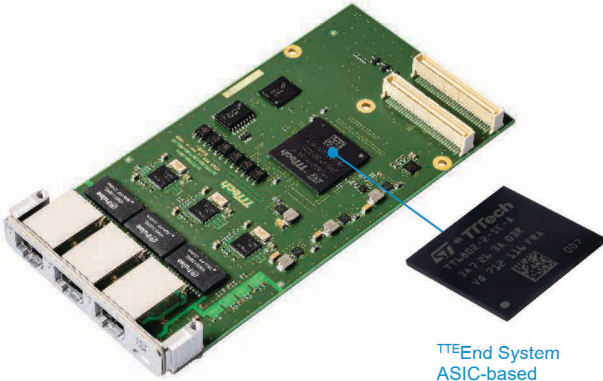




TTEnd System Lab Space (PMC)

TTEthernet® end system card based on the TTEnd System Controller HiRel ASIC



TTEnd System
ASIC-based

Key Benefits

- ✓ Deterministic Ethernet development platform for space applications
- ✓ Based on the TTEnd System Controller HiRel ASIC
- ✓ Three supported traffic classes
 - Ethernet (IEEE 802.3),
 - Rate-constrained (ARINC 664 part 7)
 - Time-triggered traffic (SAE AS6802)
- ✓ Three Ethernet channels, full duplex at 100/1,000 Mbit/s

The TTEnd System Lab Space (PMC) has been developed to support laboratory testing applications with Time-Triggered or Best-Effort Ethernet. With features like 1 Gbit/s speed and three supported traffic classes, it is the optimal end system solution for a large variety of application areas and especially suited for space programs. At its core is the TTEnd System Controller HiRel ASIC, which uses a state-of-the-art 65 nm radiation-tolerant technology integrated in a cost-efficient plastic package to simplify the migration from laboratory to flight hardware using the same end system silicon.

Non-synchronized and synchronized functions over Ethernet

TTEthernet permits the integration of synchronized and non-synchronized functions in Ethernet-based distributed systems. While hard real-time functions enjoy reserved bandwidth, full determinism and delivery jitter below 1 μ s, standard IEEE 802.3 Ethernet traffic operates without impact on time-critical and synchronized functions.

Virtual links and protocol support

The TTEnd System Lab Space (PMC) allows the configuration of up to 256 sending and 512 receiving virtual links (VLs). Virtual links can be configured with

8 priorities and a bandwidth allocation gap (BAG) of 0.5 ms to 1,600 ms. The configuration of the network is stored in the end system's non-volatile memory (NAND Flash 1 Gbit).

End system function

The TTEnd System Lab Space (PMC) includes:

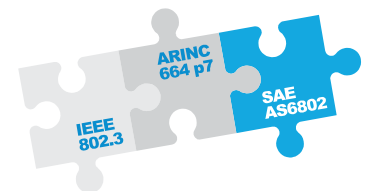
- The TTEnd System Lab Space (PMC)
- Documentation (User Manual)



Application Fields

- Laboratory development
- Space

End system controller features	<p>3x 100/1,000 Mbit/s full-duplex Ethernet links (up to three redundant channels)</p> <p>Supported standard traffic classes:</p> <ul style="list-style-type: none"> - IEEE 802.3 Ethernet - ARINC 664 part 7 - SAE AS6802 <p>Standard PMC form factor for use in lab environments</p> <p>Software driver for Ubuntu Linux 18.04 & CentOS 8</p> <p>Passive cooling</p>
Key features	<p>Standard PMC form factor</p> <p>256 send VLs, 512 receive VLs</p> <p>2,048 send COM ports, 4,096 receive ports</p> <p>Supports three channels (up to three planes)</p> <p>Flexible configurable periods (μs granularity)</p> <p>Redundancy management and rate-constrained traffic shaping fully implemented in hardware</p> <p>Profiled UDP, sampled and queued ports</p> <p>Diagnosis and status registers</p> <p>PCI bridge (<i>reduced throughput</i>)</p> <p>1 Mbyte on-chip RAM for frames and software</p> <p>1 Gbit Flash memory for storing configurations (optional)</p> <p>Pin programming (including parity)</p>
Connectors	<p>3 x 100/1,000 Mbit/s full-duplex Ethernet (100BASE-TX/1000BASE-T) via on-card RJ45 connectors</p> <p>PMC connectors</p>
Form factor	IEEE 1386.1-2001 PMC 149 x 74 (in mm)
Environmental operating ranges	<p>Air-cooled</p> <p>Operating temperature: 0 to 85 °C</p> <p>Storage temperature: -40 °C to +85 °C</p> <p>Operating/non-operating humidity: humidity level from 25 to 90%</p>
Power supply	<p>Through PMC interface</p> <p>+12 V supply from J2 connector</p> <p>+3.3 V supply from J2 connector</p>
Power consumption	Power consumption approximately 3 W
Order number	<p>13513: TTEnd System Lab Space (PMC) → TTEnd System Controller HiRel ASIC rev. 'B'</p> <p>13792: TTEnd System Lab Space (PMC) (rev.C) → TTEnd System Controller HiRel ASIC rev. 'C'</p>
Recommended additional services	<p>13056: TTETools 5 Starter</p> <ul style="list-style-type: none"> • TTEPlan (Starter) for generation of the demo application schedules • TTEBuild Device Configuration • TTEBuild Network Configuration (Starter) to create device configurations



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