PENGUIN™ SOLUTIONS

Penguin Edge™ ATCA-7480

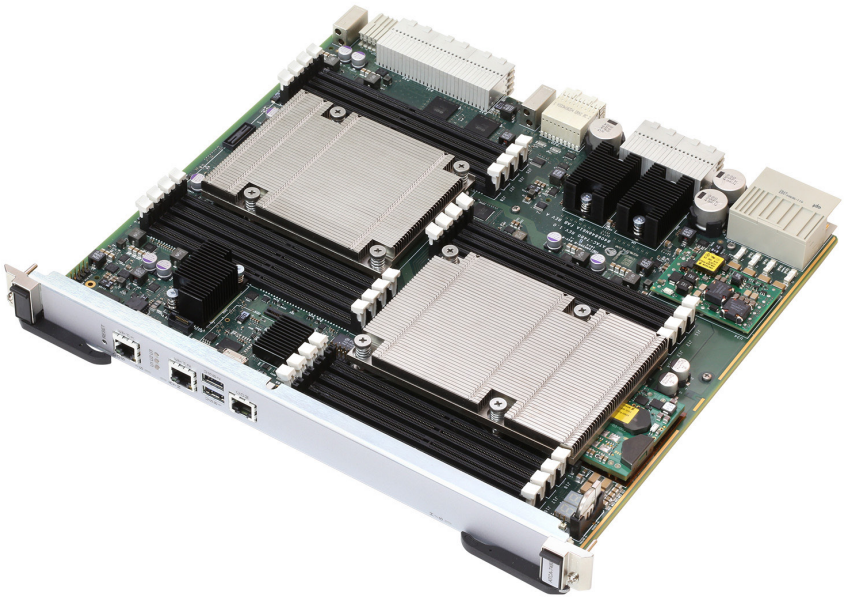
QuadStar™ 40G Packet Processing/Server Blade

- Two Intel Xeon processors, E5-2600 v3 family
- Scalable performance range with up to 12 cores per processor
- Up to 512GB main memory, DDR4, configurable for highest capacity or cost effective memory configurations
- Large scale on-board solid state storage
- QuadStar 40G fabric interfaces enabling multiple bandwidth and redundancy options
- Hot-swappable mass storage options and RAID 0/1 support via rear transition module
- Suitable for open source and commercial Linux derivatives
- Intel DPDK ready
- Designed for NEBS and ETSI compliance (configuration dependent)

ATCA is an open standard under PICMG with a multi-vendor ecosystem. With its rugged design, 5-nines high availability (99.999%) and shallow footprint, ATCA has a strong history of deployment in shipborne and land-based defense applications in addition to telecommunications. The Penguin Edge™ ATCA-7480 server blade features Dual Intel® Xeon® processors (codename Haswell) providing a reliable processing platform.

Benefits

- Use of the Intel Xeon processors maximizes compatibility with existing code base
- Adherence to the ATCA specification ensures compatibility with existing infrastructure
- OS & I/O options help ensure a seamless upgrade path from existing systems



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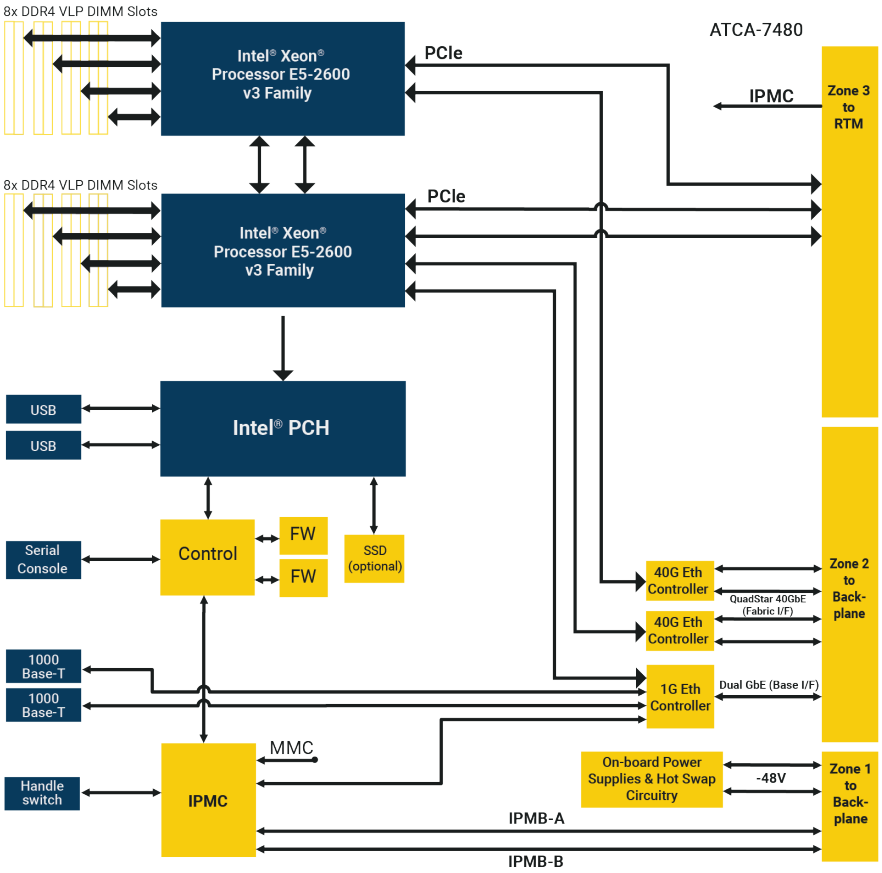
Penguin Edge ATCA-7480 Block Diagram



The Penguin Edge ATCA-7480 is fully backward compliant with RTMs available for the Penguin Edge ATCA Intel Architecture product portfolio. This easily allows extending the boards I/O and storage capabilities. The main I/O interconnect from the processor complex to the ATCA Zone 3 is based on PCIe supporting multiple I/O connections to meet high bandwidth requirements with up to Gen3.

Further members of the RTM family provide selections of 1 and 10Gb Ethernet I/O and optional on-board storage. Hot-swappable disk drives can be serviced through the RTMs faceplate.

Supported Rear Transition Modules

RTM	Networking Capabilities		Storage	I/O	
	10Gbps Ethernet (SFP+)	1Gbps Ethernet (1000Base-T, RJ-45)	Disk bay for hotswappable hard disk, 2.5”	SAS I/F on SFF-8470 connector	USB 2.0 Interface
RTM-747X-10G-SP	Six (6)	Four (4)	-	-	-
RTM-747X-10G-D	Four (4)	Four (4)	One (1)	Two (2) SAS	-
RTM-ATCA-7360	-	Six (6)	One (1)	Two (2) SAS	One (1)

Note 1: Maximum aggregated bandwidth of two 40G Ethernet interfaces located in the same network silicon is constraint by the available PCIe bandwidth. Ethernet bandwidth of two network interfaces residing in different network controllers is not impacted by PCIe constraints. Independently maximum achievable bandwidth can be limited by communication protocols being used.

Software Enablement

The Penguin Edge ATCA-7480 blade can be configured with a variety of software offerings, from firmware-only to fully integrated and verified software operating environments.

Firmware

The board is preinstalled with BIOS and IPMC firmware that allows combining the board with operating systems and integrating it into hardware platform management.

BIOS firmware includes support for:

- Unified Extensible Firmware Interface (UEFI)
- Power management
- Multiple boot options including:
  - Local and externally connected hard disks
  - On-board solid state disks
  - External USB boot media
  - PXE boot via ATCA base and fabric interface
- Serial redirection of the BIOS console
- Serial over LAN of the BIOS console via ATCA base interface
- BIOS upgrade via local host

Intelligent Platform Management Control

The ATCA-7480 features an intelligent platform management controller (IPMC). The IPMC provides interfaces for hardware platform management that allow monitoring status, event logging, and recovery control of the blade. Features include:

- Compliance with PICMG 3.0 and IPMI 2.0
- Firmware (BIOS, IPMC, FPGA) upgradable from IPMI interface (LAN, IPMB), PICMG HPM.1 support or via Basic Blade Services (BBS) firmware upgrade utility
- FW rollback capability
- Support for serial port redirection over LAN interface

Supported Operating Systems and Appliances

The ATCA-7480 is designed to operate with:

- Open source operating systems
- Commercial operating systems
- Intel Data Plane Development Kit
- VMware ESXi 5.5

Operating systems such a CentOS, Ubuntu, OpenSuse and Red Hat 7.x can run on the board. Linux derivatives are combinable with Basic Blade Services (BBS) provided by Penguin Edge. BBS provides services that help to integrate the board into a system context and manage board resources. The Basic Blade Services include:

- Hardware Platform Management including local IPMC, LED, E-Keying and blade extraction software
- Firmware upgrade utility
- Local management access (CLI)
- Supervision of optical modules
- The ATCA-7480 can be configured for virtualization using Linux KVM or VMware ESXi 6.7 U3/7.0 U3.

Applications can benefit from the Intel Data Plane Development Kit (DPDK). DPDK enables ways for effectively handling packet processing capabilities by exploiting network silicon, processing resources and hardware off-load engines available to the board.

Hardware Specifications

Processor

Two Intel Xeon processors E5-2600 v3 family

- Dual QuickPath Interface (QPI) – 9.6 GT/s max.
- Max. 35M L3 cache, 2.5MB per available core
- Enhanced features (Intel AES-NI, AVX/SSE, VT, 64 bit, power management)
- SMP and HT support

Memory

DDR4-1600/1866/2133 memory controllers integrated into processors

- Total of four independent memory channels per CPU socket
- Scalable memory capacity 64, 128, 256GB prepared for 512GB
- Support for memory integrity (ECC)

Mass Storage

Up to three on-board solid state disks at 6Gbps SATA

- Hot-swappable hard disk options on RTM
- Mass storage options (various capacities)
  - Enterprise class disks
  - SSD options

Base and Fabric Interfaces

- PICMG 3.0 base interface compliant, Gigabit Ethernet (1Gbps)
- QuadStar ATCA Fabric Interface with four (4) 40 Gigabit Ethernet (KR4) channels, or PICMG 3.1, Option 9 (10Gbps), Option 1 (1Gbps)
- Configurable as 3+1, 2+2, 1+1 (redundant) or 4+0, 3+0, 2+0, 1+0 (non-redundant), see Note 1 on page 3

Counters/Timers

- Real-time clock
- Programmable watchdog timer

External Interfaces

- Front panel
  - 10/100/1000Base-T Ethernet (2), RJ-45
  - Serial console (1), RJ-45
  - USB 3.0 (2)
- Rear transition module
  - See RTM section on page 2 for product options

Power Requirements

- Dual-redundant –48/–60 VDC (TNV-2) rail
- Input range: –39 to –72 VDC

Thermal Characteristics

- Board variants designed for NEBS L3
  - Operating range: –5°C to 55°C
  - Airflow requirements: CP-TA B.4 or higher depending on configuration options
- Board variants designed for data center environments
  - Operating range: 0°C to 35°C (depending on available cooling)
  - Airflow cooling requirements: CP-TA B.4 or higher depending on configuration options

Relevant Blade Size

- 8U form factor, 280 mm X 322.5 mm, single slot

Relevant Standards

- PICMG 3.0 (form factor, IPMI, base interface, hot swap, RTM)
- PICMG 3.1 R2 (fabric interface)

Regulatory Compliance	
Item	**Description**
Designed to comply with NEBS, Level 3 (for product variants that are designed for NEBS L3 and ETSI compliance)	Telcordia GR-63-CORE, NEBS Physical Protection
	Telcordia GR-1089-CORE, Electromagnetic Compatibility and Electrical Safety – Generic Criteria for Network Telecommunications Equipment. Equipmentv Type 2
Designed to comply with ETSI (for product variants that are designed for NEBS L3 and ETSI compliance)	ETSI Storage, EN 300 019-1-1, Class 1.2 equipment, Not Temperature Controlled Storage Locations
	ETSI Transportation, EN 300 019-1-2, Class 2.3 equipment, Public Transportation
	ETSI Operation, EN 300 019-1-3, Class 3.1 (E) equipment, Temperature Controlled Locations
	ETSI EN 300 132-2 Environmental Engineering (EE); Power supply interface at the input to telecommunications equipment; Part 2: Operated by direct current (dc)
	ETSI ETS 300 753, Equipment Engineering (EE); Acoustic noise emitted by telecommunications equipment
CE Conformity	Directive 2004/108/EC, Directive 2006/95/EC
EMC	EN 55022 Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement (for product variants that are designed for datacenter environments)
	EN 55024 Information technology equipment - Immunity characteristics - Limits and methods of measurement (for product variants that are designed for datacenter environments)
	ETSI EN 300 386 Electromagnetic compatibility and Radio spectrum Matters (ERM); telecommunication network equipment; ElectroMagnetic Compatibility (EMC) requirements, Telecommunication equipment room (attended) (for product variants that are designed for NEBS L3 and ETSI compliance)
	CFR 47 FCC Part 15 Subpart B, Class A (US); FCC Part 15 - Radio Frequency Devices; Subpart B: Unintentional Radiators
	AS/NZS CISPR 22 (Australia/New Zealand), Limits and Methods of Measurement of Radio Disturbance Characteristics of Information Technology Equipment
	VCCI Class A (Japan), Voluntary Control Council for Interference by Information Technology Equipment
	CISPR 22 Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement
	CISPR 24 Information technology equipment – Immunity characteristics – Limits and methods of measurement
Safety	Certified to UL/CSA 60950-1, EN 60950-1 and IEC 60950-1 CB Scheme
	Safety of information technology equipment, including electrical business equipment
RoHS/WEEE compliance	DIRECTIVE 2011/65/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS).
	DIRECTIVE 2012/19/EU OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on waste electrical and electronic equipment (WEEE)

Ordering Information	
Part Number	**Description**
ATCA-7480-0GB	ATCA packet processing blade with dual 12-core Intel Xeon processors, E5-2648L v3 (1.8 GHz), 16X DIMM sockets, 0GB, QuadStar 40G support, CP-TA B.4 compliant. Designed for NEBS L3/ETSI. See Note 2
ATCA-7480-64GB	ATCA packet processing blade with dual 12-core Intel Xeon processors, E5-2648L v3 (1.8 GHz), 16X DIMM sockets, 64GB, QuadStar 40G support, CP-TA B.4 compliant. Designed for NEBS L3/ETSI.
ATCA-7480-0GB-L	ATCA packet processing blade with dual 8-core Intel Xeon processors, E5-2618L v3 (2.3 GHz), 16X DIMM sockets, 0GB, QuadStar 40G support, CP-TA B.4 compliant. Designed for NEBS L3/ETSI. See Note 2
ATCA-MEM-DDR4-8GB	8GB DDR4-2133 VLP memory module at maximum memory speed
ATCA-MEM-DDR4-16G	16GB DDR4-2133 VLP memory module at maximum memory speed
ATCA-748XMMOD-KIT	SLIM SATA (MO-297) MODULE CARRIER KIT, 3 SSD sites, 0GB
ATCA-7XMMOD-SATA3	128GB Slim SATA (MO-297) MLC Module for ATCA-737X and ATCA-747X product series, 3Gb SATA I/F
ATCA-7XMMOD-SATA5	256GB Slim SATA (MO-297) MLC Module for ATCA-748X product series, 6Gb SATA I/F
CBL-B-OPT-QSFPP-5M	40G QSFP+ optical break-out cable - multimode – 1x MTP (MPO) connector, 8x LC connectors - 5 meter
RTM-747X-10G-D	RTM for the ATCA-747X and ATCA-748X product series, 4x 10GbE (SFP+), 4x GbE, 1x slot for optional HDD. See Note 3
RTM-747X-10G-SP	RTM for the ATCA-747X product series, 6x 10GbE, 4x GbE. See Note 3
RTM-ATCA-7360	RTM for the ATCA-736X, ATCA-737X and ATCA-747X product series, 6x GbE, 2x SAS,1x slot for optional HDD
ATCA7360-HDD4-SAS	600GB SAS HDD kit for the RTM-ATCA-7360 and RTM-ATCA-7360-L
ATCA7360-HDD5-SAS	900GB SAS HDD kit for the RTM-ATCA-7360 and RTM-ATCA-7360-L
RTM-7360-HDDKIT	Carrier and mounting kit for HDD or SSD devices used with RTM-ATCA-7360 or RTM-ATCA-7360-L (no disk included)
RJ-45-DSUB-ATCA	RJ-45 DSUB cable for the ATCA-7140, 7X50, 736X, 737X, 747X blades

Note 2: No memory is installed

Note 3: Optical modules are not included

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About Penguin Solutions

Penguin Solutions accelerates customers' digital transformation with the power of emerging technologies in HPC, AI, and IoT with solutions and services that span the continuum of edge, core, and cloud. The company designs highly advanced infrastructure, machines and networked systems that enable the world's most innovative enterprises and government institutions to build the autonomous future, drive discovery and amplify human potential. The Penguin Edge portfolio covers system on modules, single board computers and application-ready platforms that extend insight, intelligence, and analytical capabilities closer to where the data is generated - optimizing a range of use cases across industries and rugged environments.

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