TTC 2700 Family

High-end off-highway safety electronic control units

Key benefits

- ✔ Future proof high-performance Infineon AURIX™ TriCore™ CPU 300 MHz, 6 cores (4 lockstep cores) and Hardware Security Module
- ✔ C-programming API with multicore real-time operating system
- ✔ Mixed-criticality support for efficient application development and validation
- ✔ 8 x CAN FD interfaces
- ✔ 2 x 100BASE-T1 / -TX Ethernet interfaces via dedicated 2-port HSD connector
- ✔ 3 x status LEDs integrated into the housing
- ✔ Up to 80 A total load current

TTC 2700 is TTControl's largest ECU Family and consist of robust and versatile control units, designed specifically for the demanding off-highway industry. The ECU with its powerful 2nd generation Infineon Aurix multi-core lockstep CPU is designed for use in complex safety and security-relevant mobile machinery applications. The product variants TTC 2740 and TTC 2785 fulfill safety requirements up to SIL 2 (IEC 61508), PL d (EN ISO 13849), AgPL d (ISO 25119), ASIL C (ISO 26262) and MPL d (ISO 19014) and are TÜV Nord safety certified.

Multicore real-time operating system

The TTC 2700 product family incorporates a real-time operating system (PXROS) that offers robustness and responsiveness for applications. The product can be programmed using either C or CODESYS©* Safety SIL 2. To be mentioned that the system supports mixed-criticality scenarios, allowing safety-related and non-safety-related code to execute on the same CPU without compromising overall safety levels. As a result, this approach reduces development costs for mobile machinery electronics and accelerates time-to-market.

Extensive and configurable I/O set

The TTC 2700 provides up to 130 highly configurable I/Os, which can be initialized at the application level as different types of inputs or outputs. In addition to analog and digital timer inputs, the Electronic Control Unit (ECU) is also equipped with High-Speed Pulse Width Modulation (HS PWM) and Proportional Valve Group (PVG) outputs. This comprehensive I/O capability ensures precise control over the various hydraulic valves used in off-highway machinery, making the TTC 2700 an ideal solution for hydraulics control.

As part of the design, the system incorporates multiple current measurement feedback loops and plausibility checks. These features enable runtime self-diagnosis of the vehicle and support various safety architectures. Additionally, for connecting smart sensors, up 4 x SENT interfaces (compliant with the SAE J2716 standard) with Short PWM Code* (SPC) support are available. This allows cost-efficient transmission of sensor data to the ECU.

Application fields

- Agricultural machines
- Construction / material handling machines
- Municipal vehicles

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Furthermore the ECU includes dedicated LED outputs, enabling control of the vehicle's LEDs. Additionally, it features 6 x full H-bridge* interfaces for controlling electric motors.

High-speed communication interfaces

In addition to the 8 x CAN FD interfaces with a bit rate of up to 2 Mbit/s, which support Wake-Up over CAN and ISOBUS compatibility, the TTC 2700 is also equipped with 2 x LIN interfaces and two traditional Ethernet interfaces. These Ethernet options include either 100BASE-TX or automotive Ethernet (100BASE-T1), all accessible via dedicated high-speed signal connectors.

Extended software feature set

The TTC 2700 system supports TCP/IP and UDP/IP communication, allowing integration into various Ethernet architectures. To ensure efficient memory management, data logging, and configuration, a filesystem is provided. Additionally, the bootloader is compatible with the Unified Diagnostic Services (UDS), enabling standardized vehicle diagnosis and software updates.

In emergency situations, up to three safety groups of freely assignable output pins can be deactivated via an external switch. This feature facilitates the straightforward and cost-efficient implementation of an emergency button for the machine.

Variant overview

	TTC 2740	TTC 2785
CPU	Infineon Aurix™ TriCore™ TC399 300 MHz, 6 cores (4 lockstep cores) 6,47 MB int. SRAM, 16 MB int. Flash, 32 MB ext. serial Flash	
	-	8 kB ext. FRAM
	1 MB int. EEPROM emulation	
	Hardware security module	
Interfaces	8 x CAN FD up to 2 Mbit/s (1 x CAN ISOBUS compliant; 1 x CAN wake)	
	2 x 100BASE-T1 up to 100 Mbit/s	2 x 100BASE-TX up to 100 Mbit/s
	2 x LIN serial interface	
Number I/Os	68 Out, 62 In (40x HS PWM 4A and 6x with 8A; 8 x SENT)	
H-bridge	-	6 x full H-bridge * interfaces for electric motor control
Sensor supply	1 x sensor supply 5 - 12 V / max. 2.5 W / configurable by software in 0.5 V steps	
	4 x sensor supplies 5 V / max. 500 mA	
Internal	Internal monitoring of board temperature, sensor supply and supply voltage Power-On via Terminal	
	3 x independent shut-off groups for output stages	
Software	C-Programming with PXROS multicore real-time operating system	
	Hardware Security Module firmware **	
	CODESYS© Safety SIL 2 including support for CANopen Safety Master *	
Functional Safety	IEC 61508:2010 SIL 2 / EN ISO 13849:2015 PL d / ISO 25119:2018 AgPL d / ISO 26262	

*upcoming feature   **licensed feature

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