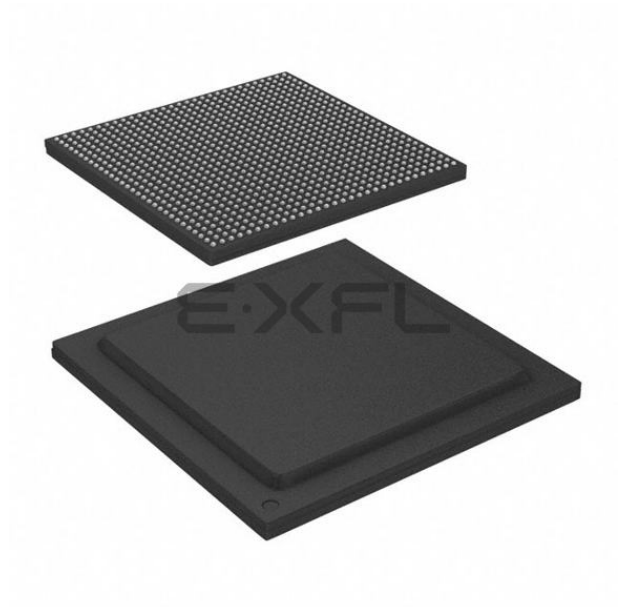


Welcome to E-XFL.COM

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	Active
Core Processor	PowerPC e6500
Number of Cores/Bus Width	4 Core, 64-Bit
Speed	1.533GHz
Co-Processors/DSP	-
RAM Controllers	DDR3, DDR3L
Graphics Acceleration	-
Display & Interface Controllers	-
Ethernet	1Gbps (8), 2.5Gbps (4), 10Gbps (4)
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	896-BFBGA, FCBGA
Supplier Device Package	896-FCPBGA (25x25)
Purchase URL	https://www.e-xfl.com/product-detail/nxp-semiconductors/t2080nsn8ptb

QorIQ Communications Platforms

T Series—QorIQ T2080 and T2081 communication processors

The 28 nm QorIQ T2080 and T2081 communications processors bring the architectural innovations of the T series flagship T4240, such as the 1.8 GHz dual-threaded e6500 core, into an eight virtual core mid-range platform at reduced power and price points.

OVERVIEW

The T2080 processor is primarily intended to succeed our successful P3041 and P2041 mid-range series of quad-core devices as a control plane or integrated control and data plane processor. It provides an excellent migration path, as it offers 2x or better in core capability, cache size, SerDes bandwidth and Ethernet connectivity within a similar power budget. It also provides a value engineering opportunity for P4080 customers, as T2080 provides equivalent performance at much lower price and power.

The T2081 is a smaller package version of the T2080, which is pin compatible with the quad-core T1042. This provides T1042 customers an easy upgrade to higher performance if processing requirements increase. It also enables customers to reuse a single board for two different product performance levels.

TARGET MARKETS AND APPLICATIONS

The T2080 and T2081 processors are targeted at mid-range control plane applications or mixed control and data plane applications. The highly efficient eight virtual core device achieves up to 1.8 GHz even while maintaining a short seven-stage pipeline for better latency response to unpredictable control plane code branches. Advanced virtualization technology facilitates safe partitioning of control and data plane applications within the device.

- **Enterprise equipment:** Modular Ethernet switches, services cards, UTM equipment, enterprise storage, data center
- **Service provider:** Core and edge routers, broadband access, metro Ethernet, optical networking
- **Wireless infrastructure:** Mobile backhaul, NICs, channel cards, control cards in LTE, WCDMA, GSM, WiMAX
- **Aerospace and defense:** ruggedized or highly secure routers, avionics networking, instrumentation panels, military SBCs
- **Industrial computing:** SBCs, factory automation, test and measurement

E6500 CORE

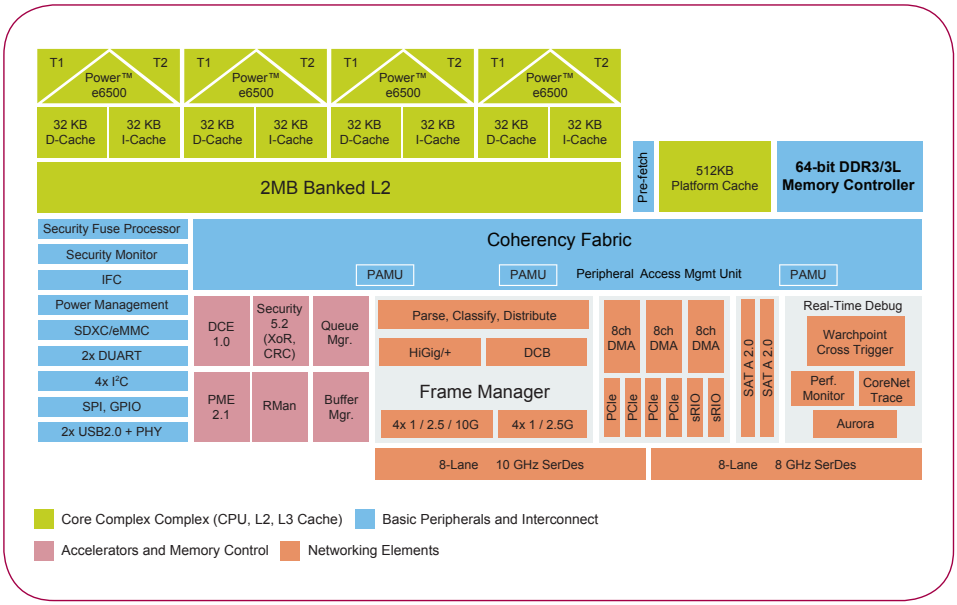
The T2080 and T2081 processors are based on the 64-bit e6500 core, built on Power Architecture® technology, and run up to 1.8 GHz. The e6500 core also offers higher aggregate instructions per clock at lower power with an innovative "fused core" approach to threading. The e6500's fully resourced dual threads provide 1.7 times the performance of a single thread.

The four e6500 dual-threaded cores share a low-latency backside 2 MB L2 cache, allowing efficient sharing of code and data. Each e6500 core implements the NXP AltiVec technology-based SIMD engine, dramatically boosting the performance of media and networking algorithms, offering native inline programming and using less power than a separate DSP.

VIRTUALIZATION

TThe T2080 and T2081 processors include support for hardware-assisted virtualization. The e6500 core offers an extra core privilege level (hypervisor) and hardware offload of logical to real address translation. In addition, the T2080 and T2081 include platform-level enhancements such as SR-IOV and I/O virtualization with DMA memory protection through IOMMUs and configurable "storage profiles," which provide isolation of I/O buffers between guest environments. Virtualization software for the T2080 and T2081 processors includes kernel virtualization model (KVM), Linux® containers and the NXP hypervisor.

QorIQ T2080 COMMUNICATIONS PROCESSOR



T2080 VS. T2081 DIFFERENCES

	T2080	T2081
SerDes	16	8
PCIe	2x Gen3 + 2x Gen2	1x Gen3 + 3x Gen2
SRIO	2 + RMan	No
SATA	2	No
Aurora	Yes	No
10 Gb/s MACs	Up to four, with XFI, XAUI, HiGig	Up to 2x XFI
1 Gb/s MACs	Up to eight	Up to seven
Package	25 x 25mm, 896 pins, 0.8 mm pitch	23 x 23mm, 780 pins, 0.8 mm pitch, pin compatible with T1042

DATA PATH ACCELERATION ARCHITECTURE (DPAA)

The T2080 and T2081 processors integrate the QorIQ DPAA, an innovative multicore infrastructure for scheduling work to cores (physical and virtual), hardware accelerators and network interfaces. The FMAN, a primary element of the DPAA, parses headers from incoming packets and classifies and selects data buffers with optional policing and congestion management. The FMAN passes its work to the QMAN, which assigns it to cores or accelerators with a multi-level scheduling hierarchy, while maintaining packet ordering. The BMAN manages allocation and de-allocation of packet buffers. The T2080 and T2081's implementation of DPAA offers accelerators for cryptography, deep packet inspection and compression decompression.

SOFTWARE AND TOOL SUPPORT

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

- QorIQ T2080 reference design board (T2080RDB)
- CodeWarrior Development Studio for Power Architecture
- NXP 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 & 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

T2080 AND T2081 FEATURES LIST

Four dual-threaded e6500 cores built on Power Architecture® technology	• Up to 1.8 GHz, 6.0 DMIPS/MHz per core • Shares a 2 MB L2 cache • Three levels of instructions: User, supervisor, hypervisor • Hybrid 32-bit mode to support legacy software and transition to a 64-bit architecture • Advanced power saving modes include state retention power gating
CoreNet platform cache	• 512 KB shared platform cache with prefetch engine
Hierarchical interconnect fabric	• CoreNet fabric supporting coherent and non-coherent transactions with prioritization and bandwidth allocation amongst CoreNet endpoints
Memory controller	• 64-bit DDR3/3L SDRAM up to 2133 MT/s • 72-bit width including ECC
DPAA incorporating acceleration for the following functions	• Packet parsing, classification and distribution to 24 Gb/s (FMAN) • Queue management for scheduling, packet sequencing and congestion management of up to 224 queues (QMAN) • Hardware buffer management for buffer allocation and de-allocation with 64 buffer pools (BMAN) • Cryptography acceleration to 10 Gb/s (SEC) • Decompression/compression acceleration at up to 17.5 Gb/s (DCE) • DPAA chip-to-chip interconnect via RapidIO® message manager (RMAN) (T2080 only) • Pattern matching acceleration to 10 Gb/s (PME)
SerDes	• 16 lanes at up to 10 GHz (8 on T2081)

Ethernet interfaces	• Quality of service: Egress traffic shaping and priority flow control for data center bridging in converged data center applications
	• 8 MACs (7 on T2081), multiplexed over the following options:
	  • Up to four 10 Gb/s MACs supporting XFI/KR, XAUI and HiGig
	  • (two on T2081 supporting XFI/KR only)
	  • Up to eight 1 Gb/s MACs (5 on T2080) supporting SGMII
	  • Up to two 2.5 Gb/s SGMII
	  • Up to two RGMII

High-speed peripheral interfaces	• Two PCI Express 3.0 controllers (one on T2081) • Two PCI Express 2.0 controllers (three on T2081) • Endpoint SR-IOV • Two Serial RapidIO 2.1 controllers/ports running at up to 5 GHz with Type 11 messaging and Type 9 data streaming support (T2080 only)
Additional peripheral interfaces	• Two serial ATA (SATA 2.0) controllers (T2080 only) • Two High-Speed USB 2.0 controllers with integrated PHYs • Enhanced secure digital host controller (SD/MMC/eMMC) • Enhanced serial peripheral interface • Four I^2C controllers • Four UARTS • Integrated flash controller supporting NAND and NOR flash memory
DMA	• Dual eight channel
Support for hardware virtualization and partitioning enforcement	• Extra privileged level for hypervisor support • Logical to real address translation • Virtual core aware MMU/TLB • vMPIC (virtualized interrupt controller)/virtual core capable PPC cores • vDMA (user level DMA engine) • PAMU v2 (I/O MMU supporting paging) • DPAA (Ethernet MAC virtualization, accelerator virtualization)
QorIQ trust architecture	• Secure boot, secure debug, tamper detection (T2080 only), volatile key storage, alternate image and key revocation

www.nxp.com/QorIQ

Document Number:
T2080FS REV 2

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