

TTE End System A664 Rugged (XMC)

The Ruggedized 10/100/1000 Mbit/s TTEthernet Network Board



The TTE End System A664 Rugged is equipped with three 10/100/1000 Mbit/s Ethernet P14 rear-I/O ports running at full-duplex speeds. The End System uniquely supports three standard traffic classes: Ethernet (IEEE 802.3), rate-constrained (ARINC 664 p7) and time-triggered (SAE AS6802) traffic in parallel on one physical infrastructure. The board operates under the harshest conditions: withstanding forces up to 40G, vibrations of 2000 Hz, temperatures of up to +85 °C while remaining fully operational at an altitude of 18,300 m (60,000 ft).

One Board – 3 Standardized Traffic Classes

The TTE End System A664 Rugged supports three standard Ethernet traffic classes:

- Standard Ethernet traffic(IEEE 802.3)
- Rate-constrained traffic (ARINC 664 p7)
- Time-triggered traffic with hard real-time guarantee and transport delay jitter in sub-microsecond range

Therefore the board is 100 % compatible to all standard (IEEE 802.3) Ethernet off-the-shelf components as well as ARINC 664 p7 system architectures. Furthermore the ruggedized XMC NIC implements the distributed fault-tolerant clock synchronization algorithm of TTEthernet in hardware.

KEY FEATURES/BENEFITS

- 10/100/1000 Mbit/s full-duplex Ethernet links with up to 3 channels over P14 rear-IO
- Standard XMC form factor end system for use in harsh environments MIL-STD-810G
- Fully compliant with Ethernet 802.3, ARINC 664 part 7 and Time-Triggered Ethernet (SAE AS6802)
- Supported software driver (PCI/Linux)
- DMA support
- Conduction cooled board design

Full Application Area Flexibility

The TTE End System A664 Rugged can be used in PCI, CPCI, VME, VPX and VXS; plugged on various PCs or embedded systems for deployment in ruggedized systems.

100 % Deterministic Data Transmission

The TTE End System A664 Rugged provides a fully in hardware implemented and therefore deterministic IP/UDP communication layer for critical traffic which offloads the host CPU.

Further unique features include a fixed latency and transmission jitter in the sub-microsecond range and unmatched bandwidth efficiency while maintaining full determinism (up to 95 % utilization of available network bandwidth).

Key Features

- Three configurable traffic classes
 - Standard Ethernet traffic (IEEE 802.3)
 - Rate-constrained (ARINC 664 p7) traffic
 - Time-triggered (SAE AS6802) traffic
- Three 10/100/1000 Mbit/s full-duplex Ethernet links over P14 rear-IO
- Standard XMC form factor end system for use in harsh environments MIL-STD-810G
- Supports up to 3 channels
- 128 send VLs, 512 receive VLs
- 1024 send COM ports, 4096 receive ports
- Redundancy management and rate-constraint traffic shaping fully implemented in hardware
- Profiled IP/UDP, sampled and queued ports
- IP/UDP handled on hardware
- ICMP handling
- DMA support
- JTAG support on board
- Conduction cooled board design
- Variant suitable for use in flight tests possible

Supported Standards

- IEEE 802.3
- ARINC 664 part 7
- SAE AS6802

Network Connectivity

- 3 ports 10/100/1000 Mbit/s Ethernet over P14 rear-IO

Hardware Connectivity

- Host Interfaces:
 - PCIe 1.1 x4 Gen1 (2.5 Gbit/s)
- P14 rear-I/O: Up to 3 ports 1 Gbit/s 1000Base-T

TTEthernet End System

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

Physical Specifications

- IEEE Standard 1386.1-2001 compliant
- Vita 42 Conduction Cooled XMC with faceplate I/O
- Size: 144 x 74 (in mm)
- Weight: 120 g

Power Supply

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

Power

- Power consumption: 7.5 W typ.

Environmental Operating Ranges

- Operational temperature: -40 °C to +85 °C
- Storage temperature: -55 °C to +105 °C
- Operating/non-operating humidity: 95 %
- Vibration (random, all axis): 0.1 g²/Hz, 15 Hz to 2000 Hz
- Operating shock: 40 g/11 ms half-sine
- Altitude above sea level: 18,300 m (60,000 ft)
- Environmental tests according to MIL-STD-810G (see test plan)

Packaging Contents

- TTEthernet XMC rugged card hardware board
- User Manual
- Driver CD

Software Driver Support

- Ubuntu Linux 14.04 LTS (64bit)
- Other drivers on request

Order Number

- 12106: ^{TTE}End System A664 Rugged (XMC)

Other Recommended Products

- ^{TTE}Build Device Configuration

Optional Products

- ^{TTE}Plan Starter
- ^{TTE}Build Network Configuration

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