

P2020-MSC8156 AdvancedMC™ Reference Design

Multi-standard baseband development platform for LTE, WiMAX, WCDMA and TD-SCDMA applications

Overview

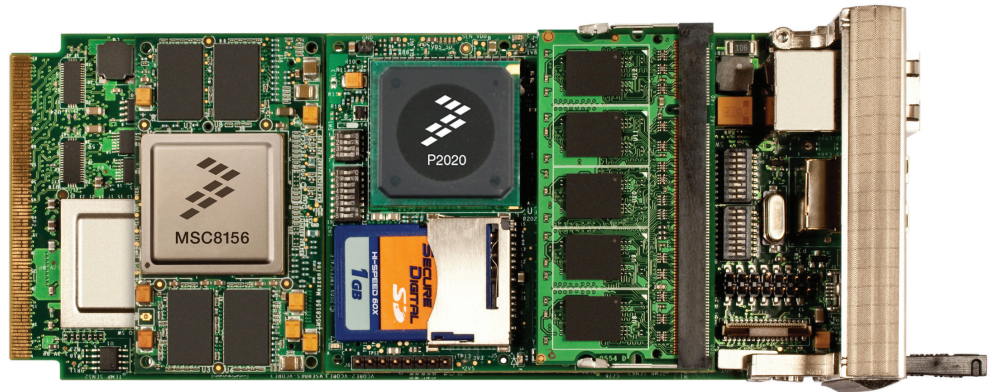
The Freescale P2020-MSC8156 AdvancedMC™ (AMC) reference design is a multi-standard baseband development platform for the next generation of wireless standards such as LTE, WiMAX, WCDMA and TD-SCDMA.

This single width, full height AMC platform, integrates Freescale's latest generation of multicore processors, the QorIQ P2020, with its award-winning MSC8156 digital signal processor (DSP).

This offers an unprecedented combination of Power Architecture® and StarCore technology as well as multi-protocol acceleration engines in an AMC form factor to provide a complete Layer 1, 2 and 3 baseband processing platform.

The AMC has been designed around a mezzanine concept, with a P2020 and MSC8156 mezzanine card providing the system building blocks to enable rapid prototyping systems to be quickly realized.

The P2020 processor offers an excellent combination of protocol and interface support, including dual high-performance e500v2 processor cores, built on Power Architecture technology, DDR2 memory, three enhanced three-speed Ethernet controllers with RGMII support, a SerDes interface with the option of PCI Express® or Serial RapidIO® interface, eSDHC controller and a USB 2.0 interface.



The MSC8156 DSP delivers a high level of performance and integration, combining six fully programmable, SC3850 DSP cores, each running at 1 GHz. This 6 GHz of processing power, coupled with an architecture highly optimized for wireless infrastructure applications, make this an ideal device for developing solutions for the next generation of wireless standards.

For data plane applications, the P2020 processor, MSC8156 DSP and backplane are connected via high throughput 3.125 GHz x4 Serial RapidIO links using the IDT high bandwidth CPS10Q Serial RapidIO switch.

Data and control plane applications are also handled by Gigabit Ethernet links. These connect the P2020 and MSC8156 interfaces to the backplane Ethernet ports and front panel RJ45s.

Board control and hot swapping are provided by the Pigeon Point based module management controller.

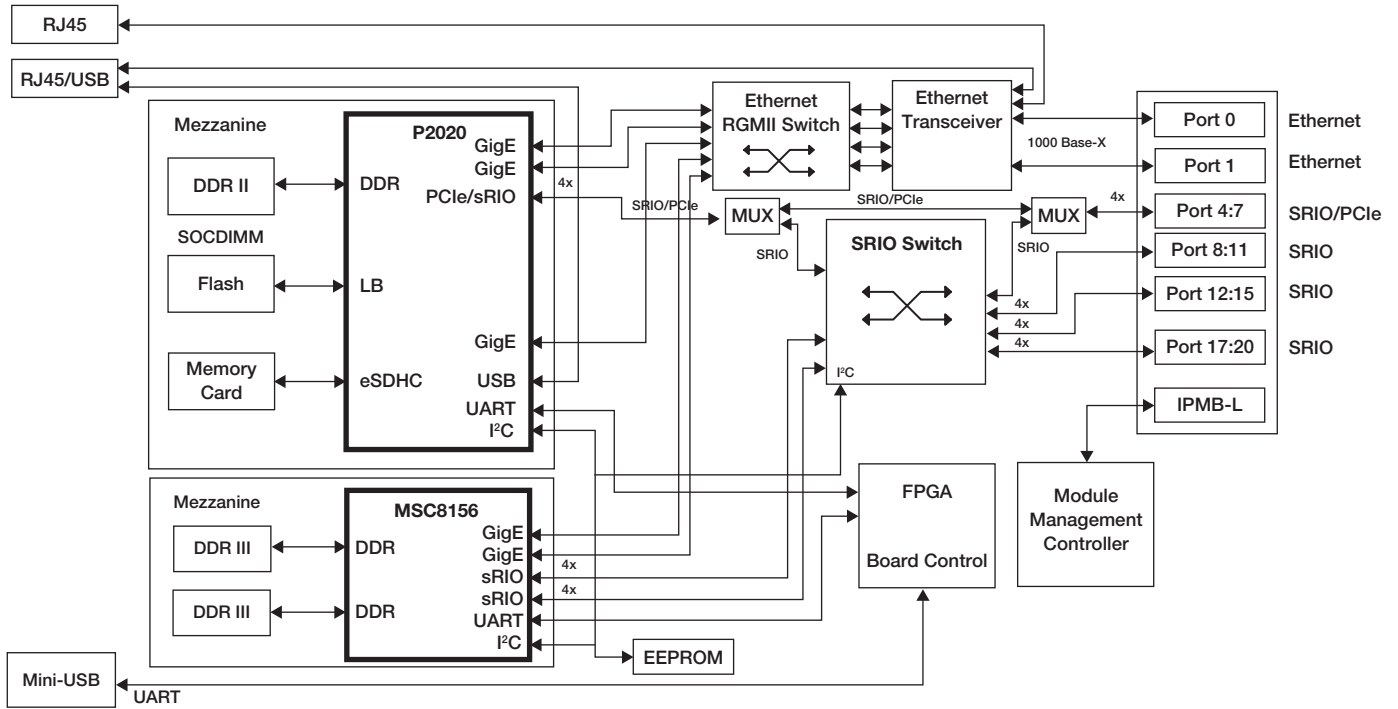
Key Features

- Single-width, full-height AMC form factor
- QorIQ P2020 processor
 - Dual e500v2 cores at 1.2 GHz
 - 1 GB of DDR2 (SOCDIMM)
 - TCP/IP acceleration
 - eSDHC
 - USB
- MSC8156 DSP
 - Six SC3850 cores, built on StarCore technology, at 1 GHz each
 - Multi Accelerator Platform Engine for Baseband (MAPLE-B)
 - Two banks of 512 MB 64-bit DDR3-800

Connectivity

- Serial RapidIO infrastructure (x4 3.125 GHz) connecting processor, DSP and backplane via Serial RapidIO switch
- Gigabit Ethernet infrastructure connecting processor, DSP, backplane and front panel via Ethernet switch
- Module management controller
 - Hot swapping
 - Board control

P2020-MSC8156 AdvancedMC™ Block Diagram



QorIQ P2020 Processor

- Dual high-performance e500v2 cores built on Power Architecture technology
- 512 KB L2 cache
- Three RGMII interfaces
 - TCP/IP acceleration
- High-speed SerDes interface (options)
 - One x4 3.125 GHz Serial Rapid IO
 - One x4 2.5 GHz PCI Express
 - One x1 2.5 GHz PCI Express and one x1 2.5 GHz Serial RapidIO
- USB interface (USB 2.0)
- Enhanced secure digital host controller (SD/MMC)
- 1 GB 72-bit DDR2-1600 SOCDIMM

MSC8156 Digital Signal Processor

- Six SC3850 cores, built on StarCore technology, operating at 1 GHz/8000 MMACS per core and 48000 MMACS per device

- MAPLE-B
 - Programmable Turbo and Viterbi decoder
- High-speed, high-bandwidth CLASS fabric arbitrates between the DSP cores and other CLASS members to M2 memory, M3 memory, DDR controllers, MAPLE-B and configuration registers
- Dual RISC core QUICC Engine subsystem operating at 500 MHz providing parallel processing independent of the DSP cores
- 2x 512 MB 64-bit DDR3-800

Board IO

- AMC connector
 - 3.125 GHz (x4) Serial RapidIO or 2.5 GHz PCI Express ports [4:7]
 - 3.125 GHz (x4) Serial RapidIO ports [8:11]
 - 3.125 GHz (x4) Serial RapidIO ports [12:15]

- 3.125 GHz (x4) Serial RapidIO ports [17:20]
- 2x Gigabit Ethernet Interfaces (Port 0 and 1)

Front Panel

- 2x Gigabit Ethernet Interfaces (RJ45)
- Mini USB Type B for UART access
- USB Type B connector

Application Areas

- 3G-LTE
- TDD-LTE
- WiMAX
- 3GPP-HSPA
- TD-SCDMA

Learn More:

For current information about Freescale products and documentation, please visit www.freescale.com/dsp and www.freescale.com/qorIQ.



Freescale, the Freescale logo are trademarks of Freescale Semiconductor, Inc., Reg. U.S. Pat. & Tm. Off. QorIQ, QUICC Entine and StarCore are trademarks of Freescale Semiconductor, Inc. All other product or service names are the property of their respective owners. The Power Architecture and Power.org word marks and the Power and Power.org logos and related marks are trademarks and service marks licensed by Power.org. © 2010 Freescale Semiconductor, Inc.

Document Number: P2020MSC8156RDFS
REV 2

