

COMPUTING

ATCA-8330

Data Sheet

Dense Media Processing for Voice & Video over IP

The ATCA-8330 media processing engine enables high density voice and video processing to be integrated into network elements based on the proven AdvancedTCA standard.

- High performance Intel® Xeon® server combined with up to 40 power-efficient DSPs for accelerated media processing
- Single slot AdvancedTCA® form factor media processing engine
- Similar architecture to server-based element eases porting and maintenance
- Comprehensive voice and video processing firmware and programmers interface included
- Hardware and software platform to support VoLTE and Media Resource Function
- Designed for NEBS Level 3 and ETSI telecom standards compliance

The Artesyn ATCA-8330 is a combination of an Intel® Xeon® server CPU and a media processing array based on the Octasic OCT2224M multi-core DSP with comprehensive media processing software suite.

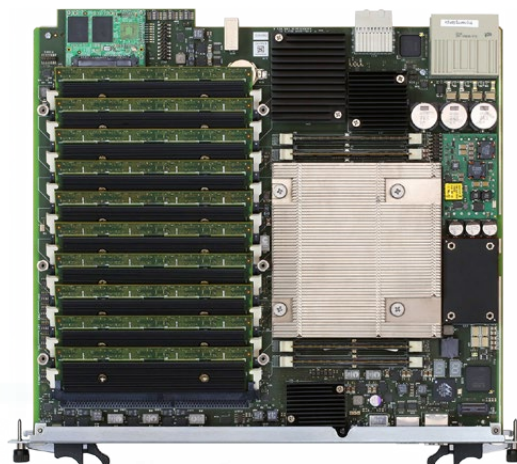
Voice and video streaming is becoming more pervasive as customer demand for media consumption continues to rise, and the diversity of media sources, network conditions and individual consumption devices proliferate. Using traditional Intel Xeon architectures, power and efficiency soon become a limitation when scaling to high channel density media stream transcoding. By employing highly efficient Digital Signal Processors to provide direct offload of the host CPU, the new ATCA-8330 acceleration engine allows network equipment providers to either add or substantially increase the voice channel or video processing density within existing systems, so reducing overall power and space demands for their equipment as it scales to higher throughput.

ATCA-8330 brings high density DSPs with embedded voice and video firmware from Octasic together with Artesyn's strong ATCA® system heritage and thermal design skill, resulting in an industry-leading media processing density for the next generation of voice and video processing systems.

Key Benefits

- Combining a server and accelerated media processing on a single blade minimizes the amount of hardware required to implement applications such as VoLTE media resource function, session border controller or video conferencing
- Modular design allows the blade to be scaled 4 DSPs at a time, up to 40 DSPs, to match application requirements
- On-board Ethernet network connecting all the key elements which simplifies programing model
- Comprehensive media processing software suite shortens application development and time to market (See "Important Notice - Standards Essential Patents and the use of CODECs" on pages 5 and 6.)

AdvancedTCA®

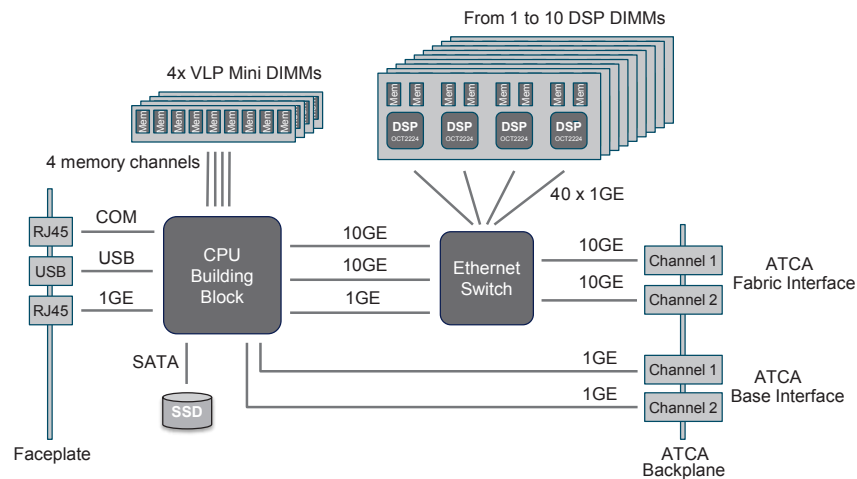


ARTESYN™
EMBEDDED TECHNOLOGIES

Overview

ATCA-8330 is a combination of an Intel® Xeon® E5-2648v2 server CPU and a media processing array based around the Octasic OCT2224M multi-core Digital Signal Processor running Vocallo MGW firmware. The DSP array performs media processing acceleration, supporting both voice and video conferencing and transcode applications. The architecture is deliberately intended to be similar to a rackmount server + media processing accelerators.

Media acceleration performance depends on both the codecs required and the number of DSPs available. An innovative DSP DIMM approach allows granular scaling of capability to match customer needs and to support “pay as you grow” business models. Up to 10 DSP DIMMs can be installed.



A comprehensive host-based Media Processing Application Programmers Interface is provided. This is used to configure and execute voice and video stream processing functions.

The API commands communicate directly with the DSP array based on an endpoint and stream resource model. A non-blocking command/response protocol aids multi-channel programming efficiency. Additional board support utilities can set the board's internal switching infrastructure into various modes, and provide diagnostic information.

The internal data flows of the board are all based on a 48 port Gigabit Ethernet (GbE) switch with all DSPs accessible via individual single GbE connections. The same switch allows direct connection to the ATCA fabric backplane via a 2 x 10G interface. The server CPU has a 20G data plane connection and a separate 1GbE control plane connection to the switch matrix.

Media streams can be routed to the DSPs either via the server CPU (which can perform packet processing) or optionally directly from the ATCA interface. In this configuration, packets for transcode can bypass the server CPU entirely.

Media Processing Functions

TRANSPORT AND ENDPOINT SUPPORT

- Voice and Video over IP Endpoints
 - RTP/UDP/IP endpoint
 - IPv4 with DHCP & IPv6
 - Supports Secure RTP
 - Adaptive Jitter Buffer
 - Supports RTCP [RTCP-XR in mid 2013]
 - CALEA/Lawful Intercept support
- Line Echo Cancellation and Voice Quality Enhancements
 - G.168 (2004) compliant line echo cancellation, up to 128ms tail, with HLC & Music Protection
 - Manual and Automatic Level Control (G.169)
 - Acoustic Echo Control (AEC)
 - Adaptive Noise Reduction (ANR)
 - Natural Level Enhancement (NLE)
- Endpoint Statistics
 - RTP/UDP/IP per channel and per port packets and errors
 - Per channel/port states, terminations used, media stream events

AUDIO STREAM PROCESSING¹

- 3GPP/3GPP2 Wireless Voice Codecs
 - GSM Adaptive Multi-Rate (AMR)
 - GSM Enhanced Full Rate (EFR)
 - GSM Wideband AMR-WB (G.722.2)
 - EVRC and EVRC-B (subject to separate upgrade)
- ITU-T, IETF, and other Voice Codecs
 - G.711 μ -law/A-law with Appendices I and II
 - Silence Suppression with spectral Comfort Noise Generation
 - Clear Channel Operation
 - Narrowband: G.729AB, G.729.1, G.723.1A, G.726, G.727
 - Wideband: G.722, G.722.1
 - T.38 Fax Relay
 - V.152 Voice Band Data
 - iLBC
 - SILK (subject to separate upgrade)
 - OPUS (subject to separate upgrade)
- In-band Announcements and Signaling Support
 - Announcements & Message Playback
 - Tone Detection, Generation, Removal
 - SS5, MFR1, MFR2, DTMF
 - Tone Relay (RFC 2833/4733)
 - Caller ID Generation and Detection (ETSI, BellCore & NTT)
- N-way Audio Conferencing
 - All channels on a DSP can participate in one or many conferences
 - Noise Reduction for Conferencing
 - Prime Speaker Detection
 - Conference Supervisor Function

VIDEO STREAM PROCESSING¹

- Video Encoder/Decoder Support
 - H.263 profile 0 (baseline) and 3 level 10, 20, 30, 40, 45 and 50 (CIF/QCIF) RFC4629
 - MPEG-4 simple profile, single object level 0, 1, 2 and 3 (CIF/QCIF) RFC3016
 - H.264 baseline profile [High Profile mid 2013] level 1, 1b, 1.1, 1.2, 1.3 (CIF/QCIF) level 2.2 (VGA), 3.2 (720p) and 4.2 (1080p) RFC3984
- Scaling and Adaptation
 - Advanced-CBR, CBR and VBR rate controllers
 - Frame rate adaptation up to 30 FPS/channel

- Scaling between resolutions, from SQCIF to 1080p
- Packet loss concealment
- A/V Synchronization (Lip Sync) via delay compensation
- Video conferencing/mixing support
 - Video MCU function
 - Voice Activity based source selection
 - Graphics overlay with key color
 - Video mix: up to 16 layers per stream for video or graphics

Technical Specifications

HARDWARE

- Form Factor: ATCA Single Slot Blade
- Intel Xeon CPU
 - Single Intel Xeon E5-2600 V2 series processor
 - Intel Communications Chipset PCH
- Digital Signal Processing Core



- Multicore Octasic OCT2224M DSPs running Vocallo MGW firmware
- 4 DSPs per DSP DIMM
- Up to 10 DSP DIMMs
- External Ethernet Connectivity
 - 2 x 10G ATCA Option 9 Fabric (can operate active/active)
 - 2 x 1G ATCA Base Fabric for control and management
- Internal Ethernet Infrastructure Capacity
 - 2 x 10G + 1G to host via PCI Ethernet controller
 - 1Gbit/s to each DSP
- Board Control and Management Functions
 - On-board temperature monitoring and reporting
 - Individual DSP and other function resets

DEPLOYMENT ENVIRONMENT

- Board Power Consumption (Estimated worst case)
 - 40 DSP Variant: ~310W
- Board Operating Temperature
 - Normal Operation: 0 °C to 40 °C
 - NEBS exceptional operation: 0 °C to 55 °C

HOST SOFTWARE ENVIRONMENT

- Host Operating System
 - Wind River Linux 4.3
- Programmers Environment
 - Octasic Vocallo MGW SDK and documentation
 - Octasic Debug Tools

¹See "Important Notice - Standards Essential Patents and the use of CODECS" on pages 5 and 6.

Representative Performance*

Media Processing Application	40 DSP
Standard Voice Gateway/Transcode: G.711 (20ms) <=> G.729AB (20ms)	25600 channels
Wireless Voice Gateway/Transcode: G.711(20ms) <=> AMR NB(20ms)	17160 channels
Mobile Video Transcode MPEG4/CIF => H.264 /CIF 15fps	1280 channels
HD Video Conference H.264/720p 30fps x 4 participant conferences	20 bridges

*Note: Exact performance depends on many factors including exact codec mix and use patterns. These figures are provided as guidance to potential performance.

Standard Board Configurations

Part Number	Description
ATCA-8330-A0-01	ATCA MEDIA BLADE BASE WITH SINGLE E5-2648L V2, 16GB MEMORY, NO DSP DIMMS FITTED
8XXX-DIMM1-A4	DSP DIMM WITH 4 X OCT2224M INCLUDING BASIC AUDIO LICENSE

Systems with ATCA-8330

Artesyn offers a number of NEBS certifiable systems which can incorporate the ATCA-8330 along with range of other blades

- Centellis® 2000 2-slot ATCA system
- Centellis® 4000 series which can accommodate up to 12 payload blades
- Centellis® 8000 series which can cool up to 600W per slot and accommodate up to 12 payload blades.

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

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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ATCA-8330-DS 14Jul2017