

# TTE<sup>DE</sup>Development System 1 Gbit/s

TTEthernet Development System 1Gbit/s for Linux



The TTE<sup>DE</sup> Development System with 1 Gbit/s and 2 channels enables hard real-time communication and event-driven Ethernet traffic on the same network. The standard Ethernet traffic runs in the background and can not influence determinism and synchronization of hard-real-time Ethernet transfers. The TTE<sup>DE</sup> Development System allows the exploration of TTEthernet features and the development of distributed real-time applications in a ready-to-run out-of-the-box system.

### Guaranteed Real-Time Performance and Determinism in Ethernet Networks

TTEthernet consolidates experiences and proven mechanisms used in aerospace design, automotive electronics and industrial automation. It excels in congestion-free transfers of parallel data streams and scales easily to critical and fault-tolerant applications.

### Open Environment for Hard Real-Time Ethernet Applications

This TTE<sup>DE</sup> Development System allows to benefit from quick design of complex real-time applications, innovative Ethernet-based architectures for on-board systems, high-availability and fault-tolerant networks, as well as infotainment applications.

### KEY FEATURES/BENEFITS

- High bandwidth, deterministic message transport, fault tolerance in dual channel configuration can be demonstrated
- Support for time-triggered, rate-constraint and best-effort Ethernet traffic
- Audio- and video streaming application
- Out-of the box pre-configured demo application - adaptable by the user
- On-site quickstart day and 1 year maintenance included

### TTEthernet Design Tool Suite

Design tools are used to capture system-level communication requirements and network topology. In a multi-step process configuration files for TTEthernet switches and end systems are generated. Finally, the design tools will be incrementally clustered around an open XML database, supporting the customer's unique work flow by a flexible combination of design steps.

### End System Controller Features

- Standard PCIe form factor end system for use in lab environments
- IEEE 802.3 Ethernet
- Supports 10/100/1000 Mbit/s full duplex Ethernet links
- Supports up to 3 channels
- PCIe 1.1 x4 Gen1 (2.5 Gbit/s)
- Two optical SFP modules included
- Software driver for Linux
- Compliant to TTEthernet 1.0 specification
- DMA support
- Support of ARINC 664 part 7 data reception
- Passive cooling

### TTEthernet Switch Features

- 12 full-duplex 1 Gbit/s Ethernet ports supported
- High-speed deterministic Ethernet for safety-critical real-time applications
- Robust partitioning between three traffic classes (time-triggered, rate-constraint and best-effort Ethernet traffic)
- Wide data paths - supporting internal bandwidth processing of 24 Gbit/s
- Full power of the TTEthernet switch IP
  - 8 subschedules
  - 4096 VL IDs
  - 1024 shared BAGs
- Clock synchronization at sub- $\mu$ s level

### Software Tools

- <sup>TTE</sup>Demo Scheduler for generation of the demo application schedules
- <sup>TTE</sup>Build Basic and <sup>TTE</sup>Build Network Configuration Plug-in to create device configurations for this lab setup
- <sup>TTE</sup>Load for loading switch configurations
- <sup>TTE</sup>View as viewing solution

### Demo Application Features

- Audio/video streaming
- Platform: Linux (Linux distribution: Ubuntu 8.04; Linux kernel version: 2.6.22)
- Background traffic over the switch (e.g. ping application with adjustable load)

### Demo Items

- 2 <sup>TTE</sup>Development Switches 1 Gbit/s with four SFP modules
- 4 <sup>TTE</sup>PCIe Cards (end system controllers)
- Comes with fixed time-triggered schedule (can be modified with tools for developing a prototype)
- Driver (Linux-based for standard PC) and API for PCIe-based end system controller
- Simple demo application

### PC System

- 4 Shuttle PCs SN78SH7 AMD
  - AMD Phenom II X2 processor
  - 1 x 1 GB DDR2-800
- 1 set of speakers
- 1 USB switch box
- 1 LCD
- 1 USB keyboard and 1 USB mouse

### Environmental Operating Range

- Lab equipment
- Operating temperature: 15 °C to 40 °C

### Power Supply

- AC voltage: 100 to 240 V, 60 to 50 Hz

### Order Number

- HE01.03.0: <sup>TTE</sup>Development System 2.0 (2 channels, 1 Gbit/s); to be ordered together with:
  - ME01.20.0: Software Maintenance Service for <sup>TTE</sup>Development System (2 channels, 1 Gbit/s)
  - SUE00.00.0: Support Package comprising one-day on-site installation quick-start and 32-hours on-demand off-site support

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