



Alveo MA35D Media Acceleration Card Data Sheet

DS1010 (v1.1) November 10, 2023

Product Specification

Summary

The AMD Alveo™ MA35D media accelerator is a single slot, half-height, half-length passively cooled card capable of supporting video decoding, multi-resolution scaling, and encoding of 4k and 1080p source streams (up to 32 1080p60 streams). It targets a new era of media applications, scaling for cost, area, and power per stream while maintaining video quality. The MA35D card is capable of faster than real-time encoding as well as multiple concurrent standards. Standards supported include:

- H.264, H.265, AV1, and VP9 decode.
- H.264, H.265, and AV1 encode.

The Alveo MA35D media acceleration card has a physical PCIe® x8 interface which functions as a bifurcated PCIe Gen4 x4x4 compliant interface. The card operates up to 40W thermal design power (TDP). A video acceleration solution is available for the card and can be found in the [Advanced Media Acceleration \(AMA\) Video SDK](#). It provides software along with directions to update the card firmware.

Figure 1: Alveo MA35D Card with Full-Height Bracket



For card installation, see the *Alveo MA35D Media Acceleration Card Installation Guide* (UG1608).

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Product Details

The following table provides high-level product details.

Table 1: Alveo MA35D Media Acceleration Card Product Details

Specification	MA35D Card
Product SKU	A-MA35D-P16G- PQ-G
Thermal design power (TDP) ¹	40W
Thermal cooling solution	Passive
Weight	325g
Form factor	Half height, half length, single slot
PCIe physical	x8 PCIe
PCIe functionality support	PCIe Gen4 bifurcated x4x4
Virtualization	Supports SR-IOV
Memory	16 GB LPDDR5

Notes:

1. The cooling solution is designed with a 40W TDP. Under load the card is expected to draw less power with some per-device variation.

The following table provides the video capabilities such as built-in transcoder blocks and AI/ML support.

Table 2: Alveo MA35D Video Capabilities

Feature	Details
Encode formats	• H.264 • H.265 • AV1
Decode formats	• H.264 • H.265 • AV1 • VP9
H.265/H.264 performance	• 4x 4Kp60 • 16x 1080p60 • 32x 1080p30 • 72x 720p30
AV1 performance	• 8x 4Kp60 • 32x 1080p60 • 64x 1080p30 • 144x 720p30
Maximum channel density	256 maximum transcode channels
8/10-bit formats	YUV420 planar and semi planar
Comparable presets	• H.264: x264 medium • H.265: x265 medium • AV1: x265 slow

Table 2: Alveo MA35D Video Capabilities (cont'd)

Feature	Details
Video processing	- ABR scaler - resolution can be set per transcode - Compositor 2D graphics overlay 4K streaming latency as low as 8 ms
AI/ML	22 TOPS per card
Aux processor	2x 64 bit quad core RISC-V subsystem

Notes:

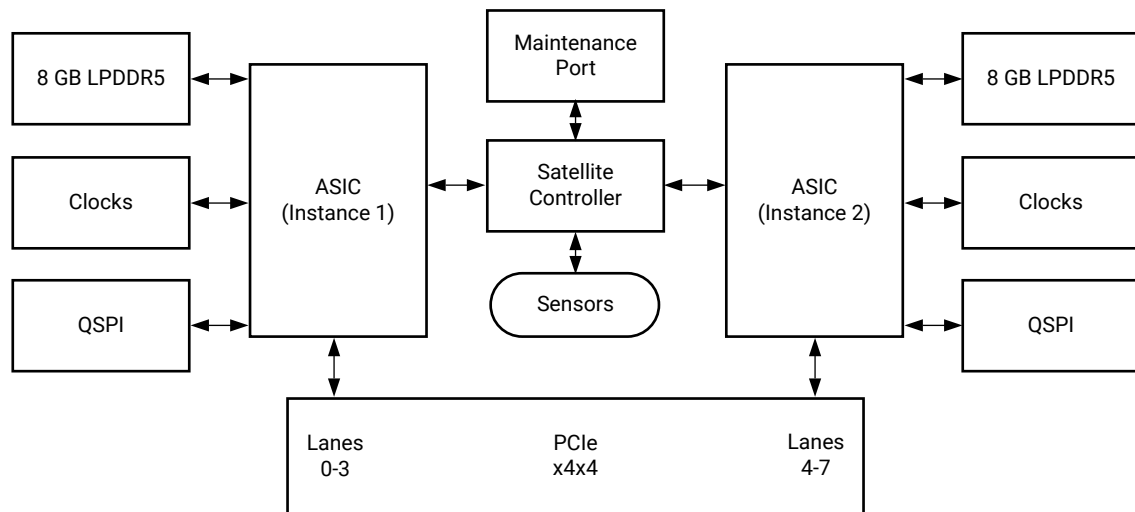
- For current software capabilities, refer to the [AMA Video SDK documentation](#).

Card Specifications

Block Diagram

The following high-level block diagram shows the key components and interfaces of the Alveo MA35D media acceleration card. There are two instances of the media acceleration ASIC. The ASIC has built-in video codec engines that can be used to implement video pipeline acceleration while minimizing latency and power. Supported video formats and additional card features are listed in [Table 2](#).

Figure 2: MA35D Block Diagram



X27707-020623

Note: In the above block diagram, the maintenance port is for manufacturing only.

In addition, the card has 16 GB LPDDR5 memory. Each media acceleration ASIC has exclusive access to 8 GB providing superior memory bandwidth. While there is a maintenance port, it is for manufacturing bring up and validation only.

PCIe Connector

The Alveo MA35D accelerator card has a PCIe Gen4 x4x4 interface configured as a dual PCIe Endpoint. Servers hosting the card must support and enable bifurcation. Because the device has a x4x4 bifurcated interface, it will show up as two PCIe devices to the host. Host servers must support a BAR4 PCIe memory region of 512 MB.

Satellite Controller

The card satellite controller (SC) provides independent supervisory and card management functions including power and temperature monitoring. The host server board management controller (BMC) can interact with the satellite controller to monitor and control the card through out-of-band communication. The card supports the PLDM protocol over MCTP over SMBUS, complying with DMTF standards. Refer to the *Alveo Card Out-of-Band Management Specification for Server BMC* ([XD038](#)) for more information.

LPDDR5 Specifications

The card has 16 GB total memory consisting of eight discrete 2 GB LPDDR5 2CHx16 memory devices. Each media acceleration ASIC has exclusive access to four memory devices (8 GB). The following table details the LPDDR5 memory component used.

Table 3: LPDDR5 Memory Component

Parameter	Value
Manufacturer	Micron
Part Number	MT62F512M32D2DS-031 WT:B
Total number of parts on card	8
Details	16 GB total on the card - Supports ECC error detection and corrections - Speed 5500 MT/s

Maintenance Port

The maintenance port referenced in [Figure 2](#) is for manufacturing bring up use only.

Card and Electrical Protections

The MA35D card has logic to reset individual ASIC devices and to reset the card when respective reset thresholds are reached or exceeded. When a reset occurs, power to the SC will remain on, but the card will be pulled off the PCIe bus and not be detectable by the OS. A cold reboot of the server is required to recover. Warning thresholds should be used by BMC. The following table lists ASIC device thresholds and are applicable equally to both devices.

Table 4: Device Thermal and Electrical Protection Thresholds

Sensor Description	Device Reset Threshold	Device Warning Threshold
ASIC temperature	110°C	100°C

Table 4: Device Thermal and Electrical Protection Thresholds (cont'd)

Sensor Description	Device Reset Threshold	Device Warning Threshold
V _{CCINT} temperature	125°C	105°C

The following table lists the card thresholds. Card temperature is the maximum of the inlet and outlet temperatures.

Table 5: Card Thermal and Electrical Protection Thresholds

Sensor Description	Card Reset Threshold	Card Warning Threshold
3.3V PEX	3A for 1s	2.75A for 1s
12V PEX	5.5A for 1s	5.25A for 1s
Card temperature	90°C	85°C

Mechanical Specifications

The MA35D card dimensions are compatible with the PCIe CEM 5.0 specification as a single slot, half height, half length card, as given in the following table.

Table 6: Card Dimensions

Parameter	Dimension
Height	2.71 inch (68.90 mm)
Primary side width	0.570 inch (14.47 mm)
Secondary side width	0.105 inch (2.67 mm)
Length	6.60 inch (167.65 mm)

Thermal Specification

Operating and Storage Temperature Conditions

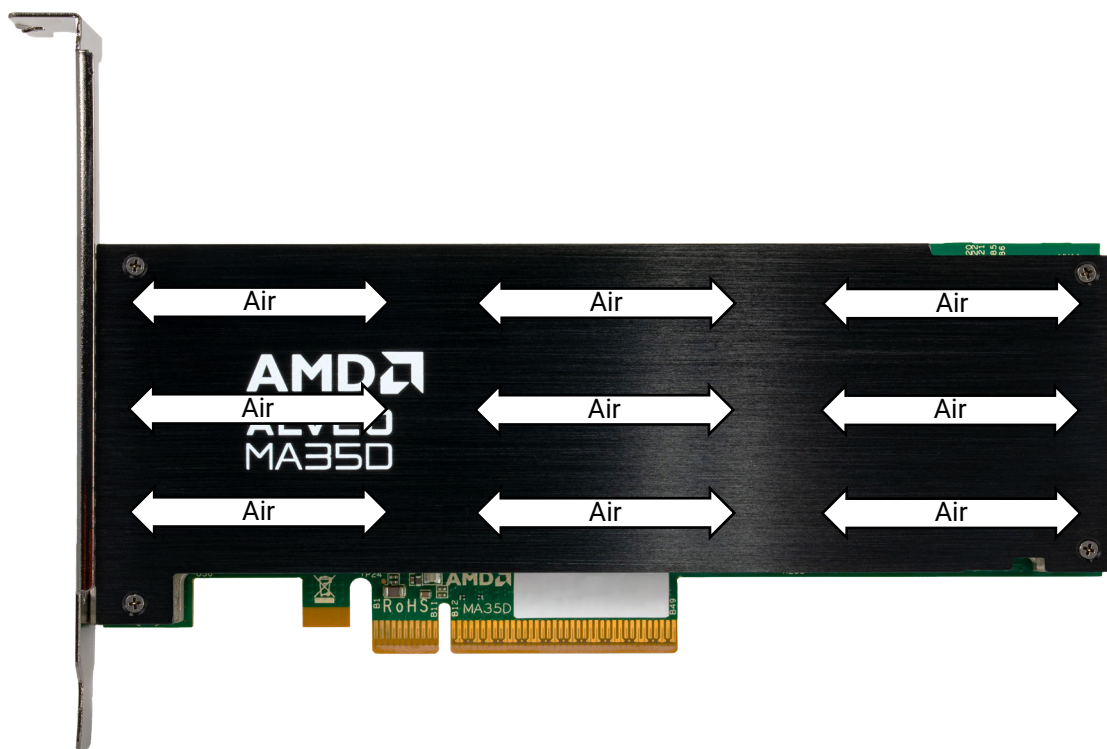
Table 7: Operating and Storage Temperatures and Humidity Conditions

Specification	Condition
Operating temperature	0°C to 55°C
Storage temperature	-40°C to 75°C
Operating humidity, non-condensing	8% to 90%
Storage humidity, non-condensing	5% to 95%
Operating temperature gradient	15°C/hour

Airflow Direction Support

The Alveo MA35D card is designed for passive cooling and requires an external mechanism to ensure proper airflow for cooling. The card supports bidirectional airflow which includes normal (forward) airflow direction from retainer bracket to I/O bracket and reverse airflow, as illustrated in the following figure. Passive cards should not be powered without a forced airflow mechanism in place.

Figure 3: Supported Airflow Directions for Alveo MA35D



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Operating Conditions

Inlet Temperature versus Airflow Requirement in Server

The following tables provide the estimated airflow rate and airflow speed to the MA35D card under various operating conditions. For a higher or lower total card power target, ensure the appropriate air flow and inlet temperature conditions are in place.

Table 8: Normal Flow into I/O Bracket at Sea Level

Inlet Temperature vs Airflow Requirement of PCIe Card Slot (56.51 mm x 20.33 mm) at Sea Level for 33W Total Card Power			
Inlet Temperature (°C)	Airflow (CFM)	Air Speed (LFM)	System Pressure Drop (inwg)
25.0	1.8	150	0.07
30.0	2.0	170	0.08
35.0	2.2	190	0.10

Table 8: Normal Flow into I/O Bracket at Sea Level (cont'd)

Inlet Temperature vs Airflow Requirement of PCIe Card Slot (56.51 mm x 20.33 mm) at Sea Level for 33W Total Card Power			
Inlet Temperature (°C)	Airflow (CFM)	Air Speed (LFM)	System Pressure Drop (inwg)
40.0	2.5	210	0.11
45.0	3.0	240	0.14
50.0	3.6	290	0.18
55.0	4.6	370	0.26

Table 9: Normal Flow into I/O Bracket at 1800m above Sea Level

Inlet Temperature vs Airflow Requirement of PCIe Card Slot (56.51 mm x 20.33 mm) at 1800m above Sea Level for 33W Total Card Power			
Inlet Temperature (°C)	Airflow (CFM)	Air Speed (LFM)	System Pressure Drop (inwg)
25.0	2.0	170	0.08
30.0	2.2	190	0.10
35.0	2.5	210	0.11
40.0	2.8	230	0.13
45.0	3.3	270	0.16
50.0	4.0	330	0.21
55.0	5.1	420	0.31

Table 10: Reverse Flow into I/O Bracket at Sea Level

Inlet Temperature vs Airflow Requirement of PCIe Card Slot (56.51 mm x 20.33 mm) at Sea Level for 33W Total Card Power			
Inlet Temperature (°C)	Airflow (CFM)	Air Speed (LFM)	System Pressure Drop (inwg)
25.0	1.2	130	0.07
30.0	1.4	150	0.08
35.0	1.5	160	0.09
40.0	1.7	180	0.10
45.0	2.0	210	0.12
50.0	2.4	250	0.16
55.0	3.0	320	0.21

Table 11: Reverse Flow into I/O Bracket at 1800m above Sea Level

Inlet Temperature vs Airflow Requirement of PCIe Card Slot (56.51 mm x 20.33 mm) at 1800m above Sea Level for 33W Total Card Power			
Inlet Temperature (°C)	Airflow (CFM)	Air Speed (LFM)	System Pressure Drop (inwg)
25.0	1.4	150	0.08
30.0	1.5	160	0.09
35.0	1.7	180	0.10
40.0	1.9	200	0.12
45.0	2.2	240	0.14
50.0	2.7	280	0.18
55.0	3.4	360	0.25

Regulatory and Compliance Information

FCC Class A Products

See this table for a list of the products referred to in this document: [Table 1](#).

Note: These devices are for use with UL Listed Servers or I.T.E.

Regulatory compliance statements are valid for the production version of this product; not for engineering sample (ES) products.

Safety

The following safety standards apply to all products listed in this document.

IEC 62368-1A:2018 (Third edition)

EN 62368-1A:2019 (Third Edition)

UL 62368-1 Ed. 3-2019

CSA C22.2 No. 62368-1A:2019 (Third Edition)

EU LVD Directive 2014/35/EU

EMC Compliance

Class A Products

The following standards apply:

- FCC Part 15 – Radiated & Conducted Emissions (USA)
- CAN ICES-3(A)/NMB-3(A) – Radiated & Conducted Emissions (Canada)

- CISPR 32 – Radiated & Conducted Emissions (International)
- EN55032: 2015 – Radiated & Conducted Emissions (European Union)
- EN55035:2017 – Immunity (European Union)
- EMC Directive 2014/30/EU
- VCCI (Class A)– Radiated & Conducted Emissions (Japan)
- CNS13438 – Radiated & Conducted Emissions (Taiwan)
- CNS 15663 - RoHS (Taiwan)
- AS/NZS CISPR 32 – Radiated and Conducted Emissions (Australia/New Zealand)
- Article 58-2 of Radio Waves Act, Clause 3 (Korea)

Regulatory Compliance Markings

When required, these products are provided with the following product certification markings:

- UL Listed Accessories Mark for the USA and Canada
- CE mark
- UKCA mark
- FCC markings
- VCCI marking
- Australian RCM mark
- Korea MSIP mark
- Taiwan BSMI mark
- German GS mark

FCC Class A User Information

The Class A products listed above comply with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.



CAUTION! *This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at their own expense.*



ATTENTION! Cet équipement a été testé et jugé conforme à la Class A digital device, conformément à la règle 15 du standard FCC. Ces limites sont conçues pour fournir des protections contre des interférences nuisibles lorsque l'équipement est utilisé dans un environnement commercial. Cet équipement génère, utilise et peut émettre des énergies de radio-fréquence et, s'il n'est pas installé et utilisé conformément aux instructions, peut nuire aux communications radio. L'exploitation de cet équipement dans une zone résidentielle est susceptible de causer des interférences nuisibles, auquel cas l'utilisateur peut être tenu de prendre des mesures adéquates à ses propres frais.



VORSICHT! Dieses Gerät wurde getestet und entspricht den Grenzwerten für digitale Geräte der Klasse A gemäß Teil 15 der FCC-Bestimmungen. Diese Grenzwerte bieten einen angemessenen Schutz gegen schädliche Interferenzen, wenn das Gerät in einer gewerblichen Umgebung betrieben wird. Dieses Gerät erzeugt und verwendet Hochfrequenzenergie und kann diese abstrahlen. Wenn es nicht gemäß den Anweisungen installiert und verwendet wird, kann dies Funkstörungen verursachen. Der Betrieb dieses Geräts in einem Wohngebiet kann schädliche Interferenzen verursachen. In diesem Fall muss der Benutzer die Interferenz auf eigene Kosten beheben.



CAUTION! If the device is changed or modified without permission from AMD, the user may void their authority to operate the equipment.



ATTENTION! Si l'appareil est modifié sans l'autorisation d'AMD, l'utilisateur peut annuler son ability à utiliser l'équipement.



VORSICHT! Wenn das Gerät ohne Erlaubnis von AMD geändert wird, kann der Benutzer seine Berechtigung zum Betrieb des Geräts verlieren.

Canadian Compliance (Industry Canada)

CAN ICES-3(A)/NMB-3(A)

RoHS Compliance

- RoHS Directive 2011/65/EU
- RoHS 3 Directive 2015/863
- SJ/T 11363-2006, 11364-2006, and GB/T 26572-2011 (China RoHS)

VCCI Class A Statement

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VCCI-A

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EU WEEE Logo



Manufacturer Declaration European Community



Manufacturer Declaration

Xilinx declares that the equipment described in this document is in conformance with the requirements of the European Council Directives listed below:

- Low Voltage Directive 2014/35/EU
- EMC Directive 2014/30/EU

- RoHS 3 Directive 2011/65/EU, 2015/863
- China RoHS Declaration: Standards SJ/T 11363-2006, 11364-2006, and GB/T 26572-2011
- REACH Regulation 1907/2006
- POP Regulation 2019/1021

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Dit product is in navolging van de bepalingen van Europees Directief 2014/53/EU.

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Este producto cumple con las normas del Directivo Europeo 2014/53/EU.

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EN 55032 (CISPR 32 Class A) RF Emissions Control

EN 55035:2017 (CISPR 35) Electromagnetic compatibility of multimedia equipment – Immunity requirements

EN 62368-1A:2019 (Third Edition)

EN 50581:2012 - Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances.

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Responsible Party

Xilinx, Inc.

2100 Logic Drive, San Jose, CA 95124

United States of America

Phone: (408) 559-7778

References

The following documents provide additional information:

1. *Alveo MA35D Media Acceleration Card Installation Guide* (UG1608)
2. *Alveo Card Out-of-Band Management Specification for Server BMC* (XD038)
3. [Advanced Media Acceleration \(AMA\) Video SDK](#)
4. [Answer Record 35526: MA35D Master Release Notes](#)

Revision History

The following table shows the revision history for this document.

Section	Revision Summary
11/07/2023 Version 1.1	
Summary and Product Details	Updated TDP to 40W.
09/18/2023 Version 1.0	
Initial release.	N/A

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