



QorIQ Multicore Processor Development

QorIQ P5040 Reference Design Board

P5040 Reference Design Board



Overview

The QorIQ P5040 reference design board (P5040RDB) is a flexible system that supports the quad-core P5040 processor. With frequencies scaling to 2.2 GHz and rich input/output (I/O) mix, the P5040RDB is intended for development of enterprise and data center networking, telecom and industrial applications, where its high-performance, high-efficiency cores and integration make it very well suited as a multicore control plane processor.

The P5040RDB can help shorten time to market. The board is built to exercise most of the capabilities of the device, and can serve as a reference for system-level hardware development by providing a comparison tool for customer-specific board implementations. It can also be used for customer software development and performance evaluation.

Hardware

The P5040RDB main board is mounted in a 1U custom chassis. The P5040RDB design features a scaled down version of the most popular features of the full-featured QorIQ P5040 development system (P5040QDS) design. The P5040RDB is scaled back to provide basic interoperability and flexibility for system clocking, power distribution and I/O multiplexing. The selection of interfaces has been optimally selected to be built into the RDB. The P5040RDB includes features that will meet many popular customer use cases.

Linux® SDK

The P5040RDB is shipped with a prebuilt u-boot/Linux image programmed in flash memory to get developers up quickly to a Linux prompt. The system includes a Linux board support package (BSP) that provides a comprehensive starting point for Linux development efforts. This BSP is tested for the P5040 processor and the P5040RDB development system, ensuring an operational tool chain, kernel and specific peripherals that are ready to use together. The P5040RDB Linux BSP includes u-boot boot loader, Linux kernel, device drivers, Yocto package manager, applications, services, libraries and GNU tools such as compilers and linkers.

Supported Features of the Linux SDK

- U-boot: Boot from NOR flash, DDR, DUART, I²C, networking, USB, PCIe
- Linux: Data Path Acceleration Architecture (DPAA) networking on 1 G and 10 G interfaces, PCIe, SATA, SDHC, USB, SEC, RAID5/6
- User space DPAA (USDPA): QMan, BMan, RMan, SRIO, PME
- FMan storage profiles
- QMan egress traffic shaping
- Hypervisor: KVM, Freescale embedded hypervisor, Linux containers
- Demonstration applications: Reflector, IPFwd, IPsec, SimpleCrypto, PME

QorIQ Configuration Suite

Freescale offers the QorIQ configuration suite (QCS) to simplify the configuration of the flexible and powerful P5040 processor independent of the written reference manual. This additional suite of tools is implemented as a set of components, each of which knows the details of the silicon control registers, configuration specifics, mixing rules and the necessary value ranges for all configuration properties. A simple wizard is used to select basic configuration values and to define settings, which in turn will generate source files for use in board initialization code for the P5040. The QCS is delivered as a plug-in to a standard Eclipse environment, such as the Freescale CodeWarrior development studio.

Components of the QorIQ

Configuration Suite

- Pre-boot loader configuration tool
- BOOTROM configuration tool
- DDR configuration tool
- DPAA component configuration
- Device tree editor

QorIQ P5040RDB Board Features

Processor

- QorIQ P5040 quad-core processor, up to 2.2 GHz cores with up to 1.6 MT/s DDR3
- Multiple SysClk inputs for generating various device frequencies

Memory

- Two sockets for DDR3 204-pin SODIMM modules with ECC (72-bit bus), and one 8 GB memory shipped with the system
- 128 MB NOR flash, 16-bit
- 1 GB NAND flash, 8-bit (async)
- SPI serial 128 MB flash
- eSDHC connector to interface with an SD media card (no card shipped with system)

PCI Express gen 2.0

- One x1 miniPCIe and one x4 PCIe slots

SATA

- Two SATA II connectors

USB 2.0

- One High-Speed USB controller

DUART

- One dual-ported DB9 connector

Ethernet

- Supports two 10/100/1000 ports through RGMII to RJ45
- Up to two 10 GbE via XFI fiber connectors
- Up to two 10 GbE via XAUI connectors
- Up to two GbE through dual ported SGMII

Debug

- JTAG/COP
- Aurora high-speed connector

Other

- IEEE® 1588 connector for Symmetricom option card (not from Freescale)
- Temperature monitoring

Commercial Operating Systems and Tools

In addition to the SDK shipped with P5040RDB, there is a rich ecosystem of tools, debuggers, virtualization software and real-time operating system available from industry-leading Freescale Connect Partners including Mentor Graphics, ENEA, Green Hills Software and Wind River.