32-bit Microcontroller

Qorivva MPC5676R MCU

Multicore MCU for advanced powertrain applications

Target Applications

- Powertrain engine control

- Gasoline direct injection

- Common rail diesel injection or clean diesel

- Hybrid electric vehicles

- Knock detection

- Cylinder or multi-valve deactivation

- Transmission control

- Continuously variable transmission

Overview

The 32-bit Qorivva MPC5676R microcontroller (MCU) built on Power Architecture® technology is a multicore device designed for advanced powertrain control applications. The high-performance Qorivva MPC5676R addresses advanced filtering and signal processing requirements of direct injection, advanced diesel, hybrid electric and full electric powertrain applications to meet extreme regulatory and environmental requirements.

The Qorivva MPC5676R MCU achieves significant performance benchmarks with dual 180 MHz processors, three second-generation, high-performance time processor units (eTPU2), 6 MB of on-chip flash, 128-channel timers (3 x eTPU2s and 1 x eMIOS), quad ADCs, 384 KB RAM (for data storage) and on-chip digital signal processing capable of knock detection without the requirement of additional external components.

The Qorivva MPC5676R MCU is fully compatible with the Qorivva MPC567xF MCU, allowing automakers to incorporate this new technology easily for applications that require increased performance or memory expansion. Offering customers a seamless migration allows design re-use, and helps to reduce overall design cost and speed time to market.
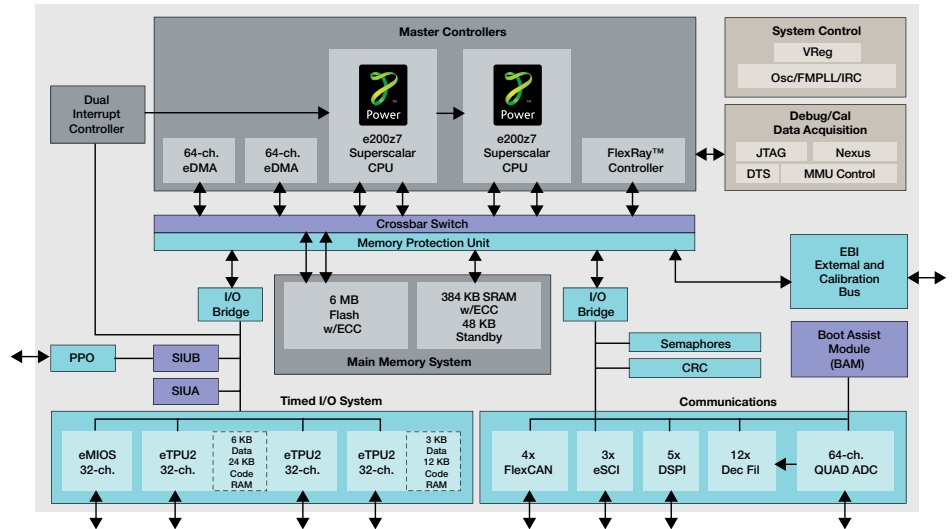
Package Options

Part Number	Temperature Ranges	Package
SPC5676RDK2MVY1	-40°C to +125°C	516 PBGA (Pb free)
SPC5676RDK2MVU1	-40°C to +125°C	416 PBGA (Pb free)

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Development Tools

- MPC567XKIT416-PT
  (416 PBGA evaluation board)

- MPC567XKIT516-PT
  (516 PBGA evaluation board)

- MPC567XADAT-PT4
  (416 PBGA adapter card, to be used with
  MPC567XEVBMB main board)

- MPC567XADAT-PT5
  (516 PBGA adapter card, to be used with
  MPC567XEVBMB main board)

MPC5676R Block Diagram

MPC5676R

Features	Benefits
Dual e200z7 cores built on Power Architecture® technology (each core operating at up to 180 MHz)	818 DMIPS from dual 180 MHz cores with integrated DSP capability allows users to enable virtual sensors and eliminate many external ICs
SIMD module for DSP and floating point operations Variable-length encoding	The capability to reduce code footprint by up to 30 percent for improved code density and reduced memory requirements
6 MB flash memory w/error correcting codes (ECC)	Generous memory supports autocode generation and modeling tools that speed time to market
	Flash/EEPROM driver compatibility between MPC567xF and MPC5676R
384 KB SRAM w/ECC (48 KB of stand-by RAM)	High RAM size to meet next-generation requirements
128-channel enhanced direct memory access (eDMA)	Twice the eDMA channels than previously offered to help manage on-chip memory needs
96-channel dual eTPU2 32-channel eMIOS	Precise engine timers optimized for powertrain. Using complex timers to monitor engine control systems results in precisely measured fuel and air delivery and improved gas mileage
64-channel quad analog-to-digital converter (ADC)	Allows independent and simultaneous conversions
	12-bit ADC offers <1 us conversions
Dual-channel FlexRay™ controller	Capable of up to 10 Mbps bandwidth
4 x FlexCAN	Compatible with TouCAN, 64 buffers each
3 x eSCI 5 x DSPI Microsecond bus support	Supports LIN/J2602 16 bits wide with up to six chip selects each
12 x hardware decimators	Used to minimize DSP calculations and reduce CPU load by up to five percent by leveraging the DMA as an anti-knock hardware filter
On-chip regulator for standby voltage	Helps to reduce system cost
Nexus 3+ support	Sophisticated debug capability
416-pin PBGA package 516-pin PBGA package (with expanded bus option)	Offers significant I/O and access to external memory or ASICs

For more information, visit freescale.com/MPC5676R