



**AXELERA**  
ARTIFICIAL INTELLIGENCE

## Metis M.2 Max AI Accelerator Card Datasheet

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### Document revision history

Revision	Date	Description
1 - PRELIMINARY	2026-04-07	First issue.

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# 1 Introduction

The Axelera AI Metis M.2 Max AI Accelerator Card is an advanced AI processing module that provides AI acceleration in edge systems with requirements for high performance and low power consumption.

This datasheet provides instructions and safety information to ensure the Metis M.2 Max AIPU AI Accelerator Card can be installed, operated, stored, maintained, repaired, and disposed of safely.

## 1.1 Metis M.2 Max AI Accelerator Card overview

The Metis M.2 Max AI Accelerator Card (referred to as the *Metis M.2 Max card*) has a single Axelera AI Metis AIPU (AI processing unit) chip that can deliver up to 214 TOPS. It is available in 2 GB, and 8 GB LPDDR4X memory configurations. The Metis M.2 Max design utilizes both DRAM interfaces of the Metis AIPU, doubling bandwidth compared to the original Metis M.2. It is designed to provide a significant boost for AI inference processing in any system that has an NGFF (Next Generation Form Factor) socket.



Figure 1: Axelera AI Metis M.2 Max card AI module fits to systems with an NGFF socket

## 1.2 Key features

- A high-performance M.2 card that features a Metis AIPU to enable state-of-the-art AI inference in small footprint devices.
- A single board can run inference on multiple cameras as well as support multiple independent parallel neural networks.
- A wide range of end-to-end AI pipelines and models are available out of the box.
- Hassle free evaluation and software integration thanks to [Voyager SDK](#).
- Uncompromised prediction accuracy thanks to advanced quantization tools.

## 2 Specifications

### 2.1 Board and product characteristics

The tables in this section list the board characteristics, including physical and software characteristics.

Table 1: Characteristics and of the Metis M.2 Max card

Specification	Description
Product name	Metis M.2 Max AI Accelerator Card
Main chip	Axelera AI Metis AIPU (AI Processing Unit)
Memory	2 GB or 8 GB LPDDR4X, utilizing both interfaces of the Metis AIPU.
Thermal solution	Active fan-cooled or no-cooling. For further details see section 2.4 <i>Cooling solution</i> .
Host interface	PCIe Gen. 3.0, 4-lanes Bandwidth: Up to 4 GB/s.
Certification	CE, FCC, UKCA, ROHS

Table 2: Physical characteristics

Specification	Description
Mechanical form factor	M.2 2280 M-key, requires H5.6 connector height. See 2.2 <i>Board mechanical details</i> .
Dimensions	22 mm x 80 mm. For full details see section 2.2 <i>Board mechanical details</i> .
Weight	100 grams for AXE-BME21M1####A04 (card with active cooling) 15 grams for AXE-BME21M1####B04 (card with no cooling)
Power Rating	The Metis M.2 Max card is compliant with PCI-SIG's M.2 Specification revision 4.0, which indicates the following power rating for M-key M.2 cards: <ul style="list-style-type: none"> <li>- Max. average power (over 1 s): 11.55 W (3500 mA at 3.3 V).</li> <li>- Peak power (over 100 <math>\mu</math>s): 23.1 W (7000 mA at 3.3 V).</li> </ul>
Thermal Design Power	11.0 W <sup>1</sup>

Table 3: Environmental characteristics

Specification	Description
Standard operating temperature (ambient)	-20~70°C
Storage temperature	-40~85°C
Storage Humidity	0%~85% RH, non-condensing

<sup>1</sup> 11 W is the default maximum power setting. The maximum power configuration can be lowered or raised via software commands.

## 2.2 Board mechanical details

This section provides the board package information of the Metis M.2 Max card.

- Figure 2 shows the board layout and dimensions.
- Table 4 describes the board and gives the package dimensions.

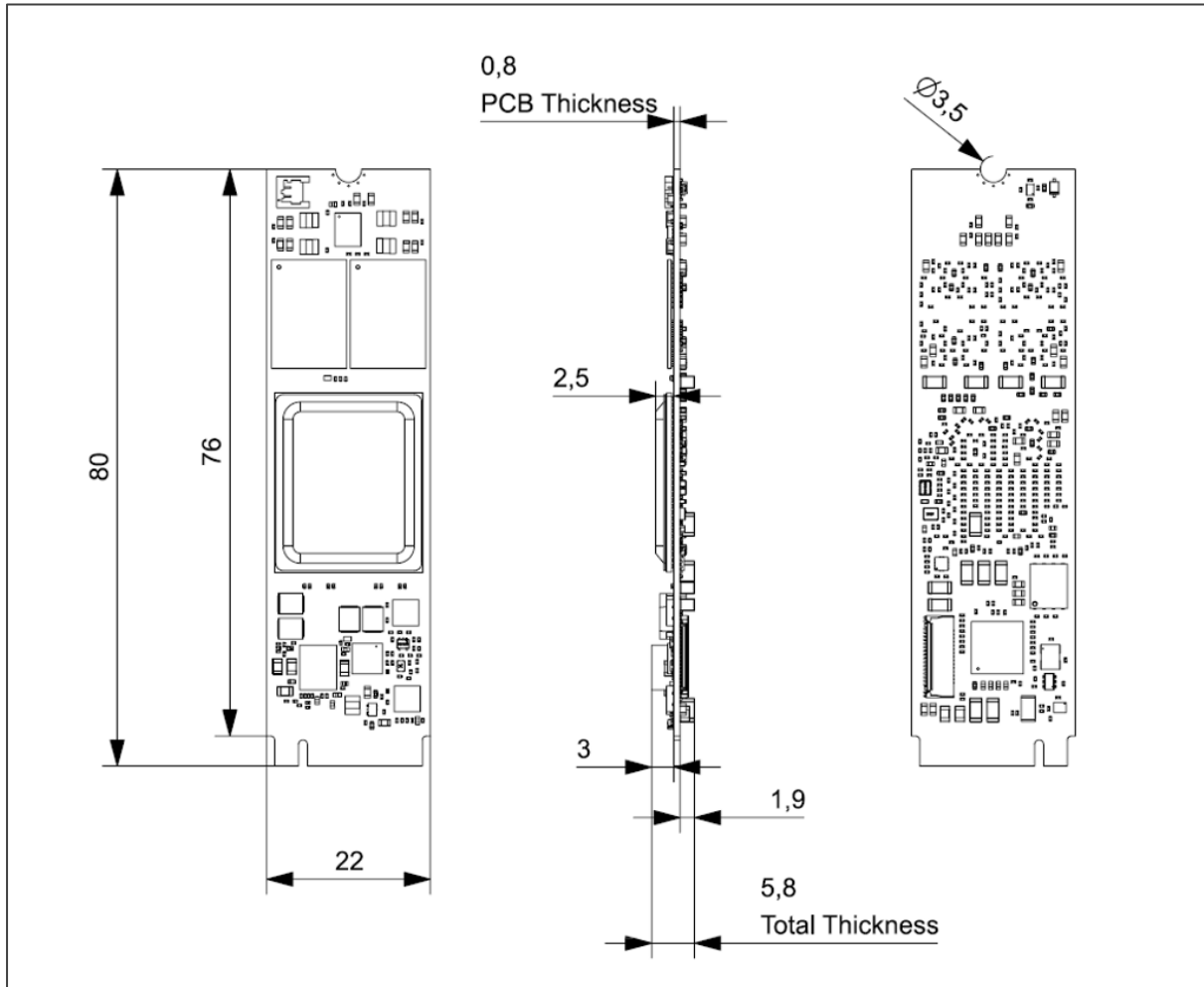


Figure 2: Board dimensions of the Metis M.2 Max card

Table 4: Metis M.2 Max card package dimensions

Item	Dimensions <sup>2</sup> (mm. tolerance $\pm 0.15$ mm)
<b>Top view</b>	
PCB board length	80.00
Board width	22.00
PCB mounting hole radius	3.50 $\pm 0.01$
Length of connector	4.00
<b>Edge dimensions</b>	
Max. height	5.8
Underside clearance	1.90
<b>Detail A</b>	
Board thickness	0.80 $\pm 0.08$
Edge chamfer length (to full thickness)	0.30 $\pm 0.25$
Edge chamfer angle	20.0° $\pm 5.^\circ$
<b>Underside view</b>	
M-key to PCB central line	6.125
PCB edge to PCB layer stack	1.00 $\pm 0.10$

## 2.3 Connector pinout

Table 5 shows the connector pinout for the Metis M.2 Max card alongside signals from the Metis AIPU chip.

Table 5: Metis M.2 Max card connector pinout and signals

Pin name	Pin reference	Signal name (other side)
+3.3V	2	3.3V Power
+3.3V	4	3.3V Power
+3.3V	12	3.3V Power
+3.3V	14	3.3V Power
+3.3V	16	3.3V Power
+3.3V	18	3.3V Power
GND	1	Ground
GND	3	Ground
GND	9	Ground
GND	15	Ground
GND	21	Ground

<sup>2</sup> Dimensions are nominal. Tolerance is  $\pm 0.15$  mm unless otherwise stated for individual items.

Pin name	Pin reference	Signal name (other side)
GND	27	Ground
GND	33	Ground
GND	39	Ground
GND	45	Ground
GND	51	Ground
GND	57	Ground
GND	71	Ground
GND	75	Ground
PETn0	41	PCIe TX Negative (Lane 0)
PETn1	29	PCIe TX Negative (Lane 1)
PETn2	17	PCIe TX Negative (Lane 2)
PETn3	5	PCIe TX Negative (Lane 3)
PETp0	43	PCIe TX Positive (Lane 0)
PETp1	31	PCIe TX Positive (Lane 1)
PETp2	19	PCIe TX Positive (Lane 2)
PETp3	7	PCIe TX Positive (Lane 3)
PERn0	47	PCIe RX Negative (Lane 0)
PERn1	35	PCIe RX Negative (Lane 1)
PERn2	23	PCIe RX Negative (Lane 2)
PERn3	11	PCIe RX Negative (Lane 3)
PERp0	49	PCIe RX Positive (Lane 0)
PERp1	37	PCIe RX Positive (Lane 1)
PERp2	25	PCIe RX Positive (Lane 2)
PERp3	13	PCIe RX Positive (Lane 3)
PCIE_REF_CLK_N	53	PCIe Reference Clock Negative
PCIE_REF_CLK_P	55	PCIe Reference Clock Positive
PERST#	50	PCIe Reset

## 2.4 Cooling solution

This section provides details of the fan-cooled heatsink used in the Metis M.2 Max card.

- Figure 3 shows the fan-cooled heatsink for the Metis M.2 Max card.
- Table 6 describes the package and gives the dimensions of the heatsink.

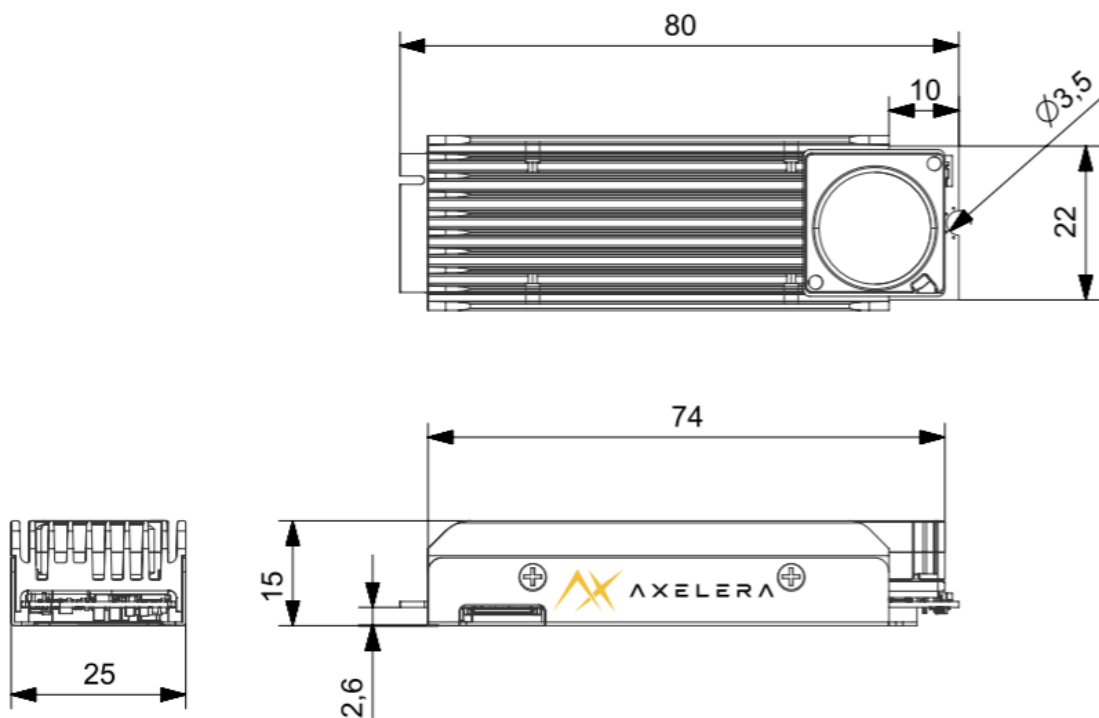


Figure 3: The fan-cooled heatsink for the Metis M.2 Max card

Table 6: Dimensions of the fan-cooled heatsink for the Metis M.2 Max card

Item	Dimensions (mm)
Total length	80.00
Length (heatsink only)	74.00
Height (to top of heatsink)	15.00
Width	25.00

The fan-cooled heatsink fan dissipates hot air on either side of the heatsink. Figure 4 shows the airflow directions: the blue arrow indicates cold air, the red indicates hot air.

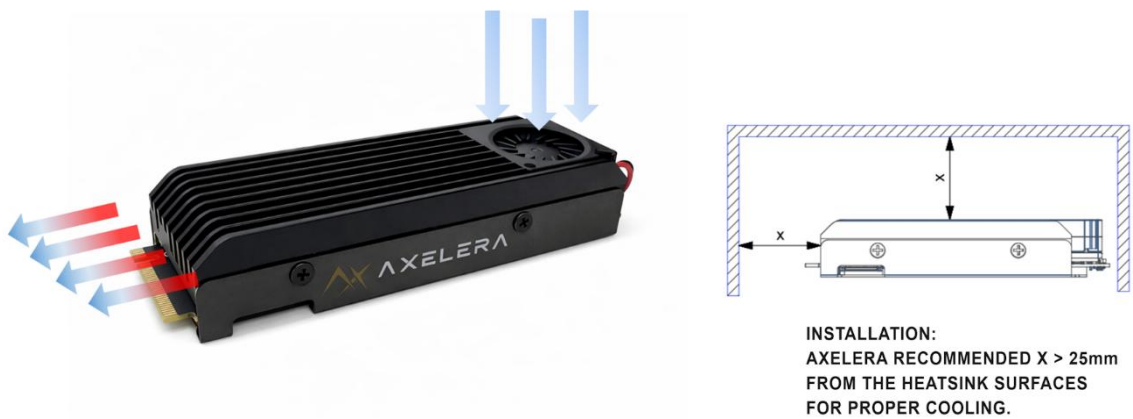


Figure 4: Air flow directions for the Metis M.2 Max card

## 2.5 Security

The Metis AIPU chip features a Root of Trust (RoT) that can be securely provisioned during chipset manufacturing. Firmware integrity protection is provided through secure boot and secure upgrade features built on this foundational RoT. For more information, please see Axelera contact details in section 6 *Support*.

### 3 Safety information

Before installing the Metis M.2 Max card and to ensure the safe use of the card, follow these guidelines:

- **General handling:**
  - Handle the card with care to avoid physical damage.
  - Wear an anti-static wrist strap during installation to prevent electrostatic discharge (ESD).
  - Disconnect the power source before handling, installing, or maintaining the product.
- **Installation:**
  - Ensure the card is installed in a M.2-compliant slot.
  - Verify that the power source complies with the product's power requirements.
- **Operation:**
  - Do not block the airflow to the fan or heatsink during operation.
  - Monitor system temperatures regularly to prevent overheating.
  - Operate within the specified ambient temperature range (-20°C to 70°C) as much as possible.
- **Storage:**
  - Store the product in a dry environment within -40°C to 85°C and 0%-85% relative humidity (non-condensing).
- **Maintenance:**
  - Regularly clean the fan and heatsink to prevent dust buildup.
  - Ensure software and firmware are updated to maintain performance and security.
  - Inspect the card and connectors periodically for signs of wear or damage.
- **Disposal:**
  - Dispose of the product in accordance with local electronic waste regulations.

**WARNING:** Improper handling, installation, or use may result in injury, equipment damage, or voiding of warranty.

## 4 Installation instructions

1. **Card installation:**
  - Align the card with the chosen M.2 slot in your system slot and gently insert it.
  - Secure the card using the bracket screws.
2. **Cooling verification:**
  - Ensure the fan is securely attached and unobstructed.
  - Verify airflow in the system chassis.
3. **Power connection:**
  - Confirm that your system provides sufficient power directly through the M.2 slot.
4. **Software Setup:**
  - Install the Voyager SDK for model configuration and optimization.

## 5 Troubleshooting

**Issue:** The system does not detect the card.

**Solution:**

1. Verify the card is properly seated in the M.2 slot.
2. Check the system's BIOS/UEFI to confirm M.2 lane availability.

**Issue:** Overheating during operation.

**Solution:**

1. Ensure adequate airflow within the chassis.
2. Clean the fan and verify its operation.

## 6 Support

For further information and support please visit:

- Axelera AI Community: <https://community.axelera.ai/>
- Axelera AI Customer Portal: <https://support.axelera.ai/>

## 7 Model/Part numbers

The Metis M.2 Max AI Accelerator Card is available in multiple configurations. Table 7 shows the part numbers for the available variants.

*Table 7: Metis M.2 Max AI Accelerator Card reference identification*

Part number	Description
AXE-BME21M1BN02A04	Metis M.2 Max AI Accelerator Card, 1-AIPU, 2 GB, active cooling, Rev 2.1
AXE-BME21M1BG02B04	Metis M.2 Max AI Accelerator Card, 1-AIPU, 2 GB, no cooling, Rev 2.1
AXE-BME21M1B008A04	Metis M.2 Max AI Accelerator Card, 1-AIPU, 8 GB, active cooling, Rev 2.1
AXE-BME21M1BC08B04	Metis M.2 Max AI Accelerator Card, 1-AIPU, 8 GB, no cooling, Rev 2.1

*Other memory variants and extended temperature support are available upon demand, subject to minimum order quantities.*

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