

TTE^EDevelopment System 100 Mbit/s

Entry Level Development System for TTEthernet



TTEthernet development systems allow the investigation of TTEthernet features and the development of distributed real-time applications. The entry-level product, offering 100 Mbit/s of bandwidth, represents a door opener to TTEthernet providing fault containment features at a competitive price.

TTEthernet is inherently deterministic and has been designed for safe and highly available real-time applications. The software-based TTEthernet implementation of this development system uses regular Ethernet controllers and Intel Atom CPUs, showcasing that real-time Ethernet can be implemented on any Ethernet-compliant hardware.

TTE^EDevelopment System 100 Mbit/s enables mixed real-time and non-real-time Ethernet communication. It consists of a TTE^EDevelopment 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.

It 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.

KEY FEATURES/BENEFITS

- 100 Mbit/s TTEthernet Switch with 8 ports
- Two Intel ATOM-based end system PCs
- Software-based TTEthernet as Linux driver
- Mapping the software-based TTEthernet buffers to Linux network device drivers
- Configuration and development tools
- TTEthernet API
- Real-time demo application in source code

The TTE^EDevelopment 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. Standard Ethernet traffic sent over the same network does not affect determinism and synchronization of TTEthernet traffic.

The system is extendable by additional TTE^EDevelopment Switches in cascading mode, TTE^EEnd Systems or standard non-real-time Ethernet devices, such as PCs with Ethernet interface.

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
- Real-Time demo application in source code
- Demo application configuration files for the TTE Switch and end systems

Interfaces

- 8 Ethernet ports, 100Base-TX Physical Layer with TTEthernet capability; hard real-time guarantees 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 Specification

- Dimensions: 170 x 121 x 55 (in mm)
- Weight: approx. 800 g
- Operating temperature: 0 °C to +70 °C
- Storage temperature: -40 °C to +85 °C
- Robust housing

Development/Configuration Tools

- TTE Demo Scheduler Tool for basic topology design message routing and scheduling of time-triggered traffic
- TTE Build for HWE specific generating configuration files for switch and end system
- TTE Load to update the TTE Switch
- TTE View Wireshark (including TTEthernet plug-in) for monitoring
- Make environment installed in the Eee PC, allowing the further development of TTEthernet demo application in a seamless way

Embedded Software

- TTEthernet driver for Linux operating system:
 - Linux network interfaces for standard Ethernet traffic implemented as Linux virtual network device driver
 - Linux network interfaces for time-triggered Ethernet traffic implemented as separated Linux network device driver
- TTEthernet protocol layer object files
- TTEthernet API (ANSI C)
- Demo application (ANSI C)
- Ethernet controller driver (ANSI C)

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- HE01.00.0

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