Overview

The 32-bit Qorivva MPC5676R microcontroller (MCU) built on Power Architecture® technology is Freescale's first multicore device designed for advanced powertrain control applications. The Qorivva MPC5676R performs four to five times better than previous-generation MCU families, addressing 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

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Temperature Ranges</th>
<th>Package</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPC5676RDQ2MVY1</td>
<td>-40°C to +125°C</td>
<td>516 PBGA (Pb free)</td>
</tr>
<tr>
<td>SPC5676RDQ2MVU1</td>
<td>-40°C to +125°C</td>
<td>416 PBGA (Pb free)</td>
</tr>
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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
- Dual e200z7 cores built on Power Architecture® technology (each core operating at up to 180 MHz)
- SIMD module for DSP and floating point operations
- Variable-length encoding
- 6 MB flash memory w/error correcting codes (ECC)
- 384 KB SRAM w/ECC (48 KB of stand-by RAM)
- 128-channel enhanced direct memory access (eDMA)
- 96-channel dual eTPU2 32-channel eMIOS
- 64-channel quad analog-to-digital converter (ADC)
- Dual-channel FlexRay™ controller
- 4 x FlexCAN
- 3 x eSCI
- 5 x DSPI
- Microsecond bus support
- 12 x hardware decimators
- On-chip regulator for standby voltage
- Nexus 3+ support
- 416-pin PBGA package
- 516-pin PBGA package (with expanded bus option)

Benefits
- 818 DMIPS from dual 180 MHz cores with integrated DSP capability allows users to enable virtual sensors and eliminate many external ICs
- The capability to reduce code footprint by up to 30 percent for improved code density and reduced memory requirements
- Generous memory supports autocode generation and modeling tools that speed time to market
- Flash/EEPROM driver compatibility between MPC567xF and MPC5676R
- High RAM size to meet next-generation requirements
- Twice the eDMA channels than previously offered to help manage on-chip memory needs
- Most 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
- Allows independent and simultaneous conversions
- 12-bit ADC offers <1 us conversions
- Capable of up to 10 Mbps bandwidth
- Compatible with TouCAN, 64 buffers each
- Supports LIN/J2602 16 bits wide with up to six chip selects each
- Used to minimize DSP calculations and reduce CPU load by up to five percent by leveraging the DMA as an anti-knock hardware filter
- Helps to reduce system cost
- Sophisticated debug capability
- Offers significant I/O and access to external memory or ASICs

For more information, visit freescale.com/MPC5676R

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