

T400TSS

Telemetry Signal Simulator

The RT Logic 400 Telemetry Signal Simulator (T400TSS) is a modular software-defined telemetry simulator, command formatter, and signal generator. The system's flexible architecture allows the T400TSS to support many different signal simulation missions using an extensive standard feature set. All signal processing is performed in software and Field- Programmable Gate Arrays (FPGAs). The system is capable of telemetry simulation or command uplink processing. Standard operating frequencies include S-band and L-band, 70 MHz, and baseband. Other frequency bands are supported through options.

Application

The T400TSS is well suited for testing telemetry subsystems within satellite and range ground stations, missile and satellite factories, and calibration laboratories. The T400TSS can be a replacement for legacy telemetry signal simulators or for new simulation applications. Multiple, independently controlled channels (or modulators) in the T400TSS provide multi-channel simulation capability. The T400TSS provides up to four individual channels, each with its own data source (all four exist within a 150 MHz Bandwidth). The standard packaging is a 2U high, 19-inch, rack-mount unit, with a 1U drawer with keyboard and flip-up monitor.

The highly modular and flexible architecture allows the T400TSS to support multiple encoding standards and modulation schemes, including FM, PM, FSK, BPSK, QPSK, OQPSK (SQPSK), UAQPSK, SOQPSK (MIL-STD and TG), and multi H-CPM. Continuous frequency (Doppler) sweeping with selectable offsets and rates enables receiver testing against expected signal dynamics. Variable amplitude profiles enable further receiver testing for acquisition and lock thresholds, Automatic Gain Control (AGC) performance, and fading performance. Amplitude and phase profiles can be combined for accurate and repeatable fading tests. A built-in Bit Error Rate Tester (BERT), with clock and data inputs, is included for standalone testing of telemetry receivers.

The T400TSS can be controlled through the local RT Logic Graphical User Interface (GUI), using either a local monitor or over Ethernet using a networked computer. The unit can also be controlled from third-party software applications using documented Ethernet interfaces to the T400TSS software.



Features

- ✓ L/S-Band, 70 MHz, baseband output frequencies standard, other bands optional.
- ✓ FM (TIER 0), PM, FSK, BPSK, QPSK, OQPSK (SQPSK), UAQPSK, SOQPSK (MIL-STD and TG (TIER 1)), mH-CPM (TIER 2) waveforms.
- ✓ BPSK subcarrier phase modulated onto a carrier.
- ✓ Command processing in SGLS (FSK/AM) and USB (BPSK Subcarrier) formats.
- ✓ PCM encoding (including NRZ-L, NRZ-M, NRZ-S, and BIO-L, BIO-M, BIO-S).
- ✓ Convolutional encoding (rate 1/2, K=7).
- ✓ Data rates up to 20 MSymbols/sec.
- ✓ Continuous Doppler simulation (20 MHz Range and greater than ± 100 kHz/sec Doppler rate).
- ✓ Integrated BERT and IF spectrum display.
- ✓ Local and remote control over IP (using GEMS protocol).
- ✓ Realistic simulation of propagation path effects when integrated with the T400CS Channel Simulator.



