
Entry-Level Evaluation System for TTEthernet



TTEvaluation System 100 Mbit/s – The Door-Opener to Time-Triggered Ethernet Technology

TTEthernet – 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 TTEvaluation System 100 Mbit/s supports 100Base-TX Ethernet and enables hard real-time communication using a software implementation of the TTEthernet protocol on the end system computer. 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 TTEvaluation System offers all TTEthernet features and supports the development of distributed real-time applications at entry-level pricing. The software-based TTEthernet implementation of this evaluation system uses regular Ethernet controllers and Intel Atom CPUs, showcasing that real-time Ethernet can be implemented on virtually any Ethernet-compliant hardware. The cost-efficient technology implementation can be used for real-time applications such as industrial automation, transportation, and medical applications.

Build Scalable and Safe Ethernet Networks for Demanding Real-Time Applications

TTEthernet consolidates experience 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

^{TTE}Evaluation System 100 Mbit/s enables mixed real-time and non-real-time Ethernet communication. It consists of a ^{TTE}Development Switch with 8 x 100 Mbit/s ports and two Linux-based End System PCs with software implementation of the TTEthernet protocol as Linux driver. The system is extendable by additional ^{TTE}Development Switches in cascading mode, ^{TTE}End Systems or standard non-real-time Ethernet devices, such as PCs with Ethernet interface.

The included demonstration application shows the properties of TTEthernet additionally offered to standard Ethernet functionality and is intended to be a template for user specific real-time applications based on the TTEthernet technology. Since the TTEthernet driver is compatible with standard Ethernet traffic, existing applications can be migrated step-by-step to real-time applications.

^{TTE}Evaluation System 100 Mbit/s 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

- ^{TTE}Development Switch with 8 x 100 Mbit/s ports
- Two End System PCs (IBX-530W-ATOM, Asus Eee PC 900A) with software-based TTEthernet as Linux Driver
- Configuration tools, development tools, TTEthernet API (ANSI C), manuals
- Extendable demo application in source code

^{TTE}Development Switch, 100 Mbit/s Interfaces

- 8 Ethernet ports, 100Base-TX Physical Layer with TTEthernet capability; hard real-time switching based on TTEthernet configuration
- Compatible with all kinds of Ethernet traffic, e.g. TCP/IP-based protocols and applications (Note: VLAN and 802.1x support not included)
- 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, FlexRay)
 - Option: 4 ports for I/O
- Hardware Specifications (^{TTE}Development Switch)
 - Dimensions (mm): 170 x 121 x 55
 - Weight: ca. 800 g
 - Operating temperature: 0 °C – +70 °C
 - Storage temperature: -40 °C – +85 °C
 - Robust housing

Development/Configuration Tools

- ^{TTE}Load to update the ^{TTE}Switch
- Wireshark (including TTEthernet plug-in) for monitoring
- Tool for basic topology design, message routing and scheduling of time-triggered traffic

Embedded Software

- TTEthernet driver for Linux operating system:
 - Linux network interfaces for legacy Ethernet traffic
 - Linux network interfaces for time-triggered Ethernet traffic
- TTEthernet protocol stack libraries
- TTEthernet API (ANSI C),
- Demo application (ANSI C)

Subject to changes and corrections.

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

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