^{TTE}End System A664 Core IP

The Certifiable 10/100/1000 Mbit/s TTEthernet® End System IP

Key Benefits

- RTCA DO-254 DAL A certifiable end system Core IP for use in flight programs
- Compliant with Ethernet (IEEE 802.3), rate-constrained (ARINC 664 part 7) and time-triggered traffic (SAE AS6802)
- Support of 10/100/1,000 Mbit/s on both network and host interface
- Certification Data Package available

^{TTE}End System A664 Core IP is a RTCA DO-254 DAL A certifiable solution which can be used in avionics systems. Modern host interfaces together with a state-of-the-art hardware platform allow the transmission of safety-critical data with up to 1 Gbit/s speeds over avionics data networks, enabling optimization of size, weight and power of the system.

Three traffic classes on one chip

The ^{TTE}End System A664 Core IP supports three traffic classes:

- IEEE 802.3 Ethernet traffic
- ARINC 664 part 7 traffic
- Time-triggered SAE AS6802 traffic with hard real-time guarantee and transport delay jitter in sub-microsecond range.

Up to 1 Gbit/s of safety-critical traffic

Two GMII network interfaces together with the high-speed host interface (AXI4) allow the transmission all three traffic classes over the network with up to 1 Gbit/s speeds in a deterministic way. Additionally, the SAE AS6802 traffic class provides fixed transmission latency and jitter in the sub-microsecond range and unmatched bandwidth efficiency while maintaining full determinism (up to 95% utilization of available network bandwidth). GMII interfaces (in possible triplication mode) allow the integration of ^{TTE}End System A664 Core IP in dual fault-tolerant networks.

Diagnostic and health monitoring

The ^{TTE}End System A664 Core IP contains self-diagnostic and health monitoring capabilities such as configuration and frame memory protection mechanisms, configurable scrubbing rates, continuous Built-In Tests, etc. All these allow the use of the IP in different environmental and radiation conditions.
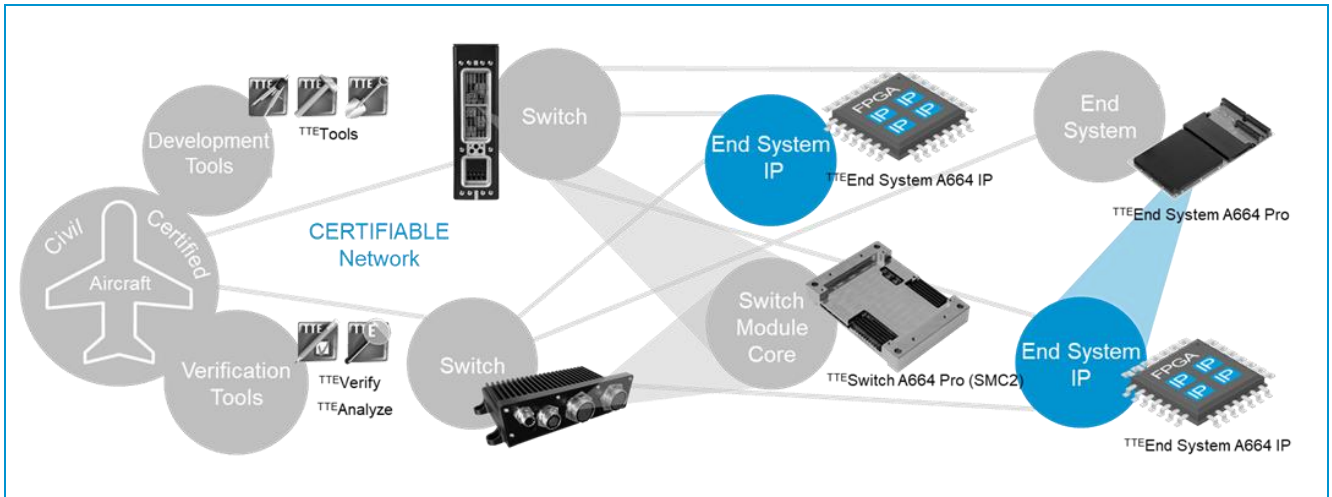
SWaP optimization

The possibility to utilize MPSoC platforms allows the integration of the ^{TTE}End System A664 Core IP solution on high circuitry density PCBs. This provides flexibility in the hardware design and leads to significant SWaP improvements.

Application Fields

- Technology evaluation
- Architecture development
- Flight programs

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General Product features	– Firm IP delivered as a netlist (target FPGA Xilinx US+ Family)
	– IP size: ~30,000 LUTs
	– Three configurable traffic classes: Best Effort, Rate Constrain, Time Triggered
	– Parametrization:
	   o 256 Tx VLs
	   o 2048 Rx VLs
	   o 1,024 output ports
	   o 4,096 input ports
	– Interfaces:
	   o Host interface: AXI4, 32-bit at 125 MHz
	   o Network interface: supports two GMII channels configurable in 10/100/1000 Mbps
	   o APB status/control
	   o On chip RAM interface for frame data, configuration data, status information
	– Fault-tolerant distributed clock synchronization algorithm in compliance with the Time-Triggered Ethernet standard
	– Integrity checking and redundancy management compliant with ARINC 664 P-7
	– Traffic shaping in compliance with ARINC 664 P-7
	– IP Fragmentation / Reassembly supported for message of size up to 8192 bytes
	– Support for queuing and sampling ports.
	– Independent memory partitions: 2
	– Reliability: CRC, ECC protection support

Standards compliance	– IEEE 802.3 – ARINC 664 part 7 – SAE AS6802A

Documentation	– ^{TTE}End System A664 Core IP Hardware Integration Manual
	– ^{TTE}End System A664 Core IP Example Implementation of Integration Cases
	– ^{TTE}End System A664 Core IP Qualitative FMEA
	– ^{TTE}End System A664 Core IP Errata
	– ^{TTE}End System A664 Core IP ICD
	– ^{TTE}End System A664 Core IP Release notes
	– DO-254 certification package (optional)
	   o ^{TTE}End System Core IP PHAC
	   o ^{TTE}End System Core IP HRD
	   o ^{TTE}End System Core IP HCI
	   o ^{TTE}End System Core IP HAS

Order Number	14689 - ^{TTE}End System A664 Core IP Pro, Project License 14688 - ^{TTE}End System A664 Core IP Pro Certification Data Package, Project License 15164 - ^{TTE}End System A664 Core IP Pro, Integration Package
Recommended products	13380 - ^{TTE}End System A664 Core IP Pro Integration Kit 13822 - Project services for driver support (baremetal, RTOS)

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