

PICO-IMX6

Freescale i.MX6 Dual Lite/Quad Processor

Onboard 1GB Memory

USB 2.0, I2C, CAN Bus

18-bit Single-Channel LVDS

4GB eMMC (Optional)

(Detailed Testing Instructions can be found in
accompanying Test Guide in disk)

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Packing List

Before you begin installing your card, please make sure that the following materials have been shipped:

- 1 PICO-IMX6 Board
- 1 CD-ROM for manual (in PDF format)
- 2 UART Screws
- 1 UART Cable
- 1 Power Cable
- 1 USB Cable (by SKU)

If any of these items should be missing or damaged, please contact your distributor or sales representative immediately.

China RoHS Requirements
产品中有毒有害物质或元素名称及含量

AAEON Main Board/ Daughter Board/ Backplane

部件名称	有毒有害物质或元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
印刷电路板 及其电子组件	×	○	○	○	○	○
外部信号 连接器及线材	×	○	○	○	○	○
<p>O: 表示该有毒有害物质在该部件所有均质材料中的含量均在 SJ/T 11363-2006 标准规定的限量要求以下。</p> <p>X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 SJ/T 11363-2006 标准规定的限量要求。</p> <p>备注: 此产品所标示之环保使用期限, 系指在一般正常使用状况下。</p>						

China RoHS Requirements
 Poisonous or Hazardous Substances or Elements in Products
 AAEON Main Board/ Daughter Board/ Backplane

Component	Poisonous or Hazardous Substances or Elements					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (Cr(VI))	Polybrominated Biphenyls (PBB)	Polybrominated Diphenyl Ethers (PBDE)
PCB & Other Components	X	O	O	O	O	O _o
Wires & Connectors for External Connections	X	O	O	O	O	O

O: The quantity of poisonous or hazardous substances or elements found in each of the component's parts is below the SJ/T 11363-2006-stipulated requirement.

X: The quantity of poisonous or hazardous substances or elements found in at least one of the component's parts is beyond the SJ/T 11363-2006-stipulated requirement.

Note: The Environment Friendly Use Period as labeled on this product is applicable under normal usage only

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Chapter

1

**General
Information**

1.1 Introduction

This User's Manual contains all the essential information, such as detailed descriptions and explanations on the product's hardware and software features (if any), its specifications, dimensions, jumper/connector settings/definitions, and driver installation instructions (if any), to facilitate users in setting up their product.

Users may refer to the AAEON.com for the latest version of this document.

1.2 Features

- Onboard Freescale i.MX6 DualLite Commercial/ Quad Automotive ARM Cortex A9 processor
- Onboard DDR3 Memory 1 GB, 533 MHz, (1066 MT/s)
- eMMC 4 GB (by SKU)
- Gigabit Ethernet x 1
- 18-bit Single-channel LVDS, up to 1024 x 768
- USB 2.0 x 1 (Optional up to 4)
- USB OTG
- I2C, CAN Bus, 2-pin SATA Power, SATA 3.0 Gb/s (Optional), MiniCard (Optional)
- Supports Linux Kernel 3.0.35, Android 4.4 Kernel 3.10.17

1.3 Specifications

System

- Form Factor Pico-ITX
- Processor Onboard Freescale i.MX6 Dual Lite
Commerical/ Quad Automative ARM Cortex
A9 Processor
- System Memory Onboard DDR3 1 GB
- Chipset Freescale i.MX6
- Supported OS (OS not bundled with product) Android 4.4
Linux Kernel 3.0.35 (Ubuntu 11.10)
- I/O Chipset Freescale i.MX6
- Ethernet Gigabit Ethernet
- Wake On LAN No
- Watchdog Timer Integrated Watchdog and Timer
- H/W Status Monitoring Supports CPU Temperature Monitoring (by
3rd party app or by command via debug port)
- Expansion Interface 8-bit DI/O
- Power Requirement +12 V
- Power Consumption Quad Core: 6-7W@12 V when running HD
video
- Board Size (L x W) 100 x 72mm (3.94 x 2.76")
- Gross Weight 0.4 kg (0.88 lb)
- Operating Temperature 0 ~ 60°C (32 ~ 140 °F)
-40 ~ 85°C (-40 ~ 185°F) (Optional)

- Storage Temperature -40 ~ 80°C (-40°F ~ 176°F)
- Operation Humidity 0% ~ 90% relative humidity, non-condensing

Display

- Chipset Freescale i.MX6
- Resolution LVDS up to 1920 x 1080 (Default at 1024 x 768)
HDMI up to 1080p
- LCD Interface Supports 1ch 18-bit LVDS x 1
- LCD Power PWM only (default)
DC Mode: Requires custom app

I/O

- Storage SATA 3.0 Gb/s x 1 (by SKU)
Onboard eMMC (4 GB for Quad core SKU only)
Micro SD Card (up to 32 GB)
- USB USB 2.0 x 5 (Type A Connectors x 2, USB wafer x 2, USB OTG x 1)
- Serial Port 4-wire UART x 1 (wafer, can be used as debug port)
4-wire UART x 1 (DB9 connector, COM1)
- I2C 1 (Pin Header)
- Digital I/O 8-bit DI/O
- Audio I2S, WM8962B (speaker out, Mic-In)

Chapter

2

**Quick
Installation
Guide**

2.1 Safety Precautions

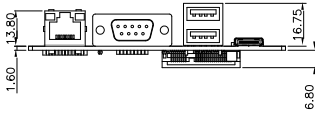
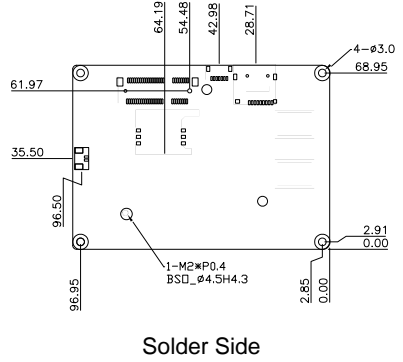
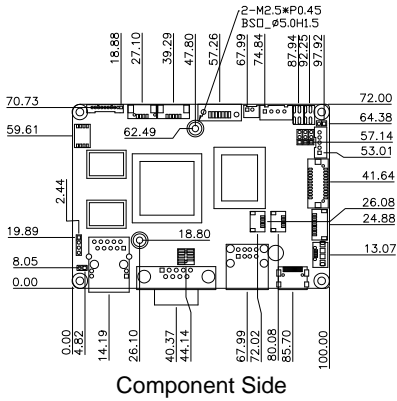
Warning!

Always completely disconnect the power cord from your board whenever you are working on it. Do not make connections while the power is on, because a sudden rush of power can damage sensitive electronic components.

Caution!

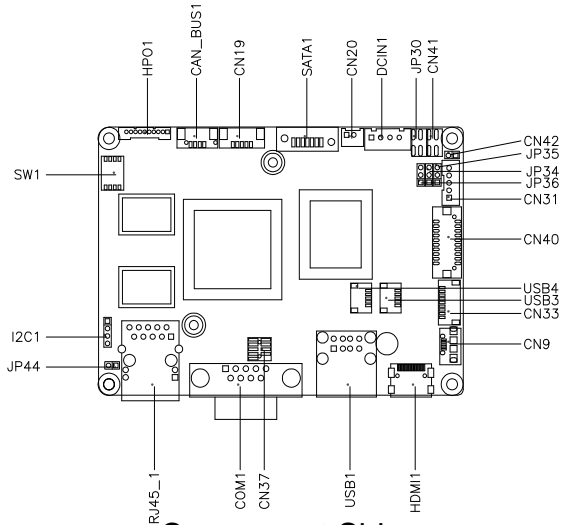
Always ground yourself to remove any static charge before touching the board. Modern electronic devices are very sensitive to static electric charges. Use a grounding wrist strap at all times. Place all electronic components on a static-dissipative surface or in a static-shielded bag when they are not in the chassis

2.2 Dimensions

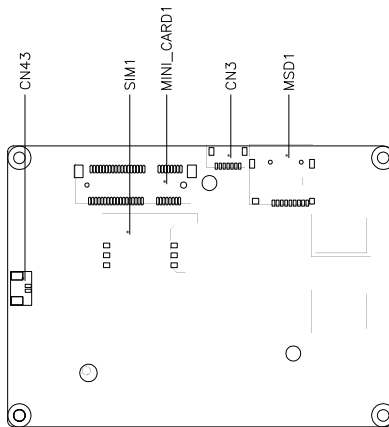


2.3 Jumpers and Connectors

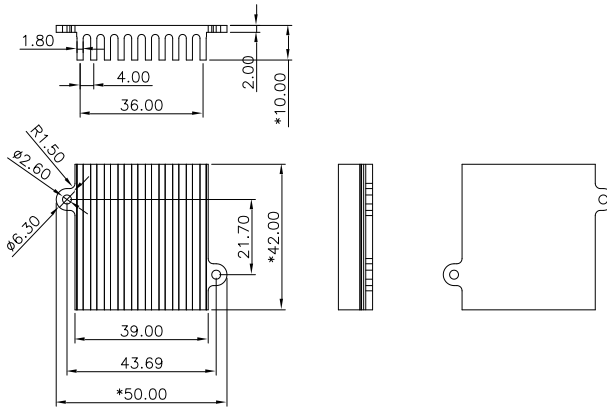
Component Side



Solder Side



Heat Sink



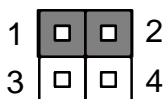
2.4 List of Jumpers

The board has a number of jumpers that allow you to configure your system to suit your application.

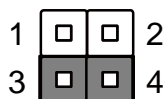
The table below shows the function of each of the board's jumpers:

Label	Function
JP30	Boot Mode Selection
JP34	LVDS Backlight Inverter Voltage Selection
JP35	LVDS Backlight Lightness Control Mode Selection
JP36	LVDS Operating Voltage Selection
JP44	Auto Power Button Selection

2.4.1 Boot Mode Selection (JP30)

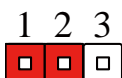


Internal Boot (Default)

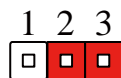


Serial Downloader

2.4.2 LVDS Backlight Inverter Voltage Selection (JP34)

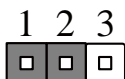


+12V

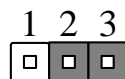


+5V (Default)

2.4.3 LVDS Backlight Lightness Control Mode Selection (JP35)

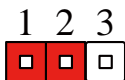


VR Mode

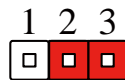


PWM Mode (Default)

2.4.4 LVDS Operating Voltage Selection (JP36)



+5V



+3.3V (Default)

2.4.5 Auto Power Button Selection (JP44)



Disable



Enable (Default)

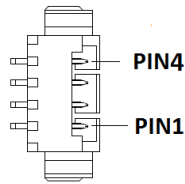
2.5 List of Connectors

The board's connectors provide links to external devices such as hard disk drives and keyboards.

Label	Function
CAN_BUS1	CAN BUS Connector
CN3	SPI Program Connector
CN9	Micro USB Connector
CN19	ICSP Program Connector
CN20	SATA Power Connector
CN31	LVDS Backlight Power Connector
CN33	UART for debug port Connector
CN37	DIO Connector
CN40	LVDS Connector
CN41	Power Button & Reset
CN42	Buzzer Connector
CN43	Battery Connector
COM1	UART Connector
DCIN1	12V Connector
HDMI1	Mini HDMI Connector
HPO1	Audio Connector
I2C1	I2C Connector
MINI_CARD1	MINI CARD Connector
MSD1	Micro SD Connector

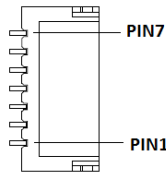
RJ45_1	LAN Connector
SATA1	SATA Connector
SIM1	SIM Card Connector
USB1	2 Port USB Connector
USB3	USB 2.0 Port 3 Connector
USB4	USB 2.0 Port 4 Connector

2.5.1 CAN Bus Connector (CAN_BUS1)



Pin	Pin Name	Signal Type	Signal Level
1	NC		
2	CANH	I/O	
3	CANL	I/O	
4	GND	GND	

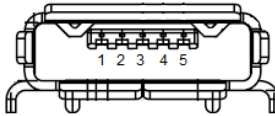
2.5.2 SPI Program Connector (CN3)



Pin	Pin Name	Signal Type	Signal Level
1	SPI_SO_F	OUT	
2	GND	GND	
3	SPI_SI_F	IN	
4	+3V3_SPI	PWR	+3.3V
5	SPI_SI_F	IN	

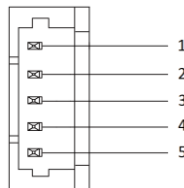
6	SPI_CS0#_F	IN
7	NC	

2.5.3 Micro USB Connector (CN9)



Pin	Pin Name	Signal Type	Signal Level
1	USB_OTG_VBUS	PWR	+5V
2	USB_OTG_D-	DIFF	
3	USB_OTG_D+	DIFF	
4	USB_OTG_ID	IN	
5	GND	GND	

2.5.4 ICSP Program Connector (CN19)



Pin	Pin Name	Signal Type	Signal Level
1	MCLP#	IN	
2	+3V3SB	PWR	+3.3V
3	GND	GND	
4	ICSPDAT	I/O	+3.3V

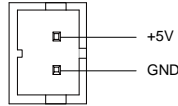
5

ICSPCLK

I/O

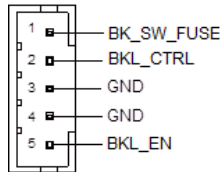
+3.3V

2.5.5 SATA Power Connector (CN20)



Pin	Pin Name	Signal Type	Signal Level
1	+5V	PWR	+5V
2	GND	GND	

2.5.6 LVDS Power Connector (CN31)



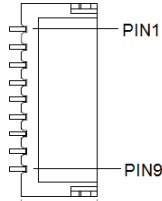
Pin	Pin Name	Signal Type	Signal Level
1	BK_SW_FUSE	PWR	+5V/ +12V
2	BKL_CTRL	OUT	
3	GND	GND	
4	GND	GND	
5	BKL_EN	OUT	+5V

* BK_SW_FUSE can be set to +5V or +12V by JP34

* BK_EN can be set by JP35

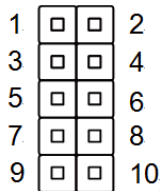
* The driving current supports up to 2A

2.5.7 UART for Debug Port Connector (CN33)



Pin	Pin Name	Signal Type	Signal Level
1	NC		
2	NC		
3	RXC	IN	
4	RTS#C	OUT	±5.2V
5	TXC	OUT	±5.2V
6	CTS#C	IN	
7	NC		
8	NC		
9	GND	GND	

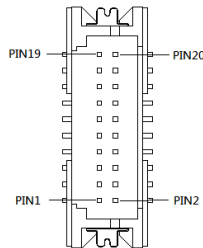
2.5.8 DI/O Connector (CN37)



Pin	Pin Name	Signal Type	Signal Level
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Pico-ITX Board**PICO-IMX6**

1	GPIO4_IO31	I/O	+3.3V
2	GPIO5_IO05	I/O	+3.3V
3	GPIO5_IO06	I/O	+3.3V
4	GPIO5_IO07	I/O	+3.3V
5	GPIO5_IO08	I/O	+3.3V
6	GPIO5_IO09	I/O	+3.3V
7	GPIO5_IO10	I/O	+3.3V
8	GPIO5_IO11	I/O	+3.3V
9	+3V3	PWR	+3.3V
10	GND	GND	

2.5.9 LVDS Connector (CN40)

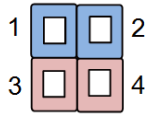
* VLCD can be set to +3.3V or +5V by JP36

*The max. driving current is 1A

LVDS			
Pin	Pin Name	Signal Type	Signal level
1	LVDS_BLEN	OUT	

LVDS			
Pin	Pin Name	Signal Type	Signal level
2	L_BKLTCTLD	OUT	
3	VLCD	PWR	+3.3V/+5V
4	VLCD	PWR	+3.3V/+5V
5	LVDS_DATA0_CLK_N	DIFF	
6	LVDS_DATA0_TX2_P	DIFF	
7	LVDS_DATA0_CLK_P	DIFF	
8	LVDS_DATA0_TX2_N	DIFF	
9	VLCD	PWR	+3.3V/+5V
10	GND	GND	
11	LVDS_DATA0_TX0_P	DIFF	
12	LVDS_DATA0_TX3_P	DIFF	
13	LVDS_DATA0_TX0_N	DIFF	
14	LVDS_DATA0_TX3_N	DIFF	
15	GND	GND	
16	GND	GND	
17	LVDS_DATA0_TX1_P	DIFF	
18	LVDS0_DAT	I/O	3.3V
19	LVDS_DATA0_TX1_N	DIFF	
20	LVDS0_CLK	I/O	3.3V

2.5.10 Power Button & Reset (CN41)

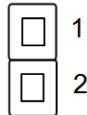


Pin	Pin Name	Signal Type	Signal level
1	PWRBTN#	IN	
2	GND	GND	
3	WDT_RST#	IN	
4	GND	GND	

* Pin 1 – 2 are for the power button

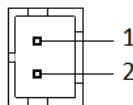
* Pin 3 – 4 are for the reset button

2.5.11 Buzzer Connector (CN42)



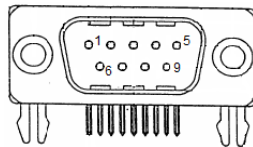
Pin	Pin Name	Signal Type	Signal level
1	+5V	PWR	+5V
2	SPKR	OUT	

2.5.12 Battery Connector (CN43)



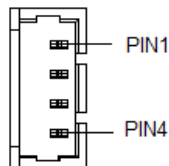
Pin	Pin Name	Signal Type	Signal level
1	RTCBAT	PWR	+3V
2	GND	GND	

2.5.13 UART Connector (COM1)



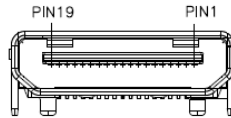
Pin	Pin Name	Signal Type	Signal level
1	NC		
2	RXD	IN	
3	TXD	OUT	$\pm 5.2V$
4	NC		
5	GND	GND	
6	NC		
7	RTS#	OUT	$\pm 5.2V$
8	CTS#	IN	
9	NC		

2.5.14 12V Connector (DCIN1)



Pin	Pin Name	Signal Type	Signal level
1	GND	GND	
2	GND	GND	
3	DCIN	PWR	+12V
4	DCIN	PWR	+12V

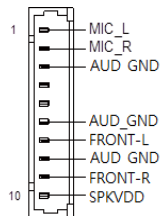
2.5.15 Mini HDMI Connector (HDMI1)



Pin	Pin Name	Signal Type	Signal level
1	GND	GND	
2	HDMI_D2P	DIFF	
3	HDMI_D2M	DIFF	
4	GND	GND	
5	HDMI_D1P	DIFF	
6	HDMI_D1M	DIFF	
7	GND	GND	
8	HDMI_D0P	DIFF	
9	HDMI_D0M	DIFF	
10	GND	GND	
11	HDMI_CLKP	DIFF	
12	HDMI_CLKM	DIFF	
13	GND	GND	

Pin	Pin Name	Signal Type	Signal level
14	NC		
15	HDMI_CLK_LV	I/O	
16	HDMI_DAT_LV	I/O	
17	NC		
18	+5V_HDMI	PWR	+5V
19	HDMI_HPD#	IN	

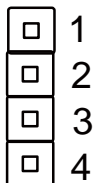
2.5.16 Audio Connector (HPO1)



Pin	Pin Name	Signal Type	Signal level
1	MIC_L	IN	
2	MIC_R	IN	
3	AUD_GND	GND	
4	NC		
5	NC		
6	AUD_GND	GND	
7	FRONT_L	OUT	
8	AUD_GND	GND	
9	FRONT_R	OUT	

Pin	Pin Name	Signal Type	Signal level
10	SPKVDD	PWR	+5V

2.5.17 I2C Connector (I2C1)



Pin	Pin Name	Signal Type	Signal level
1	+3V3	PWR	+3.3V
2	HDMI_DAT	I/O	+3.3V
3	HDMI_CLK	I/O	+3.3V
4	GND	GND	

Note: I2C is shared with I2C on HDMI

2.5.18 MiniCard Connector (MINI_CARD1)

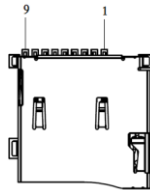
Pin	Pin Name	Signal Type	Signal level
1	PCIE_WAKE#	IN	
2	3.3V_3G	PWR	+3.3V
3	NC		
4	GND	GND	
5	NC		
6	MINI_1.5V	PWR	+1.5V

Pin	Pin Name	Signal Type	Signal level
7	NC		
8	UIM_PWR	PWR	
9	GND	GND	
10	UIM_DATA	I/O	
11	CLK_PCIE_100M#	DIFF	
12	UIM_CLK	IN	
13	CLK_PCIE_100M	DIFF	
14	UIM_RESET	IN	
15	GND	GND	
16	UIM_VPP	PWR	
17	NC		
18	GND	GND	
19	NC		
20	EN_3G	OUT	+3.3V
21	GND	GND	
22	PCIE_RST#	OUT	+3.3V
23	PCIE_RXN0	DIFF	
24	3.3V_3G	PWR	+3.3V
25	PCIE_RXP0	DIFF	

Pin	Pin Name	Signal Type	Signal level
26	GND	GND	
27	GND	GND	
28	MINI_1.5V	PWR	+1.5V
29	GND	GND	
30	I2C3_SCL	I/O	+3.3V
31	PCIE_TXN0	DIFF	
32	I2C3_SDA	I/O	+3.3V
33	PCIE_TXP0	DIFF	
34	GND	GND	
35	GND	GND	
36	USB_HUB_DM1	DIFF	
37	GND	GND	
38	USB_HUB_DP1	DIFF	
39	3.3V_3G	PWR	+3.3V
40	GND	GND	
41	3.3V_3G	PWR	+3.3V
42	NC		
43	GND	GND	
44	NC		

Pin	Pin Name	Signal Type	Signal level
45	NC		
46	NC		
47	NC		
48	MINI_1.5V	PWR	+1.5V
49	NC		
50	GND	GND	
51	NC		
52	3.3V_3G	PWR	+3.3V

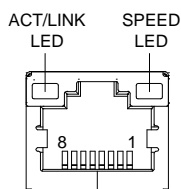
2.5.19 Micro SD Connector (MSD1)



Pin	Pin Name	Signal Type	Signal level
1	SD_DATA2	I/O	
2	SD_DATA3	I/O	
3	SD3_CMD	I/O	
4	+3.3V	PWR	+3.3V

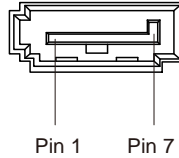
Pin	Pin Name	Signal Type	Signal level
5	SD3_CLK	I/O	
6	GND	I/O	
7	SD3_DATA0	I/O	
8	SD3_DATA1	I/O	
9	SD3_DET	I/O	

2.5.20 LAN Connector (RJ45_1)



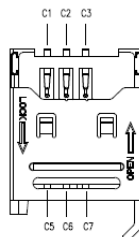
Pin	Pin Name	Signal Type	Signal level
1	MDI0+	DIFF	
2	MDI0-	DIFF	
3	MDI1+	DIFF	
4	MDI2+	DIFF	
5	MDI2-	DIFF	
6	MDI1-	DIFF	
7	MDI3+	DIFF	
8	MDI3-	DIFF	

2.5.21 SATA Connector (SATA1)



Pin	Pin Name	Signal Type	Signal level
1	GND	GND	
2	SATA_TXP0	DIFF	
3	SATA_TXN0	DIFF	
4	GND	GND	
5	SATA_RXN0	DIFF	
6	SATA_RXP0	DIFF	
7	GND	GND	

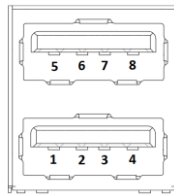
2.5.22 SIM Card Connector (SIM1)



Pin	Pin Name	Signal Type	Signal level
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Pin	Pin Name	Signal Type	Signal level
1 (C1)	UIM_PWR	PWR	3V/1.8V from MiniCard
2 (C2)	UIM_RESET		
3 (C3)	UIM_CLK		
4 (C5)	GND		
5 (C6)	UIM_VAPP		
6 (C7)	UIM_DATA		

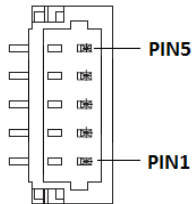
2.5.23 2-Port USB Connector (USB1)



Pin	Pin Name	Signal Type	Signal level
1	USB_COR_VBUS1	PWR	+5V
2	USB_HUB_DM2	DIFF	
3	USB_HUB_DP2	DIFF	
4	GND	GND	
5	USB_COR_VBUS1	PWR	+5V
6	USB_HUB_DM3	DIFF	

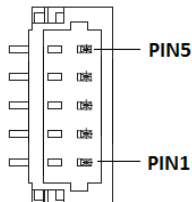
Pin	Pin Name	Signal Type	Signal level
7	USB_HUB_DP3	DIFF	
8	GND	GND	

2.5.24 USB 2.0 Port 3 Connector (USB3)



Pin	Pin Name	Signal Type	Signal level
1	USB_COR_VBUS1	PWR	+5V
2	USB_HUB_DM4	DIFF	
3	USB_HUB_DP4	DIFF	
4	GND	GND	
5	GND	GND	

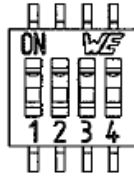
2.5.25 USB 2.0 Port 4 Connector (USB4)



Pin	Pin Name	Signal Type	Signal level
1	USB_COR_VBUS1	PWR	+5V
2	USB_HUB_DM6	DIFF	
3	USB_HUB_DP6	DIFF	
4	GND	GND	
5	GND	GND	

2.6 Boot Configuration Selection Switch (SW1)

This switch allows users to manually customize boot configurations for their needs.



Boot Device	Bit 1	Bit 2	Bit 3	Bit 4	
Micro SD	OFF	OFF	ON	OFF	Default
eMMC	ON	ON	ON	ON	
SATA	X	X	OFF	ON	Reserved

Appendix

A

Mating Connectors

A.1 List of Mating Connectors and Cables

The table notes mating connectors and available cables.

Connector Label	Function	Mating Connector		Available Cable	Cable P/N
		Vendor	Model no		
CAN_BUS1	CAN BUS Connector	MOLEX	53261-047 1	N.A	
CN3	SPI Program Connector	PINREX	710-74-07 TW01	SPI wafer Cable	1701140271
CN19	ICSP Program Connector	CATCH	1201-700- 05SM	N.A	
CN20	SATA Power Connector	PINREX	721-81-02 TW00	SATA power wafer cable	1702150155
CN31	LVDS Backlight Power Connector	PINREX	721-81-05 TW00	Backlight wafer cable	1705050205
CN33	UART for debug port Connector	PINREX	710-74-09 TWR6	Debug wafer cable	1701090152
CN37	DIO Connector	Molex	78120-100 7	N.A	
CN40	LVDS Connector	E-CALL	0110-01-5 53-200	LVDS cable	1703200170
CN41	Power Button & Reset	Astron	27-24041- 202-1G-TB 1R	N.A	
CN42	Buzzer Connector	JIH VEI	21B12050- 02S10B-01 G-4/2.8	N.A	
CN43	Battery Connector	PINREX	712-73-02 TWE0	RTC battery cable	175011301C
DCIN1	12V Connector	CATCH	1191-700- 04S	DC power cable	170204010S

Pico-ITX Board**PICO-IMX6**

HPO1	Audio Connector	CATCH	1201-700-10S	Audio wafer cable	1700100129
I2C1	I2C Connector	PINREX	220-96-04 GB01	N.A	
SATA1	SATA Connector	MOLEX	67800-500 5	SATA cable	1709070500
USB3	USB 2.0 Port 3 Connector	CATCH	1204-700-05SMR	USB wafer cable	170005020L
USB4	USB 2.0 Port 4 Connector	CATCH	1204-700-05SMR	USB wafer cable	170005020L

Appendix

B

Electrical Specifications for I/O Ports

B.1 Electrical Specifications for I/O Ports

I/O	Reference	Signal Name	Rate Output
Micro USB Port	CN9	USB_OTG_VBUS	5V/0.5A
SATA Power Connector	CN20	+5V	5V/2A
Backlight Connector	CN31	BK_SW_FUSE	5V/2A or 12V/2A
DIO Connector	CN37	+3.3V	3.3V/1A
LVDS Port	CN40	VLCD	3.3V/1A or 5V/1A
Buzzer Port	CN42	+5V	5V/1A
RTC Battery	CN43	RTCBAT	3V/1A
Mini HDMI Port	HDMI1	+5V_HDMI	5V/0.5A
Audio Port	HPO1	SPKVDD	5V/1A
I2C Connector	I2C1	+3.3V	3.3V/1A
Mini Card Slot	MINI_CARD1	3.3V_3G MINI_1.5V	3.3V/0.5A per pin 1.5V/0.5A per pin
Dual USB Connector	USB1	USB_COR_VBUS1	5V/0.5A per port
USB Port	USB3	USB_COR_VBUS1	5V/1A
USB Port	USB4	USB_COR_VBUS1	5V/1A