

# TC 1775 Advanced 32-bit TriCore™-based Microcontroller for Automotive Embedded Control Applications

The AUDO™ architecture is driven by the demanding requirements of powertrain systems. This architecture is easily applicable to other embedded control application areas such as safety and body control.

KEY FEATURES		KEY BENEFITS
<b>Triple-layer AUDO™ Architecture</b>	<ul style="list-style-type: none"> <li>■ Separate application, transfer and physical layers</li> <li>■ Hardware in dependency of application software</li> </ul>	<ul style="list-style-type: none"> <li>■ Clear software architecture</li> <li>■ High software portability</li> <li>■ Improved software quality</li> <li>■ IP protection</li> <li>➤ Reduced system development time and cost</li> </ul>
<b>32-bit TriCore™ CPU</b>	<ul style="list-style-type: none"> <li>■ High-performance 32-bit super-scalar RISC CPU</li> <li>■ Superior real-time performance</li> <li>■ Strong bit handling</li> <li>■ Fully integrated DSP capabilities</li> </ul>	<ul style="list-style-type: none"> <li>■ Excellent high-level language support</li> <li>■ Designed for RT embedded control</li> <li>■ Digital signal analysis</li> <li>➤ High system performance</li> </ul>
<b>32-bit I/O processor (PCP)</b>	<ul style="list-style-type: none"> <li>■ Intelligent DMA controller</li> <li>■ Logical and arithmetic operation support</li> </ul>	<ul style="list-style-type: none"> <li>■ I/O processor for autonomous peripheral management</li> <li>➤ Zero TriCore™ CPU load for peripheral management</li> </ul>
<b>POWERFUL ON-CHIP PERIPHERALS</b>		
<b>GPTA®</b>	<ul style="list-style-type: none"> <li>■ Input signal conditioning and analysis</li> <li>■ Digital PLL function</li> <li>■ Capture/compare</li> <li>■ Flexible timer array</li> </ul>	<ul style="list-style-type: none"> <li>■ Largely autonomous operation</li> <li>■ Scalable functionality to maximize use of system resources</li> <li>■ Emergency functions</li> </ul>
<b>TwinCAN™</b>	<ul style="list-style-type: none"> <li>■ 2 CAN modules</li> <li>■ 32 message objects, assignable</li> </ul>	<ul style="list-style-type: none"> <li>■ Configurable gateway functionality without CPU overhead</li> </ul>
<b>2 ADCs</b>	<ul style="list-style-type: none"> <li>■ 2 16 fast channels (8-, 10-, 12-bit res.)</li> <li>■ Multiple conversion request modes including concurrent &amp; synchronous conversion modes</li> </ul>	<ul style="list-style-type: none"> <li>■ No need for external multiplexing</li> <li>■ Largely autonomous operation</li> <li>■ Safety critical applications</li> </ul>
<b>329 pin Package</b>	<ul style="list-style-type: none"> <li>■ High I/O functionality</li> </ul>	<ul style="list-style-type: none"> <li>➤ True high level of functional integration</li> </ul>

## TC 1775 Target Applications

- Engine management
- Transmission control
- Electric valve drive
- Starter generator

This is preliminary information on a product under development. The information describes the type of component and shall not be considered as assured characteristics. Terms of delivery and rights to change design reserved.

AUDO™  
TC 1775 – Highly Integrated  
32-bit Microcontroller  
for Automotive Applications

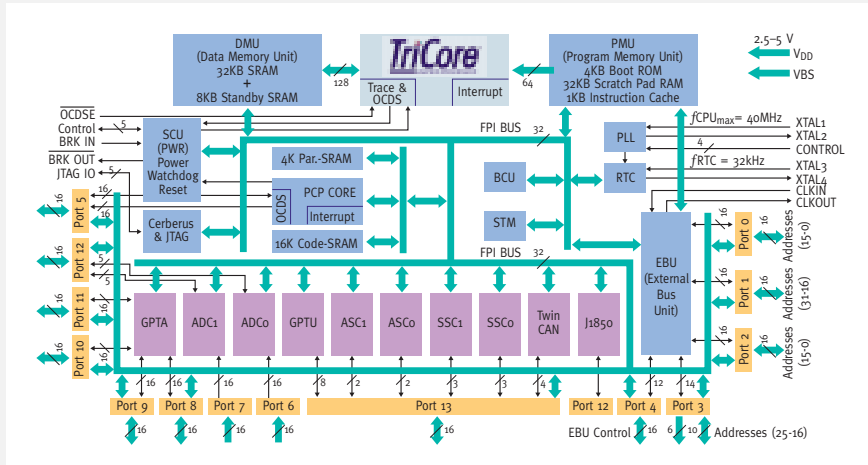


Never stop thinking.

## Features

- 32-bit super-scalar TriCore™ main CPU
  - Hardware supported context switch
  - 1-, 8-, 16-, 32- & 64-bit data format
  - Powerful integrated DSP capabilities
  - Bit logical operations
  - Concurrent 16-/32-bit instruction set
- 32-bit I/O processor (PCP):
  - Data move between any memory or I/O location
  - Read-modify-write
  - Arithmetic and logical operations
- On-chip memories
  - 32-KB scratch-pad memory
  - 1-KB code cache, optionally locable
  - 4-KB boot ROM
  - 40-KB TriCore™ data memory
  - 16-KB PCP code memory
  - 4-KB PCP data memory
- 32-bit multi-master on-chip FPI bus (Flexible Peripheral Interface)
- More than 100 interrupt request nodes
- 2 service request arbitration units: TriCore™, PCP
- TwinCAN™
  - 2 CAN nodes, V2.0 part B (active)
  - Standard frames (11-bit) or extended frames (29-bit)
  - 32 independent message objects flexibly assignable to each of the two CAN nodes
  - Configurable gateway functionality
  - Dedicated control register per channel
  - Advanced acceptance filtering

TC 1775 BLOCK DIAGRAM



- J1850 (SDLM)
- GPTA®
  - 6 filter and pre-scaler cells for input signal filtering and pre-scaling
  - 2 phase discrimination units for direction indication
  - 4 duty cycle measurement cells e.g. for speed analysis
  - 1 digital PLL: Flexible and accurate clock signal generation with high resolution
  - 32 global timer cells (24-bit wide) for input signal capture and output signal generation based on two 24-bit wide global timers
  - 64 local timer cells (16-bit wide) for PWM signal treatment
  - Flexible assignment of input and output signals to pins
- GPTU
  - 3 independently operating 32-bit timers
  - 32-bit timers can be split into 8- and 16-bit sub-timers
- System timer
- Real Time Clock (RTC)
- 2 ADCs:
  - 5 V input
  - 16 channels, each ADC
  - Selectable resolution: 8-, 10-, 12-bit
  - 5 microsecond conversion time at 10-bit resolution
  - Multiple conversion request modes, includes equidistant sampling
  - Optional synchronization
- 2 high-speed Synchronous Serial Interface (SSC)
- 2 Asynchronous/Synchronous Serial Interface (ASC)
- Debug interface (OCDS levels 1 & 2)
- 32-bit wide external memory interface
  - Glueless interface to wide range of memories
  - Burst mode memory support
- 40 MHz, automotive temperature range
- P-BGA-329

Note: For details please refer to applicable User Manual

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