Metis PCIe 4-AIPU AI Accelerator Card Datasheet

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Document revision history

Revision	Date	Description
1 – PRELIMINARY	2025-09-19	First Issue
2	2026-03-20	Added certification in Table 2 Added passive cooling solution sections 2.2.2 and 2.4.2 and updated part numbers in section 7.

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1 Introduction

Metis is Axelera's high-performance AI Processing Unit (AIPU) for edge computing, available in M.2, PCIe, and SBC form factors. Each variant is tailored to meet specific deployment needs, offering a range of chip and memory configurations.

The Metis PCIe 4-AIPUs AI Accelerator Card is a four-chip PCIe solution available in 16/64 GB RAM configurations, designed to deliver powerful AI processing for edge servers.

This datasheet provides instructions and safety information to ensure the Metis PCIe 4-AIPUs Accelerator Card module can be installed, operated, stored, maintained, repaired, and disposed of safely.

1.1 Metis PCIe 4-AIPU AI Accelerator Card overview

Figure 1: Axelera AI Metis PCIe 4-AIPUs AI Accelerator Card with active cooling

Figure 2: Axelera AI Metis PCIe 4-AIPUs AI Accelerator Card with passive cooling

1.2 Key features

- The highest-performance AI accelerator PCIe card on the market for edge AI applications. Powered by four Metis AIPUs.
- A single board can run inference on dozens of cameras as well as support multiple parallel neural networks.
- A wide range of end-to-end AI pipelines and models are available out of the box.
- Hassle-free evaluation and SW integration thanks to Axelera AI 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: Metis PCIe 4-AIPU board characteristics and properties

Specification	Description
Product name	Metis PCIe 4-AIPUs AI Accelerator Card
Main chip	Axelera AI Metis AIPU (AI Processing Unit)
Memory	16 GB and 64 GB LPDDR4x. See section 7 Model/Part numbers
Thermal solution	Active air cooling Passive air cooling
Host interface	PCIe Gen. 3.0, 16-lanes Bandwidth: Up to 16 GB/s
Certifications	CE, FCC, ROHS, REACH

Table 2: Metis PCIe 4-AIPU physical characteristics

Specification	Description
Mechanical form factor	PCIe single slot, full height, three-quarter length
Dimensions	Total length: three-quarters[1]
Weight	712 grams
Power Rating	225 W - total board power requirement, including a PCI-SIG compliant slot and a 2 x 4 auxiliary power connector
Thermal Design Power	70 W
Typical Power	30 W - 58 W - typical average power across various workloads using maximum performance profile. This measurement assumes an ambient temperature of 25°C

Table 3: Metis PCIe 4-AIPU environmental characteristics

Specification	Description
Standard operating temperature (ambient)	0~60°C
Storage temperature	-40~85°C
Storage humidity	0%~85% RH, non-condensing

[1] The actual length is slightly less than three-quarters, see section 2.2, Board mechanical details, for exact dimensions

2.2 Board mechanical details

2.2.1 Active cooling solution

This section provides the package information of the Metis PCIe 4-AIPUs active cooling card. Figure 3 shows the card with its fan-based cooler.

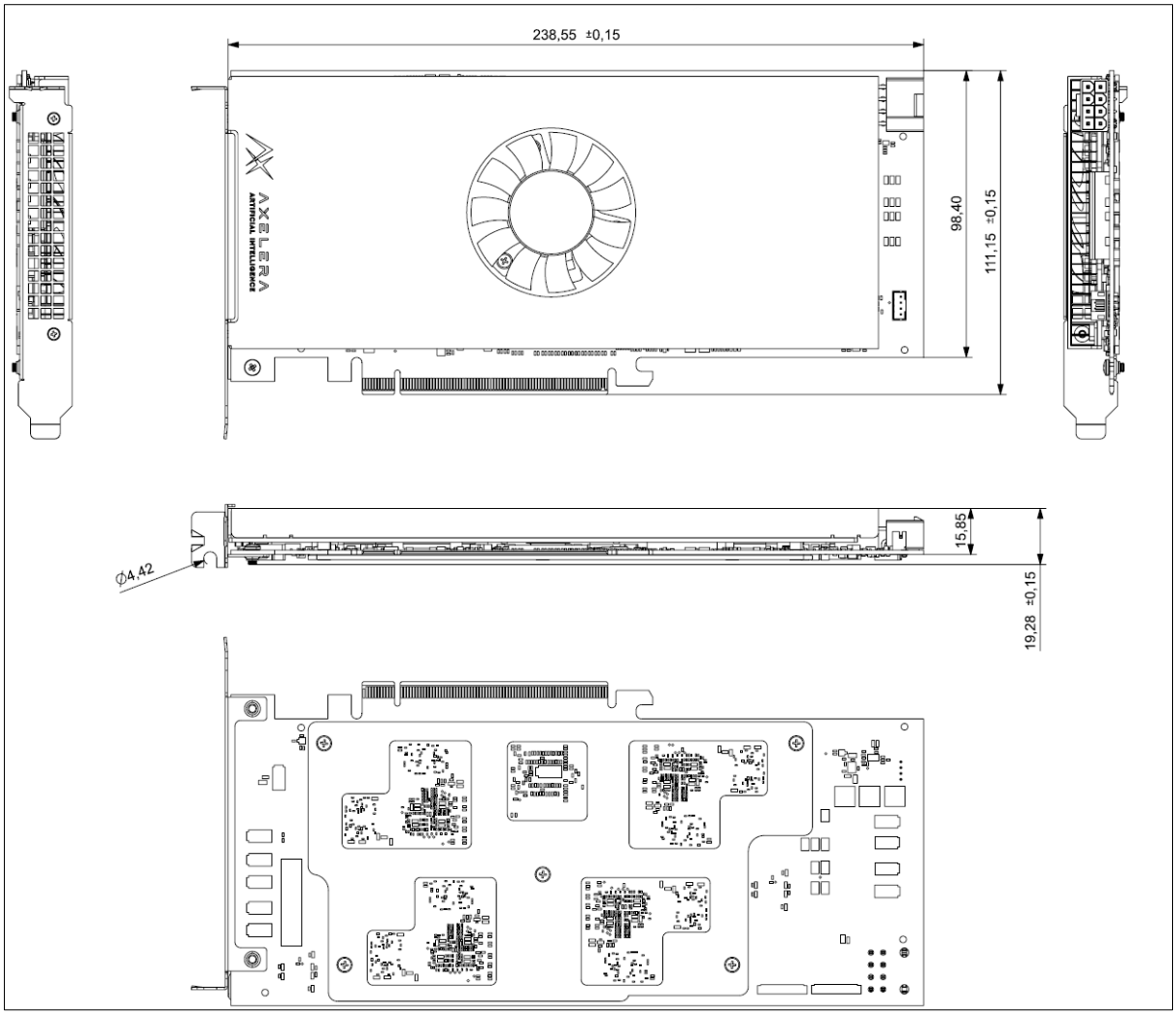

Figure 3: Metis PCIe 4-AIPU card package diagram showing fan-based cooler

Table 4 provides the package mechanical dimensions for the active and passive cooling variants of the Metis PCIe 4-AIPU card.

Table 4: Metis PCIe 4-AIPUs card dimensions

Item	Dimensions (mm)
Total length	238.55
Width (front)	111.15
Total height	19.28

2.2.2 *Passive cooling solution*

This section provides the package information of the Metis PCIe 4-AIPUs passive cooling card. Figure 4 shows the card with its passive cooling solution.

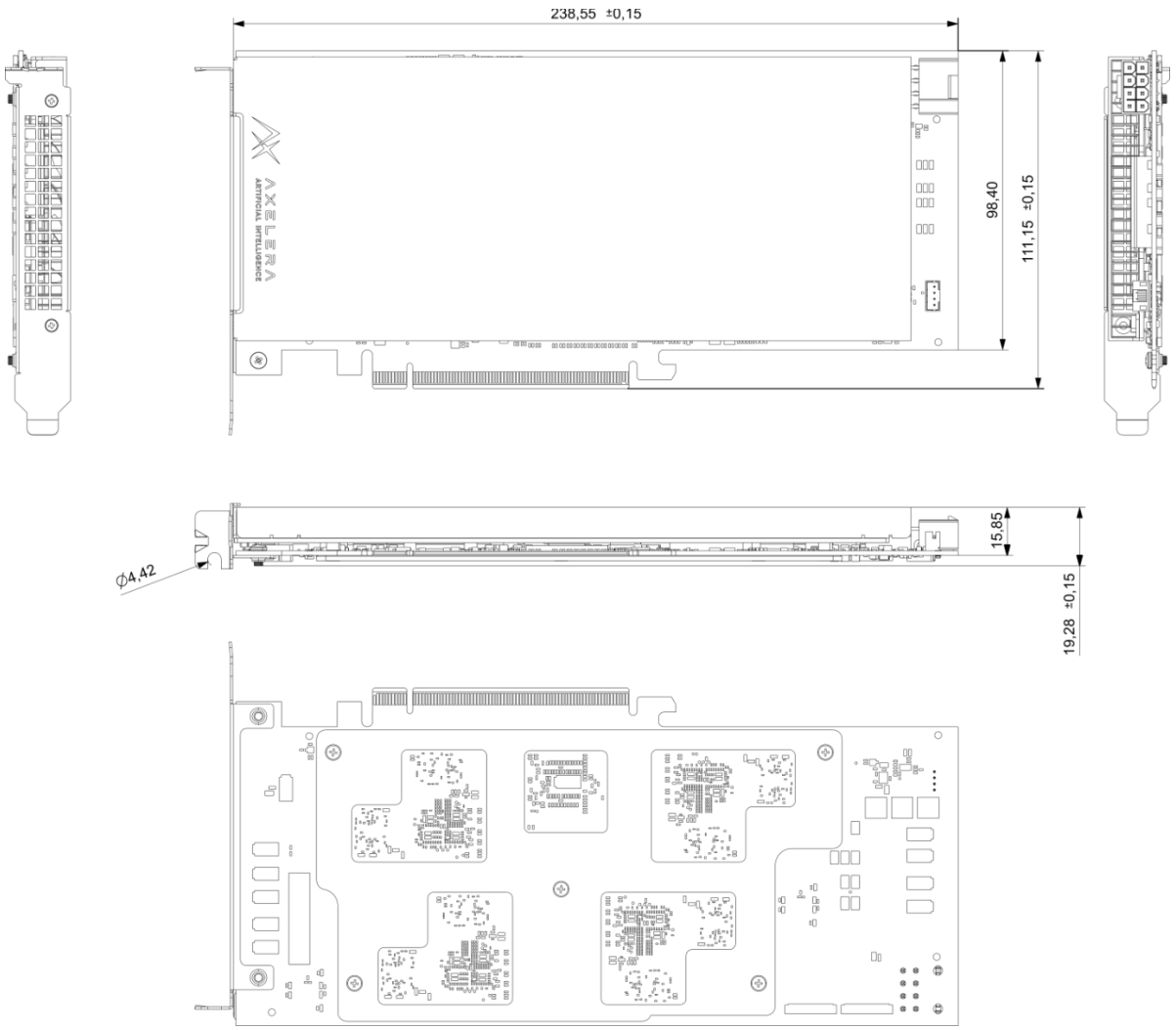

Figure 4: Metis PCIe 4-AIPU card package diagram showing passive cooler

2.3 Connector pinout

Refer to Appendix A PCIe x16 pinouts for connector pinouts.

2.4 Cooling solutions

2.4.1 Active cooling solution

The Metis PCIe 4-AIPUs card uses a fan-based cooler, the fan dissipates hot air as depicted in Figure 5.

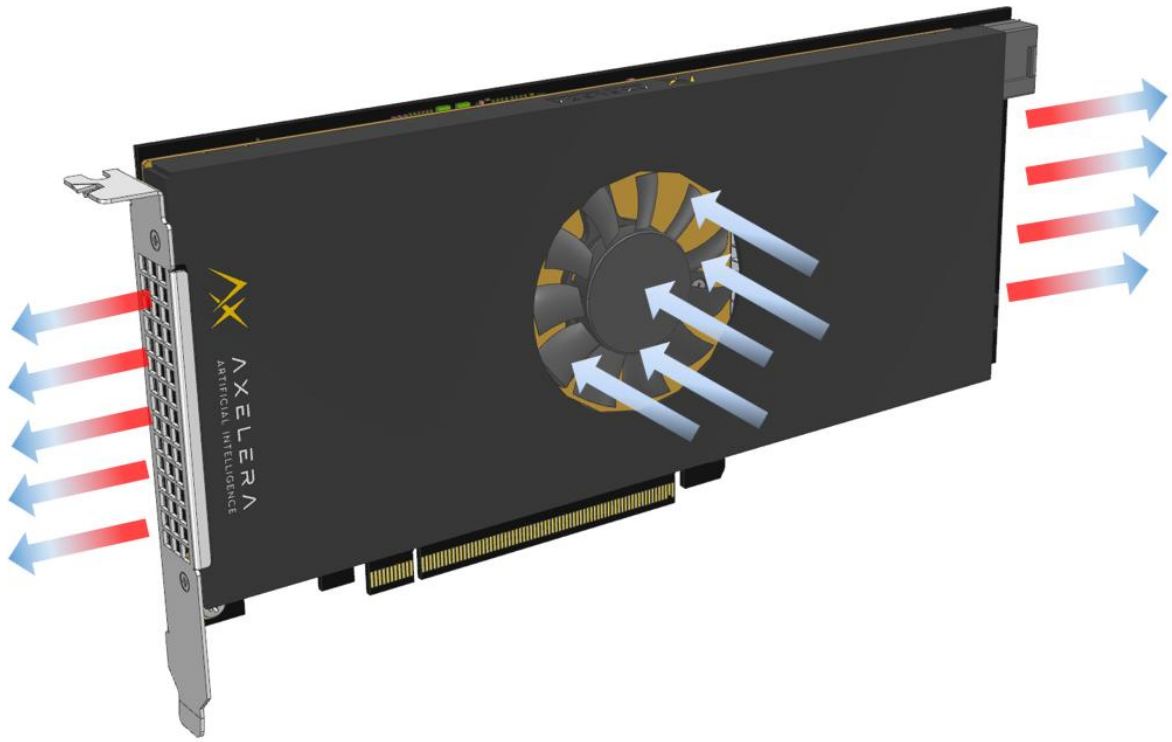

Figure 5: Air flow directions for the Metis PCIe 4-AIPUs card with a fan-based cooler.

Table 5 shows the fan characteristics of the fan-based cooler.

Table 5: Metis PCIe 4-AIPUs card's fan characteristics

Fan dimensions	55 x 55 x 10
Voltage	12V
Power consumption	3.12 W (max 3.6 W)
Speed	5400 RPM
Maximum air flow	19 CFM
Air pressure	4.4 mmH2O

2.4.2 Passive cooling solution

The Metis PCIe 4-AIPU passive cooling solution relies on system-generated longitudinal airflow. Air enters through the rear intake aperture, flows beneath the heatsink shroud across the

internal fins, and exhausts through the front bracket ventilation slots. The shroud must remain installed during operation to maintain the intended airflow path.

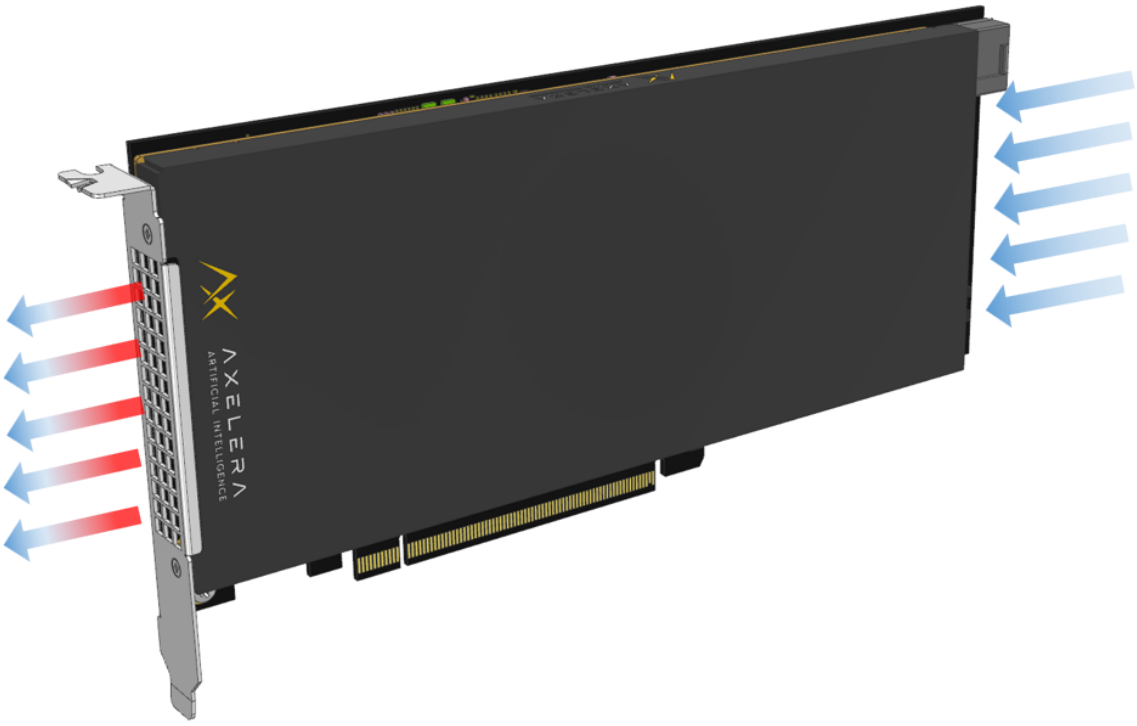

Figure 6: Air flow directions for the Metis PCIe 4-AIPUs card with the passive cooling solution

2.5 Security

The Metis AIPU chip features a Root of Trust (RoT) that can be securely provisioned during chipset manufacturing. Secure Boot and other security features built on this foundational RoT will be enabled in future revisions. For more information, please see Axelera contact details in section *6 Support*.

3 Safety information

Before installing the Metis PCIe 4-AIPUs AI Accelerator Card and to ensure its safe use, 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 PCIe-compliant slot.
  - Verify that the power sources comply 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 only within the specified ambient temperature range (0 °C to 60 °C).
- **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 PCIe Gen. 3.0 x16 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**:
    - Connect the PCIe auxiliary power cable from your system to the 2 x 4 connector
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 PCIe slot.
2. Check the system's BIOS/UEFI to confirm PCIe 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 **Model type** of the Metis PCIe 4-AIPUs Accelerator Card is **AXE-BME20P4.** Table 6 shows the part numbers for the various configurations of the card with four AIPUs.

Table 6: Metis PCIe 4-AIPU AI Accelerator Card – part numbers

Part number	Description
AXE-BME20P4BJ08A01	Metis AI Accelerator PCIe Card with 4 AIPUs, 8 GB RAM, active cooling, Rev1.0
AXE-BME20P4AC16A01	Metis AI Accelerator PCIe Card with 4 AIPUs, 16 GB RAM, active cooling, Rev1.0
AXE-BME20P4BL32A01	Metis AI Accelerator PCIe Card with 4 AIPUs, 32 GB RAM, active cooling, Rev1.0
AXE-BME20P4AY64A01	Metis AI Accelerator PCIe Card with 4 AIPUs, 64 GB RAM, active cooling, Rev1.0
AXE-BME20P4BK08C01	Metis AI Accelerator PCIe Card with 4 AIPUs, 8 GB RAM, passive cooling, Rev1.0
AXE-BME20P4AT16C01	Metis AI Accelerator PCIe Card with 4 AIPUs, 16 GB RAM, passive cooling, Rev1.0
AXE-BME20P4BM32C01	Metis AI Accelerator PCIe Card with 4 AIPUs, 32 GB RAM, passive cooling, Rev1.0
AXE-BME20P4AU64C01	Metis AI Accelerator PCIe Card with 4 AIPUs, 64 GB RAM, passive cooling, Rev1.0

Appendix A PCIe x16 pinouts

Table 7: Metis PCIe 4-AIPUs card connector pinout and signals shows the connector pinout for the Metis PCIe 4-AIPUs card alongside signals from the Metis AIPU chips.

Note: Pins marked in gray are not connected in this implementation.

Table 7: Metis PCIe 4-AIPUs card connector pinout and signals

Pin	Name	Pin	Name
B1	+12v	A1	PRSNT#1
B2	+12v	A2	+12v
B3	+12v	A3	+12v
B4	GND	A4	GND
B5	SMCLK	A5	JTAG2
B6	SMDAT	A6	JTAG3
B7	GND	A7	JTAG4
B8	+3.3v	A8	JTAG5
B9	JTAG1	A9	+3.3v
B10	3.3Vaux	A10	+3.3v
B11	WAKE#	A11	PERST#
Mechanical Key			
B12	RSVD	A12	GND
B13	GND	A13	REFCLK+
B14	HSOp(0)	A14	REFCLK-
B15	HSOn(0)	A15	GND
B16	GND	A16	HSIp(0)
B17	PRSNT#2	A17	HSIn(0)
B18	GND	A18	GND
B19	HSOp(1)	A19	RSVD
B20	HSOn(1)	A20	GND
B21	GND	A21	HSIp(1)
B22	GND	A22	HSIn(1)
B23	HSOp(2)	A23	GND
B24	HSOn(2)	A24	GND
B25	GND	A25	HSIp(2)
B26	GND	A26	HSIn(2)
B27	HSOp(3)	A27	GND
B28	HSOn(3)	A28	GND
B29	GND	A29	HSIp(3)
B30	RSVD	A30	HSIn(3)

Pin	Name	Pin	Name
B31	PRSNT#2	A31	GND
B32	GND	A32	RSVD
B33	HSOp(4)	A33	RSVD
B34	HSOn(4)	A34	GND
B35	GND	A35	HSIp(4)
B36	GND	A36	HSIn(4)
B37	HSOp(5)	A37	GND
B38	HSOn(5)	A38	GND
B39	GND	A39	HSIp(5)
B40	GND	A40	HSIn(5)
B41	HSOp(6)	A41	GND
B42	HSOn(6)	A42	GND
B43	GND	A43	HSIp(6)
B44	GND	A44	HSIn(6)
B45	HSOp(7)	A45	GND
B46	HSOn(7)	A46	GND
B47	GND	A47	HSIp(7)
B48	PRSNT#2	A48	HSIn(7)
B49	GND	A49	GND
B50	HSOp(8)	A50	RSVD
B51	HSOn(8)	A51	GND
B52	GND	A52	HSIp(8)
B53	GND	A53	HSIn(8)
B54	HSOp(9)	A54	GND
B55	HSOn(9)	A55	GND
B56	GND	A56	HSIp(9)
B57	GND	A57	HSIn(9)
B58	HSOp(10)	A58	GND
B59	HSOn(10)	A59	GND
B60	GND	A60	HSIp(10)
B61	GND	A61	HSIn(10)
B62	HSOp(11)	A62	GND
B63	HSOn(11)	A63	GND
B64	GND	A64	HSIp(11)
B65	GND	A65	HSIn(11)
B66	HSOp(12)	A66	GND
B67	HSOn(12)	A67	GND
B68	GND	A68	HSIp(12)
B69	GND	A69	HSIn(12)

Pin	Name	Pin	Name
B70	HSOp(13)	A70	GND
B71	HSOn(13)	A71	GND
B72	GND	A72	HSIp(13)
B73	GND	A73	HSIn(13)
B74	HSOp(14)	A74	GND
B75	HSOn(14)	A75	GND
B76	GND	A76	HSIp(14)
B77	GND	A77	HSIn(14)
B78	HSOp(15)	A78	GND
B79	HSOn(15)	A79	GND
B80	GND	A80	HSIp(15)
B81	PRSNT#2	A81	HSIn(15)
B82	RSVD#2	A82	GND

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