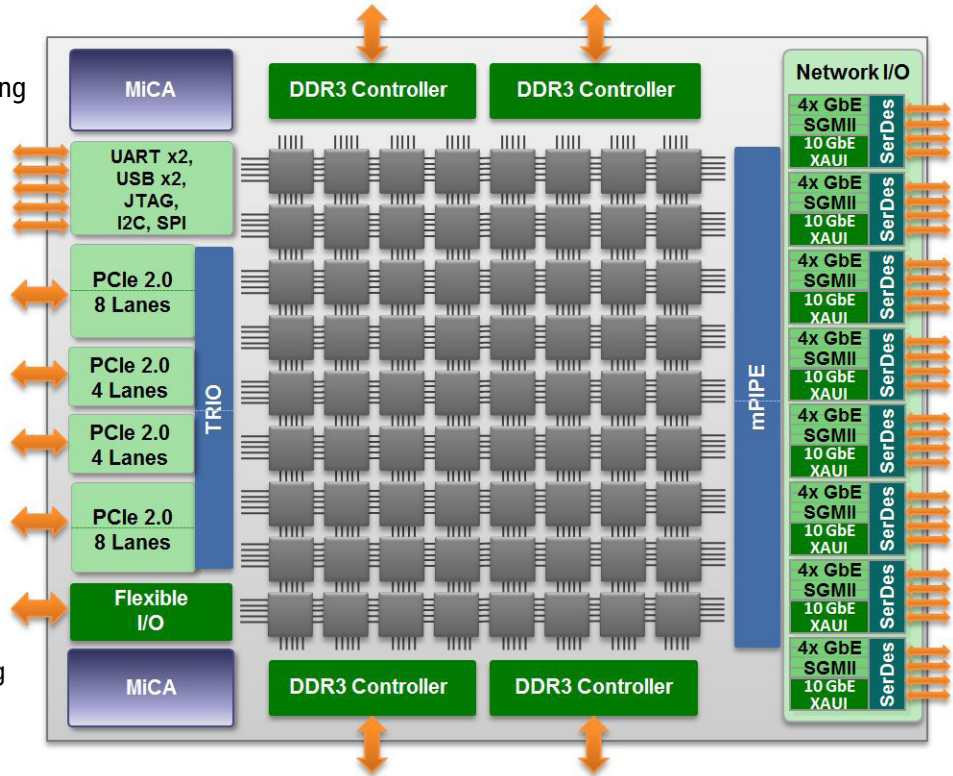


The TILE-Gx72™ Processor is optimized for intelligent networking, multimedia and cloud applications, and delivers remarkable computing and I/O with complete “system-on-a-chip” features. The device includes 72 identical processor cores (tiles) interconnected with the iMesh™ on-chip network. Each tile consists of a full-featured, 64-bit processor core as well as L1 and L2 cache and a non-blocking Terabit/sec switch that connects the tiles to the mesh and provides full cache coherence among all the cores.

The TILE-Gx72 is ideal for applications such as:

- 80 - 100 Gbps of networking and security dataplane offload
- 80 Gbps packet filtering and bandwidth management
- 40 Gbps SSL/IPsec security protocol processing
- High-performance computing offload across PCIe
- H.264/H.265 high-density video transcoding



TILE-Gx8072 Processor Block Diagram

### Powerful Processor Cores

- Seventy-two cores operating at frequencies up to 1.2 GHz
- 64-bit architecture (datapath and address)
- Three execution pipelines
- Robust virtual memory system with TLBs, multiple page size support, and Hardwall™ protection
- Instruction Set Architecture (ISA) extensions for multimedia and SIMD processing

### Cache

- 23.5 MBytes total on-chip cache
- Dynamic Distributed Cache (DDC™) scalable hardware coherence
- 32 KB L1 instruction cache and 32 KB L1 data cache per core
- 256 KB L2 cache per core
- 18 MBytes coherent L3 cache

### iMesh Interconnect

- Five independent low-latency mesh networks
- >110 Tbps aggregate bandwidth
- Non-blocking, cut-through switching with one clock cycle per hop

### Integrated Memory Controllers

- Four 72-bit DDR3 controllers with ECC support
- 1 TB total memory capacity
- Speeds up to 1,866 MT/s
- Advanced request reordering

### Networking Interfaces

- Eight 10 Gbps XAUI ports, including double-XAUI support
- Up to thirty-two 10/100/1000 SGMII ports (multiplexed with XAUI ports)
- Egress QoS queuing and traffic shaping support
- IEEE 1588v2 precision timing controller support
- IEEE 802.1Qbb priority flow control and datacenter Ethernet (DCE) support
- Precision 1ns granularity packet timestamping

### mPIPE Wire-Speed Packet Engine

- C-programmable classification
- 100 Gbps aggregate throughput and 150 Mpps performance for minimum size packets
- Programmable TCP/UDP checksum and Cyclic Redundancy Check (CRC) offload for packet headers and payload
- Multi-mode load-balancer with direct-to-cache packet delivery
- Flexible buffer manager with 64 configurable memory domains

### MiCA Acceleration Engines

- MiCA™ engines deliver low-latency, high-bandwidth offload
- 40 Gbps encryption throughput (-E option)
- Support for IPsec, SSL, TLS, MACsec, SRTP, and 3GPP
- Public Key Accelerator (RSA, DSA, DH, and ECC)
- True random number generator (TRNG)

### PCI Express

- 96 Gbps of PCIe throughput
- Six integrated Gen2 PCIe controllers (5G SerDes) with 24 lanes
- Each port configurable as root complex or endpoint
- High-performance coherent transaction DMA engine
- Multiple configurable transaction modes for efficient data movement
- SR-IOV support

### StreamIO Interfaces

- Six high-performance transaction ports for chip-to-chip or FPGA interconnect
- Multiplexed with PCIe SerDes
- 20 Gbps peak performance per 4-lane port

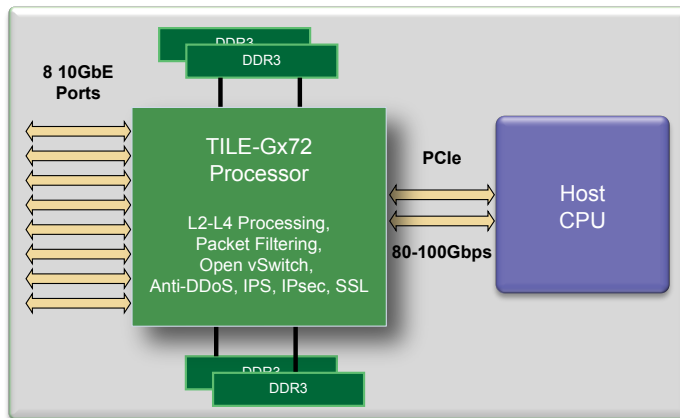
### System Integration Features

- Two USB 2.0 interfaces: one host and one host/endpoint
- Four I<sup>2</sup>C interfaces
- One SPI (master) interface
- Two high-speed UART interfaces
- Forty-eight GPIO/Interrupt pins
- JTAG port

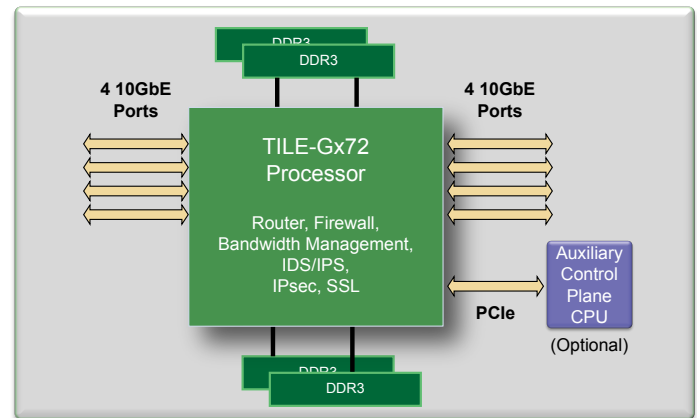
### Package Information

- 45 mm x 45 mm BGA
- 1 mm ball pitch device

### Usage Examples



High I/O "Front End" Application Processor



40Gbps In-Line Dataplane Processor

### Ordering Guide

Device	Part Number	Max Core Frequency	Max Memory Speed	# of Cores	MiCA Accelerator	Typical Power*	Operating Temperature	Package
TILE-Gx72	TLR4-07280DG-10C A0a	1.0 GHz	1,600 MT/s	72	No	51W	Commercial	1,847 BGA
TILE-Gx72	TLR4-07280DG-10CE A0a	1.0 GHz	1,600 MT/s	72	Yes	54W	Commercial	1,847 BGA
TILE-Gx72	TLR4-07280DG-12C A0a	1.2 GHz	1,866 MT/s	72	No	62W	Commercial	1,847 BGA
TILE-Gx72	TLR4-07280DG-12CE A0a	1.2 GHz	1,866 MT/s	72	Yes	65W	Commercial	1,847 BGA

\* Power may vary based on application and I/O configuration.