# Tactical System Timer

Beyond Electronics Corporation's Tactical System Timer (TST) is a self contained, high accuracy time base for environments that must maintain accurate time in harsh conditions. The unit synchronizes to a system GPS time through an NMEA compatible interface. For systems that require synchronization to a local clock, software can be used to command the unit to synchronize its internal clock using NTP over a network interface. The time is read using a time management library.
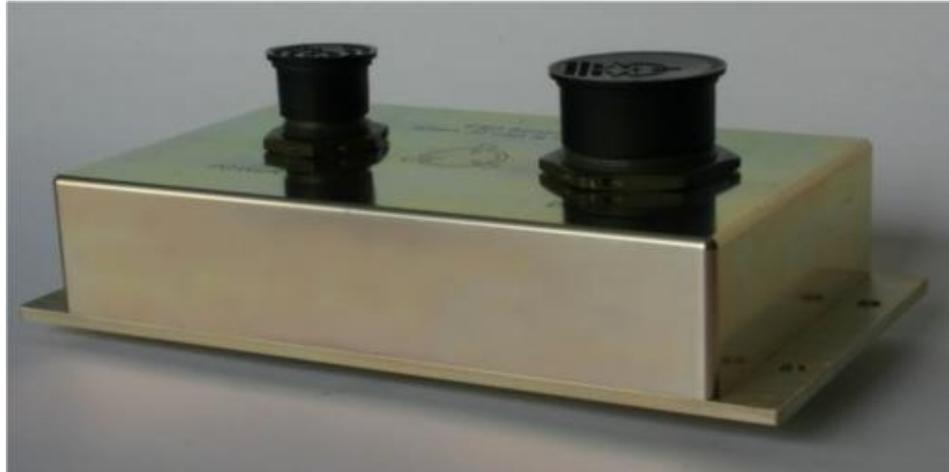
Features

- Automatic clock setting through GPS or Network Time Protocol (NTP)
- Manual clock setting through software
- Automatic unit self-calibration
- Automatic unit synchronization to a GPS clock source
- Automatic fail over to autonomous mode in the event GPS or NTP is no longer available
- Interfaces, through hardware, directly to GPS NMEA-0183 and PPS
- Tightly specified and highly stable Oven Controlled Crystal Oscillator (OCXO)
- 10/100/1000 Mbps Ethernet Interface
- 32 bit RISC processor, with real time operating system
- Design hardware and software can be field upgraded

Benefits

Time accuracy is guaranteed by a combination of digital filters and predictive algorithms. This enables the system to provide a host application or a system query a more accurate time than is possible by a single reading of GPS or NTP. Absolute frequency errors, temperature errors and aging errors are all managed by the timer's algorithms thus providing the most accurate possible time.

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The heart of the high precision TTS is a very low power, high density FPGA. By designing the majority of the hardware in a single FPGA, the system power consumption is reduced and the MTBF is significantly increased. In addition, the soft design allows field upgrades or hardware and software enhancements without removing the unit or opening the case.

The design contains a 32 bit RISC microprocessor, DMA engine, memory interfaces, Ethernet interface and an interface to the precision time unit.

The timer increases its accuracy as it acquires more time points. It contains circuitry that converges on the time as samples are taken. To avoid wide deviations in time, it rejects samples that are outside its current time window since it knows they cannot be valid.

The unit is factory configurable to various levels of precisions to meet the system cost/precision requirements.

TIME ACCURACY/RESOLUTION[1]

- ➢ Free Running Drift:
    - o 10 milliseconds in 72 hours
    - o 50 microseconds per hour
- ➢ Temperature drift: < 125 ns across temperature range of -32 to +65C
- ➢ Resolution: 1 ns
- ➢ Warm up time: 5 minutes maximum
- ➢ Full calibration time: < 30 minutes[2]

MECHANICAL AND ENVIRONMENTAL DATA

- ➢ Enclosure Dimensions, including mounting tabs and excluding the circular mil connectors: 177.8 x 92.71 x 33.66 mm
- ➢ Power: 28V DC nominal
- ➢ Operating Temperature: -40 to +85C
- ➢ Storage Temperature: -55 to +100C
- ➢ Shock: 40G ½ sine, 20 mS
- ➢ Random Vibration: $0.1g^2$/Hz 5-1000Hz
- ➢ Sine Vibration: 5g 32-2000Hz
- ➢ Humidity: 98% condensing
- ➢ Reliability data: 217-F, GB, 25C estimated to exceed 150,000 hours

ORDERING INFORMATION

TST - BaseTimer System
TST-Lib-Vx - VxWorks Interface Library
TST-Lib-Lx - Linux Interface Library
All library code is delivered in source form.

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[1] Accuracy for base unit. Higher accuracy is available.
[2] assuming a stable GPS lock of adequate time quality.

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