

## TTE PCIe Card

The 1 Gbit/s TTEthernet Network Board



The TTE PCIe Card brings the full power of time-triggered Ethernet communication technology to the PCIe (PCI express) form factor. The TTEthernet technology enables hard real-time operation in distributed systems based on Ethernet networks. TTEthernet hardware provides robust architecture level building blocks for integrating a deterministic high-speed fault-tolerant communication system.

### PCI Express Card for Network Communication

The TTE PCIe Card supports the three TTEthernet traffic classes:

- Time-Triggered traffic with hard real-time guarantee and transport delay jitter in sub-microsecond range
- Rate-constrained traffic (supporting ARINC 664 part 7 data reception) with guaranteed bandwidth
- Standard (COTS) Ethernet traffic

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

It is a PCI express (PCIe) card for network communication. TTE PCIe Card enables real-time Ethernet communication between an embedded computer and TTE Switches for redundant channels in a safety-critical system.

### KEY FEATURES/BENEFITS

- Compliant to TTEthernet 1.0 specification
- IEEE 802.3 Ethernet
- Supports 1 Gbit/s full duplex Ethernet links
- Standard PCIe form factor end system for use in lab environments
- PCIe 1.1 x4 Gen1 (2.5 Gbit/s)
- Supports up to 3 channels using SFP connectors
- Software driver for Linux
- DMA Support
- Support of ARINC 664 part 7 data reception
- Passive cooling
- Variant suitable for use in flight tests

### Compatible with IEEE 802.3 Ethernet

The card transmits time-critical and safety-critical data in a 100% deterministic 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 per connection.

TTE PCIe Card is built using a TTEXMC Card and a passive PCIe COTS carrier board. It can be used in PCI Express (PCIe) x4, x8, and x16 slots and is available in a lab version supporting three SFP channels. In its default configuration, the card is offered with a passive cooler.

## Hardware Features

### Form Factor

- PCI express x4 Card

### Connectivity

- Host Interfaces:  
PCIe 1.1 x4 Gen1 (2.5 Gbit/s)
- Front Connectors:  
3 ports 1 Gbit/s SFPs

### Environment

- Lab environment

### TTEthernet End System

- The FPGA implements the TTEthernet End System IP with 3 channels
- DMA controller allowing up to 120 Mbyte/s throughput on the host interface

### TTEthernet Connections

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

### Bus Interfaces

- PCIe

### Power Supply

- +12 V supply from J15 connector and
- +3.3 V Supply from J15 connector
- +12 V or +5 V over VPWR from J15 available on request

### 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 %

## Dimensions

- Size: 235 x 127 (in mm)
- Weight: 350 g

## 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

## Complementing Products

- TTEthernet Tools
- TTEthernet Switches

## Packaging Contents

- TTEthernet PCIe Card hardware board
- User Manual
- Linux driver
- Ports to other operating systems can be provided upon request

## Order Number

- HE05.02.1: Three 1000Base-SX SFPs (optical)
- HE05.03.1: Three 1000Base-TX SFPs (copper)
- SE10.02.1: <sup>TT</sup>EMC/XMC LabView

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