner LO Tuning Resolution                  | 100 kHz (adjustable in 1 kHz increments in AFC Manual Mode)   |
| IF SAW Filters                              | 8 from 0.3 to 40 MHz  |
| IF FIR Filters                              | 15 user-selectable per data rate entered + Auto-Set based on data rate; 4 kHz to 37.3 MHz   |
| AGC Time Constants                          | 5 software selectable (0.1 ms, 1 ms, 10 ms, 100 ms, and 1000 ms)  |
| AGC Outputs                                 | 2 scalable AGC outputs per channel (+/- 10, 20, and 50 dB/V)  |
| Baseband (Video) Output                     | Analog – 0 to > 4 Vp-p into 75 ohms; TTL Clock and Data; user-selectable AC-DC coupling; 4 user-configurable analog and digital outputs per channel   |
| Baseband Video FIR Filtering                | 15 user-selectable per data rate entered + Auto-Set based on data rate; 2 kHz to 18.7 MHz + Bypass  |
| AM Outputs/Channel                          | Normal and Inverted; 2 Vp-p into 50/75 $\Omega$ (50% AM)  |
| AM Low Pass Filters                         | User-selectable 30 Hz–30 kHz (Bessel Filters)   |
| AM Frequency Response                       | User-selectable 0 – 30 kHz  |
| Acquisition Tracking                        | +/- 250 kHz   |
| Automatic Frequency Control                 | +/- 250 kHz with 5 user-selectable AFC Loop Speeds  |
| Demodulator Operating Modes                 | FM, NTSC Video with switched de-emphasis, PM, BPSK, QPSK, OQPSK, SQPSK, A/UQPSK, IRIG 106-11 Trellis PCM/FM (Tier 0), SOQPSK SK-TG (Tier I), and Multi-h CPM (Tier II), PM/PSK Subcarrier, and FM/FM Subcarrier |
| Maximum Data Rates                          | 23 Mbps FM, 20 Mbps PM/PSK, 40 Mbps S/O/QPSK, 23 Mbps Tier 0 PCM/FM, 40 Mbps, Tier I SOQPSK-TG, 37 Mbps Tier II Multi-h CPM   |
| Minimum Data Rates                          | 10 Kbps FM, 2 Kbps PM/PSK, 30 Kbps S/O/QPSK, 20 Kbps Tier 0 PCM/FM, 20 Kbps Tier I, SOQPSK-TG, 20 Kbps Tier II Multi-h CPM  |
| Embedded Bit Synchronizer                   | NRZ-L/S/M and Bi-Phase; de-randomizer; manual and auto-select loop bandwidths; user-selectable clock and data polarity  |
| Pre-d (70 MHz) Outputs                      | Linear (-10 +/- 2 dBm)  |
| Pre-d Diversity Combiner                    | User-selectable AM/AGC Optimal ratio or Best Source Select; >50 kHz Break Frequency; CH1/CH2 Balance Feature; >2.5 dBm improvement with equal signal input  |
| Pre-d Recording and Tape Playback           | Optional User-selectable 75 kHz to 15 MHz in 1 kHz increments   |
| Adaptive Equalization (AE)                  | AE option mitigates harsh multi-path environments using CMA and Decision Equalization   |
| Data Quality Encapsulation/Metric (DQE/DQM) | DQE/DQM option Source Selection by embedding data quality information within the PCM/FM and SOQPSK-TG demodulator formats   |
| RF Spectrum Analyzer                        | 3 RF spectral sweep displays with CF measurement and selectable span control; simultaneous displays during receiver and demodulator operation   |

## **POWER, PHYSICAL AND ENVIRONMENTAL**

|                    |   |
|--------------------|---|
| Power Requirements | 5U Ruggedized Hardigg Case (TRT400/TRT300); 3U Hardigg Case (TRT200/TRT200) |
| Temperature        | 90-265 VAC, 50-60 Hz; Auto-Ranging  |
| Humidity           | 0° to 50 ° C Operating; -20° to +70° C Storage                              |
| Altitude           | Up to 95% non-condensing  |
| EMI                | Up to 30,000'   |
|                    | Designed to meet MIL-STD 461  |

## **TRANSMITTER CHARACTERISTICS**

|                        |   |
|------------------------|---|
| Power Output (Analog)  | 2W, 5W, 10W, or 15W (dependent on link margin analysis); PCM/FM and PM/PSK  |
| Power Output (Digital) | Optional Multi-Mode 5W, 10W or 20W; PCM/FM, PM/PSK and/or IRIG 106-15 ARTMS |
| Power Requirements     | 12 VDC or 90-265 VAC; 50-60 Hz  |

Contact the Factory for detailed specifications applicable to specific model numbers and configurations

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