ATCA-8310
AdvancedTCA DSP Blade

Data Sheet

Supports up to 30 DSPs with local packet processing resources and a powerful general purpose processor all on one blade

- PICMG® compliant single-slot AdvancedTCA blade with 1/10G Ethernet fabric ports

- Up to 30 Texas Instruments TMS320TCI6486 6-core DSPs

- 8-core NXP® QorIQ® P4080 for packet processing and load balancing in the IP I/O path

- Pre-installed Linux on P4080 with utilities for blade configuration, switch management and DSP setup

- Red Hat RHEL certified 2-core Intel® Core™ i7 processor for control plane application

- Local Ethernet switch connecting all DSPs, CPUs, ATCA networks and I/O

- IP RTM supporting 10Gigabit Ethernet

- Designed for NEBS and ETSI compliance in a CP-TA B.4 class enclosure

The ATCA-8310 from Artesyn Embedded Technologies is a state-of-the-art AdvancedTCA® DSP/Media Processing platform designed to provide power-efficient, high-density voice and video transcoding functions. The blade features a uniquely flexible mix of processing technologies to support:

- "DSP farm" architectures for scalable voice and video gateways based on multiple ATCA-8310 blades, featuring a high processing density with up to 180 DSP cores on a single blade.

- "Gateway-on-a-blade" architectures for small systems with just one or two ATCA- 8310 blades, providing DSP functionality, packet processing functionality and an Intel® CPU all on each blade.

- "Pay-as-you-grow" capability with field-upgradeable DSP expansion options.

The ATCA-8310 is optimized for IP to IP applications, but may be adapted to support legacy TDM applications in specific customer configurations using a range of TDM rear transition modules (RTMs), including variants with multiple OC/3 and OC/12 line terminations.

In a fully expanded voice configuration, the ATCA-8310 is capable of handling over 8000 channels of TDM to compressed (G.729AB) Voice over IP conversion including tone detection and echo cancellation, or over 6000 channels of GSM-AMR mobile voice transcode in a single ATCA slot. The ATCA-8310 is also ready for video transcode and transrate applications, estimated to be able to handle up to 350 individual mobile video streams per slot.

AdvancedTCA®

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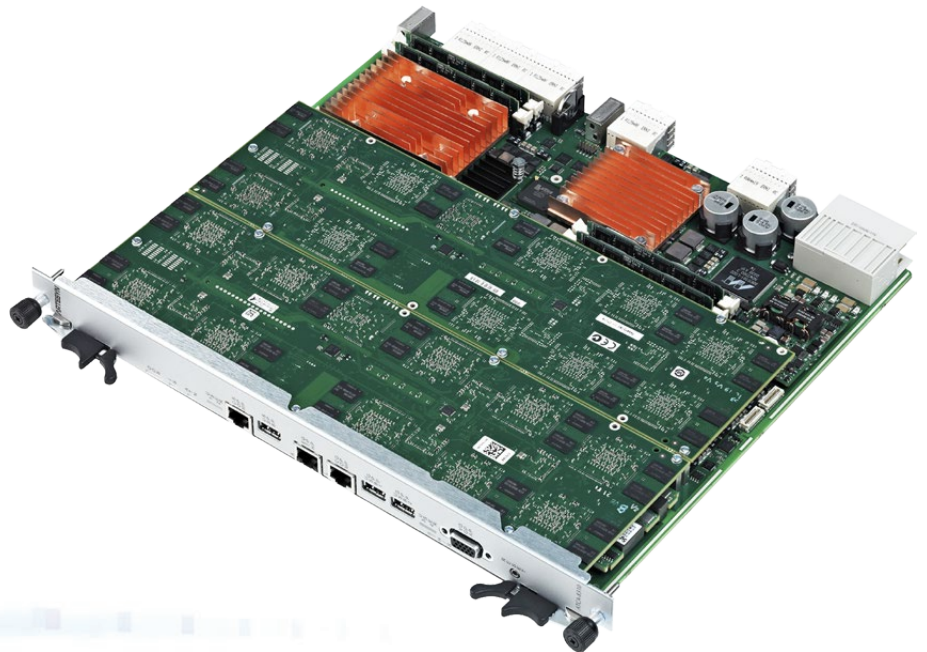
ATCA-8310 Overview

The ATCA-8310 utilizes a base board and media mezzanine module approach for maximum flexibility and scalability, while also supporting the insertion of new technology as it becomes available. At the heart of the board is a NXP P4080 packet processing CPU and a Broadcom Layer 2/3 Ethernet switch that interconnects all the various processing elements and provides access to the ATCA fabric. The P4080 implements powerful security and load balancing functions that hide the complexity of the voice and video processing subsystem from external networks.

The initial ATCA-8310 digital signal processor (DSP) array is based on the Texas Instruments powerful TMS320TCI6486 DSPs, each with external memory, and each connected to the local Ethernet switch. Up to 30 DSPs can be carried in a NEBS configuration; 5 or 10 on the base board, and 10 on each of two field-upgradeable mezzanines. The mezzanines are designed to support connectivity appropriate to next generation DSPs for future-proofing. Using mezzanines allows for low entry costs and pay-as-you-grow scalability.

Finally, the board offers an optional Intel® Core™ i7 processor subsystem that, when fitted, allows the board to operate as a fully functional "media gateway on a blade" for small systems. The Intel Core i7 processor can run both management and call agent applications. It avoids the need for additional ATCA blades to perform this task, again minimizing the cost to first call.

STANDARD NETWORKING SUPPORT

The ATCA-8310 media processing blade provides PICMG® 3.0 base interface connectivity in a dual star configuration using standard Gigabit Ethernet (GbE) technology. The PICMG 3.1 fabric interface features both dual 10Gbps (Option 9) and dual 1Gbps (Option 1).

DIGITAL SIGNAL PROCESSING COMPLEX

The ATCA-8310 contains up to 30 DSPs on three logical modules with 10 DSPs each. The first module is fixed assembled on the ATCA baseboard, the 2nd and 3rd module are located on two mezzanines. Factory assembly options allow baseboard module configurations with 0, 5 and 10 DSPs. In total this gives options for 5, 10, 15, 20, 25 and 30 DSPs. The DSPs are connected to the infrastructure with two SRIO ports per module, two concentrated TSIP SERDES interfaces per module and one GbE link per DSP. The DSPs are TMS320TCI6486 operating at 500 MHz. Future DSP technologies can be supported via new DSP mezzanine modules.

PACKET PROCESSING AND LOCAL MANAGEMENT COMPLEX

The ATCA-8310 contains a powerful multi-core NXP P4080 packet processor. In default configuration all cores run Mentor Graphics Embedded Linux. Light Weight Executives (LWE) allow execution of packet processing software, either inside Linux using User Space Data Path Acceleration Architecture (USDPAA), or separated via the NXP Hypervisor.

- NXP QorIQ P4080 communications processor @ 1.5 GHz
- Two 244-pin DDR3 Mini-DIMM sockets, bus-width 64-bit plus 8-bit ECC
  - 2x 1GB DDR3 memory DIMMS
  - Up to 2x 4GB on request

- 4GB USB user flash memory
  - Up to 16GB on request
- Front panel connections
  - 1x COM
  - 1x USB

GENERAL PURPOSE PROCESSING COMPLEX

The ATCA-8310 contains a build option for a general purpose processor building block based on the Intel® Core™ i7 Mobile Processor. This processing complex is operating independent from the rest of the media processing functionality. It is connected to the local Ethernet switch via two Gigabit Ethernet connections. Its intended usage are control plane functions like call servers.

- Intel® Core™ i7-620LE Processor @ 2.00 GHz
  - Two 244-pin DDR3 Mini-DIMM sockets, bus-width 64-bit plus 8-bit ECC
  - 2x 2GB DDR3 memory DIMMS
  - Up to 2x 4GB on request
- Solid State Disk option
- Front panel connections
  - 1x COM
  - 2x USB
  - 1000Base-T Ethernet
  - VGA

Rear Transition Modules
IP RTM

- 1x 10 Gigabit Ethernet via a SFP+ interface
- 4x 10/100/1000BaseTx via RJ-45

OC-3, OC-12, DS1 and DS3 RTM options are available on request.

Performance Estimations

Performance figures below are based on a configuration with 30x TMS320TCI6486 DSPs @ 500 MHz and are estimations based on typical voice and video codecs.

ESTIMATED VOICE CODING PERFORMANCE

- 14,000 channels of TDM ↔ G.711 VoIP as used in access media gateways
- 8,000 channels of TDM ↔ G.729 AB compressed VoIP as used in trunk media gateways
- 6,000 channels of G.711/IP ↔ AMR/IP as used extensively in mobile voice gateways

ESTIMATED VIDEO CODING PERFORMANCE

- 350 channels of H.264 CIF mobile video transcoding as used in mobile video applications
- 100 channels of MPEG2/H.264 transode used in IPTV applications

Software Support

MULTI-CORE CPU (NXP P4080)

User configurable symmetrical multiprocessing (SMP) Linux distribution with real-time extensions and Light Weight Executives (LWE).

- Boot firmware
- Mentor Graphics Embedded Linux
- Artesyn Basic Blade Services (BBS) with
  - All necessary drivers for the ATCA-8310 and the ARTM-831X-IP
  - Control, boot and operation of the DSP hardware
  - Firmware upgrade utility
  - IPMI support
  - Artesyn SRstackware for switch management
    - Comprehensive L2 and selected L3 functionality
    - Packet classification and forwarding supporting a single IP address for the entire DSP farm
    - CLI and SNMP based user interfaces

DIGITAL SIGNAL PROCESSORS

- Basic platform support software to support DSP image load and control
- Validated to run Texas Instruments Voice and Video Software

INTEL PROCESSOR (INTEL CORE I7 MOBILE PROCESSOR)

- Red hat Enterprise Linux 6
- Blade specific drivers as supported binary and sample source code

Hardware Specifications

POWER REQUIREMENTS

- Dual-redundant -48 to -60 VDC (TNV-2)
- Input range: 39 to 72 VDC
- Power consumption front blade: Full power mode - 300 Watts (estimated)

THERMAL CHARACTERISTICS

- Operating range: –5 °C to 55 °C
- Cooling requirements at ETSI/NEBS conditions according to CP-TA B.4

BLADE SIZE

- PICMG 3.0: 8U form factor, 280 mm X 322.5 mm, single slot

BASE AND FABRIC INTERFACES

- Dual star configuration
- PICMG 3.0 base interface compliant, Gigabit Ethernet (1.0Gbps)
- PICMG 3.1 fabric interface compliant, Gigabit Ethernet
  - PICMG 3.1, Option 1 - Single, redundant Gigabit Ethernet pair (1.0Gbps)
  - PICMG 3.1, Option 9 - Single, redundant 10 Gigabit Ethernet pair (10Gbps)
- PICMG 3.0 Update Channel Gigabit Ethernet (1.0Gbps)

RELEVANT STANDARDS

- PICMG 3.0 (form factor, IPMI, base interface, hot swap, RTM)
- PICMG 3.1, Option 1, 9

Regulatory Compliance

Item	Description
Designed to comply with NEBS, Level 3	Telcordia GR-63-CORE, NEBS Physical Protection
	Telcordia GR-1089-CORE, Electromagnetic Compatibility and Electrical Safety – Generic Criteria for Network Telecommunications Equipment. Equipment Type 2
Designed to comply with ETSI	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	ETSI EN 300 386 Electromagnetic compatibility and Radio spectrum Matters (ERM); telecommunication network equipment; ElectroMagnetic Compatibility (EMC) requirements, Telecommunication equipment room (attended)
	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 2002/96/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on waste electrical and electronic equipment (WEEE)
Interoperability	Designed to operate within a CP-TA B.4 system environment at full performance

Ordering Information

Part Number	Description
ATCA-8310-0-T10	ATCA BLADE - P4080/2GB - no I7-620LE - 10 X TMS320TCI6486/256MB - SRIO - 2 FREE MODULE SLOTS - SW LICENSES: P4080 BBS
ATCA-8310-IA-T5	ATCA BLADE - P4080/2GB - I7-620LE/4GB - 5 X TMS320TCI6486/256MB - SRIO - 2 FREE MODULE SLOTS - SW LICENSES: P4080 BBS
ATCA-8310-IA-T10	ATCA BLADE - P4080/2GB - I7-620LE/4GB - 10 X TMS320TCI6486/256MB - SRIO - 2 FREE MODULE SLOTS - SW LICENSES: P4080 BBS
ARTM-831X-IP	ARTM-831X-2X10GE-4X1GBE
MEZZ-83XX-EXTR-TOOL	EXTRACTION TOOL FOR THE ATCA-83XX MEZZANINE MODULES
831X-MEZZ-T10	DSP MODULE FOR ATCA-8310 - 10 X TMS320TCI6486/256MB
8310-SSD-240GB-MLC	SSD FOR ATCA-83XX IA PROCESSOR - 240GB - MLC TECHNOLOGY
RJ45-DSUB-ATCA	RJ45 DSUB CABLE FOR THE ATCA-7140, 7X50, 736X, 737X, 747X, 83XX, 940X ATCA BLADES (ROHS 6/6)

IMPORTANT NOTICE - STANDARDS ESSENTIAL PATENTS AND THE USE OF CODECS

The Artesyn End User License Agreement covering software related to the ATCA-8330 does not represent or warrant that the codec software is free of infringement of any third party patents, copyrights, or trade secrets. Many codecs and other recognized standards may require licensing arrangements involving the execution of license agreements or payment of fees to an intellectual property rights (IPR) holder or an IPR agent acting on behalf of the IPR holder.

It is the user's responsibility to determine, for any codecs or other standards they intend to use, whether any additional IPR licenses are required, including the payment of royalties or license fees. The availability of implementations including codecs packaged in products acquired from Artesyn does not imply the right to practice these standards nor does Artesyn grant a license or the right to use or practice some or all of these standards. Depending on the country involved, the end user may be legally obliged to contact an IPR holder or agent and conform to their patents licensing requirements.

STANDARDS ESSENTIAL PATENTS

Standards Essential Patents (SEPs) are an unavoidable consequence of complex standards developed by consortia. Patents are essential when the technology covered by the patent must be practiced in order to comply with the Standard. A patent is typically defined as essential if a standard cannot be practiced without infringing the patent. The contributor of the IP is usually a company involved in the standards process and almost always retains ownership. Companies that own SEPs that are often members of standards setting organizations (such as ETSI or IEEE) and may be required to declare that they will license their patents on Reasonable And Non-Discriminatory (RAND) terms. Most standards organizations do not review patents alleged to be essential to determine that they in fact are essential. This is a determination that may not occur until decided in a contested legal matter.

COVERAGE FOR STANDARDS-ESSENTIAL PATENTS (See Table 1)

Artesyn does not generally provide indemnification against infringement of SEPs related to codecs, but there are some exceptions where Artesyn does offer limited indemnification. Table 1 summarizes Artesyn's understanding of licensing requirements with respect to selected codecs. Except where specifically stated that Artesyn does offer indemnification, it should be understood that Artesyn does not offer indemnification.

COVERAGE FOR NON-ESSENTIAL PATENTS

Non-Essential patents are by definition patents that are not necessarily infringed in order to practice the standard implemented by a codec. As part of a custom license, Artesyn may offer indemnification against infringement of non-essential patents with respect to the codecs embedded in the ATCA-8330 software. Contact your Artesyn sales representative for further details.

A NOTE ON WIRELESS VOICE CODECS

Although the patent situation for wireless voice codecs is very complex, it is not standard industry practice for embedded board-level product manufacturers like Artesyn to offer IPR licensing cover for AMR and EVRC codecs because they are not well placed in the IPR value chain. Therefore, Artesyn does not typically offer indemnification for AMR and EVRC codecs. The IPR holders usually approach end-product manufacturers because many end-products include additional standards compliant technologies that may infringe patents. Many IPR holders prefer to offer portfolio licenses that cover much more than just the codecs. Additionally, a starting point for licensing is based on the number of channels used in a product, and the end-product manufacturer is much better placed to quantify and control usage than the embedded technology provider. Artesyn strongly recommends that customers undertake a full product mapping exercise to determine the feature sets that need to be covered by patent portfolios.

Table 1		01October 2014
CODEC FAMILIES AND STANDARDS ESSENTIAL PATENTS		
Class	*CODEC Family*	*Standards Essential Patent Situation*
Wireline Voice	G.711 PCM	Artesyn believes that these codecs are currently unencumbered by standards essential patents.
	G.722 Wideband	
	G.726 ADPCM	
	G.723.1	Indemnification for infringement of SEPs for these codecs is included within the Artesyn custom license described here.
	G.729AB	
	G.722.1	G.722.1 (also known as "Siren") is licensed royalty free by Polycom provided that the end-product manufacturer executes the license at http://www.polycom.com/company/about-us/technology/siren.html. Customers interested in this codec should contact Polycom directly.
	iLBC	iLBC is an open source royalty-free codec available directly to Customers under the "revised BSD" license. The full text of the Revised BSD License can be found at: http://opensource.org/licenses/BSD-3-Clause.
Wireless Voice	GSM FR	GSM and GSM AMR codecs may incorporate SEPs held by Ericsson, Voiceage, Nokia, NTT, and France Telecom. Please see "A NOTE ON WIRELESS VOICE CODECS".
	GSM AMR	
	GSM AMR WB	
	EVRC-A	EVRC codecs may incorporate SEPs held by Qualcomm, Ericsson, NTT, France Telecom and others. Please see " A NOTE ON WIRELESS VOICE CODECS".
	EVRC-B	
Internet Voice	SILK	SILK can be used royalty free under a patent license at http://developer.skype.com/silk/license. Customers interested in SILK should contact Skype directly.
	SPEEX	Speex is an open source royalty-free codec available directly to Customers under the "revised BSD" license (see iLBC above for reference).
	Opus	Opus is an open source royalty-free codec available directly to Customers under the "revised BSD" license (see iLBC above for reference).
Video	H.263	MPEG LA (www.mpegla.com) offers coordinated patent licenses for video codecs to end-product manufacturers. Customers interested in these codecs should contact MPEG-LA directly.
	MPEG-4	
	H.264	

SOLUTION SERVICES

Artesyn Embedded Technologies provides a portfolio of solution services optimized to meet your needs throughout the product lifecycle. Design services help speed time-to-market. Deployment services include global 24x7 technical support. Renewal services enable product longevity and technology refresh.

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