TTESwitch Space 3U cPCI (EDU)

12-port TTEthernet® switch for lab use

Key Benefits

- 6x 1000BASE-T + 6x 100BASE-TX Ethernet ports, 16 Gbit/s total switching performance
- Safe partitioning between IEEE 802.3, rate-constrained, and time-triggered Ethernet traffic (SAE AS6802)
- Switch IP for up to 4,096 virtual links, up to 8 priorities
- Fault-tolerant high-speed communication with high bandwidth

The TTESwitch Space 3U cPCI (EDU) is a high-performance TTEthernet® switch specifically designed to meet the engineering needs during the development of space applications. TTEthernet simplifies the design of complex distributed systems and applications and allows safe processing of critical and non-critical Ethernet traffic on a single network.

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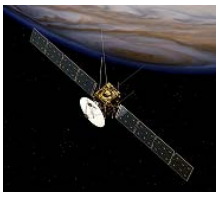
The TTESwitch Space 3U cPCI (EDU) forms the core of a TTEthernet network. The card is provided in a compact cPCI 3U form factor as an off-the-shelf product. TTEthernet permits the use of synchronized and non-synchronized functions of distributed systems in the same Ethernet network. System-critical hard real-time functions enjoy reserved bandwidth, full determinism, and delivery jitter below 1 µs. Thanks to a combination of SAE AS6802 time-triggered, rate-constrained, and IEEE 802.3 Ethernet, high transfer rates for non-critical data can be achieved at the same time, without impacting critical traffic. The switch has an internal frame memory of 512 kB to enable the storage of lower priority traffic while higher priority traffic is processed. Being manufactured and qualified using consumer-grade processes while providing full space-grade functionality, the card allows for an increased availability during critical development phases.

Built for Modular cPCI Architectures

The TTESwitch Space 3U cPCI (EDU) was designed for maximum ease of use and reduced development cost. In the development phase, it can be placed in a standard cPCI rack, enabling access to all interfaces via a rear-I/O break-out board. The power supply is set up according to PICMG 2.0 R3, while all Ethernet signals are provided at the cPCI J2 Connector and can be routed through a customized backplane for each specific use case.

Similarity to Flight Equipment

The TTESwitch Space 3U cPCI (EDU) is designed to be equivalent to the TTESwitch Space 3U cPCI (FLIGHT) in function and electrical properties.



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Application Fields

- Human Space Flight
- Telecommunication
- Earth observation
- Reconnaissance

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TTERear-I/O 3U cPCI (EDU)

To accelerate the creation of functionally equivalent avionics set-ups, the TTERear-I/O 3U cPCI (EDU)was developed. It can be used to efficiently interface with the TTESwitch Space and TTEEnd System Space 3U cPCI (EDU). Placed in a cPCI chassis with a Rear-I/O capable backplane, it provides access to all relevant functional interfaces of the cards, such as Ethernet RJ45 ports, QSPI, SpaceWire, and a debug interface.

Product Variants and Accessories

13866 – TTERear-I/O 3U cPCI (EDU)

Break-out board, to use the EDU products efficiently in an off-the-shelf chassis.

13587 - TTESwitch Space 3U cPCI (EDU) - H: Engineering model for development purposes, form, fit and function equivalent to PROTO/FLIGHT models equipped with Hypertronics Hypertac connectors.

14034 - TTESwitch Space 3U cPCI (EDU) - C: Engineering model for development purposes, functionally equivalent to PROTO/FLIGHT models; equipped with standard COTS cPCI connectors

Applicable Documents

PICMG 2.0 R3 – compact PCI® specification
S-311-P-822 – NASA specification, H-Variant connectors, PWB, 2 mm cPCI™ Style
ECSS-E-ST-40C – ECSS, Software

Connectors	cPCI Connector J1	cPCI Connector J2
	✔ Supply voltage (+3.3 V) ✔ PCI bus	✔ 6x 1000BASE-T + 6x 100BASE-TX Ethernet (magnetics not included) ✔ UART/DSU I/F for laboratory use
Environmental	**Designed for lab environments; do not use for flight environmental loads.** **Temperature range:** Suitable for room temperature range: +15 °C – +35 °C **EMC:** Compliant to PICMG 2.0 R3	
Power supply	Supply voltage: 3.3 V (according to PICMG 2.0 R3) Power consumption: < 14 W	
Dimensions	3U cPCI form factor (PICMG 2.0 R3), conduction-cooled (ANSI/VITA 30.1-2008)	
Mass	225 g	
Additional product variants	13551 - TTESwitch Space 3U cPCI (PROTO): Flight model design, but with reduced parts and process quality. 13267 - TTESwitch Space 3U cPCI (FLIGHT): Design qualified according to ECSS and acceptance-tested. Flight-grade model for safety-critical space applications.	

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