

## TTEPCI Card

*The 1 Gbit/s TTEthernet Network Board*



The **TTEPCI Card** brings the full power of time-triggered Ethernet communication technology to the PCI form factor. The TTEthernet technology enables hard real-time operation in distributed systems based on Ethernet networks.

### PCI Form Factor Pluggable Mezzanine Card

Three TTEthernet traffic classes are supported by **TTEPCI Card**:

- Time-triggered traffic with hard real-time guarantee and transport delay jitter in sub-microsecond range
- Rate-constrained traffic with guaranteed bandwidth (ARINC 664-based send and receive operation, no traffic shaping)
- Standard (COTS) Ethernet traffic

The **TTEPCI Card** network interface card implements the distributed fault-tolerant clock synchronization algorithm of TTEthernet in hardware.

**TTEPCI Card** is a PCI form factor pluggable mezzanine card for network communication. It combines the IEEE 802.3 Ethernet standard for Gigabit Ethernet with the safety-critical time-triggered technology of TTTech. **TTEPCI Card** enables real-time Ethernet communication between an embedded computer and **TTESwitches** for redundant channels in a safety-critical system.

### KEY FEATURES/BENEFITS

- Supports 1 Gbit/s full duplex Ethernet links
- Standard PCI form factor end system for use in lab environments
- Supports up to 3 channels using SFP connectors
- Altera Stratix IV (EP4SGX)
- Compliant to TTEthernet 1.0 specification
- Variant suitable for use in flight tests possible

### Compatible with IEEE 802.3 Ethernet

The card can be used in PCI plugged on various PCs or embedded systems for lab use or for field applications. It is built using a **TTEPMC Card** and a passive PCI carrier board.

**TTEPCI Card** transmits time-critical and safety-critical data in a secure way and according to a predefined schedule. Apart from that it is compatible with IEEE 802.3 Ethernet and enables data traffic with a bandwidth of up to 1 Gbit/s.

**TTEPCI Card** is available in a lab version supporting up to three SFP channels.

### Key Features

- Compliant to TTEthernet 1.0 specification
- Supports 1 Gbit/s full duplex Ethernet links
- Standard PCI form factor end system for use in lab environments
- Supports up to 3 channels using SFP connectors
- Altera Stratix IV (EP4SGX)
- 256 Mbit Flash
- Supported software driver (PCI / Linux)
- DMA Support
- JTAG support on board
- Conduction cooled board design

### Hardware Features

#### Form Factor

- 32 bit PCI

#### Connectivity

- Host Interfaces:  
32 or 64-bit 33 MHz PCI 3.3V
- Front Connectors:  
Up to 3 ports 100/1000 Mbit/s SFPs

#### Environment

- Lab environment
- Passive cooler

#### TTEthernet End System

- The FPGA implements the TTEthernet End System IP with 3 channels.

#### TTEthernet Connections

- Up to 3 Ports 1 Gbit/s SFPs
- Connectors as faceplate I/Os

### Dimensions

- Size: 212 x 127 (in mm)
- Weight: 350 g

### Bus Interfaces

- 32 bit 33 MHz PCI 3.3V

### Power Supply

- +12 V Supply from J2 connector
- +3.3 V Supply from J2 connector

### Environmental Operating Ranges

- Lab equipment
- Operating temperature: 0 to 40 °C
- Non-operating temperature: -40 °C to 100 °C
- Operating/Non-operating humidity:  
humidity level from 25 to 90 %

### Versions

- Basic Lab Version  
Lab Version with 3 SFP cages (no magnetics, no PHYs)
- Full ARINC 664 support  
As a future release, an ARINC 664 part 7 compliant End System variant is planned

### Software Support

- A Linux driver is available (64 bit/32 bit Linux).
- An optional LabView driver is available

### Packaging Contents

- TTEthernet PCI Card hardware board
- User Manual
- Linux driver

### Order Number

- HE11.01.0: Three 1000Base-SX SFPs (optical)
- HE11.02.0: Three 1000Base-TX SFPs (copper)
- SE10.02.1: <sup>TT</sup>PMC/XMC LabView

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