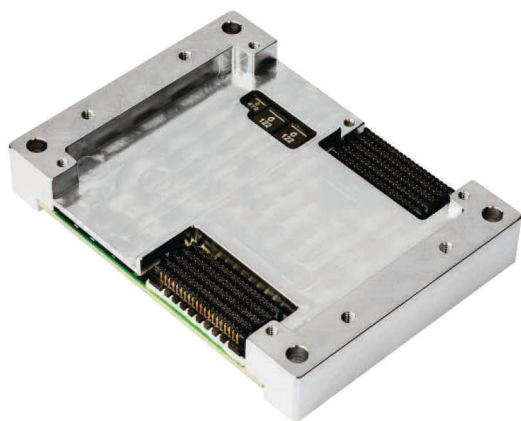**TTTech**

ᵀᵀᴱSwitch Module A664 Pro

The Certifiable 10/100/1000 Mbit/s TTEthernet Network Switch Module

Key Benefits

- ✓ RTCA DO-254/DO-178C DAL A certifiable switch module for use in flight programs
- ✓ RTCA DO-160G qualifiable switch module
- ✓ Fully compliant with Ethernet (IEEE 802.3), rate-constrained (ARINC 664 part 7) and time-triggered traffic (SAE AS6802)
- ✓ Safety assessment according to SAE ARP 4754/4761

The ᵀᵀᴱSwitch Module A664 Pro brings the full power of Deterministic Ethernet communication technology to aerospace certifiable hardware. TTEthernet technology enables hard real-time operation in distributed systems based on Ethernet networks with speeds up to 1 Gbit/s. The switch uniquely supports three standard traffic classes: Ethernet (IEEE 802.3), rate-constrained (ARINC 664 part 7) and time-triggered (SAE AS6802) traffic in parallel on one physical media.

Switching Function

The ᵀᵀᴱSwitch Module A664 Pro is a Deterministic Ethernet switch enabling the implementation of critical network-centric applications. The high-performance switch enables packet processing on all 24 ports with full line speeds:

- 6x 10/100/1000 Mbit/s ports
- 18x 10/100 Mbit/s ports
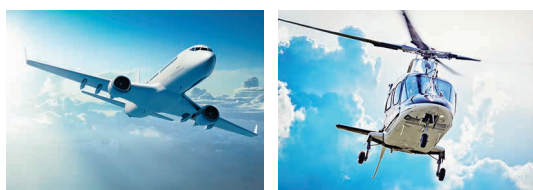- One additional mirroring port, 10/100/1000 Mbit/s

The TTEthernet technology of the ᵀᵀᴱSwitch Module A664 Pro allows for convenient configuration of deterministic processing of critical (time-triggered, ARINC 664 part 7) and non-critical Ethernet traffic.

Virtual Links and Protocol Support

The ᵀᵀᴱSwitch Module A664 Pro allows configuration of up to 4,096 virtual links (VLs). Virtual links can be configured with 8 priorities and a bandwidth allocation gap (BAG) of 0.5 to 1,600 ms. The configuration of the network is stored in the switch's non-volatile memory (256 Mbit). As an option, IEEE 802.1Q VLANs can be configured. Profiled IP/UDP, redundancy management, and traffic shaping are implemented in the hardware. A built-in TMS 570 CPU is used for management and higher-layer protocol functions.
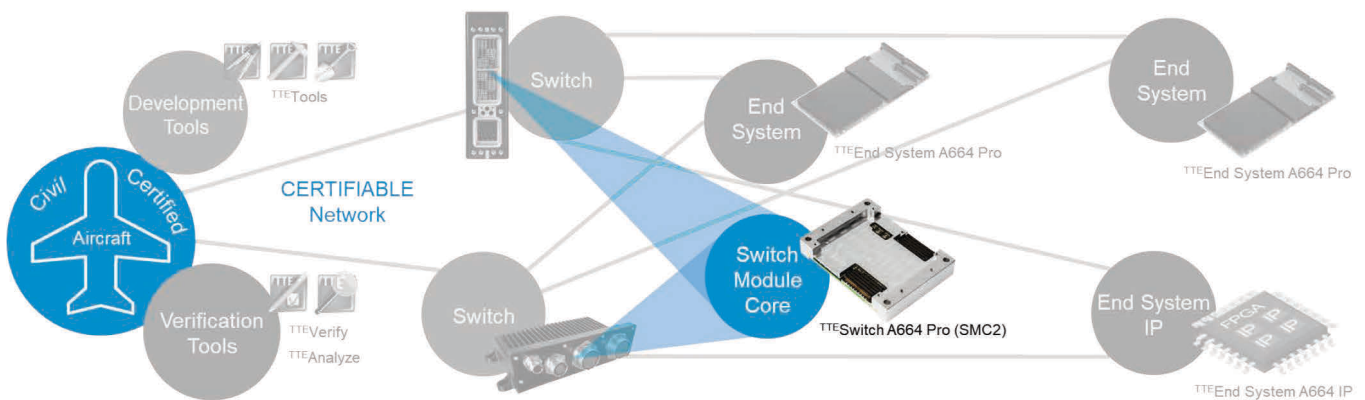
Data Loading and Diagnosis

The built-in management module runs on a separate CPU and allows for data loading as well as for querying the network status via SNMP. Data loading is done according to ARINC 615A-3.

Application Fields

- Aircrafts
- Rotorcrafts

www.tttech.com

Switch Capabilities	– Time-Triggered (SAE AS6802) Implementation
	✓ 8 sub-schedules
	✓ 8 clock sync masters
	✓ 4,096 virtual links
	✓ Store-and-forward switch architecture
	– ARINC 664 part 7 Implementation
	✓ Policing, filtering, switching engine for band-width control and traffic prioritizing
	✓ Integrity and error checking of frames
	✓ 4,096 virtual links with up to 8 priorities with restrictions of their associated ports
	✓ 4,096 shared bandwidth allocation gaps (BAGs)
	✓ BAGs freely configurable from 0.5 to 1,600 ms
	✓ BAG configuration granularity 100 µs
	✓ Jitter & BAG resolution of 8 ns
	✓ SNMP v1 & ICMP fully supported
	✓ Configuration data programmable via ARINC 615A-3
	– Diagnosis and status registers
	– Embedded CPU for BITs
	– Ability to store BIT status and error logging information
Certifiability	– Switch module core hardware RTCA DO-254 DAL A
	– Embedded software RTCA DO-178C DAL A
	– Environmental ratings RTCA DO-160G
	– Safety assessment according to SAE ARP 4754/4761
Supported Standards	– IEEE 802.3-2005 (switching, flow control)
	– IEEE 802.1Q (VLAN core capabilities)
	– ARINC 664 part 7 (fully compliant)
	– SAE AS6802
Network Connectivity	– 6x 10/100/1000 Mbit/s full-duplex Ethernet (via QSGMII)
	– 18x 10/100 Mbit/s full-duplex Ethernet (via QSGMII)
	– 1x 10/100/1000 Mbit/s Ethernet Mirroring (via QSGMII)
Dimensions	– Size: 94.4 x 70 x 14.5 mm
	– Height: < 3.5 mm
	– Weight: approx. 131 g
Power Supply	– +3.3 V
Power Consumption	– < 7.7 W (at operating temperature of +90° C at the thermal interface)
Environmental Operating Ranges	– Operating temperature range: -40° C / +85° C (ambient temperature on switch box)
	– Altitude: 15,200 m (50,000 ft) MSL
	– Relative humidity: 95% +/- 4%
	– Environmental tests: DO-160G compliant
Order Number	– Available on request

TTTech Europe, Austria
(Headquarters)
Phone: +43 1 585 34 34 0

TTTech North America Inc.
Phone: +1 978 933-7979

TTTech Japan
Phone: +81 52 485-5898

products@tttech.com   www.tttech.com