

# **ARC-4050T3-DB Hardware Manual**

## **ARC-4050T3-DB**

(Thunderbolt™ 3 to PCIe Expansion Solution)

# **Hardware Manual**

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## **FCC Statement**

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against interference in a residential installation. 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. However, there is no guarantee that interference will not occur in a particular installation.

## **Manufacturer's Declaration for CE Certification**

We confirm ARC-4050T3-DB has been tested and found comply with the requirements set up in the council directive on the approximation of the law of member state relating to the EMC Directive 2004/108/EC. For the evaluation regarding to the electromagnetic compatibility, the following standards were applied:

EN 55022: 2006, Class B  
EN 61000-3-2: 2006  
EN 61000-3-3: 1995+A1: 2001+A2: 2005

EN 55024:1998+A1:2001=A2:2003  
IEC61000-4-2: 2001  
IEC61000-4-3: 2006  
IEC61000-4-4: 2004  
IEC61000-4-5: 2005  
IEC61000-4-6: 2006  
IEC61000-4-8: 2001  
IEC61000-4-11: 2004

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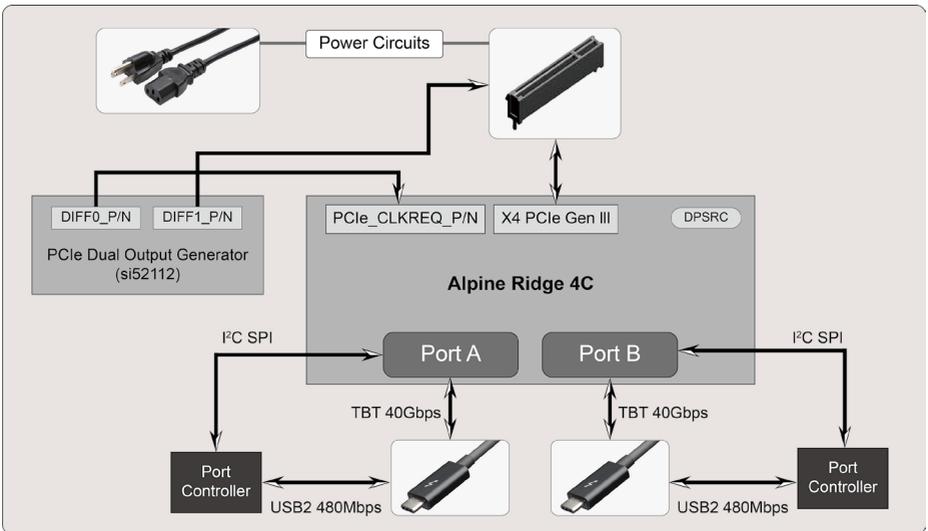
# Overview

## 1. Overview

Since the ARC-4050T3-DB is offered as a PCIe 3.0 x8 connector and two thunderbolt 3 port, it can be used with the box as the Thunderbolt 3 adapter.

## 2. Block Diagram

This section provides the board layout and connector for the ARC-4050T3-DB board.



## 3. Board Layout

The section provides the board layout and connector for the ARC-4050T3-DB

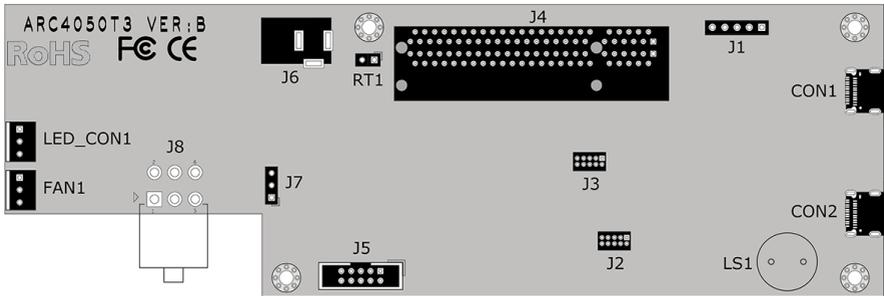


Figure 1-1, ARC-4050T3-DB Front Side

Connector	Description
1. (J1)	manufacture purpose for Alpine_Ridge_Device JTAG
2. (J2)	manufacture purpose for SWD_A monitor
3. (J3)	manufacture purpose for SWD_B monitor
4. (J4)	PCIe 3.0 x 8 Lane Connector
5. (J5)	manufacture purpose for EPLD program and Buzzer alarm CTRL
6. (J6)	19V DC power adapter input
7. (J7)	manufacture purpose for PWM firmware download
8. (J8)	Alternative Power Input
9. (CON1)	USB-C connector
10. (CON2)	USB-C connector
11. (LED_CON1)	Monitor Status Connector
12. (FAN)	FAN Connector
13. (RT1)	Temperature Sensor
14. (LS1)	Buzzer Alarm

# Pin Definition

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## 4. Connectors Pin Definition

### 4.1 J1 - Manufacture Reserved

This connector is manufacture purpose for Alpine\_Ridge\_Device JTAG.

<b>J1 Pin Definition</b>	
Pin	Signal
1	TDI
2	TMS
3	TCK
4	TD0
5	GND

### 4.2 J2 - Manufacture Reserved

This connector is manufacture purpose for SWD\_A monitor.

<b>J2 Pin Definition</b>	
Pin	Signal
1	3.3V
2	DATA
3	GND
4	CLK
5	GND
6	GPIO0
7	NC
8	GPIO1
9	GND
10	NC

## 4.3 J3 - Manufacture Reserved

This connector is manufacture purpose for SWD\_B monitor.

<b>J3 Pin Definition</b>	
Pin	Signal
1	3.3V
2	DATA
3	GND
4	CLK
5	GND
6	GPIO0
7	NC
8	GPIO1
9	GND
10	NC

# Pin Definition

## 4.4 J4 - PCIe3.0x4 Connector

The ARC-4050T3-DB board is equipped with a PCIe 3.0 x8 90 degree connector for add one internal HBA.

(Top View)		PCIe3.0 x8 Connector Pin Definition							
		B				A			
B1	A1	2	12V	1	12V	1	PRST_IN	2	12V
B2	A2	4	GND	3	RSVD	3	12V	4	GND
B3	A3	6	NC	5	NC	5	NC	6	NC
B4	A4	8	3.3V	7	GND	7	NC	8	NC
B5	A5	10	3.3VAUX	9	NC	9	3.3V	10	3.3V
B6	A6	12	NC	11	WAKE*	11	PCIe_RST_ON	12	GND
B7	A7	14	TX0_P	13	GND	13	PCIe_SLOT100M_P	14	PCIe_SLOT100M_
B8	A8	16	GND	15	TX0_N	15	GND	16	RX0_P
B9	A9	18	GND	17	PRST_IN_1	17	RX0_N	18	GND
B10	A10	20	TX1_N	19	TX1_P	19	NC	20	GND
B11	A11	22	GND	21	GND	21	RX1_P	22	RX1_N
B12	A12	24	TX2_N	23	TX2_P	23	GND	24	GND
B13	A13	26	GND	25	GND	25	RX2_P	26	RX2_N
B14	A14	28	TX3_N	27	TX3_P	27	GND	28	GND
B15	A15	30	GND	29	GND	29	RX3_P	30	RX3_N
B16	A16	32	GND	31	PRST_IN_2	31	GND	32	NC
B17	A17	34	GND	33	GND	33	NC	34	GND
B18	A18	36	GND	35	GND	35	NC	36	NC
B19	A19	38	NC	37	NC	37	GND	38	GND
B20	A20	40	GND	39	GND	39	NC	40	NC
B21	A21	42	NC	41	NC	41	GND	42	GND
B22	A22	44	GND	43	GND	43	NC	44	NC
B23	A23	46	NC	45	NC	45	GND	46	GND
B24	A24	48	PRST_IN_3	47	GND	47	NC	48	NC
B25	A25			49	GND	49	GND		

## 4.5 J5 - Manufacture Reserved

This connector is manufacture purpose for EPLD program.

Change the setting of jumper J5 pin-7 and pin-8 to enable or disable the buzzer. The default setting is "Enabled".

<b>J5 Pin Definition</b>	
Pin	Signal
1	TDI
2	TCK
3	TMS
4	TDO
5	NC
6	NC
7	MOD1
8	3.3V
9	MOD2
10	GND

<b>Buzzer Enable/Disable Pin-7 &amp; Pin-8 Settings</b>	
Jumper Setting	Definition
Open	Enabled
Short	Disabled

## 4.6 J6 - DC\_JACK

This DC\_JACK connector is for 19V DC power adapter input.

<b>J6 Pin Definition</b>	
Pin	Signal
1	19V
2	GND
3	GND

# Pin Definition

---

## 4.7 J7 - Manufacture Reserved

This connector is manufacture purpose for PWM firmware download.

<b>J7 Pin Definition</b>	
Pin	Signal
1	SCL
2	SDA
3	GND

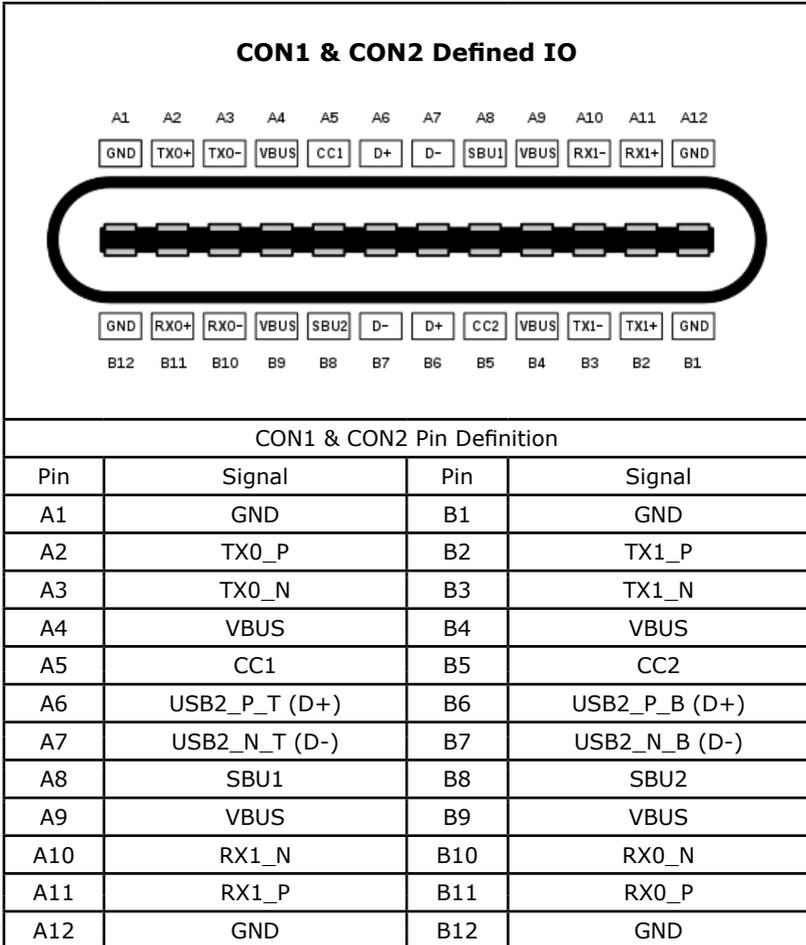
## 4.8 J8 - Alternative Power Input

There is a 6-pin PCI-E connector on the ARC-4050T3-DB labelled J8. You must plug in a PSU's PCI-E cable at all times to supply power for the board if you donot use the DC\_JACK power input.

<b>J8 Pin Definition</b>	
Pin	Signal
1	12V
2	GND
3	12V
4	GND
5	12V
6	GND

## 4.9 CON1 & CON2 - External USB-C connector

The ARC-4050T3-DB provides two thunderbolt 3 port with 40Gbps links by using two USB-C connectors.

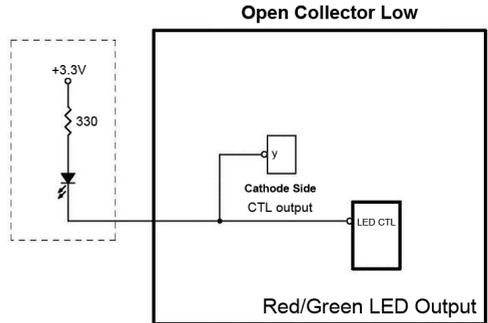


# Pin Definition

## 4.10 LED\_CON1 - Monitor Status Connector

ARC-4050T3-DB has one 3-pin status headers, pin (1, 2, 3)=(RED LED Output, 3.3 V Power, GREEN LED Output), which can show the status to the LED.

LED_CON1 Pin Definition	
Pin	Signal
1	RED
2	3.3V
3	GREEN



The following table describes the LED\_CON1 header function.

LED	Status	
Green	S0 (Working)	The green light indicates the ARC-4050T3-DB is in the S0 state.
	S3 (Sleeping)	When the green LED is slow blinking (1 time/sec), ARC-4050T3-DB is in the S3 state.
RED	The red light indicates that there has warning occurred on the ARC-4050T3-DB.	

A RED LED signal is activated if any of the warning conditions occurs, such as Voltage, Temperature, or Fan.

Item	RED LED Warning Condition
Heatsink Temperature	> 92°
Fan Speed	< 600 RPM
Power +12V	< 10.5V or > 13.5V
Power +5V	< 4.5V or > 5.5V
Power +3.3V	< 3.1V or > 3.48V

## 4.11 FAN - FAN Connector

ARC-4050T3-DB has one 3-pin fan headers, pin (1, 2, 3)=(GND, Power, Sensor), which can detect the fan status. Hardware monitor can check the FAN status and show the warning status on the ARC-4050T3-DB board's Buzzer and LED\_CON1 RED output.

J7 Pin Definition	
Pin	Signal
1	GND
2	POWER
3	SENSOR

## 4.12 RT1 - Temperature Sensor

ARC-4050T3-DB has one 2-pin 10K 1% 2.54mm thermistor thermal resistor for temperature sensor, which can detect the temperature on the heatsink. Hardware monitor can check the temperature of the HBA heatsink and show the warning status on the ARC-4050T3-DB board's Buzzer and LED\_CON1 RED output.

## 4.13 LS1 - Buzzer Alarm

An audible alarm is activated if any of the warning conditions occur, such as Voltage, Temperature, or Fan.

Item	Buzzer Warning Condition
Heatsink Temperature	> 92°
Fan Speed	< 600 RPM
Power +12V	< 10.5V or > 13.5V
Power +5V	< 4.5V or > 5.5V
Power +3.3V	< 3.1V or > 3.48V

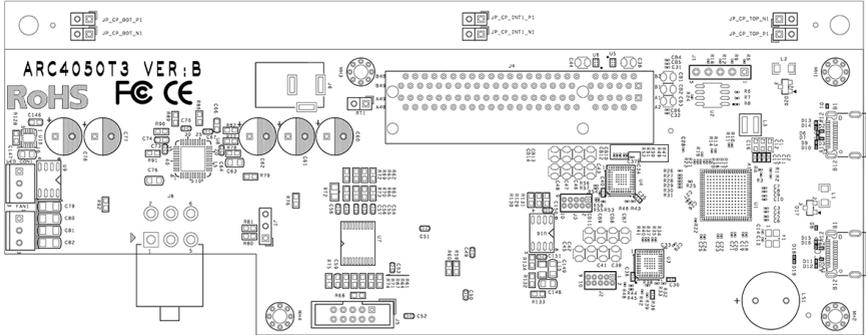
### Note:

J5 pin-7 and pin-8 is used to control the buzzer function. Short J5 pin-7 and pin-8 to "Disabled" ARC-4050T3-DB alarm tone generator.

# Foot Print & Layout

## 5. Footprint

The following picture is the "PCB Top Layout" of ARC-4050T3-DB.



## 6. Mechanical Layout Diagram

The following diagrams describe the location and placement of mounting holes, connectors and components.

