# TE2 Communication Modules Time-Triggered Ethernet Function Modules

Time-Triggered Ethernet / ARINC 664 Part 7 (AFDX®) / IEEE 802.3 Ethernet Deterministic Communications

Module TE2 is one of NAI's latest generation of advanced function Configurable Open Systems Architecture™ (COSA®) compatible modules. The TE2 is a certifiable, single-port, tri-redundant, deterministic Ethernet communications interface module that supports TTTech's certifiable TTEthernet® End System product consisting of three traffic classes: SAE AS6802 (Time-Triggered Ethernet), ARINC 664 Part 7 (Avionics Full-Duplex Switched Ethernet (AFDX®), and/or IEEE 802.3 best-effort protocol. By supporting all three traffic classes, NAI's TE2 is the ideal solution for current users of IEEE 802.3 Ethernet, who plan to upgrade to Deterministic Ethernet (ARINC 664 Part 7 (AFDX®) or Time-Triggered Ethernet SAE AS6802) protocols in the future at any time without changing hardware.

The key feature of the TE2 module is TTEthernet's ability to support all three protocols as required with triple-redundancy. IEEE 802.3 Ethernet is ubiquitous and has been the standard for many years. It provides best-effort data delivery, but does not provide any guarantee that the data was delivered or that the data was delivered in the sequence that it was sent. Deterministic Ethernet provides safety and mission critical quality of service in data transmission and reception: in the case of ARINC 664 Part 7, data sent from the TE2 through a policing AFDX® or TTE® switch is transmitted with bounded latency and jitter (millisecond precision); in the case of SAE AS6802, data sent from the TE2 through a policing TTE® switch is precisely scheduled with the highest priority and is transmitted at precise times with microsecond precision.

The TE2 module is currently supported on 67PPC2 and 68PPC2 (PowerPC T2080) with Wind River® VxWorks® 653 3.x or DDC-I Deos™. Also available on the 68G5P for 3rd party SBC boards. Contact factory for support.

TE2 TTE (SAE AS6802) / ARINC 664 Part 7 (AFDX®) / IEEE 802.3 GbE
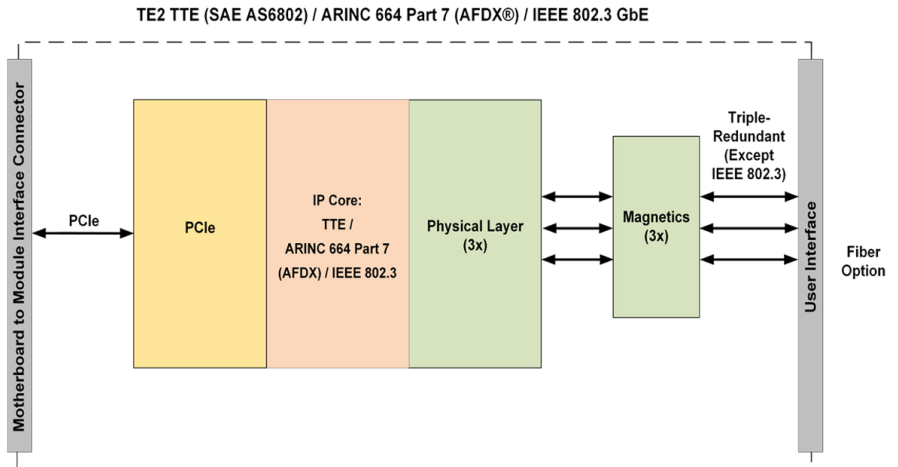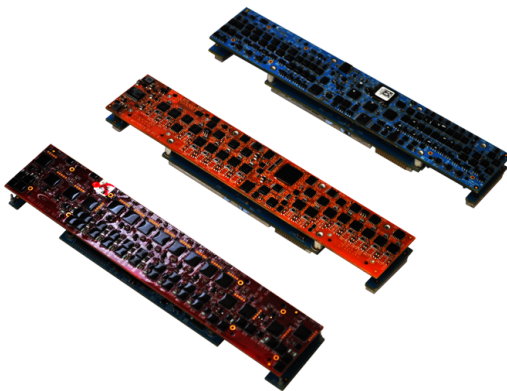
Features

- Three modes of Ethernet operation:
    - IEEE 802.3
    - ARINC 664 part 7 (AFDX®)
    - SAE AS6802 TTE
- Single-port, triple redundant Ethernet Module that supports each protocol
- Supports 10/100/1000 Mbps Ethernet
- Supported on 67PPC2 & 68PPC2 (PowerPC T2080) with Wind River® VxWorks® 653 3.x or DDC-I Deos™
- Available on the 68G5P for 3rd party SBC boards; contact factory for support

TE2 Data Sheet
Rev B

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07-10-2023
Page 1 of 2

Specifications

Communication	PCIe Gen II (5.0 Gbps) Endpoint
Protocols	IEEE 802.3; ARINC 664 Part 7 (AFDX®); SAE AS6802 (Time Triggered Ethernet). Based on TTTech's TTEthernet®
Ethernet Standards IEEE 802.3	10BASE-T, 100BASE-T, 1000BASE-T

ARINC 664 Part 7 (AFDX) / SAE AS6802 (Time-Triggered Ethernet) Comparison

Both ARINC 664 Part 7 (AFDX®) and SAE AS6802 (Time-Triggered Ethernet) provide time-critical, safety-critical data transmission and receipt sent through a single-port, tri-redundant Ethernet module that can be optimized for specific applications. Major features of ARINC 664 Part 7 (AFDX®) and SAE AS6802 (Time-Triggered Ethernet) are listed below.

	ARINC 664 Part 7	SAE AS6802
Transmission	Asynchronous	Synchronous
Jitter	up to 2 ms	~ 1 µs
Latency (typical)	1-10 ms	< 12.5 µs/switch

Architected for Versatility

NAI's Configurable Open Systems Architecture™ (COSA®) offers a choice of over 100 smart I/O, communications, or Ethernet switch functions, providing the highest packaging density and greatest flexibility of ruggedized embedded product solutions in the industry. Preexisting, fully-tested functions can be combined in an unlimited number of ways quickly and easily.

One-Source Efficiencies

Eliminate man-months of integration with a configured, field-proven system from NAI. Specification to deployment is a seamless experience as all design, state-of-the-art manufacturing, assembly and test are performed - by one trusted source. All facilities are located within the U.S. and optimized for high-mix/low volume production runs and extended lifecycle support.

Product Lifecycle Management

From design to production and beyond, NAI's product lifecycle management strategy ensures the long-term availability of COTS products through configuration management, technology refresh and obsolescence component purchase and storage.

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Page 2 of 2