Welcome to E-XFL.COM

Understanding Embedded - Microprocessors

Embedded microprocessors are specialized computing chips designed to perform specific tasks within an embedded system. Unlike general-purpose microprocessors found in personal computers, embedded microprocessors are tailored for dedicated functions within larger systems, offering optimized performance, efficiency, and reliability. These microprocessors are integral to the operation of countless electronic devices, providing the computational power necessary for controlling processes, handling data, and managing communications.

Applications of Embedded - Microprocessors

Embedded microprocessors are utilized across a broad spectrum of applications, making them indispensable in

Details	
Product Status	Obsolete
Core Processor	PowerPC e500v2
Number of Cores/Bus Width	1 Core, 32-Bit
Speed	500MHz
Co-Processors/DSP	Security; SEC 4.2
RAM Controllers	DDR3, DDR3L
Graphics Acceleration	No
Display & Interface Controllers	-
Ethernet	10/100/1000Mbps (2)
SATA	-
USB	USB 2.0 + PHY (1)
Voltage - I/O	-
Operating Temperature	0°C ~ 105°C (TA)
Security Features	Cryptography, Random Number Generator
Package / Case	457-FBGA
Supplier Device Package	457-TEPBGA-1 (19x19)
Purchase URL	https://www.e-xfl.com/pro/item?MUrl=&PartUrl=p1017nse5cfb

QorIQ Multicore Processor Development

P1 Series

BUILT ON Power

P1023 and P1017 high-performance QorIQ communications processors

Freescale QorIQ communications platforms are the next-generation evolution of our leading PowerQUICC communications processors. Built using high-performance Power Architecture® cores, QorIQ platforms enable a new era of networking innovation where the reliability, security and quality of service for every connection matters.

QorIQ P1023 and P1017 Communications Processors

The P1023 and P1017 processors offer the value of extensive integration including a high-performance data path which can off-load specific protocol processing from the CPUs. The P1023 and P1017 are ideally suited for high-performance enterprise WLAN, fixed routers and security gateway applications. The P1023 device supports 500 MHz in dual core mode or 800 MHz in single core mode, along with advanced security and a rich set of interfaces—all delivered on 45 nm technology for low power implementation.

freescale™ QorIQ

The P1023 processor includes a performance-optimized implementation of the QorIQ Data Path Acceleration Architecture (DPAA). This architecture provides the infrastructure to support simplified sharing of networking interfaces and accelerators by multiple CPU cores. The DPAA significantly reduces software overhead associated with high touch packet forwarding operations. Examples of the types of packet processing services this architecture is optimized to support include traditional routing and bridging, firewall, VPN termination for IPSec and MACSec (a standardized form of Ethernet encapsulation that can be used to provide confidentiality).

The 256 KB L2 cache offers incremental configuration to partition the cache between the two cores or to configure it as SRAM or stashing memory. The integrated security features include support for data integrity and authenticity protection over Ethernet, as well as a security engine which supports cryptographic algorithms commonly used in IPsec, SSL, 3GPP and other networking and wireless security protocols. It also provides header and trailer offload for security protocols such as IPSec, SSL/TLS, SRTP 802.1ae, 802.11i and 802.16e. The memory controller offers future-proofing against memory technology migration with support for DDR3/DDR3L.

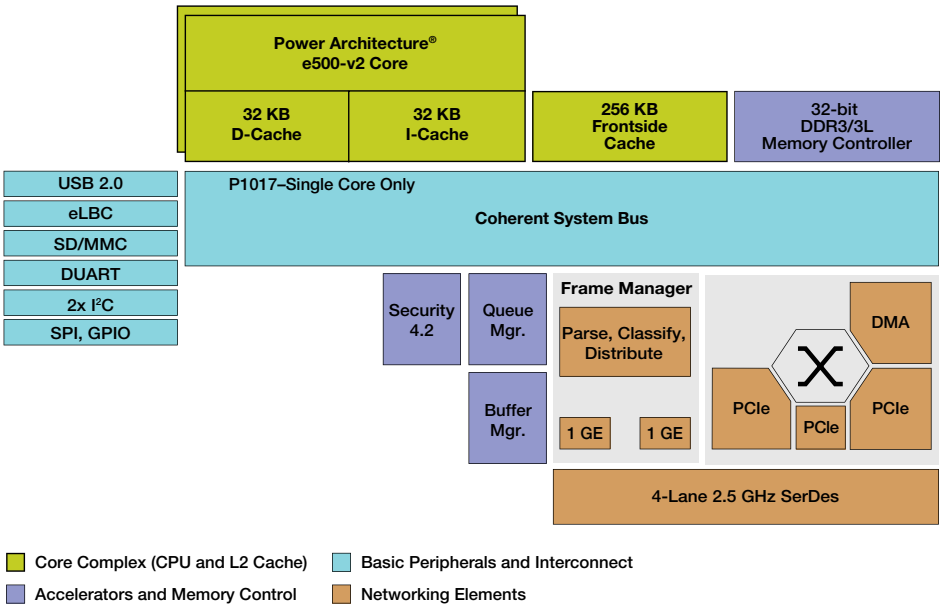
The QorIQ P1023 processor integrates a rich set of interfaces including SerDes, Gigabit Ethernet, three PCI Express® controller and USB. The two 10/100/1000 Ethernet ports support advanced packet parsing, flow control and quality of service features, as well as IEEE® 1588 time-stamping—all ideal for managing the data path traffic between the LAN and WAN interface. Four SerDes lanes can be portioned across three PCI Express ports and two SGMII ports. The PCI Express ports can provide connectivity to IEEE 802.11n and 802.11ac radio cards for wireless support. USB or SD/MMC interfaces can be used to support local storage.

Target Applications

The P1023 and P1017 processors serve a wide variety of applications. The devices are well-suited for various combinations of data plane and control plane workloads in networking and telecom applications. With an available junction temperature range of -40ºC to +105ºC, the devices can be used in power-sensitive defense and industrial applications, as well as outdoor environments less protected from the environment. The devices primarily target applications such as networking and telecom linecards.

A wireless router or business gateway requires a combination of high performance and a rich set of peripherals to support the data path throughputs and required system functionality. The P1017 single-core and P1023 dual-core devices offer a scalable platform to develop a range of products that can support the same feature set. Integrated 10/100/1000 Ethernet controllers with data path offload for classification and QoS capabilities are ideal for managing the data path traffic between the LAN and WAN interface. PCI Express ports can provide connectivity to IEEE 802.11n and 802.11ac radio cards for wireless support, the USB or SD/MMC interfaces can be used to support local storage, and the integrated security engine can provide encrypted secure communications for remote users with VPN support.

QorIQ P1023/17 Communication Processors



Technical Specifications

- Single (P1017) and dual (P1023) high-performance Power Architecture e500 cores
  - 36-bit physical addressing

  Double-precision floating-point support
  - 32 KB L1 instruction cache and 32 KB L1 data cache for each core
  - 400 MHz to 800 MHz core clock frequency
- 256 KB L2 cache with ECC, also configurable as SRAM and stashing memory
- Two 10/100/1000 Mbps three-speed Ethernet controllers
  - TCP/IP acceleration and classification capabilities
  - IEEE 1588 support
  - Lossless flow control
  - RGMII, SGMII
  - MACSec (IEEE 802.1ae) encapsulation and decapsulation
- High-speed interfaces (not all available simultaneously)
  - Three PCI Express controllers
  - Two SGMII interfaces
  - Four SerDes to 3.125 GHz multiplexed across controllers
- Integrated security engine (SEC 4.2)
  - Crypto algorithm support includes 3DES, AES, RSA/ECC, MD5/SHA, ARC4, SNOW 3G and FIPS deterministic RNG
  - Single pass encryption/message authentication for common security protocols (IPsec, SSL, SRTP, DTLS)
  - XOR acceleration
- High-Speed USB controllers (USB 2.0)
  - Host and device support
  - Enhanced host controller interface
  - ULPI interface to PHY
- Enhanced secure digital host controller
- Serial peripheral interface
- 32-bit DDR3/DDR3L SDRAM memory controller
- Programmable interrupt controller compliant with OpenPIC standard
- Four-channel DMA controller
- Two I²C controllers, DUART, timers
- Enhanced local bus controller
- 16 general-purpose I/O signals
- Package: 457-pin wirebond power-BGA (TEPBGA1)

Enablement

- Green Hills® Software: Complete portfolio of software and hardware development tools, trace tools and real-time operating systems
- Mentor Graphics®: Commercial grade Linux® solution
- CodeSourcery: GCC and GDB tool chain
- Development system

For more information, visit freescale.com/QorIQ

Document Number: QORIQP1023FS REV 1