

TC1796

Highly Integrated 32-bit TriCore™-based Next Generation Microcontroller for Automotive Applications



The TC1796 - member of the AUDO-NG family - is optimized for highly demanding applications where embedded real-time performance and DSP capabilities combined with an extremely fast interrupt response time and highest level of fault tolerance are needed. AUDO-NG is based on the award-winning unified 32-bit TriCore™ architecture combining RISC, CISC and DSP functionality in a single chip. New innovative peripherals like the Micro Second bus, fast analog-to-digital converter unit or the Micro Link Interface as well as the advanced triple bus structure boosting the overall system performance turn the TC1796 into the most powerful 32-bit microcontroller in the automotive arena.

Applications

- Automotive engine and transmission control
- Automotive by-wire control systems
- Industrial robotic control

Features

- High performance 32-bit super-scalar TriCore™ V1.3 CPU with 4 stage pipeline
 - Superior real-time performance
 - Strong bit handling
 - Fully integrated DSP capabilities
 - Single precision floating point unit (FPU)
 - 150 MHz at full automotive temperature range
- 32-bit Peripheral Control Processor with single cycle instruction (PCP2)
- Memories
 - 2 MByte embedded program flash with ECC
 - 128 KByte data flash for scalable 16 KByte EEPROM emulation
 - 192 KByte on-chip SRAM
 - 16 KByte instruction cache
- 16-channel DMA controller
- 32-bit external bus interface unit with synchronous burst flash access capability
- Sophisticated interrupt system with 2 x 255 hardware priority arbitration levels serviced by CPU and PCP2
- High performing triple bus structure
 - 64-bit local memory buses to internal flash and data memory
 - 32-bit system peripheral bus for interconnections of on-chip peripherals and further functional units
 - 32-bit remote peripheral bus serving the requirements of high speed peripherals

- Two Micro Second bus interfaces (MSC) for port expansion to external Power ASICs
- Two general purpose timer array modules plus separate LTC array with a digital signal filtering and timer functionality to realize autonomous and complex I/O management (GPTA4)
- Two asynchronous/synchronous serial channels with baud rate generator, parity, framing and overrun error detection (ASC)
- Two high speed synchronous serial channels with programmable data length and shift direction (SSC)
- Two high-speed Micro Link Interfaces for serial inter-processor communication (MLI)
- MultiCAN module with four CAN nodes and 128 free assignable message objects for high efficiency data handling via FIFO buffering and gateway data transfer; one CAN node with TTCAN functionality
- 4-channel fast analog-to-digital converter unit (FADC) with concatenated comb filters for hardware data reduction; 10-bit resolution/min. conversion time 280 ns
- Two 16-channel analog-to-digital converter units (ADC) with 8-bit, 10-bit or 12-bit resolution
- 44 analog input lines for ADC and FADC
- 123 digital general purpose I/O lines, 4 input lines
- Digital I/O ports with 3.3 V capability
- On-chip debug support OCDS level 1+2 (CPU, PCP, DMA)
- Dedicated emulation device chip for multicore debugging, tracing and calibration via USB 1.1 interface (TC1796ED)
- Power management system
- Clock generation unit with PLL
- Supply Voltage 1.5 V
- I/O Voltage 3.3 V
- Full automotive temperature range -40° to +125°C
- P-BGA-416 package

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TC1796 Block Diagram



TC1796 The Most Innovative Solution for High-end Engine and Transmission Control

Diesel & Gasoline Engine Control

- Reduced emission levels
- Better engine behavior
- Less fuel consumption

Automated Transmission Control

- Better acceleration
- More comfort
- Less fuel consumption

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