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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 | 1 Core, 64-Bit |
| Speed | 1.2GHz |
| 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 | 525-FBGA, FCBGA |
| Supplier Device Package | 525-FCPBGA (19x19) |
| Purchase URL | https://www.e-xfl.com/product-detail/nxp-semiconductors/t1013nsn7mqa |



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 | <ul style="list-style-type: none"> 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 | <ul style="list-style-type: none"> 256 KB shared platform cache for stashing support |
| Hierarchical interconnect fabric | <ul style="list-style-type: none"> 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 | <ul style="list-style-type: none"> 32-bit or 64-bit low power DDR up to 1600 MT/s |
| DPAA incorporating acceleration for the following functions | <ul style="list-style-type: none"> 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 | <ul style="list-style-type: none"> 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 | <ul style="list-style-type: none"> Up to 4 x Ethernet MACs |
| QUICC Engine module | <ul style="list-style-type: none"> Integrated support for legacy WAN protocols TDM, HDLC, UART, ISDN and industrial protocols |
| High-speed peripheral interfaces | <ul style="list-style-type: none"> Three PCI Express 2.0 controller |
| Additional peripheral interfaces | <ul style="list-style-type: none"> 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 | <ul style="list-style-type: none"> Dual four channel |
| Support for hardware virtualization and partitioning enforcement | <ul style="list-style-type: none"> Extra privileged level for hypervisor support |
| QorIQ trust architecture | <ul style="list-style-type: none"> Secure boot, secure debug, tamper detection, volatile key storage |
| Single source clocking | <ul style="list-style-type: none"> For BOM cost reduction |