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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	Active
Core Processor	PowerPC e5500
Number of Cores/Bus Width	2 Core, 64-Bit
Speed	1GHz
Co-Processors/DSP	-
RAM Controllers	DDR3L, DDR4
Graphics Acceleration	No
Display & Interface Controllers	-
Ethernet	GbE (8)
SATA	SATA 3Gbps (2)
USB	USB 2.0 + PHY (2)
Voltage - I/O	-
Operating Temperature	0°C ~ 105°C (TA)
Security Features	Boot Security, Cryptography, Secure Fusebox, Secure Debug, Tamper Detection, Volatile key Storage
Package / Case	780-FBGA
Supplier Device Package	780-FBGA (23x23)
Purchase URL	https://www.e-xfl.com/product-detail/nxp-semiconductors/t1024nse7kqpa

QorIQ T1024/14 and T1023/13 Communications Processors

Next-generation system-on-chip (SoC) for low-cost enterprise and service provider edge and network control applications

TARGET APPLICATIONS

- Wired and wireless branch routers
- WLAN 11ac enterprise access points
- Service provider WLAN access points
- Unified threat management gateways
- Multifunction printers
- Router and switch controllers
- Line card controllers
- Industrial automation and computing, single board computers
- Aerospace and defense ruggedized network equipment

The QorIQ T1024/23 communications processors combine single or dual 64-bit cores, built on Power Architecture® technology, with high-performance Data Path Acceleration Architecture (DPAA) and network peripheral bus interfaces required for networking and telecommunications applications. The T1024 and T1014 processors come in a full featured 23 x 23 mm package which provides scalable pin compatibility with the quad-core T1042 processor, and even the eight-core T2081 processor, for price and power scaling with a single system design. The T1023 and T1013 processors are interfaces and power-optimized SoCs designed to deliver impressive single- or dual-core performance for cost and power sensitive networking systems. Both versions offer an excellent software compatible 64-bit and I/O upgrade path for the popular QorIQ P10XX family of 32-bit communications processors.

SOFTWARE AND TOOL SUPPORT

With the help of our partner network, we deliver a wide range of tools, run-time software, reference solutions and services to accelerate your designs.

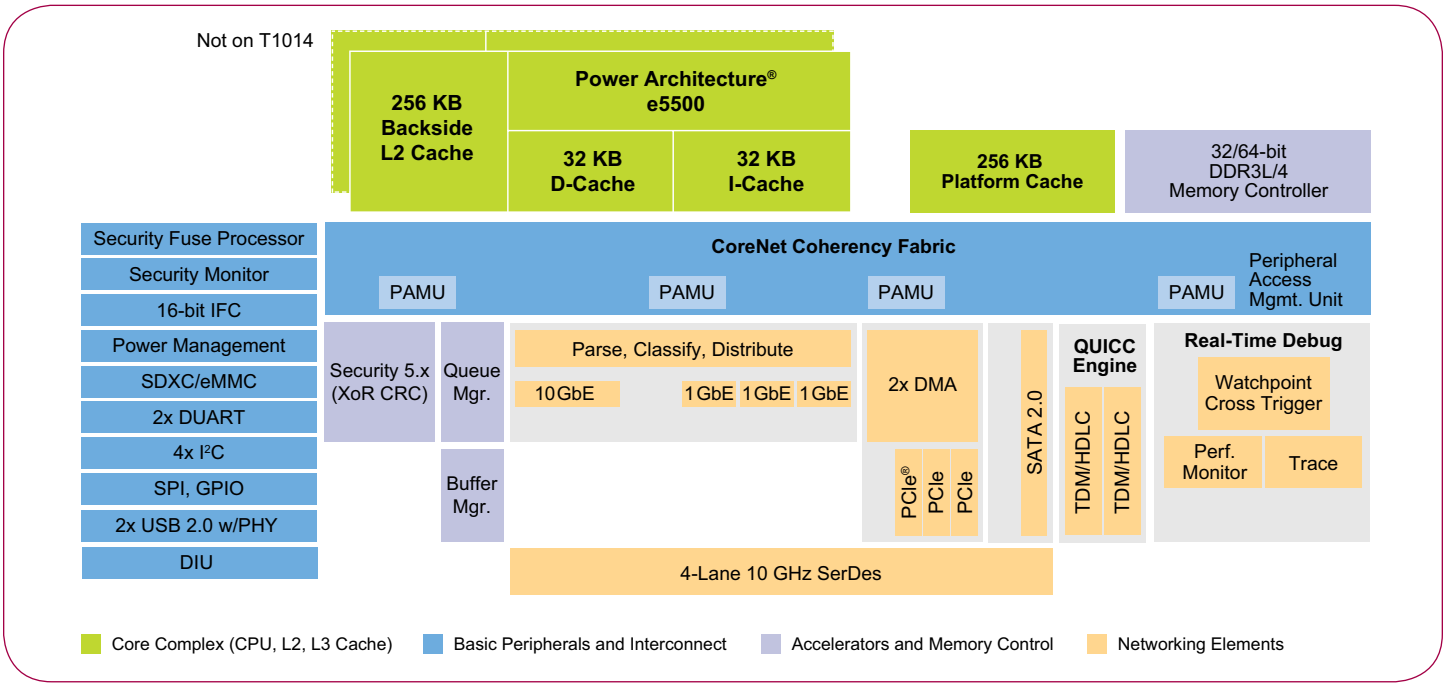
- CodeWarrior Development Studio for Power Architecture technology
- Proprietary QorIQ Linux® SDK
- VortiQa application software
  - VortiQa application identification software (AIS)
  - Enterprise software for networking
  - VortiQa open network switch software
  - VortiQa open network director software

- Professional services and support
  - Commercial services
  - Linux SDK support package
  - Reference design software (RDS) support package
- Third-party software and tools
  - Enea, Green Hills, Mentor Graphics and Wind River

QorIQ P1020 AND T102X PROCESSORS COMPARISON TABLE

	P1020/11	T1023/13	T1024/14	T1042
Core	1-2 x e500v2	1-2 x e5500	1-2 x e5500	4 x e5500
Power ISA	32-bit	64-bit	64-bit	64-bit
Max MHz	800	1400	1400	1400
L2 Backside Cache	–	256 KB	256 KB	256 KB
Platform Cache	256 KB	256 KB	256 KB	256 KB
DDR Type and Speed	2/3 1333MTs	3L/4 1600MTs	3L/4 1600MTs	3L/4 1600MTs
DDR Speed	to 1333MTs	to 1600MTs	to 1600MTs	to 1600MTs
DDR Width	36 b	36 b	36 b/72 b	36 b/72 b
SerDes	4	4	4	8
PCIe Lanes	2 x 1 v1	3 x 1 v2	3 x 1 v2	4 x 1 v2
GbE	up to 3	up to 4	up to 4	up to 5
10GbE I/O	–	1	1	-
MACSEC	–	All ports	All ports	All ports
Hardware Offload	–	DPAA	DPAA	DPAA
Crypto	SEC 3.x	SEC 5.x	SEC 5.x	SEC 5.x
Pattern Matching	–	–	–	Yes
QUICC Engine TDM/ HDLC, ISDN, Industrial	Yes	–	Yes	Yes
SATA	–	2.0 x 1	2.0 x 1	2.0 x 2
USB	2.0 x 2	2.0 x 2 w Phy	2.0 x 2 w Phy	2.0 x 2 w Phy
Lossless Deep Sleep	–	–	Yes	Yes
Auto Response	–	–	Yes	Yes
Display Interface	–	-	Yes	Yes
Single Clock Source	–	Yes	Yes	Yes
Package	31 x 31 PBGA	19 x 19 FCBGA	23 x 23 FCBGA	23 x 23 FCBGA
Pin Compatible	No	No	Yes	Yes

QORIQ T1014 AND T1024 COMMUNICATIONS PROCESSOR



QorIQ T1023/24 PROCESSORS FEATURES LIST

Two or four e5500 single-threaded cores built on Power Architecture technology	• Up to 1.4 GHz with 64-bit ISA support • Low latency, per core, core clocked 256 KB dedicated cache • Hybrid 32-bit mode to support legacy software and transition to a 64-bit architecture • Nap, wait and doze low-power modes
CoreNet platform cache	• 256 KB shared platform cache for stashing support
Hierarchical interconnect fabric	• CoreNet fabric supporting coherent and non-coherent transactions with prioritization and bandwidth allocation amongst CoreNet endpoints • QMAN fabric supporting packet-level queue management and quality of service
64-bit DDR3L/4 SDRAM memory controller with ECC support	• 32-bit or 64-bit low power DDR up to 1600 MT/s
DPAA incorporating acceleration for the following functions	• Full L2/3 tunneling and en/decrypt offload support for functions such as WLAN • CAPWAP/DTLS secure wired links • Packet parsing, classification and distribution • Queue management for scheduling, packet sequencing and congestion management • Hardware buffer management for buffer allocation and de-allocation • Cryptography acceleration (SEC 5.x)
SerDes	• Four lanes at up to 10 Gbit/s • Supports SGMII, 2.5 Gbit SGMII, QSGMII, XFI, 10G BASE-KR, PCI Express® and SATA
Ethernet interfaces	• Up to 4 x Ethernet MACs
QUICC Engine module	• Integrated support for legacy WAN protocols TDM, HDLC, UART, ISDN and industrial protocols
High-speed peripheral interfaces	• Three PCI Express 2.0 controller
Additional peripheral interfaces	• One serial ATA (SATA 2.0) controller • Two high-speed USB 2.0 controllers with integrated PHYs • Enhanced secure digital host controller (SD/MMC/eMMC) • Enhanced serial peripheral interface • Two I²C controllers • Four UARTS • Integrated flash controller supporting NAND and NOR flash memory
DMA	• Dual four channel
Support for hardware virtualization and partitioning enforcement	• Extra privileged level for hypervisor support
QorIQ trust architecture	• Secure boot, secure debug, tamper detection, volatile key storage
Single source clocking	• For BOM cost reduction

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