UP Squared 6000 PSE Carrier Board

Carrier Board
UPN-EHLCB

User's Manual 1st Ed

Last Updated: September 23, 2022

Copyright Notice

Acknowledgement

Packing List

Before setting up your product, please make sure the following items have been shipped:

Item	Quantity
● UPN-EHLCB (UP Squared 6000 PSE Carrier Board)	1
● SWD Cable	1
● UART Cable	1
● Stud	7
● Nut	2

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

About this Document

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 product page at AAEON.com for the latest version of this document.

Safety Precautions

Please read the following safety instructions carefully. It is advised that you keep this manual for future references

1. All cautions and warnings on the device should be noted.
2. Make sure the power source matches the power rating of the device.
3. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
4. Always completely disconnect the power before working on the system's hardware.
5. No connections should be made when the system is powered as a sudden rush of power may damage sensitive electronic components.
6. If the device is not to be used for a long time, disconnect it from the power supply to avoid damage by transient over-voltage.
7. Always disconnect this device from any AC supply before cleaning.
8. While cleaning, use a damp cloth instead of liquid or spray detergents.
9. Make sure the device is installed near a power outlet and is easily accessible.
10. Keep this device away from humidity.
11. Place the device on a solid surface during installation to prevent falls
12. Do not cover the openings on the device to ensure optimal heat dissipation.
13. Watch out for high temperatures when the system is running.
14. Do not touch the heat sink or heat spreader when the system is running
15. Never pour any liquid into the openings. This could cause fire or electric shock.
16. As most electronic components are sensitive to static electrical charge, be sure to ground yourself to prevent static charge when installing the internal components. Use a grounding wrist strap and contain all electronic components in any static-shielded containers.

17. If any of the following situations arises, please the contact our service personnel:
    i. Damaged power cord or plug
    ii. Liquid intrusion to the device
    iii. Exposure to moisture
    iv. Device is not working as expected or in a manner as described in this manual
    v. The device is dropped or damaged
    vi. Any obvious signs of damage displayed on the device
18. DO NOT LEAVE THIS DEVICE IN AN UNCONTROLLED ENVIRONMENT WITH TEMPERATURES BEYOND THE DEVICE'S PERMITTED STORAGE TEMPERATURES (SEE CHAPTER 1) TO PREVENT DAMAGE.

FCC Statement

This device complies with Part 15 FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received including interference that may cause undesired operation.

Caution:

There is a danger of explosion if the battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions and your local government's recycling or disposal directives.

Attention:

Il y a un risque d'explosion si la batterie est remplacée de façon incorrecte.
Ne la remplacer qu'avec le même modèle ou équivalent recommandé par le constructeur.
Recycler les batteries usées en accord avec les instructions du fabricant et les directives gouvernementales de recyclage.

China RoHS Requirements (CN)

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	O	O	O	O	O	O
外部信号连接器及线材	O	O	O	O	O	O

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。

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。

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。

China RoHS Requirement (EN)

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	O	O	O	O	O	O
Wires & Connectors for External Connections	O	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

Table of Contents

Chapter 1

Product Specifications

1.1 Specifications

I/O Placements	
External Ports	Gbe via Marvell Alaska x 2
	Micro USB (PSE DEBUG PORT) x 1
	40pin HAT2 PSE header x 1
	(CAN x 2, QEP x 4, I2C x 1, PWM x 4, ADC x 4)
Internal connector	SATA with power connector x 1
	100pin board-to-board high speed connector x 1
	Full-sized Mini-PCIe (via USB2.0) x 1
	SIM card slot x 1
	SWD 10-pin wafer (connect to MB) x 1
	UART 10-pin wafer (connect to MB) x 1
	RS232 wafer x 1

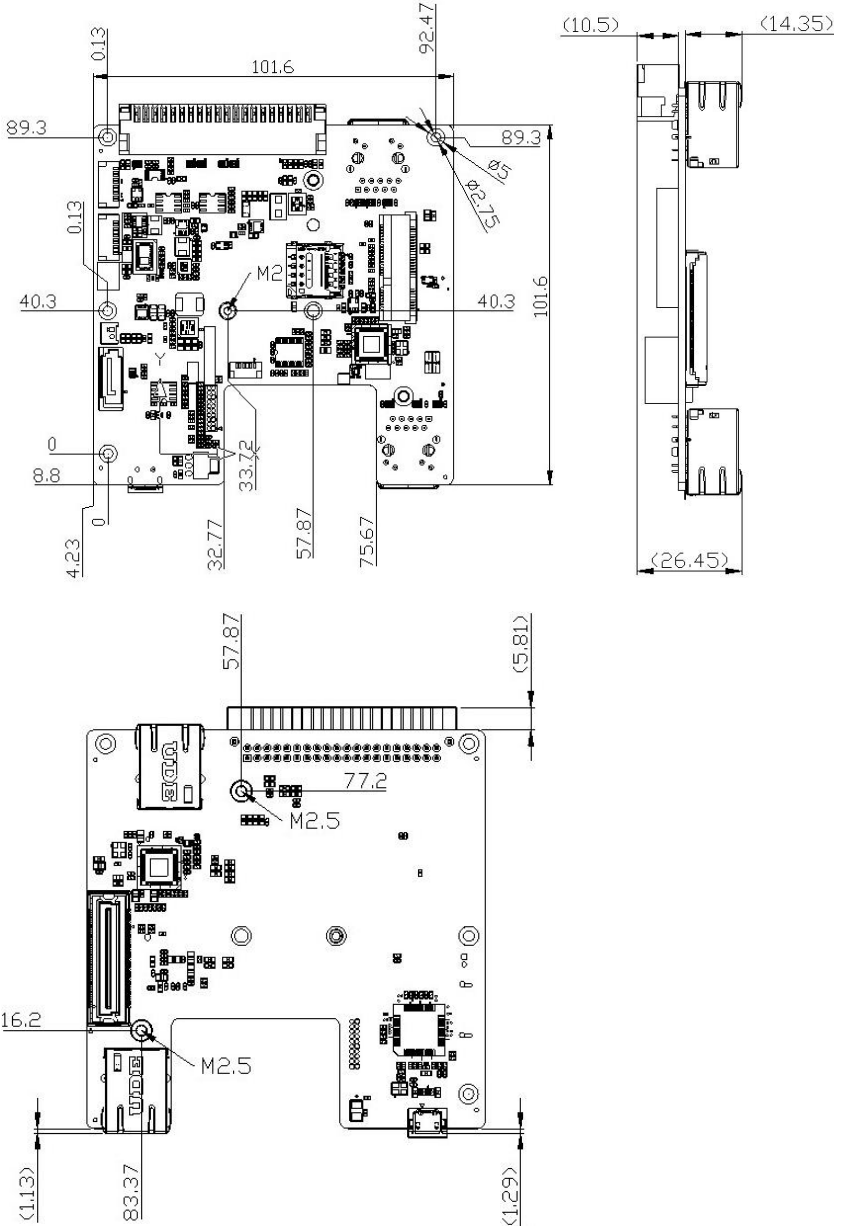
Others	
Form Factor	4" x 4" (101.6mm x 101.6mm)
Certification	CE/FCC Class A
Operating Temperature	32°F ~ 140°F (0°C ~ 60°C)
Operating Humidity	0% ~ 90% relative humidity, non-condensing

Chapter 2

Hardware Information

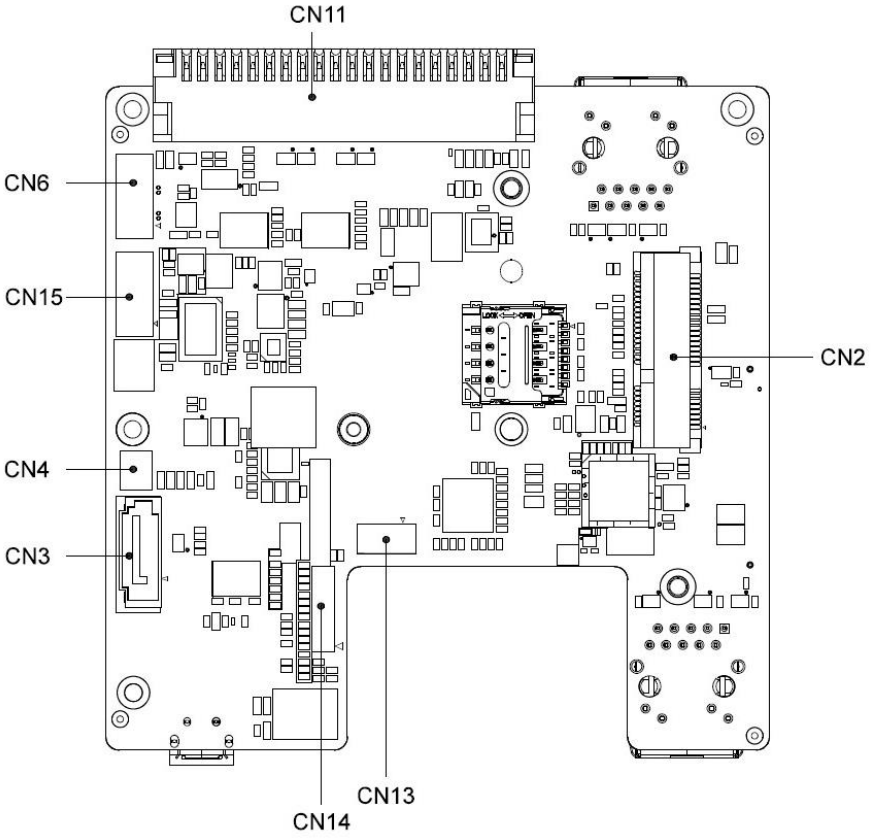
2.1 Dimensions

Board

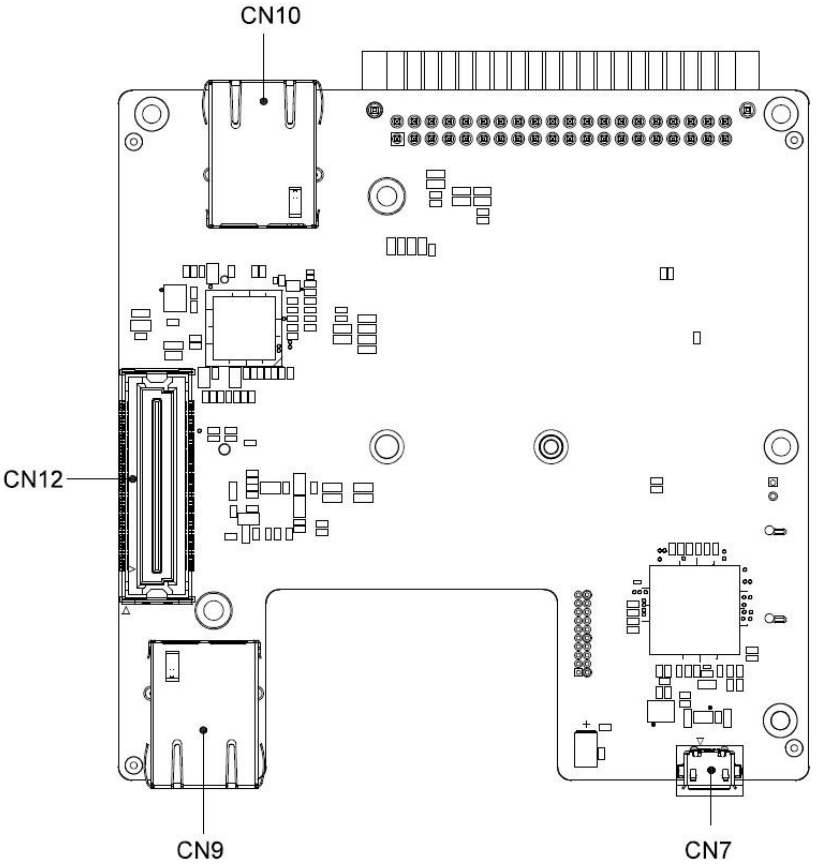


2.2 Carrier Board Jumpers and Connectors

Top



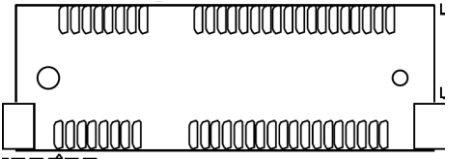
Bottom



2.3 Carrier board Connector Index

Label	Functional Description
CN2	Mini card
CN3	SATA
CN4	SATA POWER
CN6	USB WAFER
CN7	PSE DEBUG PORT
CN9	LAN1
CN10	LAN2
CN11	HAT 40
CN12	DOCKING
CN13	COM PORT
CN15	SWD

2.3.1 Mini Card (CN2)



Pin	Signal Description	Pin	Signal Description
1	NC	2	VCC3_MINIPCIE
3	NC	4	GND
5	NC	6	V1.5S
7	NC	8	P_UIM_PWR
9	GND	10	P_UIM_DAT
11	NC	12	P_UIM_CLK
13	NC	14	P_UIM_RST
15	GND	16	P_UIM_VPP
17	NC	18	GND
19	NC	20	WL_DISABLE0#
21	GND	22	3G_RST
23	NC	24	VCC3_MINIPCIE
25	NC	26	GND
27	GND	28	V1.5S
29	GND	30	NC
31	NC	32	NC
33	NC	34	GND
35	GND	36	USB2_DN_R
37	GND	38	USB2_DP_R
39	VCC3_MINIPCIE	40	GND
41	VCC3_MINIPCIE	42	NC

Pin	Signal Description	Pin	Signal Description
43	NC	44	NC
45	NC	46	NC
47	NC	48	V1.5S
49	NC	50	GND
51	NC	52	VCC3_MINIPCIE

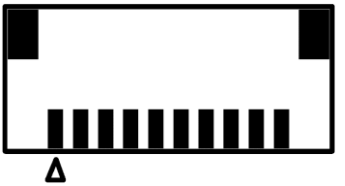
2.3.2 SATA (CN3)

Pin	Signal Description	Pin	Signal Description
1	GND	2	SATA_TXP0_C
3	SATA_TXN0_C	4	GND
5	SATA_RXN0_C	6	SATA_RXP0_C
7	GND		

2.3.3 SATA POWER (CN4)

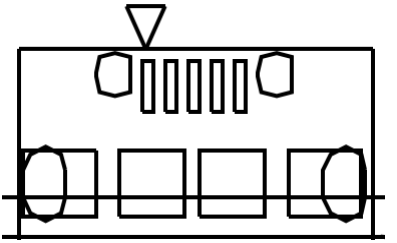
Pin	Signal Description	Pin	Signal Description
1	+V5S	2	GND

2.3.4 USB Wafer (CN6)



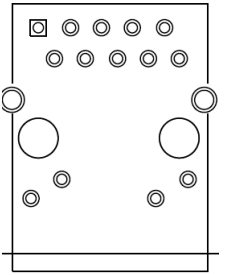
Pin	Signal Description	Pin	Signal Description	Pin	Signal Description
1	5V	2	NC	3	NC
4	GND	5	NC	6	NC
7	NC	8	NC	9	UART_RX
10	UART_TX				

2.3.5 PSE Debug Port (CN7)



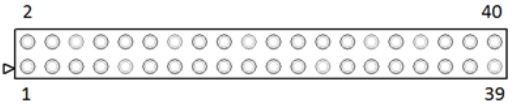
Pin	Signal Description	Pin	Signal Description
1	5V	2	USB+
3	USB-	4	ID
5	GND		

2.3.6 LAN1/LAN2 (CN9/10)



Pin	Signal Description
1	LAN1_TMDI0+
2	LAN1_TMDI0-
3	LAN1_TMDI1+
4	LAN1_TMDI2+
5	LAN1_TMDI2-
6	LAN1_TMDI1-
7	LAN1_TMDI3+
8	LAN1_TMDI3-

2.3.7 HAT (CN11)



Pin	Signal Description	Pin	Signal Description
1	+5V	2	+3.3V
3	+5V	4	+3.3V
5	GND	6	GND
7	CAN0_L	8	CAN0_H
9	GND	10	GND
11	CAN1_L	12	CAN1_H
13	GND	14	GND
15	GP_D00/PSE_QEPA0	16	GP_D01/PSE_QEPB0
17	GP_D13/PSE_QEPA1	18	GP_D14/PSE_QEPB1
19	GP_T00/PSE_QEPA2	20	GP_T01/PSE_QEPB2
21	GP_U07/PSE_QEPA3	22	GP_U11/PSE_QEPB3
23	GP_D02/PSE_QEPI0	24	GP_T02/PSE_QEPI2
25	GP_D16/PSE_QEPI1	26	GP_U19/PSE_QEPI3
27	GP_D18/PSE_PWM05	28	GP_D15/PSE_PWM03
29	GP_D03/PSE_PWM06	30	GP_D17/PSE_PWM04
31	ADC_GND	32	ADC_GND
33	ADC0	34	ADC2
35	ADC1	36	ADC3
37	ADC_GND	38	ADC_GND
39	GP_H04_SIO_I2C2_SDA	40	GP_H05_SIO_I2C2_SCL

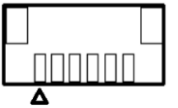
2.3.8 Docking (CN12)

Pin	Signal Description	Pin	Signal Description	Pin	Signal Description
1	VCC_12V	2	VCC_12V	3	VCC_12V
4	VCC_12V	5	GND	6	VCC_12V
7	USB2_P9_DP	8	VCC_12V	9	USB2_P9_DN
10	GND	11	GND	12	GP_E15/PSE_CAN0_TX
13	GP_H07/SIO_I2C3_SCL	14	GP_E16/PSE_CAN0_RX	15	GP_H06/SIO_I2C3_SDA
16	GND	17	GND	18	GP_E20/CAN1_TX
19	GP_D00/PSE_QEPA0	20	GP_E21/CAN1_RX	21	GP_D13/PSE_QEPA1
22	GND	23	GP_T00/PSE_QEPA2	24	GP_D15/PSE_PWM03
25	GP_U07/PSE_QEPA3	26	GP_D17/PSE_PWM04	27	GP_D01/PSE_QEPB0
28	GP_D18/PSE_PWM05	29	GP_D14/PSE_QEPB1	30	GP_D03/PSE_PWM06
31	GP_T01/PSE_QEPB2	32	GND	33	GP_U11/PSE_QEPB3
34	SIO_SPI_1_CLK	35	GP_D02/PSE_QEPI0	36	SIO_SPI_1_TXD
37	GP_D16/PSE_QEPI1	38	SIO_SPI_1_RXD	39	GP_T02/PSE_QEPI2
40	SIO_SPI_1_FS1	41	GP_U19/PSE_QEPI3	42	GND

Pin	Signal Description	Pin	Signal Description	Pin	Signal Description
43	GP_H13_USUART1_TX	44	GND	45	GP_H21_HSUART1_RS232_RTS_RS485_DE
46	ENET_A_RST	47	GP_H15_HSUART1_RS232_CTS	48	ENET_A_INT
49	GP_H12_HSUART1_RX	50	RGMII_A_SMA_MDC	51	GP_H22_HSUART1_RS485_RE_N
52	RGMII_A_SMA_MDIO	53	GP_H23_HSUART1_RS485_RS232_N	54	GBE0_RGMII_R_TXCLK
55	GND	56	GBE0_RGMII_R_TXCTL	57	ENET_B_RST
58	GBE0_RGMII_R_TXD0	59	ENET_B_INT	60	GBE0_RGMII_R_TXD1
61	RGMII_B_SMA_MDC	62	GBE0_RGMII_R_TXD2	63	RGMII_B_SMA_MDIO
64	GBE0_RGMII_R_TXD3	65	GBE1_RGMII_R_TXCLK	66	GND
67	GBE1_RGMII_R_TXCTL	68	GBE0_RGMII_RXCLK	69	GBE1_RGMII_R_TXD0
70	GBE0_RGMII_RXCTL	71	GBE1_RGMII_R_TXD1	72	GBE0_RGMII_RXD0
73	GBE1_RGMII_R_TXD2	74	GBE0_RGMII_RXD1	75	GBE1_RGMII_R_TXD3
76	GBE0_RGMII_RXD2	77	GND	78	GBE0_RGMII_RXD3
79	GBE1_RGMII_RXCLK	80	GP_T07_PSE_GBE0_PPS_PSE_TGPIO59	81	GBE1_RGMII_RXCTL
82	GP_T06_PSE_GBE0_AUXTS_USB2_OC1_N	83	GBE1_RGMII_RXD0	84	GP_H03_PSE_GBE1
85	GBE1_RGMII_RXD1	86	GP_H02	87	GBE1_RGMII_RXD2
88	GND	89	GBE1_RGMII_RXD3	90	PCIE_P9_SATA_P1_TXP
91	GND	92	PCIE_P9_SATA_P1_TXN	93	SLP_S3#

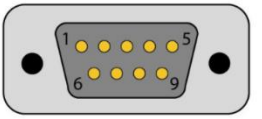
Pin	Signal Description	Pin	Signal Description	Pin	Signal Description
94	GND	95	BUF_PLT_RST#	96	PCIE_P9_SATA_P1_RXP
97	BUF_PLT_RST#	98	PCIE_P9_SATA_P1_RXN	99	GND
100	GND				

2.3.9 COM Port (CN13)



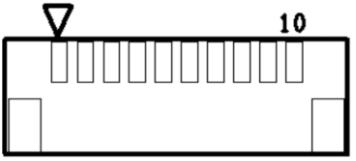
Pin	Signal Description	Pin	Signal Description
1	CTS/RX-	2	RTS/TX+
3	GND	4	TX/TX-
5	RX/RX+	6	+5V

Cable



Pin	Signal	Pin	Signal
1	NC	2	RX/RS422TX-
3	TX/RS422TX+	4	NC
5	GND	6	NC
7	RTS/RS422RX+	8	CTS/RS422RX-
9	NC		

2.3.10 SWD (CN15)



Pin	Signal Description	Pin	Signal Description
1	DBRESET	2	PSE_SWDIO
3	PSE_SWCLK	4	PSE_TRACESWO
5	PSE_TRACECLK	6	PSE_TRACEDATA_0
7	PSE_TRACEDATA_1	8	PSE_TRACEDATA_2
9	PSE_TRACEDATA_3	10	GND

2.4 Carrier Board List of Jumpers and Connectors

Reference Designation	Functional Description	Connector Type
CN2	Mini card	(TF)MINIPCI SLOT.52P.H=5.6mm.SMD.FOXCONN.AS0B22x-S56Q-7H
CN3	SATA	(TF)SATA CONNECTOR.7P.180D(M).SMT.TechBest.007-01-00757
CN4	SATA POWER	(TF)WAFER BOX.2P.180D(M).DIP.2.0mm.w/LOCK.PINREX.721-81-02TW00
CN6	USB WAFER	(TF)Wafer Box.10P.90D(M).SMD.1.0mm.PINREX.710-74-10TWR6
CN7	PSE DEBUG PORT	(TF)Micro USB Conn..5P.90D(F).SMD.AB-type.TRONTEK.TMC106-USBD05-835
CN9	LAN1	(TF)RJ45.14P.90D(F)W/TF(10/100/1000Base).& LED(L-G/O,R-Y).DIP.SPEEDTECH.RK7L8A-KWH1-F30-0R
CN10	LAN2	(TF)RJ45.14P.90D(F)W/TF(10/100/1000Base).& LED(L-G/O,R-Y).DIP.SPEEDTECH.RK7L8A-KWH1-F30-0R
CN11	HAT 40	(TF)Phoenix Connector.DIP.90D.20*2P Black.Pitch=2.54mm.H=10.5mm.MALE.DINKLE.0156-1840
CN12	DOCKING	(TF)BOARD-BOARD CONN..SMD.100P.180D.MALE.Pitch=0.5mm.H=5.5mm.Floating Connector for High-Speed Transmission.KEL CORPORATION.DT01-100S-T
CN13	COM PORT	(TF)Wafer Box.6P.180D.(M).SMD.1.0mm.w/CAP.CATCH.1204-700-06SMR
CN15	SWD	(TF)Wafer Box.10P.90D(M).SMD.1.0mm.PINREX.710-74-10TWR6

Chapter 3

Software Installation

3.1 BIOS Setup

To start using Intel PSE, please follow below step to adjust BIOS default:

Chipset-> PSE Configuration-> PSE Controller [Disabled]-> [Enabled]

For instructions of BIOS setup guide for PSE, you can find related updates in the wiki section of the UP Board website at https://up board.org.

Appendix A

Cables and Connectors

A.1 Cables and Connectors

This table provides detailed information about the cables and connectors used by the UP Squared 6000 PSE Carrier Board (UPN-EHLCB). If you have any questions about the configuration of your board, please contact your AAEON sales representative.

Location	Connector	Function Description	Mating Cable PN/CONN PN	Mating Cable Description
CN11	16522X0005	HAT 40	16522X0004	(TF)Phoenix Connector.DIP.180D.20*2P.Pitch=2.54mm.H=12.0mm.FEMALE.PCB Connector.DINKLE.0156-1A40-BK.PLUG IN Black
CN13	1655906033	COM PORT	170X000381	(TF)COM Port.6P.Pitch=1.0mm.180mm.FLYINGWAY.FWAA-1454.RS232