Entry-Level TTEthernet Evaluation System

Time-Triggered Ethernet Evaluation System with 100 Mbit/s – The Door-Opener to TTEthernet

Time-Triggered Ethernet – The Best of Real-Time Ethernet
TTEthernet extends and is fully compatible with IEEE 802.3 Ethernet. It integrates transparently with Ethernet networks using IP-based protocols. It takes advantage of design experiences with time-triggered systems in the transportation industry and provides a unique approach to real-time Ethernet networking. The TTEEvaluation System supports 100Base-TX Ethernet and enables hard real-time communication using a software implementation of the TTEthernet protocol on the end system. Regular Ethernet traffic sent over the same network does not influence determinism and synchronization of TTEthernet traffic.

Guaranteed Real-Time Performance and Determinism in Ethernet Networks
TTEthernet is inherently deterministic and has been designed for safe and highly available real-time applications. The TTEEvaluation System offers all TTEthernet features and supports the development of distributed real-time applications at entry-level pricing. The software-based TTEthernet protocol controllers use regular Ethernet hardware, showcasing that real-time Ethernet can be implemented on virtually any Ethernet-compliant hardware. The cost-efficient technology implementation can be used for most real-time applications, including industrial automation, transportation, medical, and energy production.

Build Scalable and Safe Ethernet Networks for Demanding Real-Time Applications
TTEthernet consolidates experiences and proven mechanisms used in aerospace design, automotive electronics as well as industrial automation. TTEthernet is a unique technological breakthrough that simplifies the design of highly available solutions and enables easy processing of data streams. It excels in large congestion-free transfers of parallel data streams and scales easily to safety- and mission-critical applications.
Open Environment for Hard Real-Time Ethernet Applications

TTEEvaluation System consists of:
- 1 TTEthernet switch with 8 x 100 Mbit/s ports based on Altera Cyclone III FPGA
- 4 end systems with regular Ethernet controller and software implementation of the TTEthernet protocol, including configuration software tools, manuals, Linux drivers for the TTEthernet protocol, development tools, and the libraries for the TTEthernet protocol implementation.

TTEEvaluation System enables mixed real-time and non-real-time Ethernet communication between up to eight nodes using 100Base-TX Ethernet. With this comprehensive package users can take advantage of innovative Ethernet-based architectures for on-board systems and infotainment applications.

TTEEvaluation System supports fault containment, thereby insulating failure and making the system safer than a general Ethernet network system. Whereas the faulty node is encapsulated, other nodes continue operation.

System Features
- TTEthernet switch with 8 x 100 Mbit/s ports
- 4 end systems with software-based TTEthernet communication controllers
- End systems available as embedded nodes (Freescale MPC855 CPU) or small Linux PC (Intel Atom CPU)
- Configuration software tools, manuals; Linux drivers, development tools, and libraries

TTEEthernet Switch Interfaces
- 8 Ethernet ports, 100Base-TX Physical Layer with TTEthernet capability; hard real-time switching based on TTEthernet configuration
- Additional interfaces can be added to the switch, subject to customer request:
  - Option: Gigabit monitoring Ethernet port, 1000Base-TX Physical Layer (no TTEthernet capability)
  - Option: 4 ports for gateway function with field buses (e.g. CANopen, PROFIBUS, TTP)
  - Option: 4 ports for I/O

Specifications
- Dimensions (mm): 170 x 121 x 55
- Switch weight: ca. 800 g
- Operating temperature: 0 °C – +70 °C
- Storage temperature: -40 °C – +85 °C
- Robust housing

TTEEthernet Switch Features
- Eight ports for Ethernet and TTEthernet communication up to 100 Mbit/s
- Configurable time-triggered switching schedule for real-time Ethernet traffic
- Hard real-time delivery for TTEthernet traffic
- Concurrent routing/ multicast capable – supports Virtual Links and rate-constrained traffic class
- Legacy Ethernet devices can communicate through the switch without knowing about TTEthernet
- Support for legacy Ethernet and best-effort delivery
- Compatible with all kinds of Ethernet traffic, e.g. TCP/IP-based protocols and applications (Note: VLAN and 802.1x support not included)
- TTEthernet-to-Legacy Ethernet routing
- Based on Altera Cyclone III FPGA

Software
- TTEthernet driver for Linux operating system
- TTEthernet protocol stack libraries
- Linux network interfaces for Legacy Ethernet Traffic
- Linux network interfaces for time-triggered Ethernet Traffic
- File system interface for TTEthernet traffic
- Demo application

Subject to changes and corrections.

For further information, including price and availability, contact products@tttech.com.