

## MaxCore™ IPC Platform Industrial PC

### Data Sheet

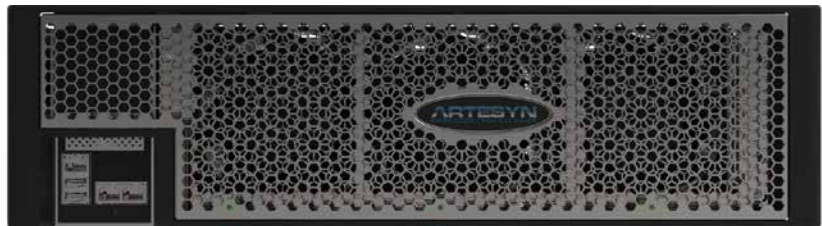
#### *MaxCore™ architecture enables a flexible platform with scalable performance*

- High performance density in 3U chassis with 15 PCI Express slots
- 15 PCI Express slots to provide flexibility to address a wide range of applications
- Intel® Xeon® Processor D
- Four (4) DDR4 DIMM slots
- Integrated PCI Express Gen 3.0 switch to provide flexible connectivity between the PCIe slots and processor
- 3U by 508mm for 19" racks
- Up to 150 watts can be provided for each slot
- Integrated 1100W AC power supply with capacity to include up to three (3) 1100W supplies for redundancy
- Includes web based GUI management

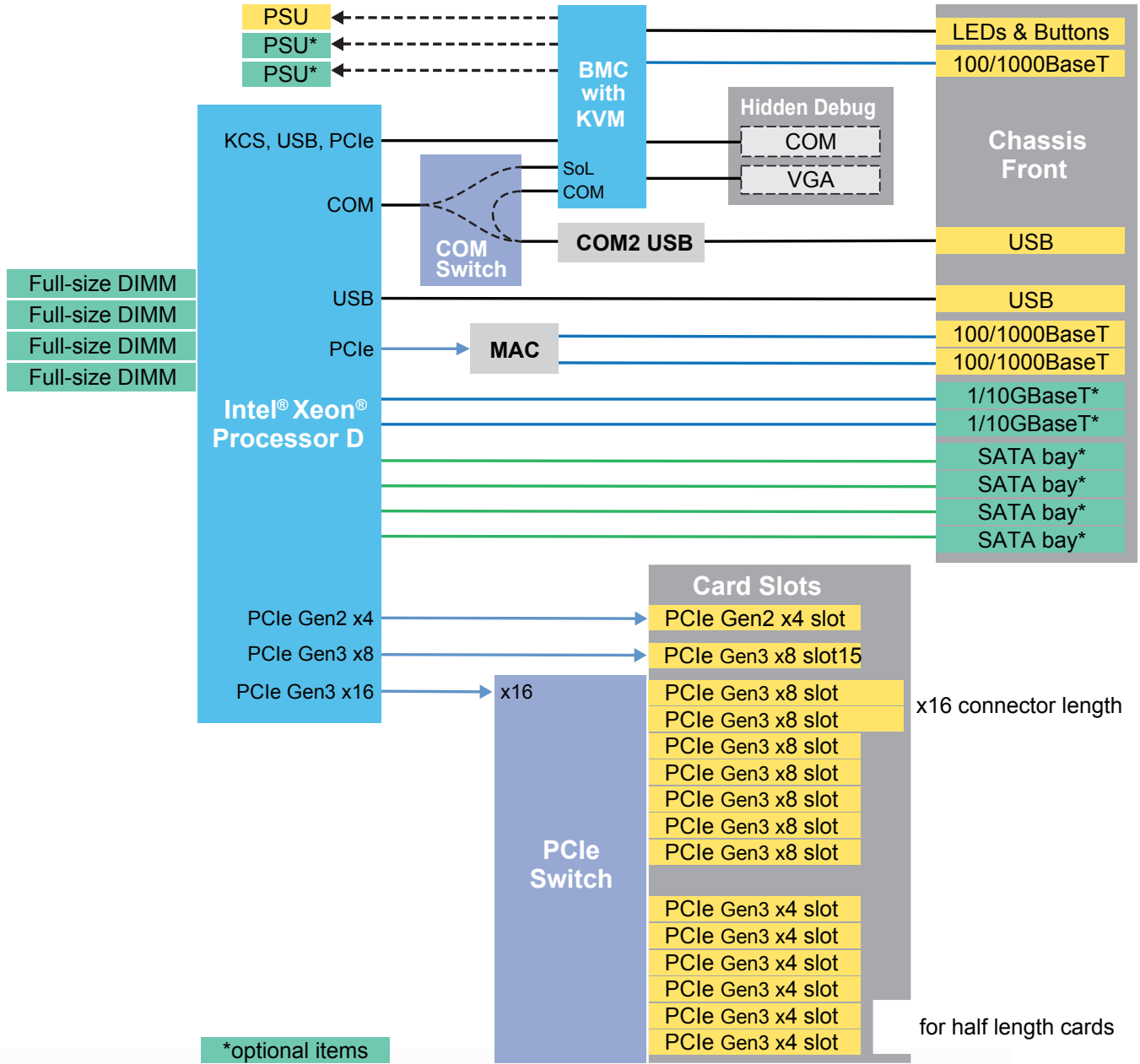
The Artesyn MaxCore™ Industrial PC (IPC) platform is a member of the MaxCore family with flexibility to address a wide range of industrial applications. MaxCore IPC hosts up to 15 PCI Express cards around a single x86 server class CPU motherboard. Its flexibility and power can be used across a wide range of applications including:

- Machine vision applications
- Video surveillance
- Industrial data acquisition and control
- Data analytics
- Video transcoding

All of this flexibility and performance is included in a future proof, managed configuration, single 3U server box.



Architecture



## Platform Information

### Platform Management

The core of MaxCore IPC platform is the combo of Board Management Controller (BMC) and CPU. For remote access to the unpowered box and for remote maintenance, the BMC runs a web server and a DMTF compliant programmatic user interface that is based on software from AMI. With this technology, the BMC supports a 100% remote management over Ethernet – from power up over boot to power down! Using the BMC, you can fix a software issue, without having physical access to the deployed box. The MaxCore IPC can run on either Linux or Windows operating systems.

### Processor Options

The CPU is a single Intel® Xeon® processor D with two memory channels to four DIMM sockets.

For specific applications where additional compute performance is required, Artesyn SharpStreamer™ or SharpNIC™ cards can be included in the platform's PCIe slots.



### Platform Configurations

The MaxCore IPC platform can host a variety of Artesyn's and third-party PCIe cards. An overview of various types of PCIe cards that could be utilized in the platform are included in Table 1. This is just a representative list of the wide range of card options available to configure the MaxCore IPC.

#### Memory

Four DDR4 DIMM slots are available on the motherboard for onboard CPU memory. These slots can be configured with memory as needed per application.

#### Storage

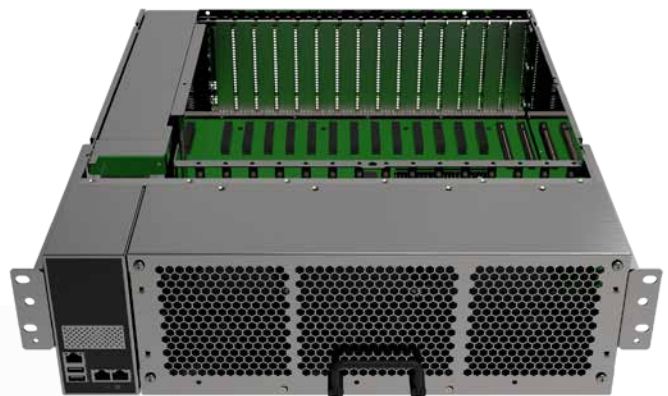
The MaxCore IPC can be configured with Artesyn M.2 SSD PCIe cards which can support four (4) M.2 SSDs, providing up to 4 TB of storage per PCIe slot. The platform can also be configured with an optional module which supports up to four traditional SATA controllers with either 2.5"/9mm HDD or SSD devices providing 4+ TB of storage per drive.

#### Network Interface

Network interface is configurable with 1Gb Ethernet standard and higher bandwidth options via PCIe cards.

#### Industrial I/O

A variety of third-party industrial I/O PCIe cards are available. A representative list in Table 1. These can be configured to provide a wide range of communication interfaces to integrate various industrial protocols.



## PCI Express Card Options for MaxCore IPC Platform

Brand	Category	Model	Type	Height	Length	PCIe Lanes
Artesyn	Storage	PCIE-6002	4x NVME M.2 SSD carrier	Full	Full	x8
Artesyn	CPU	PCIE-7205	SharpStreamer™ Mini	Full	Full	x4
Artesyn	CPU	PCIE-7207	SharpStreamer™	Full	3/4	x4
Artesyn	CPU	PCIE-7210-1	SharpStreamer™ Pro	Full	Half	x8
Artesyn	DSP	PCIE-8120 <sup>1</sup>	SharpMedia™	Full	Full	x4
Artesyn	NIC	PCIE-9205	SharpNIC™	Full	Half	x8 <sup>2</sup>
3rd party	GPU		GPU	Full	3/4	x16
3rd party	Network		10G NIC	Half	Half	x8
3rd party	Network		40G NIC	Half	Half	x8
3rd party	I/O		CC-Link Industrial Ethernet	Half	Half	x1
3rd party	I/O		DeviceNet	Half	Half	x1
3rd party	I/O		CANopen	Full	Half	x1
3rd party	I/O		PROFINET	Full	Half	x1
3rd party	I/O		Modbus TCP	Full	Half	x1
3rd party	I/O		PROFIBUS	Full	Half	x1
3rd party	I/O		Serial, RS485/422	Full	Half	x1
3rd party	Imaging		Camera Link Frame Grabber	Full	Half	x8
3rd party	Imaging		Camera Link HS Frame Grabber	Full	Half	x8
3rd party	Imaging		CoaXPRESS Frame Grabber	Full	Half	x8

Notes:

<sup>1</sup>Not tested<sup>2</sup>PCIE-9205 has 16 PCIe lanes but only 8 lanes are available.

## Application Guide

### Image Processing

The MaxCore platform's flexible PCIe architecture and large PCIe card capacity offers multiple configuration options to support a range of image processing applications. PCIe slots can be utilized to add additional compute resources, memory storage, industrial I/O and a range of industrial camera interfaces.

### Surveillance Video Analytics

The MaxCore IPC platform provides a versatile Video Surveillance Edge Analytics platform. The 15 PCIe slots can be configured with additional compute resources to perform real time edge video analytics Machine Learning. The PCIe slots can also be configured with NVMe M.2 SSD's to provide a large edge platform storage capacity. The PCIe slots can also be configured to support a range of camera interfaces and support a large number of camera's. See the Use Case overview section of this Data Sheet.

### Video Transcoding

The MaxCore IPC platform offers a low cost, flexible video transcoding platform. Artesyn offers a range of video accelerator and video transcoding accelerator PCIe cards with can be configured within the 15 PCIe slots offered by the MaxCore IPC. This range of accelerators cards and the large number of PCIe slots offers a flexible and versatile video transcoding platform. See the Use Case overview section of this Data Sheet.

### Industrial I/O and Control

For management of heterogeneous automation control systems, the MaxCore IPC's server-level processor and large PCIe slot capacity allows the platform to be configured for variety of applications. This can simplify control system configuration management as one industrial PC can be used across a range of functions and applications. The MaxCore platform also has the capacity to add functionality as your automation needs grow and evolve.

### Analytics

The MaxCore IPC server-level CPU, along with the capacity to add additional CPUs, GPUs and other high performance PCIe cards, offers an economical and efficient platform for performing a variety of demanding analytical applications. By adding or upgrading components, the same platform can continue to be upgraded when application compute needs change, providing a flexible, future-proof platform.

## Surveillance Video Analytics Use Case

The growth of video surveillance systems, in the terms of the number of cameras and the resolution of new cameras, has created opportunities and new challenges for analyzing and storing this video data. Traditional surveillance data storage and analysis is hampered by the data bandwidth and sheer amount of data generated. These challenges can be addressed by adding more intelligence to where the data is collected, allowing these systems to identify, store and forward only the data of interest. The platform requirements to support an intelligent and multi-function surveillance system can be addressed with the MaxCore IPC.

The key elements of a more capable video surveillance edge system include capabilities to run Machine Learning algorithms, store large amounts of data; and the ability to interface to a host of legacy and newer camera communication interfaces. The MaxCore IPC offers a range of configuration and storage options to meet these new video challenges. A representative block diagram of one such system is shown in Figure 1.

### Compute

The MaxCore IPC offers server-level compute performance with an Intel® Xeon® D processor on the motherboard. Additional compute performance or even GPU accelerator cards can be added as needed by the system requirements and algorithms.

### Storage

Large amounts of bandwidth and storage capabilities are required if all of the surveillance is to be collected and stored at a central location. The key to efficient data management is to only transmit that data of interest to a central location or to the cloud. An intelligent surveillance system would be able to categorize collected data, and offer a capability to store large amounts of data for future reference if needed, compressing the data categorized as the least interesting. The MaxCore IPC can be configured with a number of NVMe M.2 SSD cards for this storage. For even greater flexibility and storage capabilities, up to four SATA drives can be added through an optional I/O module.

### Camera Interface

The MaxCore IPC PCIe slot configuration allows interfacing to a large range of cameras. This enables the MaxCore IPC to be used in a retrofit basis, where the correct PCIe cards can be added to address a range of camera interfaces.

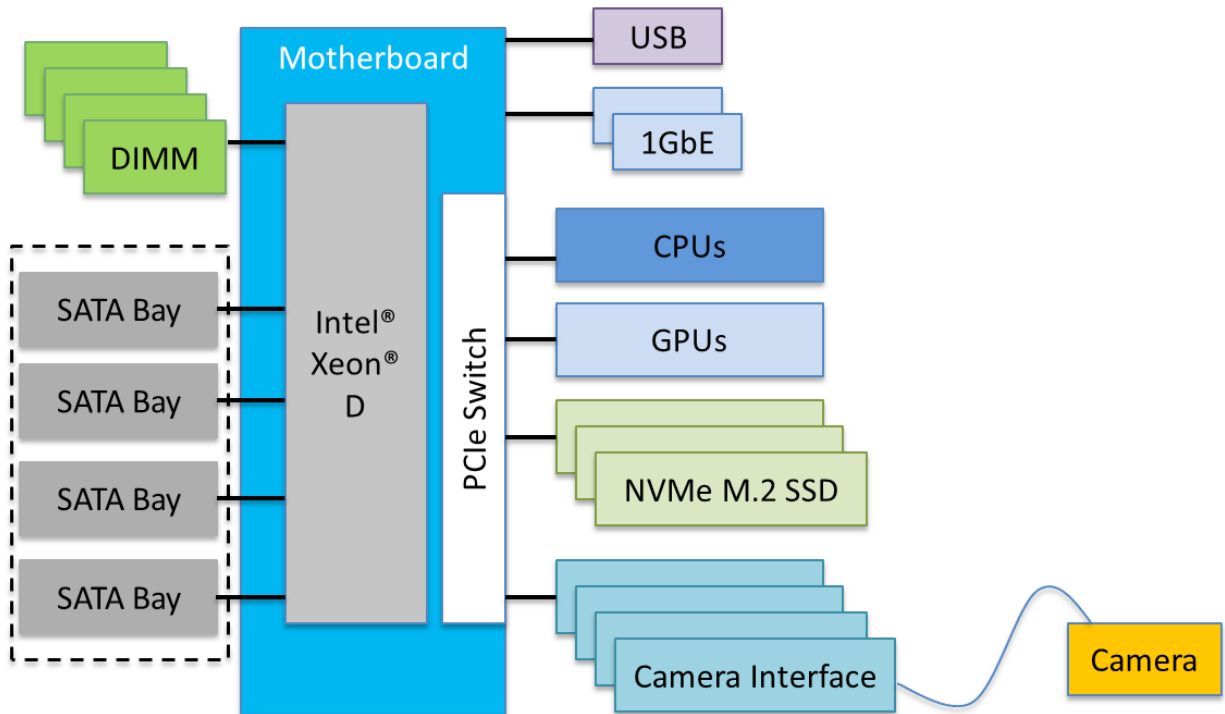


Figure 1 - Edge Surveillance Platform

## Machine Vision/Automated Optical Inspection Use Case

Today's machine vision and optical inspection applications are challenging the bandwidth, storage and compute resources of the typical PC solutions available today. High speed, high resolution cameras utilizing advanced communication protocols like CoaXPress and 10GigE Vision require high speed interconnects and growing compute performance. The large amounts of data generated that can be useful for process analysis and machine learning algorithms is difficult to manage within a typical PC solution.

The MaxCore IPC offers a unique platform configuration that can be tailored to meet a range of machine vision and automated optical inspection applications. The MaxCore IPC has 15 PCIe slots that can be configured to support application requirements for compute, camera interface and data storage requirements creating a highly flexible and scalable machine vision platform.

### Compute

The MaxCore IPC PCIe slots can be configured to provide a range of compute resources through additional CPU or accelerator cards such as GPUs and FPGAs. The amount of compute or accelerator resources can be specifically tailored or upgraded as needed by selecting the appropriate number and type of Artesyn or third party

PCIe cards. The additional compute and accelerator resources can also be used in machine learning applications to utilize onboard data to further train these algorithms locally, and transfer this information within the network.

### Camera Interface

A range of high resolution cameras can be supported through selection of the appropriate camera interface PCIe cards. As camera technologies change or are upgraded, the system can be upgraded to support this, by selecting the appropriate PCIe card. The large PCIe slot capacity allows the platform to be configured with a variety of camera interface cards, supporting a range of camera types within the same platform.

### Storage

Image processing generates large amounts of data and require higher bandwidth solutions. The PCIe slots can be used to add as much storage via NVMe M.2 SSD carrier cards as the application needs. The MaxCore IPC has an optional I/O module upgrade with up to four SATA bays for massive platform storage. This flexibility and capacity can be useful to store data not practical to push through the network or cloud, and provides new data sets to support edge machine learning algorithms.

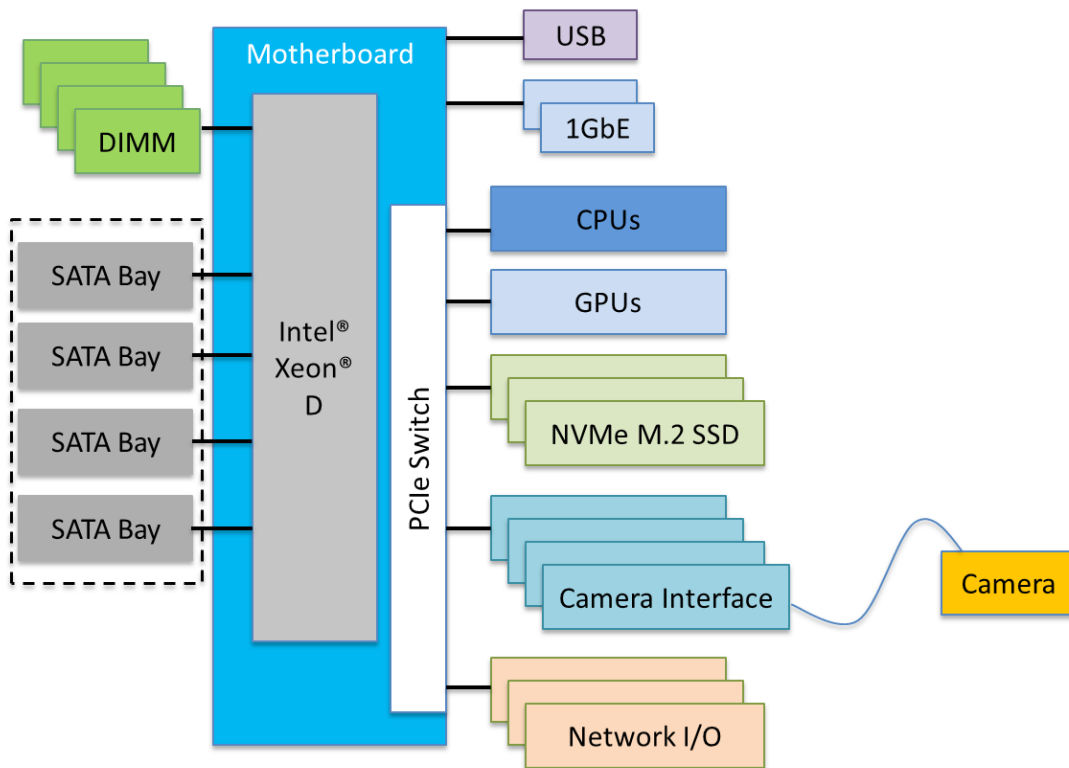


Figure 2 - Machine Vision/AOI Platform

## Video Transcoding Use Case

The video transcoding market has seen rapid growth to support higher definition video streams and a growing range of delivery models and devices the video is consumed on. Video transcoding is far more efficiently performed on dedicated accelerator cards, such as the Artesyn SharpStreamer™ line of video processing cards. The MaxCore IPC platform can support up to 13 3/4 length SharpStreamer PCIe-7207 cards and two (2) half length SharpStreamer PCIe-7205 cards.

The SharpStreamer family of video accelerator cards offer an extremely dense and efficient video transcoding. One SharpStreamer PCIe-7207 can deliver 44 channels of 1080p30 content, offering a performance density up to eight (8) times the density of traditional servers. This performance permits the use of far fewer server resources over standard server transcode efficiencies.

The MaxCore IPC offers an economical platform to configure the right amount of video accelerator cards per the end user needs. Figure 3 shows a representative configuration of the MaxCore IPC.

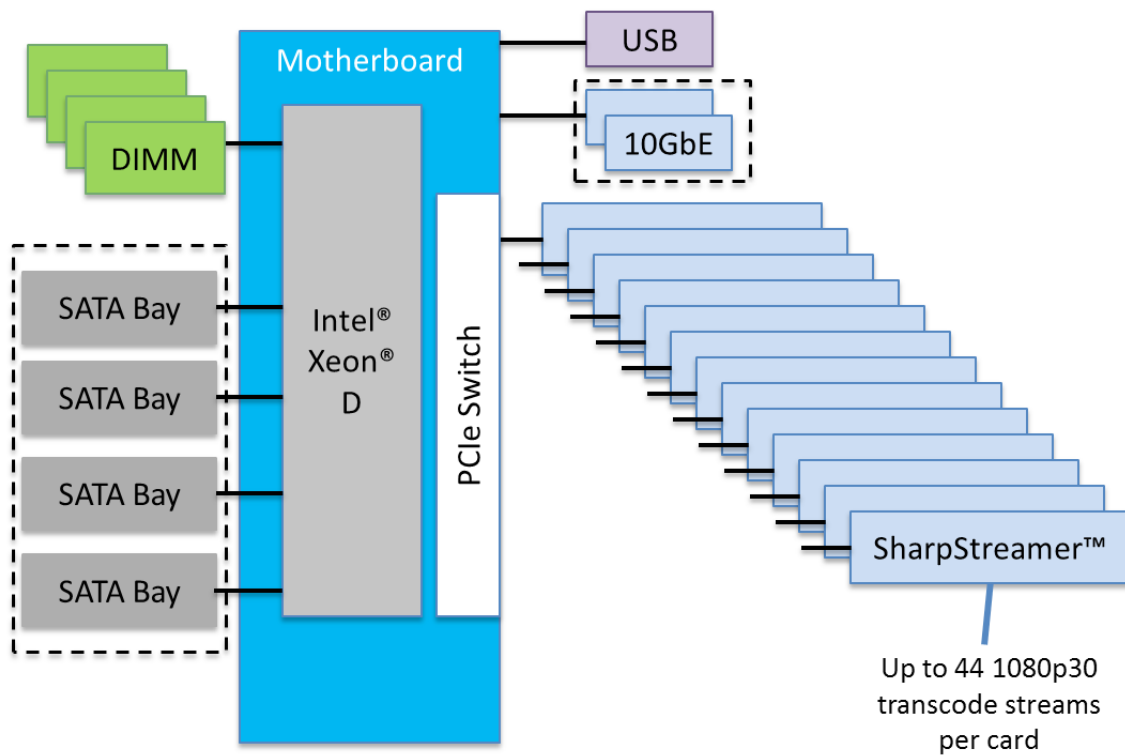


Figure 3 - Video Transcoding Platform

## Artesyn PCI Express Card Features

### SharpStreamer™ Pro PCIE-7210

- Up to eight (8) HEVC 1080p30 transcodes
- Single Intel® Xeon® E3-1578Lv5 GT4e-enabled scalable video processing engines
  - 2x DIMMs per CPU, up to 32GB per CPU
- Up to 32 AVC 1080p30 transcodes
- Up to two (2) 4KP30 HEVC encode streams per card
- Network bootable reference OS: Centos 7.x
- Intel® MSS, optional transcoding software
- Common hardware for different applications:
  - H.264/AVC & H.265/HEVC transcoding and encoding
  - VDI applications
  - Image processing equipment

### SharpNIC™ PCIE-9205

- Intel® FM10840 Red Rock Canyon SOC
- Intel Xeon processor D-1541 8-core processor
- Built-in infrastructure for cut-through traffic; or traffic to and from microserver cards
- Open vSwitch and load balancing via ECMP
- Up to 50GbE aggregated bandwidth

### SharpStreamer™ PCIE-7207

- Up to 44 1080p H.264 transcodes
- PCI Express form factor, x4, single slot
- Four (4) dual-core Intel® Core™ i7-5650U processors
- 32 GB dual channel DDR3-1600: 8 GB per processor
- Four (4) MicroSD slots

### SharpMedia™ PCIE-8120

- Leading solution for voice and VoLTE systems
- Up to 7680 G. 711 <=> G.729AB transcodes per card
- Single slot full length, full height PCI Express card with x4 interface
- High performance media processing core based on power-efficient DSPs
- Optional 2x GbE ports (RJ-45) with NAT function for direct network attachment providing server offload
- Comprehensive voice and video processing firmware and programmers interface included
- Support for 720p and 1080p video conferencing
- Designed for NEBS Level 3 and ETSI telecom standards compliance when used in a suitable carrier grade enclosure
- Supports Opus (used by WebRTC) and SILK (used by Skype) audio CODECs

### SharpStreamer™ Mini PCIE-7205

- Up to 22 1080p H.264 transcodes
- PCI Express form factor, x4, single slot, half length
- Two (2) dual-core Intel® Core™ i5-5350U processors
- 16 GB dual channel DDR3-1600: 8 GB per processor
- Two (2) MicroSD slots

### PCIe SSD Payload PCIE-6002

- Carrier for up to four (4) COTS NVMe M.2 SSDs
- Four M.2 sockets per card
  - 42 mm to 110 mm form factors supported
  - 32 Gb/s max throughput interface per socket
- PCIe Gen 3 x4
- Supports AHCI and NVMe protocols
- Up to 1 TB per SSD (4 TB total) with current SSDs



### Chassis Features

- Designed for 19" cabinets with or without rails (3U high, 508mm depth)
- Three rear accessible slots for power supplies from Artesyn
  - 100-240VAC, 1100W
- Forced-air cooling
- 15 card slots for full height PCIe cards
  - Card brackets accessible from rear
  - Eight (8) full length slots with PCIe x8 Gen 3
  - Five (5) full length slots with PCIe x4 Gen 3 via a x8 connector
  - Two (2) half-length slots with PCIe x4 Gen 3 via a x8 connector
  - One (1) full length slot with PCIe x4 Gen 2 via a x8 connector
  - Six (6) connectors for auxiliary power cables; for up to 12 cards
- Intel® Xeon® processor D-1521 CPU on motherboard (other Intel Xeon processors available)
  - Four (4) cores @ 2.4 GHz
  - Four (4) DIMM sockets; supporting up to 128GB DDR4
  - Two (2) 100/1000BaseT RJ-45, at chassis front
  - Optional two 1/10GBaseT, at chassis front
- Board Management Controller (BMC) with MegaRAC® SP-X user interface from American Megatrends Inc. (AMI)
  - Dedicated access over 100/1000BaseT RJ-45, at chassis front
  - Capable of side band access over one of the CPU-related 1GBaseT

### Environmental and Regulatory Compliance

Feature	Operating	Non-Operating (packed state)
<b>Ambient Temperature</b>	0°C (32°F) to +35°C (95°F)	-40°C (-40°F to +70°C (158°F without battery installed -30°C (-22°F to +70°C (1458°F with battery installed)
<b>Temperature Change</b>	±0.5°C/min according to NEBS standard GR-63-CORE	±0.5°C/min
<b>Relative Humidity</b>	5% to 90% non-condensing	5% to 95% non-condensing
<b>Vibration (tested in target platform)</b>	0.1g from 5 to 200 Hz and back to 5 Hz at a rate of 0.1 octave/minute	5-20 Hz at 90.01 g <sup>2</sup> /Hz 20-200 Hz at -3.0 dB/octave Random 5-20 Hz at 1m <sup>2</sup> /Sec <sup>3</sup> Random 20-200 Hz at -3.0 dB/octave
<b>Shock</b>	Half-sine, 11 mSec, 30 m/Sec <sup>2</sup>	Card level packaging Half-sine, 6 mSec at 180 m/Sec <sup>2</sup>
<b>Free fall</b>	-	600 mm (packaged) 10 kg to 25 kg: 75 mm, >25kg: 50 mm (unpacked) per GR-63-CORE fully populated system

### Safety Compliance

- Safety
  - UL/CSA 60950-1, EN 60950-1 and IEC 60950-1 CB Scheme. Marked with U.S. NRTL, Canadian Safety and CE Mark
- Product Sustainability
  - RoHS
  - WEEE
- EMC
  - FCC 47 CFR Part 15 Subpart B (US), Class A
  - CISPR 32 (EN 55032), Class A Emissions
  - CISPR 24 (EN 55024), Immunity

## Ordering Information

Product Family	Part Number	Description
<b>MC1000</b>	MC1000-01	MaxCore chassis with Intel® Xeon® processor D-1521 (4 cores, 6M cache, 2.40 GHz)
<b>Additional Options</b>	MC3000-PSU	AC power supply for MC1000
<b>SharpStreamer™ Pro Mini</b>	PCIE-7210-1	Video accelerator card with 1x Intel® Xeon® processor E3-1578Lv5
<b>SharpStreamer™ Mini</b>	PCIE-7205-2	Video processing card with 2x dual-core Intel® Core™ i5-5350U CPU
<b>SharpStreamer™ Card</b>	PCIE-7207-4	Video processing card with 4x dual-core Intel® Core™ i7-5650U CPU
<b>SharpMedia™ Card</b>	PCIE-8120	Media processing card with 12x Octasic 2224 DSP
<b>SharpNIC™ Card</b>	PCIE-9205	Intelligent network interface card (NIC)
<b>SSD Payload Card</b>	PCIE-6002	Quad M.2 SSD carrier card
<b>SSD Payload Card</b>	PCIE-6002-4-128G	Quad M.2 SSD carrier card with (4) 128GB M.2 SSDs
<b>SSD Payload Card</b>	PCIE-6002-4-1T	Quad M.2 SSD carrier card with (4) 1TB M.2 SSDs
<b>Memory</b>	ATCA-7XMEM-2400-8G	8GB DDR-4 DIMM
<b>Memory</b>	ATCA-7XMEM-2400-16G	16GB DDR-4 DIMM
<b>Memory</b>	MEM-DIMM-32G-DDR4	32GB DDR-4 DIMM

## SOLUTION SERVICES

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