TC1784 – AUDO MAX family
Automotive 32-bit TriCore™ Microcontroller

The TC1784 is the further member of the AUDO MAX family designed for automotive applications. It's 133/180MHz award-winning TriCore™ CPU provides high-end microcontroller performance combined with sophisticated DSP capabilities. The on-chip FlexRay™ module with 2 channels provides a new level of network communication. A dedicated peripheral control processor (PCP) manages on-chip peripherals and relieves the TriCore™ from standard processing tasks. On top of this, a fast interrupt response time assures low latencies and low performance overhead for interrupt driven systems. Equipped with up to 2.5MByte of embedded flash and a total of up to 176KByte RAM, the TC1784 is a high performance device offering best value for embedded real-time automotive applications. The device is positioned in the mid-range of the AUDO MAX product family that covers the complete range from the very high to the low end. The comprehensive tool support emphasizes the great scalability of the family products. In addition we will offer a Bare Die version of this product which focuses on transmission applications.

Applications
- Engine and transmission control
- 4–6 cylinder diesel or gasoline direct injection
- Hybrid and electric vehicle
- Suspension systems
- Advance Driver Assistance Systems

Features
- High performance 32-bit super-scalar TriCore™ V1.3.1 CPU with 4 stage pipeline
  - 180MHz at full automotive temperature range
  - Superior real-time performance
  - Strong bit handling
  - Fully integrated DSP capabilities
  - Single precision floating point unit
- 32-bit Peripheral Control Processor with single cycle instruction (PCP2)
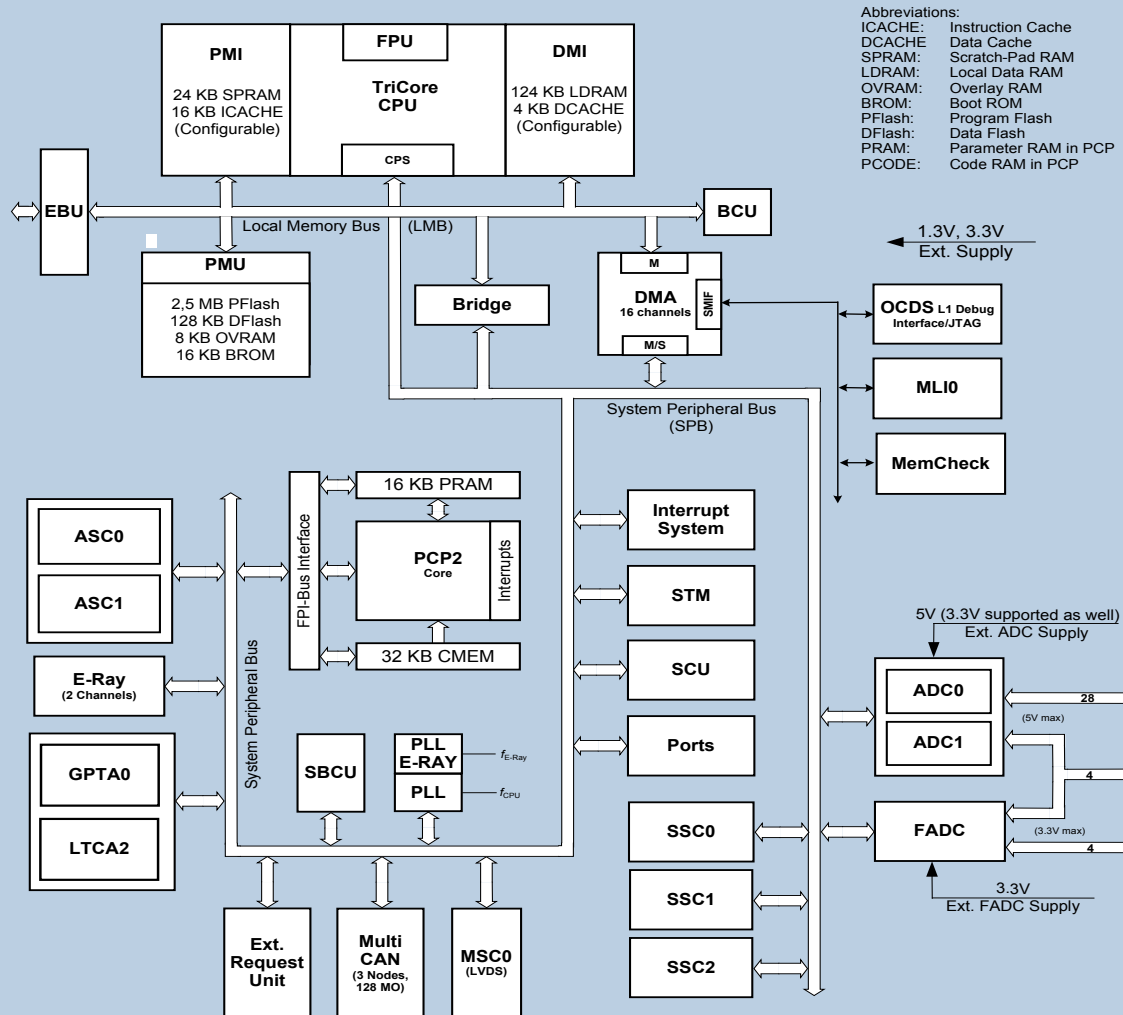 - 48KByte on-chip SRAM

Main Features

- Memories:
  - 2.5MB embedded program flash with ECC
  - 128KByte data flash
  - 176KB on-chip SRAM
  - 4KB Data cache (configurable)
  - 16KB Instruction cache (configurable)
- 16 DMA channels
- General Purpose Timer Array and local timer cells with digital signal filters and timer functionality to realize complex I/O signaling (GPTA)
- FlexRay™ module with two channels
- Micro Second bus interface (MSC)
- 2 asynchronous/synchronous serial interfaces (ASC)
- 3 high speed synchronous serial interfaces (SSC)
- High-speed Micro Link Interface (MLI)
- MultiCAN module with 3 CAN nodes and 128 message objects
- 4 channel fast analog-to-digital converter
- 32 channel analog-to-digital converter (5/3.3V)
- External Bus Unit (EBU)
- On-chip debug support (OCDS)
- Dedicated emulation device chip for multicore debugging, tracing and calibration
- Core supply voltage 1.3V
- I/O voltage 3.3V
- Full automotive temperature range -40° to +125°C
- LFBGA-292 Package

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Block Diagram

Abbreviations:
ICACHE: Instruction Cache
DCACHE   Data Cache
SPRAM: Scratch-Pad RAM
LDRAM: Local Data RAM
OVRAM: Overlay RAM
BROM: Boot ROM
PFlash: Program Flash
DFlash: Data Flash
PRAM: Parameter RAM in PCP
PCODE: Code RAM in PCP

Product Summary

Type	eFlash	Data Flash	Frequency	SRAM	Package	Temp. Range
SAK-TC1784N-320F180H	2.5MB	128KB*	180MHz	176KB*	PG-LFBGA-292	-40...+125ºC
SAK-TC1784F**-320F180H	2.5MB	128KB*	180MHz	176KB*	PG-LFBGA-292	-40...+125ºC

*EEPROM emulation (up to 60k w/e cycles)

**F stands for FlexRay included

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