

# cPCI-A3ETH

## User's Manual

3U CompactPCI® Serial 5-Port Serial Ethernet, Optional POE Card



|                       |                   |
|-----------------------|-------------------|
| <b>Manual Rev.:</b>   | 0.2 Preliminary   |
| <b>Revision Date:</b> | November 19, 2024 |
| <b>Part Number:</b>   | 50M-32013-1000    |

## Revision History

| Revision | Description                                                    | Date       | By |
|----------|----------------------------------------------------------------|------------|----|
| 0.1      | Preliminary release                                            | 2024-11-07 | AL |
| 0.2      | Specifications, mechanical layout, and connector pinouts added | 2024-11-19 | AL |

# Preface

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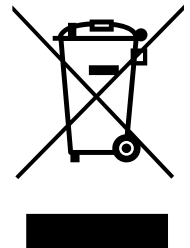
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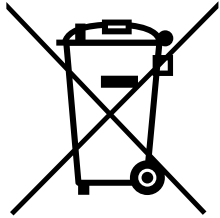
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## Battery Labels (for products with battery)



## California Proposition 65 Warning



**WARNING:** This product can expose you to chemicals including acrylamide, arsenic, benzene, cadmium, Tris(1,3-dichloro-2-propyl)phosphate (TDCPP), 1,4-Dioxane, formaldehyde, lead, DEHP, styrene, DINP, BBP, PVC, and vinyl materials, which are known to the State of California to cause cancer, and acrylamide, benzene, cadmium, lead, mercury, phthalates, toluene, DEHP, DIDP, DnHP, DBP, BBP, PVC, and vinyl materials, which are known to the State of California to cause birth defects or other reproductive harm. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov).

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## Conventions

Take note of the following conventions used throughout this manual to make sure that users perform certain tasks and instructions properly.



NOTE:

Additional information, aids, and tips that help users perform tasks.

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CAUTION:

Information to prevent **minor** physical injury, component damage, data loss, and/or program corruption when trying to complete a task.

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WARNING:

Information to prevent **serious** physical injury, component damage, data loss, and/or program corruption when trying to complete a specific task.

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# 1 Introduction

The 3U 4HP CPCI-S.0 CompactPCI Serial peripheral, cPCI-A3ETH, is an Ethernet card with Power over Ethernet (PoE) functionality, featuring 5x RJ45 ports via PCIe. All 5 Ethernet ports support both front and rear transitions, offering flexible connectivity options. The cPCI-A3ETH is specifically designed for use in standard CPCI-S.0 systems, providing reliable and scalable network solutions for industrial and embedded applications.

## 1.1 Features

- Follow PICMG® CompactPCI® Serial design guide
- CompactPCI® Serial, 3U 4HP/8HP
- 5x RJ-45 ports support up to 2.5G via Intel® i22G/IT Ethernet controllers
- Optional PoE supported
- Operating temperature: -40°C to +85°C
- Designed to meet EN50155 standards

## 1.2 Package Contents

The cPCI-A3ETH is packaged with the following components. If any of these items are missing or damaged, please retain the shipping carton and packing material and contact your dealer for inspection. Authorization must be obtained before returning any product to ADLINK. The contents of the cPCI-A3ETH packaging may vary for non-standard configurations, depending on customer specifications.

### CompactPCI Module

The cPCI-A3ETH module



NOTE:

The contents of non-standard cPCI-A3ETH configurations may vary depending on the customer's requirements.

---



CAUTION:

This product must be protected from static discharge and physical shock. Never remove any of the components except at a static-free workstation. Use the anti-static bag shipped with the product when putting the board on a surface. Wear an anti-static wrist strap properly grounded on one of the system's ESD ground jacks when installing or servicing system components.

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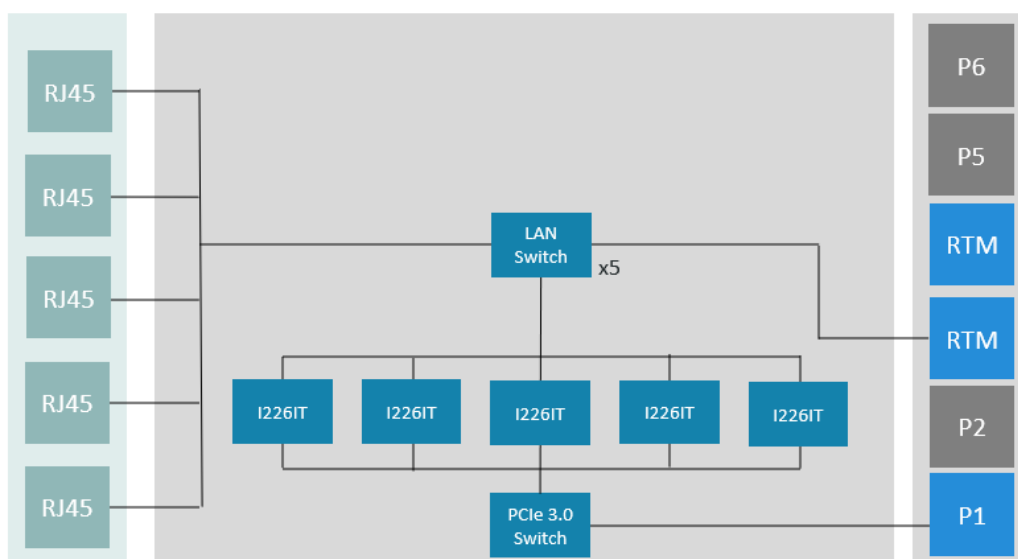
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## 2 Specifications

### 2.1 Product Specification

|                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>PCIe Bus Architecture</b>             | <ul style="list-style-type: none"> <li>Follow PICMG® CompactPCI® Serial design guide</li> <li>1x PCIe Gen 3.0 x 4 from P1</li> </ul>                                                                                                                                                                                                                                                                                                                         |
| <b>Ethernet</b>                          | <ul style="list-style-type: none"> <li>5x RJ45 ports, 2.5G via Intel i226IT</li> <li>With optional PoE function, by following PoE 802.3af standard (8HP SKU)</li> </ul>                                                                                                                                                                                                                                                                                      |
| <b>Form Factor</b>                       | <ul style="list-style-type: none"> <li>3U 4HP CPCI-S.0 standard</li> <li>3U 8HP CPCI-S.0 standard</li> <li>with P1, P3 &amp; P4 to rear</li> </ul>                                                                                                                                                                                                                                                                                                           |
| <b>Power Board</b>                       | <ul style="list-style-type: none"> <li>DB-A3PW board to board type to support 8HP on POE function with more power</li> </ul>                                                                                                                                                                                                                                                                                                                                 |
| <b>OS Support</b>                        | <ul style="list-style-type: none"> <li>Windows 10</li> <li>Ubuntu 22.X</li> </ul>                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Environmental &amp; Certification</b> | <p>Environment:</p> <ul style="list-style-type: none"> <li>Operating temperature: -40°C to 85° when provided with 1.5m/s airflow &amp; conduction cooled (on wedge lock)</li> <li>Storage temperature: -40°C to 95°C</li> <li>Humidity: 5% to 95% relative humidity (non-condensing)</li> <li>RoHS 2.0 &amp; REACH</li> </ul> <p>EMC:</p> <ul style="list-style-type: none"> <li>EN61000-6-4 / 6-2</li> <li>UKCA/CE</li> <li>FCC Part 15B CLASS A</li> </ul> |
| <b>Dimensions</b>                        | <ul style="list-style-type: none"> <li>3U 1-slot 4HP 100 x 160 x 20.32 mm (L x W x H)</li> <li>3U 2-slot 8HP 100 x 160 x 40.64 mm (L x W x H)</li> </ul>                                                                                                                                                                                                                                                                                                     |
| <b>MTBF</b>                              | <ul style="list-style-type: none"> <li>15.1 Years at minimum</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                      |
| <b>Weight</b>                            | <ul style="list-style-type: none"> <li>TBC</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                        |

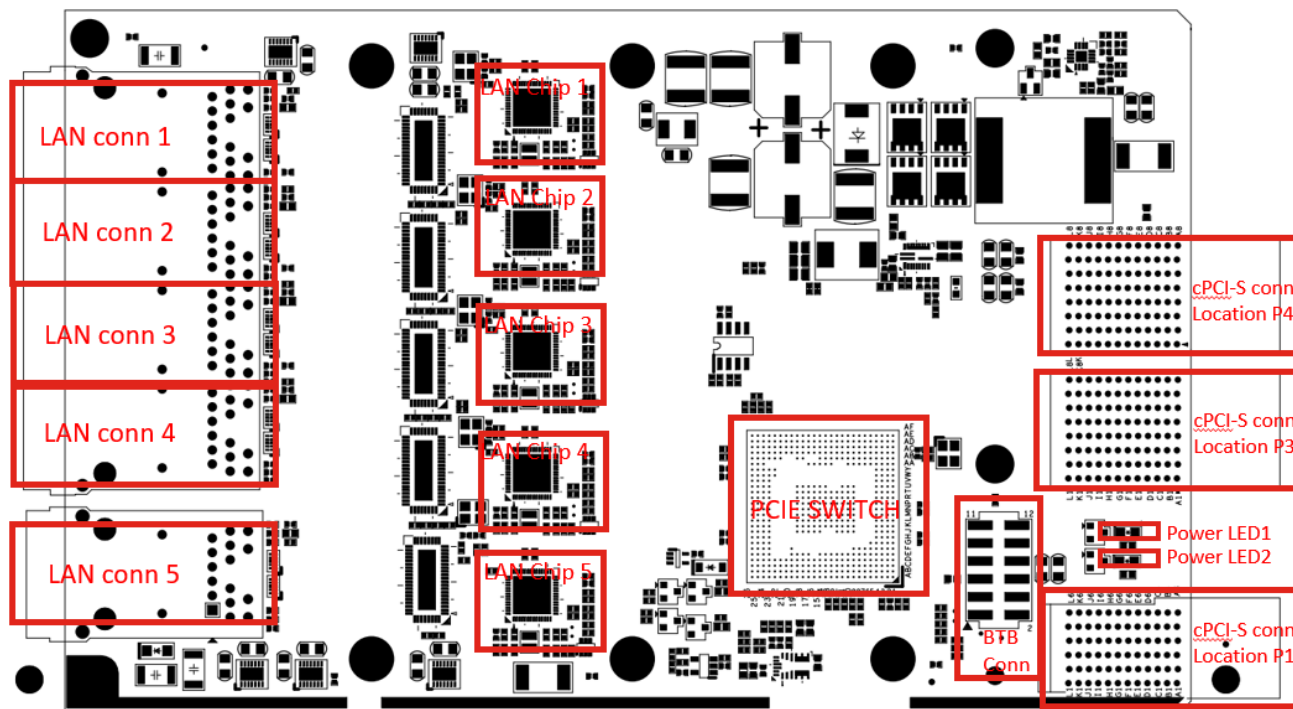
## 2.2 Block Diagram



**Figure 1: Functional block diagram**

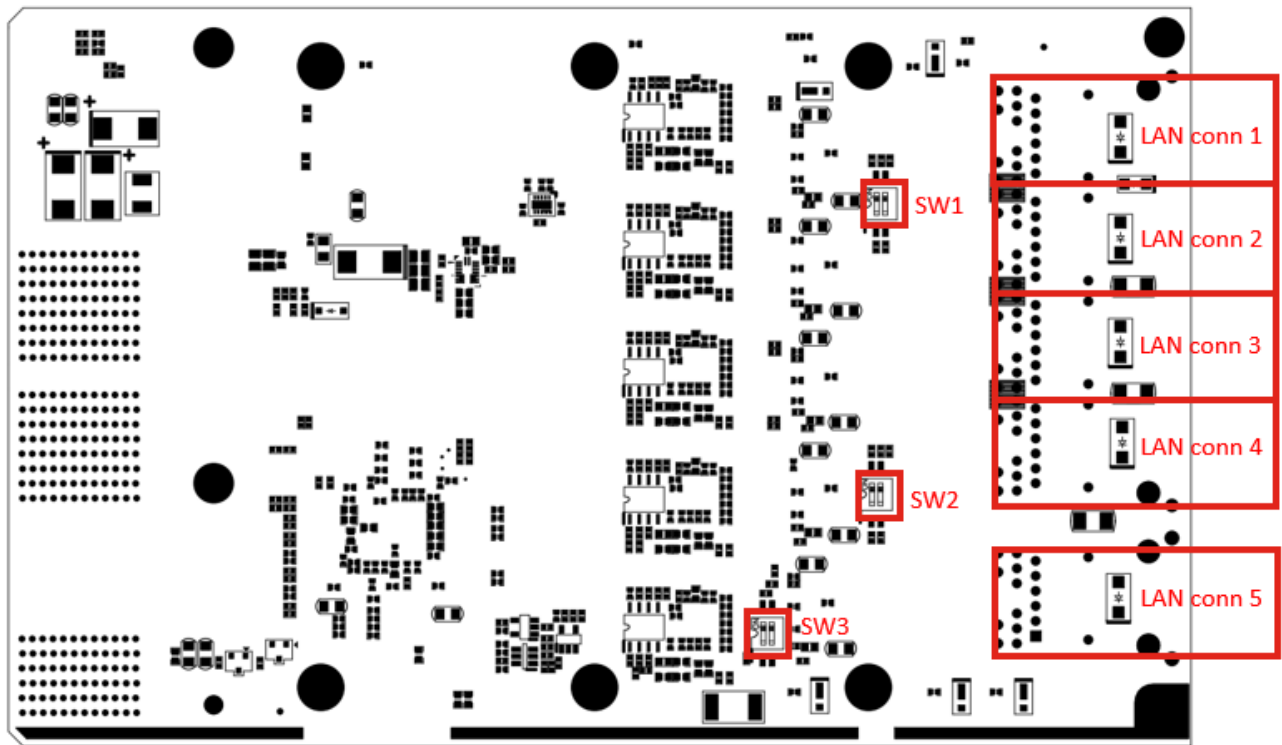
### 3 Mechanical Layout

#### 3.1 cPCI-A3ETH Connector and Switch Locations



|                             |                                                                            |
|-----------------------------|----------------------------------------------------------------------------|
| <b>P1, P3, P4</b>           | CompactPCI Serial connectors                                               |
| <b>Power OK LED 1 to 2</b>  | LED 1 (Green): for PCIe switch is ready<br>LED 2 (Green): for POE is ready |
| <b>BTB connector</b>        | Power board connector (DB-A3PW)                                            |
| <b>Switch</b>               | PCIe switch                                                                |
| <b>LAN chip 1 to 5</b>      | Intel I226-IT LAN                                                          |
| <b>LAN connector 1 to 5</b> | RJ45 LAN connectors                                                        |

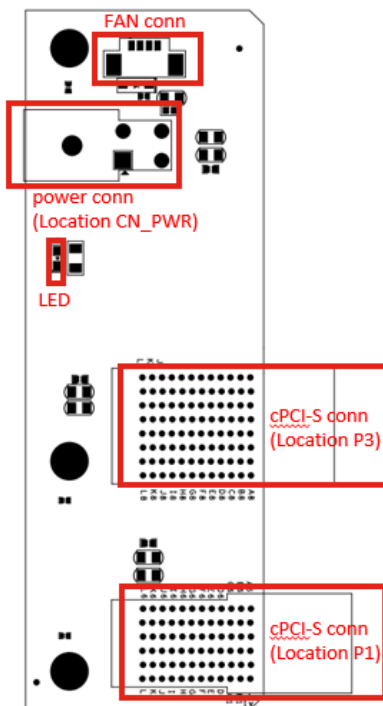
Figure 2: IO connector and switch locations (Top)



|             |                           |
|-------------|---------------------------|
| SW1 and SW2 | DisplayPort output switch |
|-------------|---------------------------|

Figure 3: Connector and switch locations (Bottom)

### 3.2 DB-A3PW Connector Locations and Functions



|                 |                               |
|-----------------|-------------------------------|
| P1 and P3       | CompactPCI Serial connectors  |
| LED             | 12V power OK                  |
| Power connector | 12V ATX 4 pin power connector |
| Fan connector   | Fan connector                 |

Figure 4: DB-A3PW power board connector locations (Top)

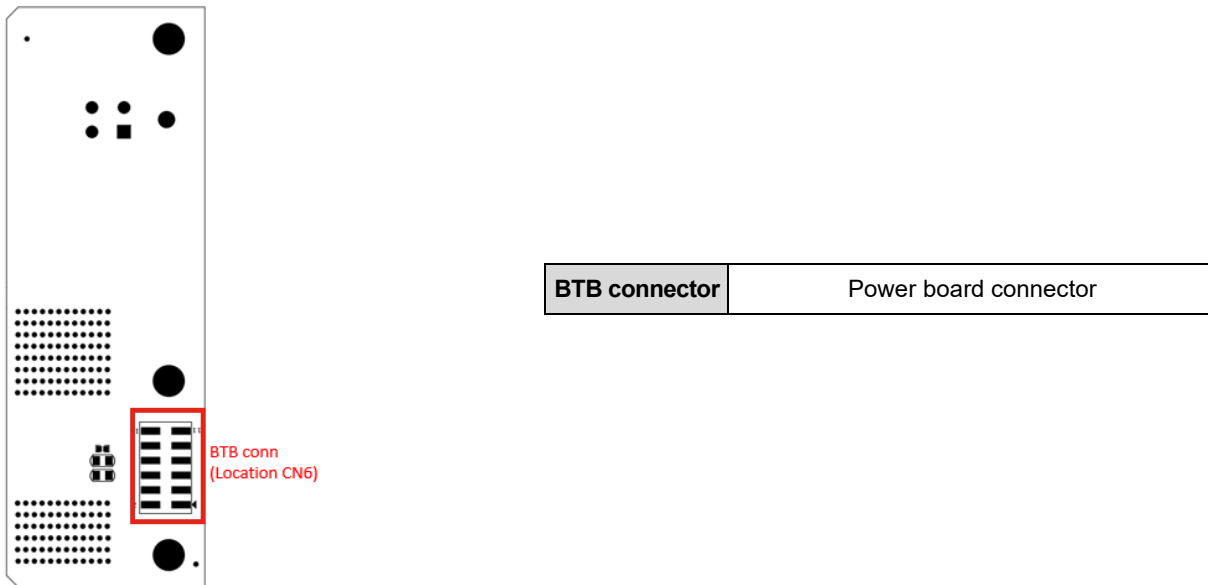
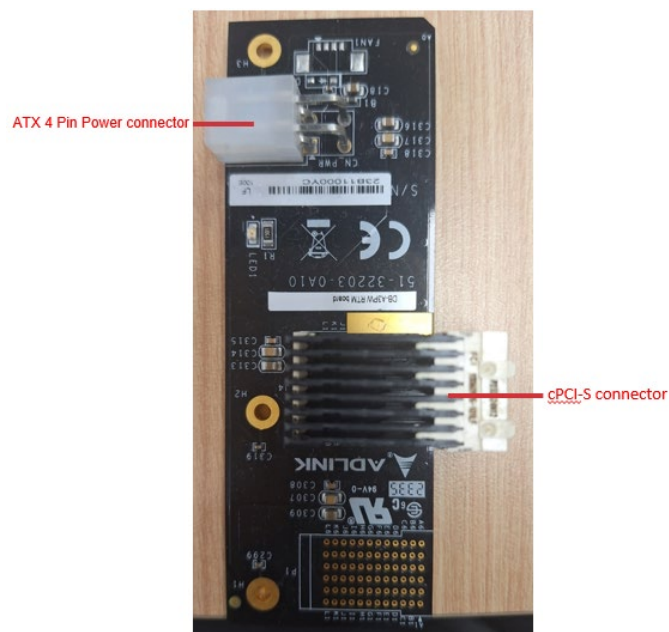


Figure 5: DB-A3PW power board connector locations (Bottom)



Figure 6: DB-A3PW daughter board – SKU 1: Power input from P1)



**Figure 7: DB-A3PW rear board – SKU 2: Power input from ATX 4 pin connector**

## 4 Connector Pinouts

### 4.1 cPCI-A3ETH CompactPCI P1 Connector

**Table 1: cPCI-A3ETH CompactPCI P1 connector**

| Pin | A             | B             | C             | D             | E              | F              |
|-----|---------------|---------------|---------------|---------------|----------------|----------------|
| 1   | P12V_PSU      | P_+5VSB       | GND           | P12V_PSU      | P12V_PSU       | GND            |
| 2   | GND           | P1_SMB_CLK    | P1_SMB_DAT    | GND           | NC             | NC             |
| 3   | NC            | NC            | P1_GA0        | NC            | NC             | P1_GA1         |
| 4   | GND           | NC            | NC            | GND           | P1_PCIE_CLK0_P | P1_PCIE_CLK0_N |
| 5   | P1_PCIE_TX0_P | P1_PCIE_TX0_N | GND           | P1_PCIE_RX0_P | P1_PCIE_RX0_N  | GND            |
| 6   | GND           | P1_PCIE_TX2_P | P1_PCIE_TX2_N | GND           | P1_PCIE_RX2_P  | P1_PCIE_RX2_N  |

| Pin | G             | H             | I             | J             | K             | L             |
|-----|---------------|---------------|---------------|---------------|---------------|---------------|
| 1   | P12V_PSU      | P12V_PSU      | GND           | P12V_PSU      | P12V_PSU      | GND           |
| 2   | GND           | P1_RST#       | P1_WAKE_OUT#  | GND           | P1_PCIE_EN#   | P1_SYSEN#     |
| 3   | NC            | NC            | P1_GA2        | NC            | NC            | P1_GA3        |
| 4   | GND           | NC            | NC            | GND           | NC            | NC            |
| 5   | P1_PCIE_TX1_P | P1_PCIE_TX1_N | GND           | P1_PCIE_RX1_P | P1_PCIE_RX1_N | GND           |
| 6   | GND           | P1_PCIE_TX3_P | P1_PCIE_TX3_N | GND           | P1_PCIE_RX3_P | P1_PCIE_RX3_N |

### 4.2 cPCI-A3ETH CompactPCI P3 Connector

**Table 2: cPCI-A3ETH CompactPCI P3 connector**

| Pin | A               | B               | C               | D               | E               | F               |
|-----|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| 1   | LAN5_RTM_MDIO_P | LAN5_RTM_MDIO_N | GND             | LAN5_RTM_MDIO_P | LAN5_RTM_MDIO_N | GND             |
| 2   | GND             | LAN4_RTM_MDIO_P | LAN4_RTM_MDIO_N | GND             | LAN4_RTM_MDIO_P | LAN4_RTM_MDIO_N |
| 3   | NC              | NC              | GND             | NC              | NC              | GND             |
| 4   | GND             | LAN3_RTM_MDIO_P | LAN3_RTM_MDIO_N | GND             | LAN3_RTM_MDIO_P | LAN3_RTM_MDIO_N |
| 5   | NC              | NC              | GND             | NC              | NC              | GND             |
| 6   | GND             | LAN2_RTM_MDIO_P | LAN2_RTM_MDIO_N | GND             | LAN2_RTM_MDIO_P | LAN2_RTM_MDIO_N |
| 7   | NC              | NC              | GND             | NC              | NC              | GND             |
| 8   | GND             | LAN1_RTM_MDIO_P | LAN1_RTM_MDIO_N | GND             | LAN1_RTM_MDIO_P | LAN1_RTM_MDIO_N |

| Pin | G               | H               | I               | J               | K               | L               |
|-----|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| 1   | LAN5_RTM_MDI2_P | LAN5_RTM_MDI2_N | GND             | LAN5_RTM_MDI3_P | LAN5_RTM_MDI3_N | GND             |
| 2   | GND             | LAN4_RTM_MDI2_P | LAN4_RTM_MDI2_N | GND             | LAN4_RTM_MDI3_P | LAN4_RTM_MDI3_N |
| 3   | NC              | NC              | GND             | NC              | NC              | GND             |
| 4   | GND             | LAN3_RTM_MDI2_P | LAN3_RTM_MDI2_N | GND             | LAN3_RTM_MDI3_P | LAN3_RTM_MDI3_N |
| 5   | NC              | NC              | GND             | NC              | NC              | GND             |
| 6   | GND             | LAN2_RTM_MDI2_P | LAN2_RTM_MDI2_N | GND             | LAN2_RTM_MDI3_P | LAN2_RTM_MDI3_N |
| 7   | NC              | NC              | GND             | NC              | NC              | GND             |
| 8   | GND             | LAN1_RTM_MDI2_P | LAN1_RTM_MDI2_N | GND             | LAN1_RTM_MDI3_P | LAN1_RTM_MDI3_N |

### 4.3 cPCI-A3ETH CompactPCI P4 Connector

**Table 3: cPCI-A3ETH CompactPCI P4 connector**

| Pin | A               | B               | C               | D               | E               | F               |
|-----|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| 1   | NC              | NC              | GND             | NC              | NC              | GND             |
| 2   | GND             | POE_PWRMGT_R    | NC              | GND             | NC              | NC              |
| 3   | LAN3_RTM_LED2-L | NC              | GND             | LAN4_RTM_LED0-L | LAN4_RTM_LED1-L | GND             |
| 4   | GND             | P12V_PSU        | P12V_PSU        | GND             | P12V_PSU        | P12V_PSU        |
| 5   | P12V_PSU        | P12V_PSU        | GND             | P12V_PSU        | P12V_PSU        | GND             |
| 6   | GND             | LAN1_RTM_LED0-L | LAN1_RTM_LED1-L | GND             | LAN1_RTM_LED2-L | LAN2_RTM_LED0-L |
| 7   | P_+3V3_S        | P_+3V3_S        | GND             | P_+3V3_S        | P_+3V3_S        | GND             |
| 8   | GND             | NC              | NC              | GND             | NC              | NC              |

| Pin | G               | H               | I               | J               | K               | L               |
|-----|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| 1   | NC              | NC              | GND             | NC              | NC              | GND             |
| 2   | GND             | NC              | NC              | GND             | NC              | NC              |
| 3   | LAN4_RTM_LED2-L | LAN4_RTM_LED0-L | GND             | LAN5_RTM_LED1-L | LAN5_RTM_LED2-L | GND             |
| 4   | GND             | P12V_PSU        | P12V_PSU        | GND             | P12V_PSU        | P12V_PSU        |
| 5   | P12V_PSU        | P12V_PSU        | GND             | P12V_PSU        | P12V_PSU        | GND             |
| 6   | GND             | LAN2_RTM_LED1-L | LAN2_RTM_LED2-L | GND             | LAN3_RTM_LED0-L | LAN3_RTM_LED1-L |
| 7   | NC              | NC              | GND             | NC              | NC              | GND             |
| 8   | GND             | NC              | NC              | GND             | NC              | NC              |

## 4.4 DB-A3PW P1 Connector – SKU 1

**Table 4: cPCI-A3ETH CompactPCI P3 connector**

| Pin | A      | B  | C   | D      | E      | F   |
|-----|--------|----|-----|--------|--------|-----|
| 1   | P_+12V | NC | GND | P_+12V | P_+12V | GND |
| 2   | GND    | NC | NC  | GND    | NC     | NC  |
| 3   | NC     | NC | NC  | NC     | NC     | NC  |
| 4   | GND    | NC | NC  | GND    | NC     | NC  |
| 5   | NC     | NC | GND | NC     | NC     | GND |
| 6   | GND    | NC | NC  | GND    | NC     | NC  |

| Pin | G      | H      | I   | J      | K      | L   |
|-----|--------|--------|-----|--------|--------|-----|
| 1   | P_+12V | P_+12V | GND | P_+12V | P_+12V | GND |
| 2   | GND    | NC     | NC  | GND    | NC     | NC  |
| 3   | NC     | NC     | NC  | NC     | NC     | NC  |
| 4   | GND    | NC     | NC  | GND    | NC     | NC  |
| 5   | NC     | NC     | GND | NC     | NC     | GND |
| 6   | GND    | NC     | NC  | GND    | NC     | NC  |

## 4.5 DB-A3PW RJ4 Connector – SKU 2

**Table 5: DB-A3PW RJ4 connector – SKU 2**

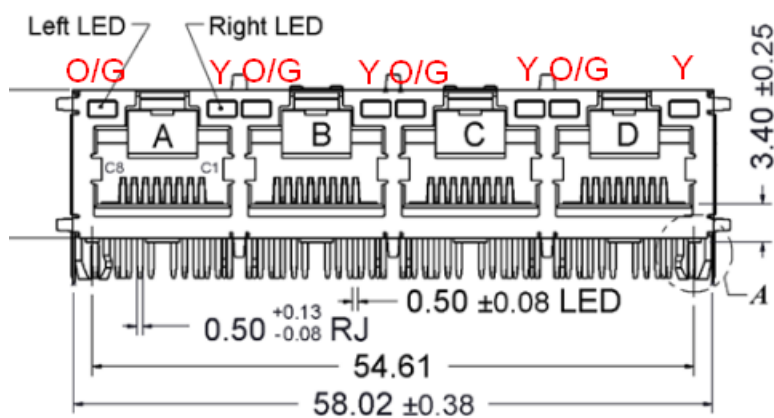
| Pin | A      | B      | C      | D      | E      | F      |
|-----|--------|--------|--------|--------|--------|--------|
| 1   | NC     | NC     | GND    | NC     | NC     | GND    |
| 2   | GND    | GND    | NC     | GND    | NC     | NC     |
| 3   | NC     | NC     | GND    | NC     | NC     | GND    |
| 4   | GND    | P_+12V | P_+12V | GND    | P_+12V | P_+12V |
| 5   | P_+12V | P_+12V | GND    | P_+12V | P_+12V | GND    |
| 6   | GND    | NC     | NC     | GND    | NC     | NC     |
| 7   | NC     | NC     | GND    | NC     | NC     | GND    |
| 8   | GND    | NC     | NC     | GND    | NC     | NC     |

| Pin | G      | H      | I      | J      | K      | L      |
|-----|--------|--------|--------|--------|--------|--------|
| 1   | NC     | NC     | GND    | NC     | NC     | GND    |
| 2   | GND    | NC     | NC     | GND    | NC     | NC     |
| 3   | NC     | NC     | GND    | NC     | NC     | GND    |
| 4   | GND    | P_+12V | P_+12V | GND    | P_+12V | P_+12V |
| 5   | P_+12V | P_+12V | GND    | P_+12V | P_+12V | GND    |
| 6   | GND    | NC     | NC     | GND    | NC     | NC     |
| 7   | NC     | NC     | GND    | NC     | NC     | GND    |
| 8   | GND    | NC     | NC     | GND    | NC     | NC     |

## 4.6 LAN Connectors

### 4.6.1 4-Port LAN (RJ1)

**Table 6: LAN connector**

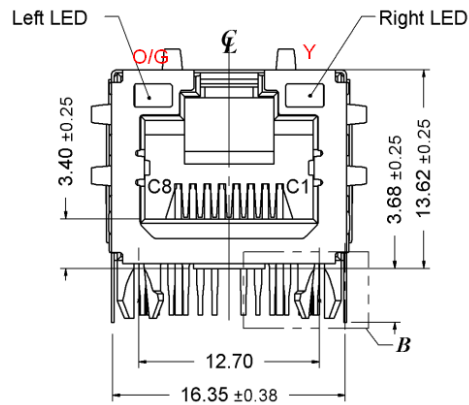


| Pin | Signal    |
|-----|-----------|
| R11 | MDI0_P    |
| R10 | MDI0_N    |
| R4  | MDI1_P    |
| R5  | MDI2_P    |
| R3  | MDI2_N    |
| R2  | MDI1_N    |
| R8  | MDI3_P    |
| R9  | MDI3_N    |
| R13 | POE power |
| R14 | POE power |

| LED   | Status        | Color    |
|-------|---------------|----------|
| Right | Link / Active | Blinking |
| Left  | Speed 10/100  | Off      |
| Left  | Speed 1000    | Green    |
| Left  | Speed 2500    | Orange   |

## 4.6.2 1-Port LAN (RJ3)

Table 7: LAN connector

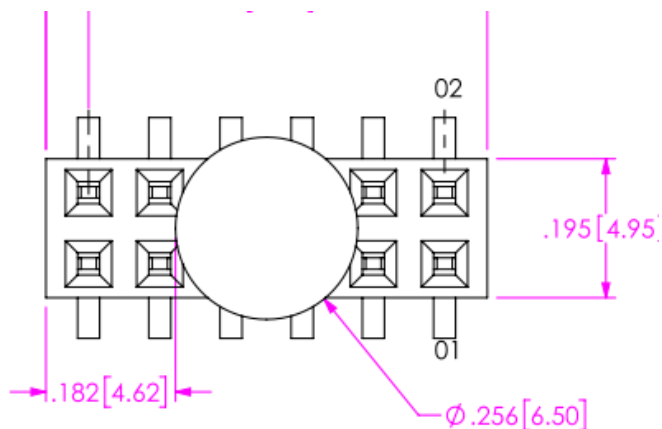


| Pin | Signal    |
|-----|-----------|
| R11 | MDI0_P    |
| R10 | MDI0_N    |
| R4  | MDI1_P    |
| R5  | MDI2_P    |
| R3  | MDI2_N    |
| R2  | MDI1_N    |
| R8  | MDI3_P    |
| R9  | MDI3_N    |
| R13 | POE power |
| R14 | POE power |

| LED   | Status        | Color    |
|-------|---------------|----------|
| Right | Link / Active | Blinking |
| Left  | Speed 10/100  | Off      |
| Left  | Speed 1000    | Green    |
| Left  | Speed 2500    | Orange   |

#### 4.7 cPCI-A3ETH Board to Board Connector (CN6)

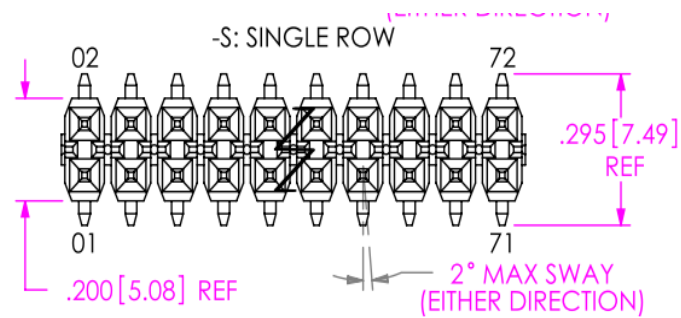
**Table 8: Board to board connector**



| Pin | Signal       | Function                                                                                                                             |
|-----|--------------|--------------------------------------------------------------------------------------------------------------------------------------|
| 1   | P12V_PSU     | Provide additional power from another peripheral card (Power Board-DB-A3PW) to enable full PoE wattage.                              |
| 2   | P12V_PSU     |                                                                                                                                      |
| 3   | P12V_PSU     |                                                                                                                                      |
| 4   | P12V_PSU     |                                                                                                                                      |
| 5   | P12V_PSU     |                                                                                                                                      |
| 6   | P12V_PSU     |                                                                                                                                      |
| 7   | GND          | Ground                                                                                                                               |
| 8   | GND          | Ground                                                                                                                               |
| 9   | GND          | Ground                                                                                                                               |
| 10  | GND          | Ground                                                                                                                               |
| 11  | POE_PWRMGT_R | Control PoE power wattage. When connecting another peripheral card (Power Board), this pin should be low to enable full PoE wattage. |
| 12  | GND          | Ground                                                                                                                               |

#### 4.8 DB-A3PW Board to Board Connector (CN6) – SKU 1

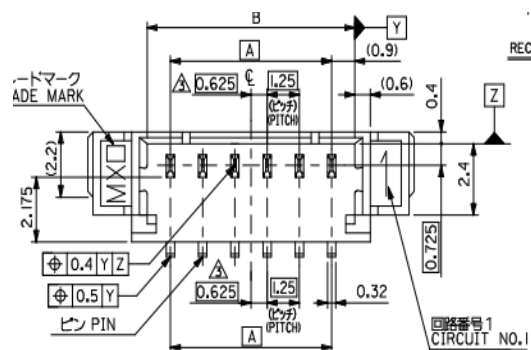
**Table 9: DB-A3PW board to board connector**



| Pin | Signal   | Function                                    |
|-----|----------|---------------------------------------------|
| 1   | P12V_PSU | 12V power from P1 via CN6 to 1F front board |
| 2   | P12V_PSU |                                             |
| 3   | P12V_PSU |                                             |
| 4   | P12V_PSU |                                             |
| 5   | P12V_PSU |                                             |
| 6   | P12V_PSU |                                             |
| 7   | GND      | Ground                                      |
| 8   | GND      | Ground                                      |
| 9   | GND      | Ground                                      |
| 10  | GND      | Ground                                      |
| 11  | GND      | Ground                                      |
| 12  | GND      | Ground                                      |

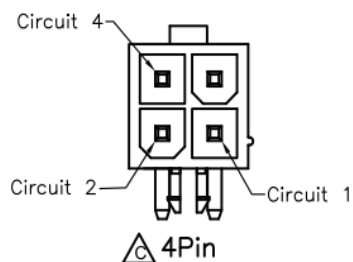
#### 4.9 DB-A3PW FAN Connector (FAN) – SKU 1

**Table 10: DB-A3PW FAN connector**



## 4.10 DB-A3PW ATX 4 Pin Power Connector (CN\_PWR) – SKU 2

Table 11: DB-A3PW ATX 4 pin power connector



| Pin | Signal Name | Function         |
|-----|-------------|------------------|
| 1   | GND         | Ground           |
| 2   | GND         | Ground           |
| 3   | P_+12V      | 12V Power Source |
| 4   | P_+12V      | 12V Power Source |

## 4.11 Switch Connector

The cPCI-A3ETH has three DIP switches (SW1-3) to set the switch connectors.

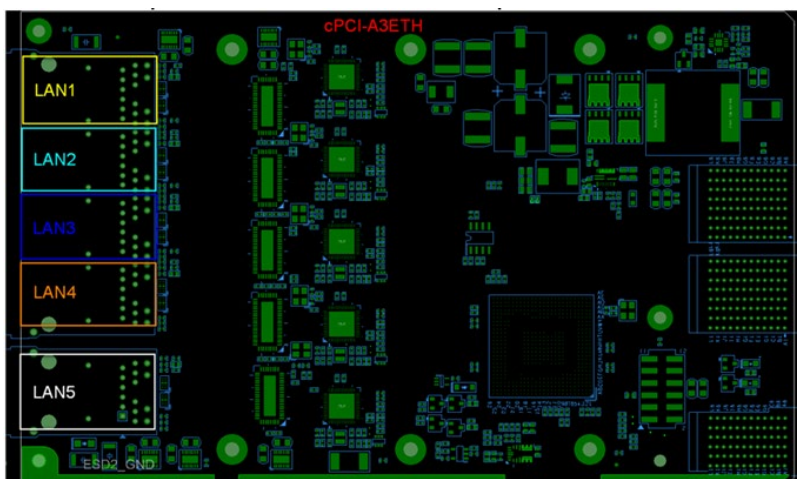
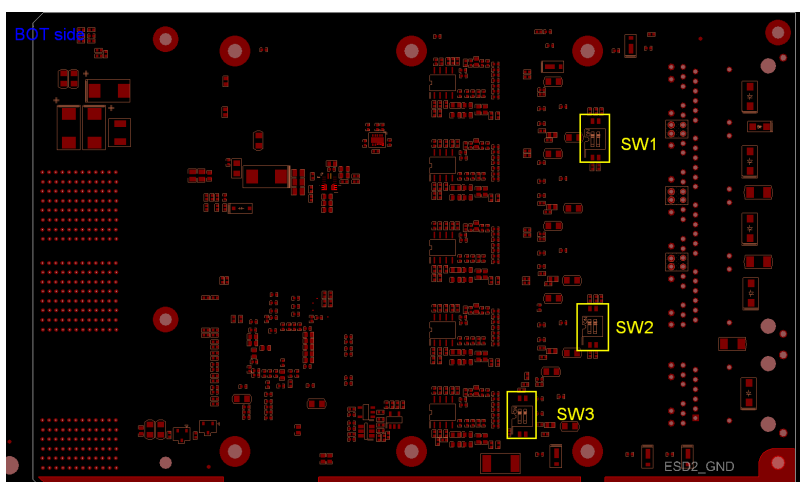


Figure 8: Switch and output LAN location (Top)



**Figure 9: Switch locations (Bottom)****Table 12: Switch connector 1, 2, and 3**

SW1 Mode Switch Settings

| SW1                         | LAN Port     | Pin 1 | Pin 2 |
|-----------------------------|--------------|-------|-------|
| cPCI-A3ETH                  | LAN 1 output | Off   |       |
| Display Port 4 Output (CN3) | LAN 2 output |       | Off   |

SW2 Mode Switch Settings

| SW2                         | LAN Port     | Pin 1 | Pin 2 |
|-----------------------------|--------------|-------|-------|
| cPCI-A3ETH                  | LAN 3 output | Off   |       |
| Display Port 2 Output (CN2) | LAN 4 output |       | Off   |

SW3 Mode Switch Settings

| SW3        | LAN Port     | Pin 1 | Pin 2 |
|------------|--------------|-------|-------|
| cPCI-A3ETH | LAN 5 output | Off   |       |

## Safety Instructions

Read and follow all instructions marked on the product and in the documentation before you operate your system. Retain all safety and operating instructions for future use.

- Please read these safety instructions carefully.
- Please keep this User's Manual for later reference.
- Read the specifications section of this manual for detailed information on the operating environment of this equipment.
- When installing/mounting or uninstalling/removing equipment, turn off the power and unplug any power cords/cables.
- To avoid electrical shock and/or damage to equipment:
  - Keep equipment away from water or liquid sources.
  - Keep equipment away from high heat or high humidity.
  - Keep equipment properly ventilated (do not block or cover ventilation openings).
  - Make sure to use recommended voltage and power source settings.
  - Always install and operate equipment near an easily accessible electrical socket-outlet.
  - Secure the power cord (do not place any object on/over the power cord).
  - Only install/attach and operate equipment on stable surfaces and/or recommended mountings.
  - If the equipment will not be used for long periods of time, turn off and unplug the equipment from its power source.
- Never attempt to fix the equipment. Equipment should only be serviced by qualified personnel.

## Getting Services

**Ask an Expert:** <https://www.adlinktech.com/en/Askanexpert>

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