

cPCI-A3USB/A3CAN/A3COM

User's Manual

3U CompactPCI® Serial 4-Port USB 3.2/2-Port Ethernet Card



Manual Rev.:	0.1 Preliminary
Revision Date:	November 20, 2024
Part Number:	50M-32015-1000

Revision History

Revision	Description	Date	By
0.1	Preliminary release	2024-11-20	AL

Preface

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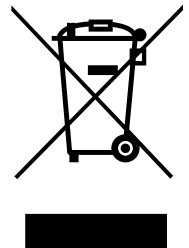
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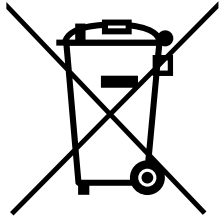
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Battery Labels (for products with battery)



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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.



CAUTION:

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



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 cPCI-A3USB, cPCI-A3CAN, and cPCI-A3COM are all 3U, 4HP CompactPCI Serial peripheral blades designed for use in standard CPCI-S.0 systems. While each card serves a different purpose, they share a common baseboard design, with variations in the specific features tailored to their intended applications.

- **cPCI-A3USB:** The cPCI-A3USB delivers high-speed USB connectivity, featuring 4x USB Type-A connectors via PCIe, 2x Ethernet RJ45 ports, and a mini PCIe slot. Optimized for USB 3.2 Gen1 and CAN FD bus support, this card is perfect for systems requiring both USB and Ethernet connections, with front and rear transition support for USB and CAN ports, and front transition for Ethernet.
- **cPCI-A3CAN:** For applications that demand CAN FD communication, the cPCI-A3CAN is the ideal solution. This 2-port CAN module includes a mini PCIe slot and provides front and rear transitions for CAN FD signal connectors. With 4x CAN FD signal connections via P3 at the rear, the cPCI-A3CAN is tailored for industrial automation and other systems that require reliable, high-performance CAN connectivity.
- **cPCI-A3COM:** The cPCI-A3COM is designed for serial communication, featuring two COM ports and a mini PCIe slot. With support for RS-232/422/485 serial protocols, this card is well-suited for industrial PCs and automation systems where multiport serial communication is critical. The COM ports support front transition, ensuring easy integration into complex systems.

1.1 Features

- Follow PICMG® CompactPCI® Serial design guide
- CompactPCI® Serial, 3U 4HP
- cPCI-A3USB: 4x USB3.2 Gen 1 ports, 1x USB2.0 port on board, 2x RJ45 2.5G LAN ports in front panel
- cPCI-A3CAN: 2x D-Sub CAN ports in front panel
- cPCI-A3COM: 2x DB9 COM ports in front panel
- Operating temperature: -40°C to +85°C
- Designed to meet EN50155 standards

1.2 Package Contents

The cPCI-A3USB/A3CAN/A3COM 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-A3USB packaging may vary for non-standard configurations, depending on customer specifications.

CompactPCI Module

The cPCI-A3USB/A3CAN/A3COM module



NOTE:

The contents of non-standard cPCI-A3USB/A3CAN/A3COM 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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2 Specifications

2.1 Product Specification

2.1.1 A3USB Specification

PCIe Bus Architecture	- Follow PICMG® CompactPCI® Serial design guide 1x PCIe Gen 3.0 x 4 from P1
Mini PCIe	1x PCIe Gen 3.0/ USB 2.0 Note: BOM option with USB2.0
USB	4x USB3.2 Gen1 (From PCIe to USB) 1x USB2.0
Ethernet	2x RJ45, RJ45 ethernet port supported 2.5G via Intel i226IT
Form Factor	3U 4HP CPCI-S.0 standard, P1, P3 & P4 to rear side. BOM option for P3 and P4
Power	- Power Input: 12V +/- 10% Max - Power Consumption: TBC
OS Support	- Windows 10 - Ubuntu 22.X
Environment & Certification	Environment: - Operating temperature: -40°C to 85°C with min. 15CFM airflow - Storage temperature: -40°C to 95°C - Humidity: 5% to 95% relative humidity (non-condensing) - Environmental: RoHS 2.0 & REACH EMC: - EN61000-6-4 / 6-2 - UKCA/CE - FCC Part 15B CLASS A
Mechanical	- Dimensions: 3U 1-slot 4HP 100 x 160 x 30.32 (mm) (L x W x H) - Net Weight: 0.26Kg
MTBF	15.1 Years at minimum

2.1.2 A3CAN/A3COM Specification

Interface	2x DB9 CAN ports, via miniPCIe dual/quad-channel module (A3CAN) 2x DB9 COM ports, support RS232/422/485 (A3COM) 1x PCIe Gen 3.0
Mini PCIe Module	- MiniPCIe dual/quad-channel (A3CAN) 2-port RS-232/422/485 miniPCI Express board (A3COM)
Form Factor	3U 4HP CPCI-S.0 standard, with P1, P3, and P4 to rear
Power	- Power input: 12V +/- 10% Max - Power consumption: TBC
Environment & Certification	Environment: - Operating Temperature -40°C to 85° when provided with airflow - Humidity operating 15% to 90% relative humidity (non-condensing) - Environmental RoHS 2.0 & REACH

	EMC • EN55032 Class A / EN55035 • IEC61000-6-2/3/4/5/6/8 - FCC Part 15B CLASS A
Mechanical	• Dimensions: 100 x 160 x 20.32 mm (L x W x H) • Net weight: 0.26KG
MTBF	• TBC

2.2 Block Diagram

2.2.1 A3USB Block Diagram

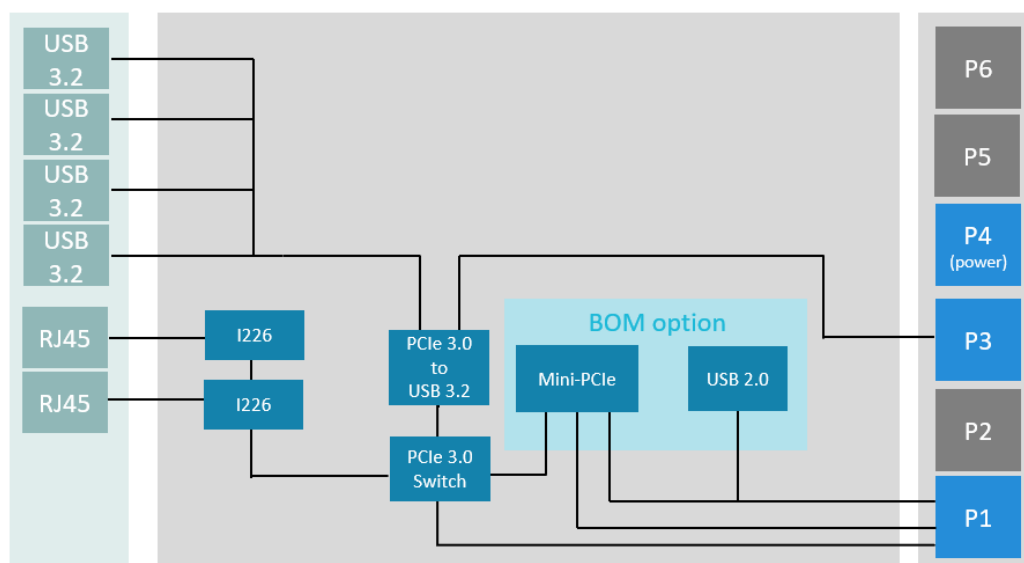


Figure 1: A3USB functional block diagram

2.2.2 A3CAN/A3COM Block Diagram

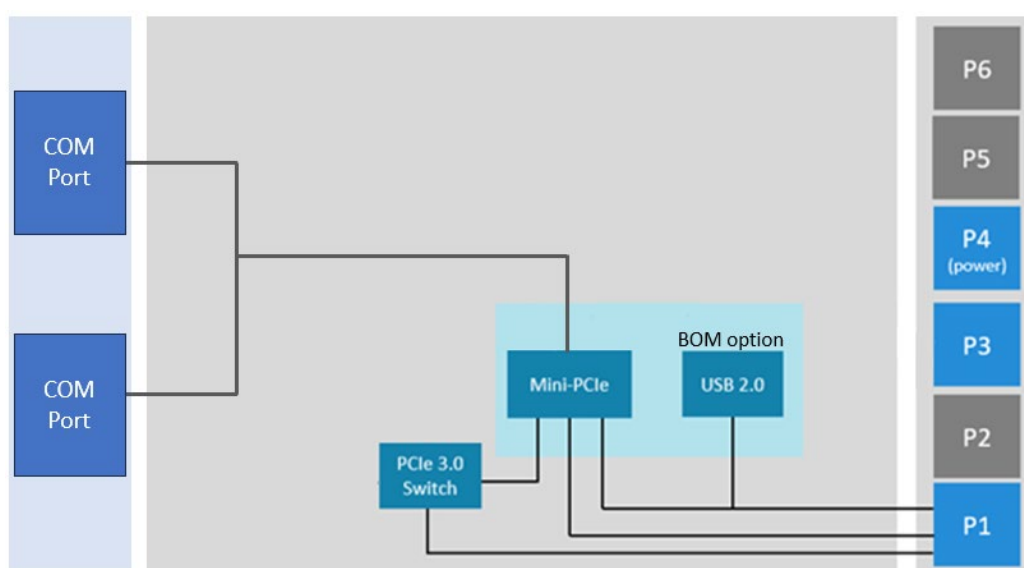
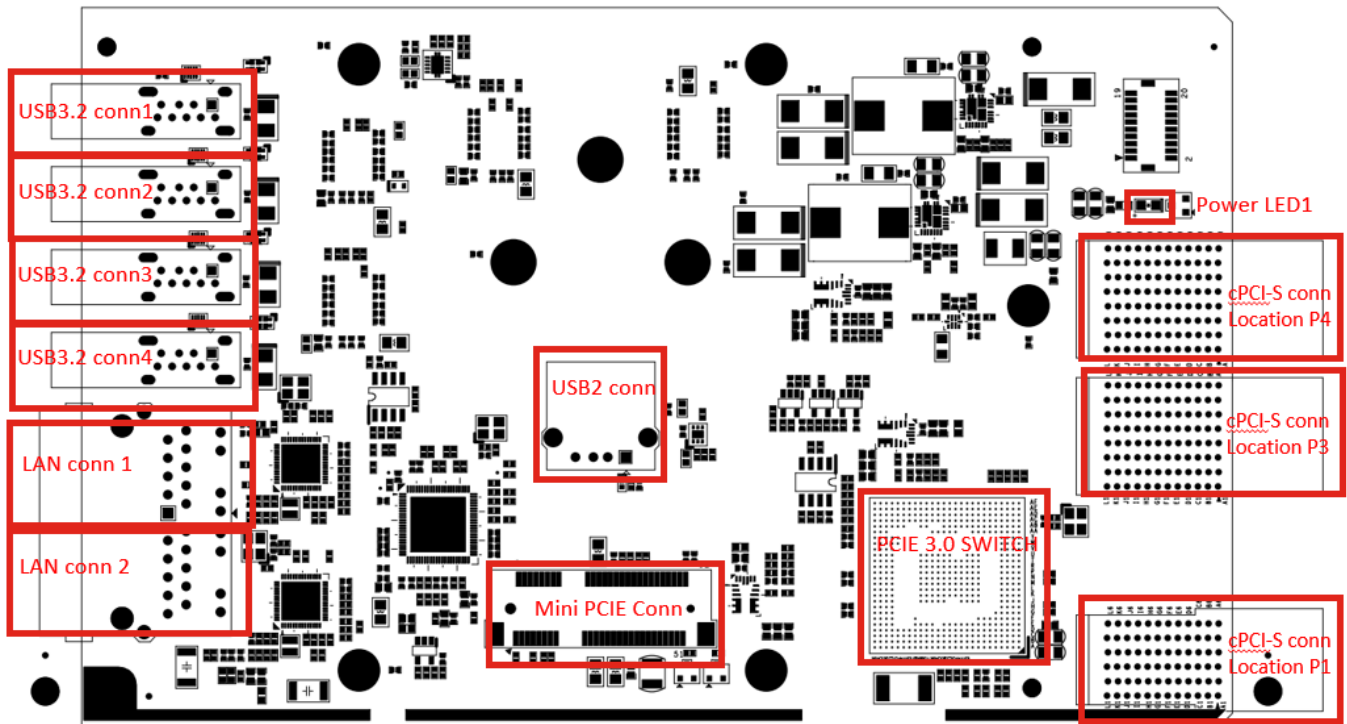


Figure 2: A3CAN/A3COM functional block diagram

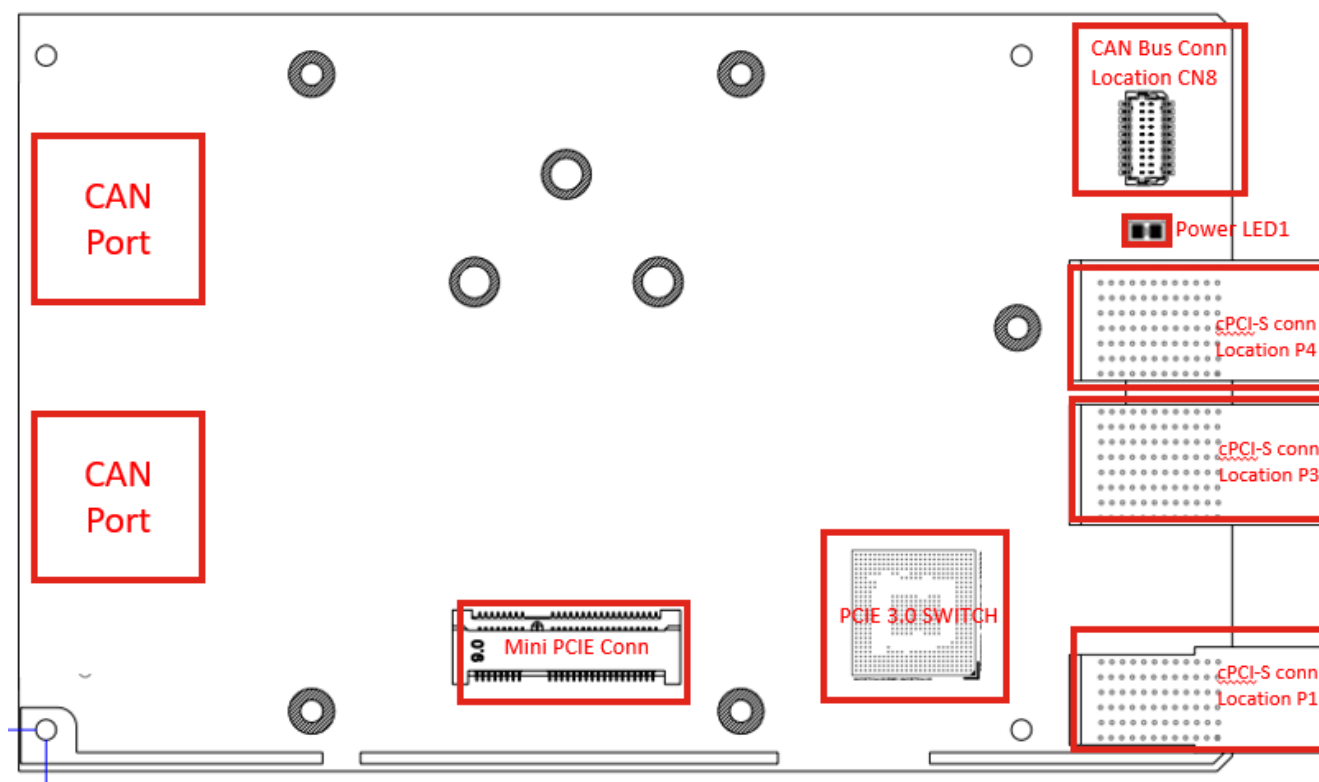
3 Mechanical Layout

3.1 Connector and Switch Locations



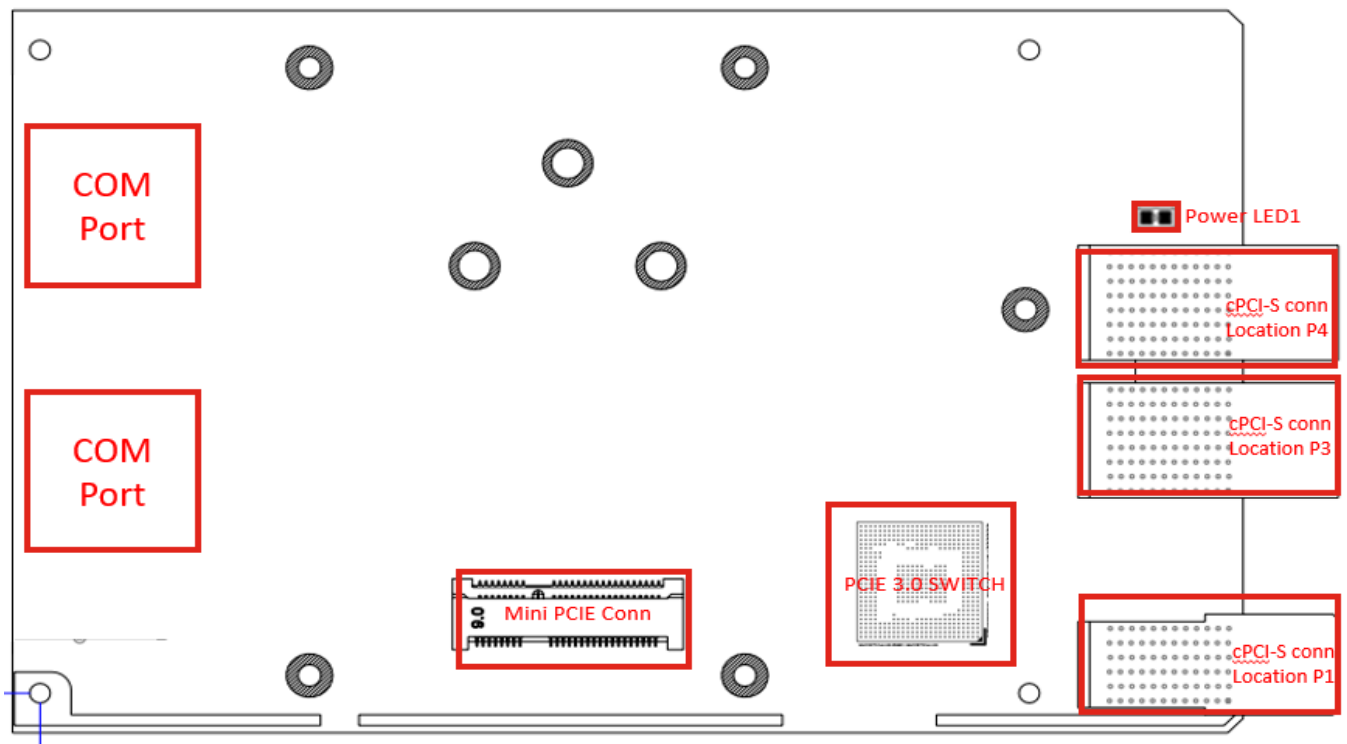
P1, P3, P4	CompactPCI Serial connector
LED	LED 1 (Green) for power OK
Switch chip	PCIe 3.0 switch
USB2.0 connector	USB2.0 Type A connector (BOM option with Mini PCIe connector)
Mini PCIe connector	1x PCIe Gen 3.0 connector (BOM option with USB2.0 Type A connector)
2x LAN connector	RJ45 Up 2.5GB LAN connector
4x USB3.2 connector	USB3.2 Gen1 connector

Figure 3: A3USB connector and switch locations (Top)



P1, P3, P4	CompactPCI Serial connector
LED	LED 1 (Green) for power OK
CAN bus connector	4x CAN Bus connector to rear
Switch chip	PCIe 3.0 Switch
Mini PCIe connector	1x PCIe Gen 3.0 connector
CAN port	CAN DB9 connector
P1, P3, P4	CompactPCI Serial connector

Figure 4: A3CAN connector and switch locations (Top)



P, P3, P4	CompactPCI Serial connector
LED	LED 1 (Green) for power OK
Switch chip	PCIe 3.0 switch
Mini PCIe connector	1x PCIe Gen 3.0 connector
COM port	COM DB9 connector

Figure 5: A3COM connector and switch locations (Top)

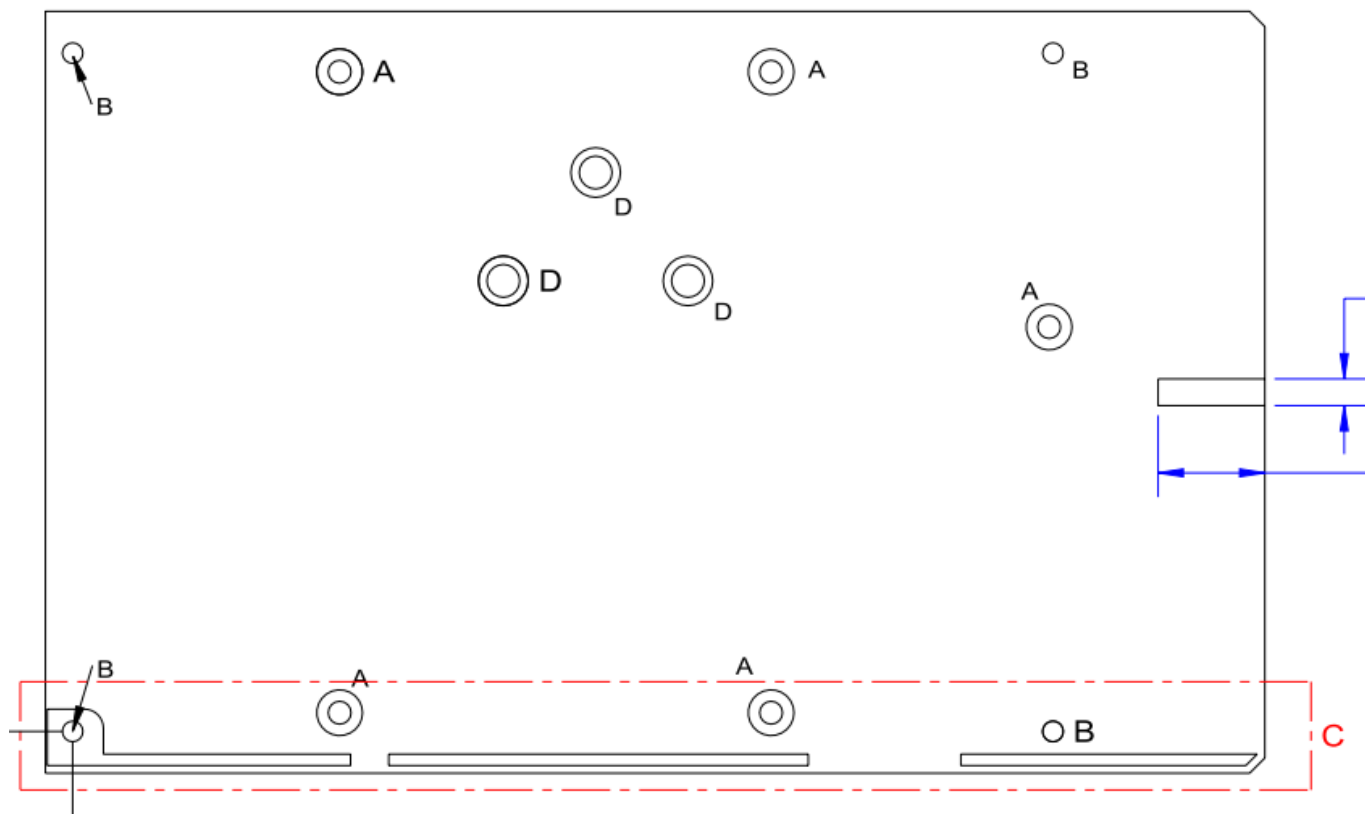


Figure 6: cPCI-A3USB/A3CAN/A3COM connector and switch locations (Bottom)

3.2 Mini PCIe – CAN Module

3.2.1 Single and Dual-Channels

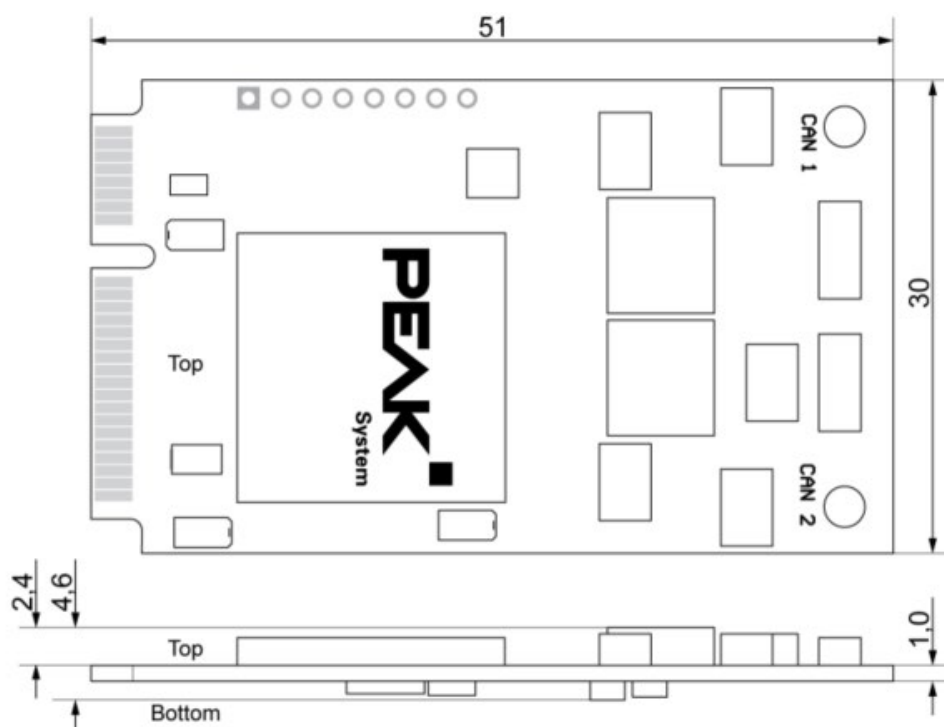


Figure 7: CAN module single and dual-channel layout

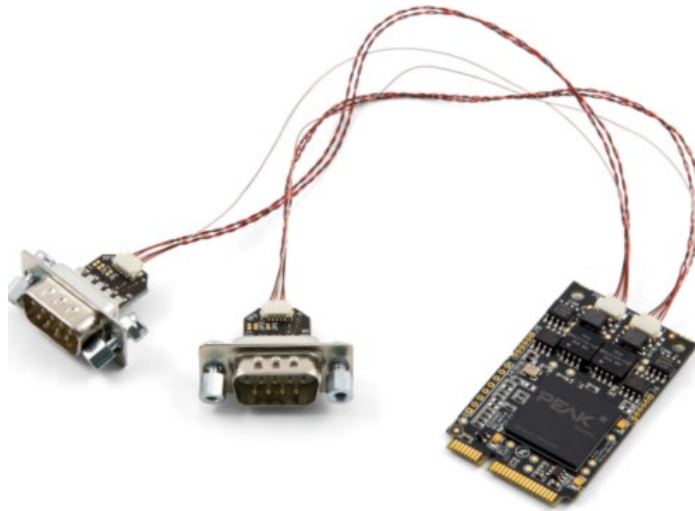


Figure 8: CAN module single and dual-channel connection cables

3.2.2 Quad-Channels

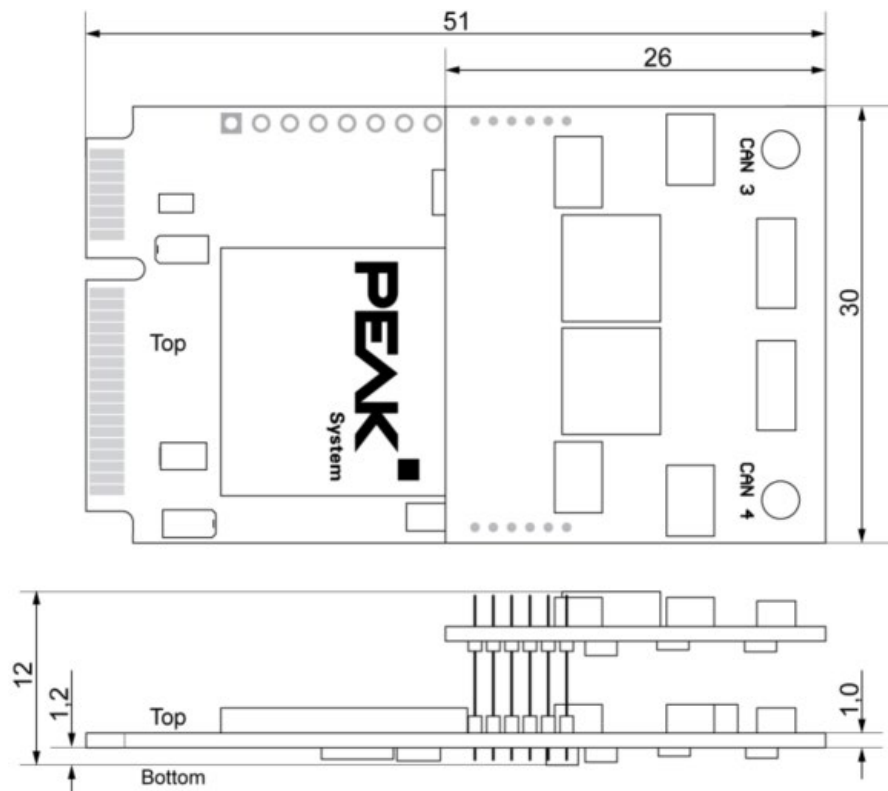


Figure 9: CAN module quad-channel layout

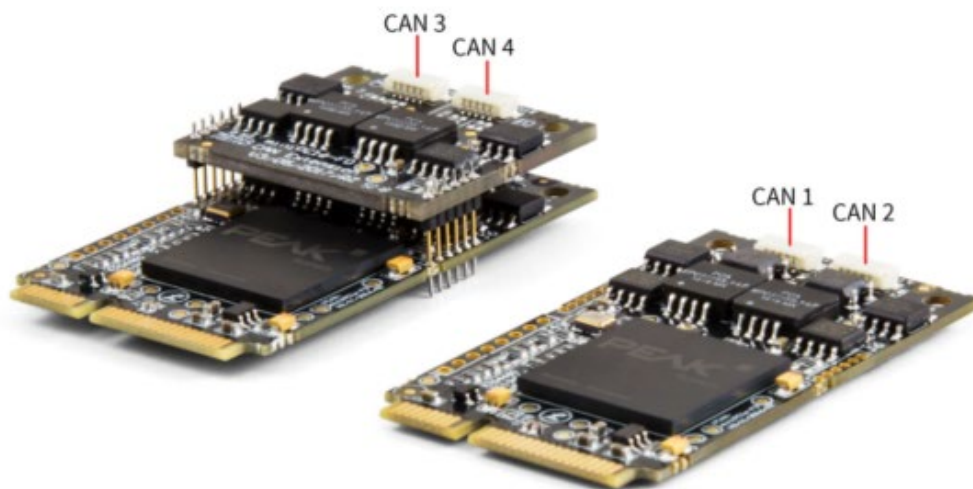


Figure 10: CAN module quad-channel connection cables

3.3 MiniPCle – COM Module

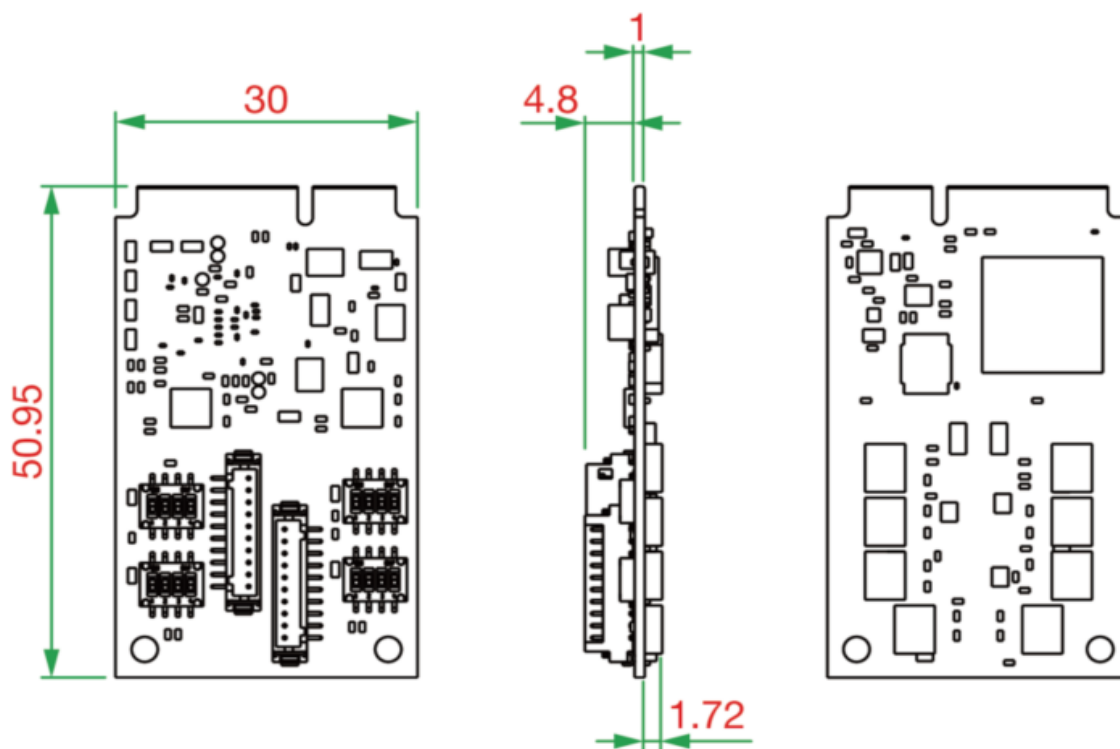


Figure 11: COM module layout



Figure 12: COM module cables

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4 Connector Pinouts

4.1 CompactPCI Connectors

4.1.1 P1 Connector

Table 1: 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	Test point	NC	NC	Test point
4	GND	P1_USB_P	P1_USB_N	GND	P1_PCIE_CLKP	P1_PCIE_CLKN
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	PRST#_CN	P1_WAKE_OUT#	GND	P1_PCIE_EN#	SYSEN#
3	NC	NC	Test point	NC	NC	Test point
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

4.1.2 P3 Connector

Table 2: CompactPCI P3 connector

Pin	A	B	C	D	E	F
1	RTM_TUSB_SST X-C-DP1	RTM_TUSB_SST X-C-DN1	GND	RTM_TUSB_DN1	RTM_TUSB_DP1	GND
2	GND	RTM_TUSB_SST X-C-DP2	RTM_TUSB_SST X-C-DN2	GND	RTM_TUSB_DN2	RTM_TUSB_DP2
3	NC	NC	GND	NC	NC	GND
4	GND	RTM_TUSB_SST X-C-DP3	RTM_TUSB_SST X-C-DN3	GND	RTM_TUSB_DN3	RTM_TUSB_DP3
5	NC	NC	GND	NC	NC	GND
6	GND	RTM_TUSB_SST X-C-DP4	RTM_TUSB_SST X-C-DN4	GND	RTM_TUSB_DN4	RTM_TUSB_DP4
7	NC	NC	GND	NC	NC	GND
8	GND	CAN1_HIGH	CAN1_LOW	GND	CAN2_HIGH	CAN2_LOW

Pin	G	H	I	J	K	L
1	RTM_TUSB_SSR X-DP1	RTM_TUSB_SSR X-DN1	GND	USB3_1_RTM_O C2	RTM_USBEN1	GND
2	GND	RTM_TUSB_SSR X-DP2	RTM_TUSB_SSR X-DN2	GND	USB3_2_RTM_OC 2	RTM_USBEN2
3	NC	NC	GND	NC	NC	GND
4	GND	RTM_TUSB_SSR X-DP3	RTM_TUSB_SSR X-DN3	GND	USB3_3_RTM_OC 2	RTM_USBEN3
5	NC	NC	GND	NC	NC	GND
6	GND	RTM_TUSB_SSR X-DP4	RTM_TUSB_SSR X-DN4	GND	USB3_4_RTM_OC 2	RTM_USBEN4
7	NC	NC	GND	NC	NC	GND
8	GND	CAN3_HIGH	CAN3_LOW	GND	CAN4_HIGH	CAN4_LOW

4.1.3 P4 Connector

Table 3: CompactPCI P4 connector

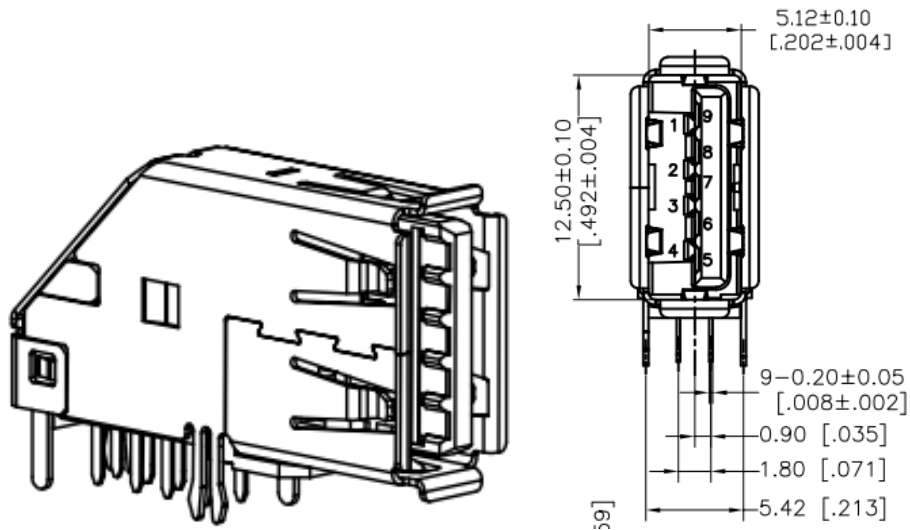
Pin	A	B	C	D	E	F
1	NC	NC	GND	NC	NC	GND
2	GND	NC	NC	GND	NC	NC
3	NC	NC	GND	NC	NC	GND
4	GND	P12V_PSU	P12V_PSU	GND	P12V_PSU	P12V_PSU
5	P12V_PSU	P12V_PSU	GND	P12V_PSU	P12V_PSU	GND
6	GND	NC	NC	GND	NC	NC
7	P_+3V3_A	P_+3V3_A	GND	P_+3V3_A	P_+3V3_A	GND
8	GND	P_+5V_A	P_+5V_A	GND	P_+5V_A	P_+5V_A

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	P12V_PSU	P12V_PSU	GND	P12V_PSU	P12V_PSU
5	P12V_PSU	P12V_PSU	GND	P12V_PSU	P12V_PSU	GND
6	GND	NC	NC	GND	NC	NC
7	NC	NC	GND	NC	USB_FP_PWR_O FF#	GND
8	GND	P_+5V_A	P_+5V_A	GND	P_+5V_A	P_+5V_A

4.2 cPCI – A3USB USB Connectors

4.2.1 USB3.2 Type A Connector (CN1-CN4)

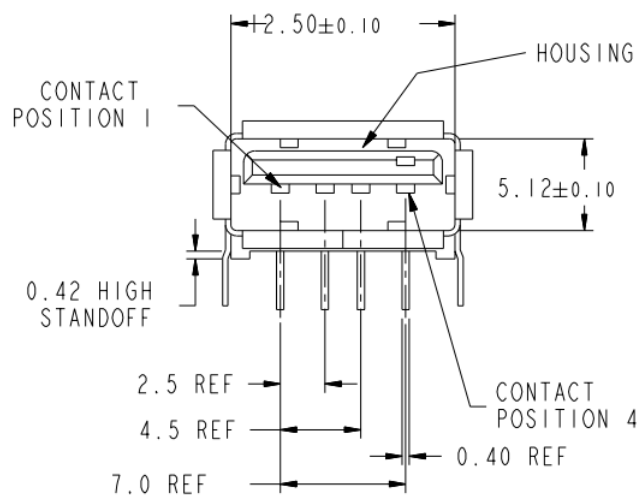
Table 4: A3USB USB3.2 type A connector pin definition



Pin	Signal
1	VBUS
2	D-
3	D+
4	GND
5	SSRX-
6	SSRX+
7	GND
8	SSTX-
9	SSTX+

4.2.2 USB2.0 type A connector (CN7)

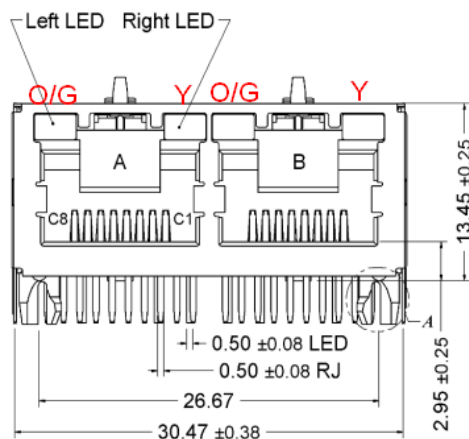
Table 5: A3USB USB2.0 type A connector pin definition



Pin	Signal
1	VBUS
2	D-
3	D+
4	GND

4.3 cPCI – A3USB RJ45 LAN Connector (RJ1)

Table 6: A3USB RJ45 LAN connector pin definition



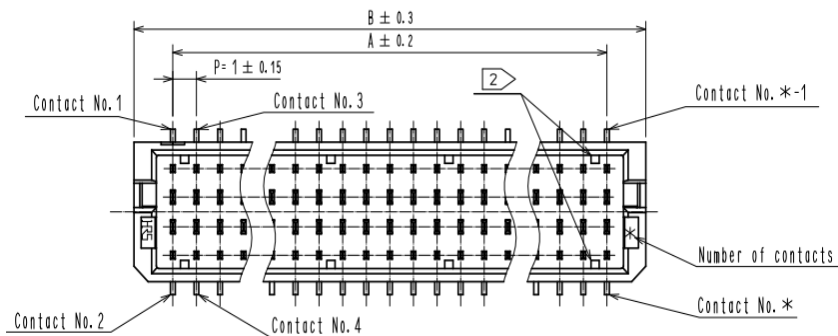
Pin	Signal
R5	VCC
R1	MDIO_P
R2	MDIO_N
R3	MDI1_P
R4	MDI1_N
R7	MDI2_P
R8	MDI2_N

R9	MDI3_P
R10	MDI3_N
R6	GND

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

4.4 cPCI – A3USB/A3CAN CAN Bus PCIe I/O to Rear Connector (CN8)

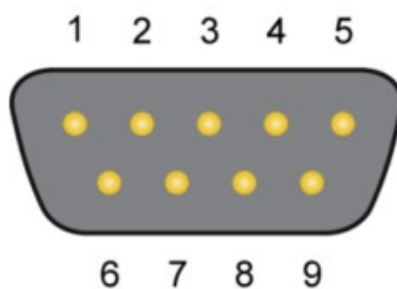
Table 7: A3USB/A3CAN CAN bus to rear connector pin definition



Pin	Signal	Pin	Signal
1	CAN3_HIGH	2	CAN1_HIGH
3	CAN3_LOW	4	CAN1_LOW
5	GND	6	GND
7	CAN4_HIGH	8	CAN2_HIGH
9	CAN4_LOW	10	CAN2_LOW
11	GND	12	GND
13	NC	14	NC
15	NC	16	NC
17	GND	18	GND
19	NC	20	NC

4.5 cPCI – A3CAN CAN Bus Connectors

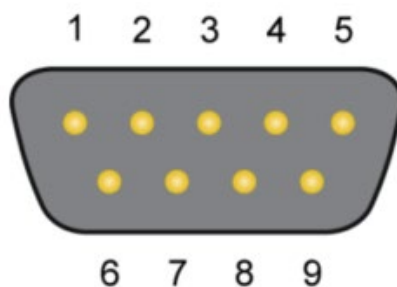
Table 8: cPCI-A3CAN CAN bus connector pin definition



Pin	Signal
1	NC
2	CAN_Low
3	GND
4	NC
5	NC
6	GND
7	CAN_High
8	NC
9	NC

4.6 cPCI – A3COM COM Bus Connectors

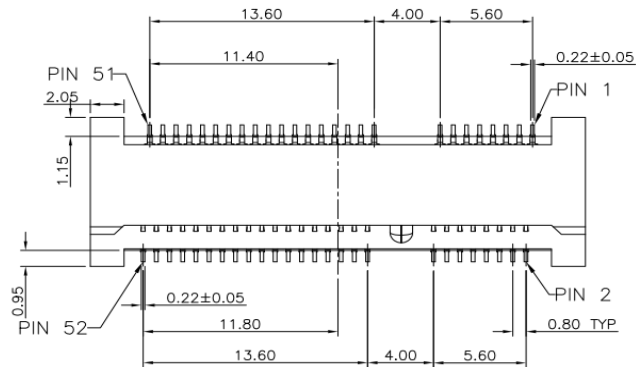
Table 9: COM bus connector pin definition



Pin	RS-232	RS-422	RS-485
1	DCD	TxD-	-
2	RxD	TxD+	-
3	TxD	RxD+	Data+
4	DTR	RxD-	Data-
5	GND	GND	GND
6	DSR	-	-
7	RTS	-	-
8	CTS	-	-

4.7 Mini PCIe Connector (CN6)

Table 10: Mini PCIe connector pin definition



Pin	Signal	Pin	Signal
1	MPCIE_WAKE#	2	MPCIE_3V3
3	NC	4	GND
5	NC	6	MPCIE_1V5
7	MPCIE_CLKREQ#	8	NC
9	GND	10	NC
11	MPCIE_REFCLK_N	12	NC
13	MPCIE_REFCLK_P	14	NC
15	GND	16	NC
17	NC	18	GND
19	NC	20	W_DISABLE1#
21	GND	22	SW2_DPE_RST_MINI_N
23	MPCIE_RX_C_N1	24	MPCIE_3V3
25	MPCIE_RX_C_P1	26	GND
27	GND	28	MPCIE_1V5
29	GND	30	MPCIE_SMB_CLK
31	MPCIE_TX_C_N1	32	MPCIE_SMB_DAT
33	MPCIE_TX_C_P1	34	GND
35	GND	36	MPCIE_USB_R_N
37	GND	38	MPCIE_USB_R_P
39	MPCIE_3V3	40	GND
41	MPCIE_3V3	42	NC
43	GND	44	NC
45	NC	46	NC
47	NC	48	MPCIE_1V5
49	NC	50	GND
51	W_DISABLE2#	52	MPCIE_3V3
53	GND	54	GND

4.8 A3USB Switch Connector

The cPCI-A3USB has a DIP switch (SW1) to configure the Wi-Fi/BT output on the mini PCIe module.

Table 11: A3USB switch connector

SW1 Mode Switch Settings

SW1	Pin 1	Pin 2	Function
cPCI-A3USB	On		Pin 1 is on that will disable Wi-Fi radio
		On	Pin 2 is on that will disable BT radio

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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