UPC-Plus

Maker Board

User's Manual 1st Ed

Last Updated: April 24, 2019

Copyright Notice

Acknowledgement

Packing List

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

Item	Quantity
● UPC-Plus	1

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 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 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 harmful 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. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

—Reorient or relocate the receiving antenna.

—Increase the separation between the equipment and receiver.

—Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

—Consult the dealer or an experienced radio/TV technician for help.

- Any changes or modifications not expressly approved by the party responsible for compliance could void the authority to operate equipment.

- This device and its antenna must not be co-located or operating in conjunction with any other antenna or transmitter.

- End-users and installers must be provided with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

This device complies with Part 15 of 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.

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

System	
● CPU/Chipset	Intel® Apollo Lake SoC E3930/E3940/E3950
● Memory	Onboard Single/Dual Channel LPDDR4 memory, Max 8GB
● Graphics	Intel® HD Graphics 1x DP 1x Full eDP
● Storage	1x eMMC ver 5.0 (32GB/64GB/128GB)
● WiFi/BT	Onboard WIFI 802.11 a/b/g/n/ac + BT 4.2
● Audio	1xDP
● MIPI CSI	Support simultaneous display 1x MIPI-CSI 2 Channel connector 1x MIPI-CSI 4 Channel connector
● USB	1x USB3.0, 1x USB 3OTG, 2x USB2.0 (Pin header)
● Expansion HAT (100 pin)	Docking Connector 1 100 pin: 1. 5V, GND 2. Original HAT 40pin interface with MAX10 (GPIOx28, I2Cx2, SPIx1, HSUART1x1, ADCx1, 5V, GND) 3. PCIex1 (Optional USB 3.0) 4. USB2.0x1 5. LPC

Docking Connector 2 100 pin:

1. 12V, GND
2. DDIx1 (for 3rd display on HDMI / DP)
3. 3x PCIex1
4. 2x PCIex1 or USB3.0
5. 1xSATA1 or USB 3.0
6. 1x SATA0
7. 3xUSB2.0

I/O

● Internal I/O Connectors	1x eDP with Backlight control Header
	1x CSI 2 Lane Header
	1x CSI 4 Lane Header
	1x 10 pin USB2.0
	1x 2 pin Fan connector
	1x RTC Pin Header
	1x Power Button header
	1x Reset Pin header
	2x 100 pin Docking Connector
	2x Antenna Headers
● External I/O Connectors	1x DP Connector
	1x USB 3.0 single Connector
	1x USB 3.0 OTG Connector
	1x Power Button
	1x DC connector

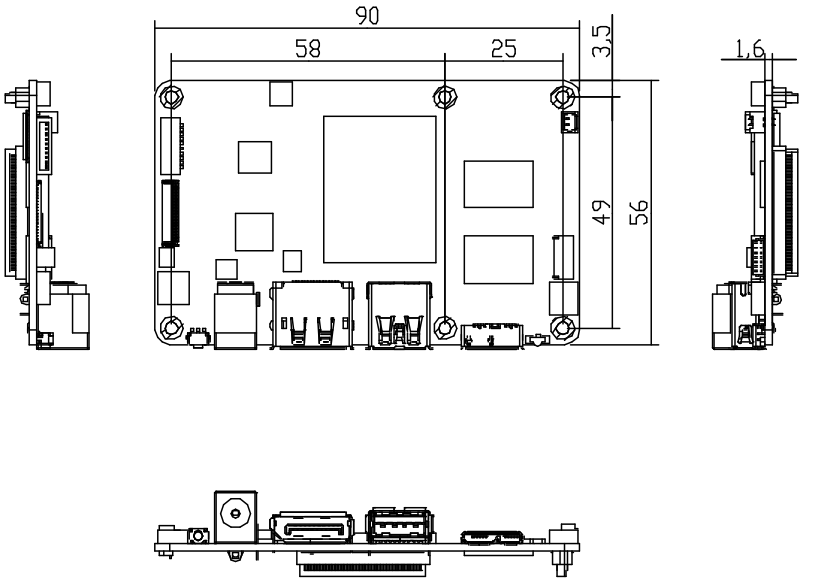
Others

Power	12V DC in
Form Factor	90 mm × 56 mm
Operating Temperature	0°C -60°C
Operating Humidity	0% ~ 90% relative humidity, non-condensing
Certification	CE,FCC ClassB
OS Support	Win 10, Linux (UbiLinux, Ubuntu, Yocto)

Chapter 2

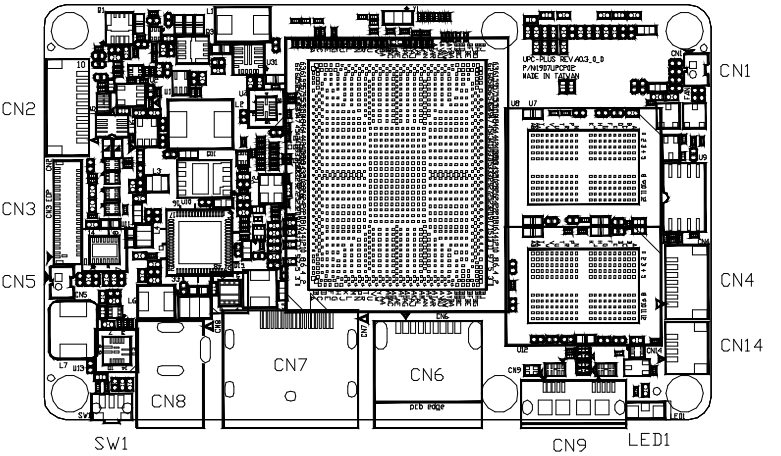
Hardware Information

2.1 Dimensions

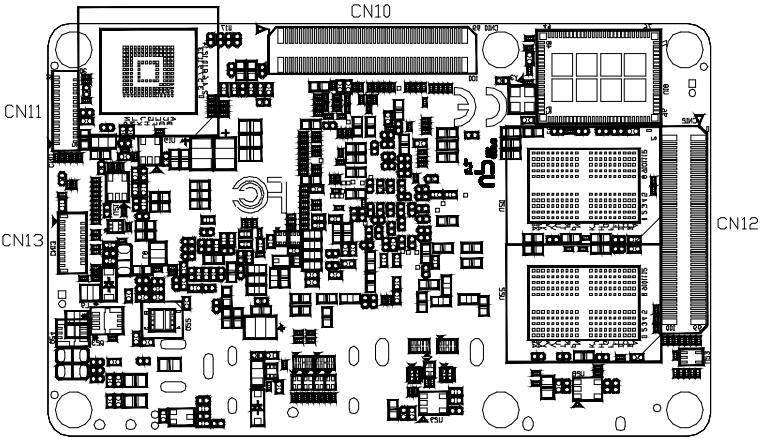


2.2 Jumpers and Connectors

Component side



Solder side



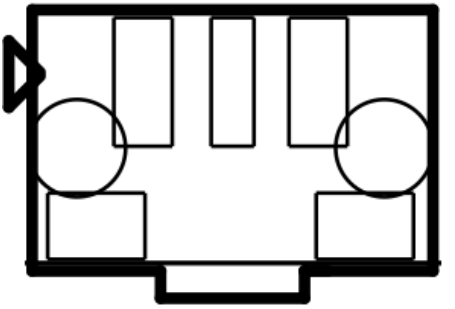
2.3 List of Switches and Connectors

Please refer to the table below for all of the board's jumpers that you can configure for your application

Reference	Function	Connector Type
SW1	PWR button	(TF)Push Button Switch.3P.12VDC.50mA.500mohm.Black.SMD.HCH.PTS-099
CN1	FAN	(TF)WAFER BOX.2P.180D(M).DIP.1.25mm.PINREX.712-71-02TW01
CN2	Internal USB UART	(TF)Wafer Box.10P.90D(M).SMD.1.0mm.PINREX.710-74-10TWR6
CN3	eDP	(TF)FPC/FFC Conn.41P.90D(F).SMD.0.6mm.Hirose.FH35C-41S-0.3SHW(50)
CN4	BIOS PROGRAM	(TF)WAFER BOX.7P.180D(M).SMD.1.0mm.W/Cap.PINREX.710-73-07TWE6
CN5	RTC	(TF)WAFER BOX.2P.180D(M).DIP.1.25mm.PINREX.712-71-02TW01
CN6	USB3.0	(TF)USB3.0 Connector.Single Port.Type A.9P.90D(F).SMD.Trontek.930-00406-A91-21
CN7	DP	(TF)DisplayPort CON.20P.90D.(F).SMD.FOXCONN.3VD51203-D7JJ-7H
CN8	Power Input	(TF)DC Power Jack.3P.90D(M).DIP.2.0mm.COXOC.416AEWTJ02004PA
CN9	Micro USB3.0	(TF)Micro USB 3.0 Conn..10P.90D(M).SMD.B-type.ATTEND.209E-BE01

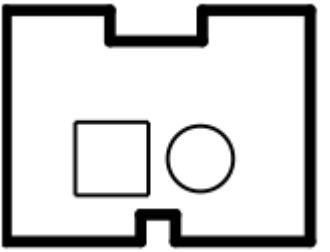
Reference	Function	Connector Type
CN10	DOCKING I	(TF)Board-Board Connector.100P.180D(M).Pitch=0.5mm.H=5.3mm.SMD. Panasonic.AXK6S00647YG
CN11	MIPI CSI	(TF)FPC/FFC Conn..31P.90D(F).SMD.0.3mm.Dual Contact.Panasonic.AYF333135
CN12	DOCKING II	(TF)Board-Board Connector.100P.180D(M).Pitch=0.5mm.H=5.3mm.SMD. Panasonic.AXK6S00647YG
CN13	MIPI CSI 2CH	(TF)FPC/FFC Conn.21P.90D(F).SMD.0.6mm.Hirose.FH35C-21S-0.3SH W(50)
CN14	PWR Button Pin Header	(TF)WAFER BOX.2P.90D(M).SMD.1.0mm.W/Cap.PINREX.710-74-02T WR6
LED1	SYSTEM Indicator	(TF)LED.3.0*1.0*1.0mm. Blue.SMD.LITEON. LTST-S320TBKT

2.3.1 Power Button (SW1)



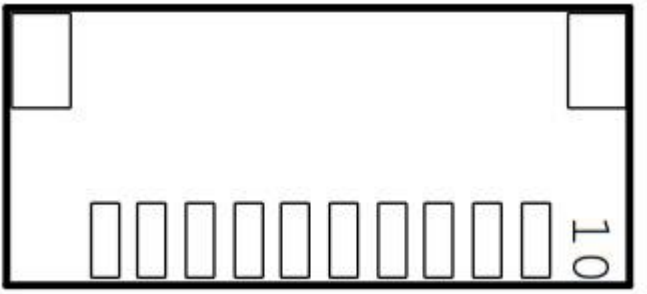
Pin	Signal	Pin	Signal
1	GND	2	PMU_PWRBTN_N
3	GND		

2.3.2 Fan (CN1)



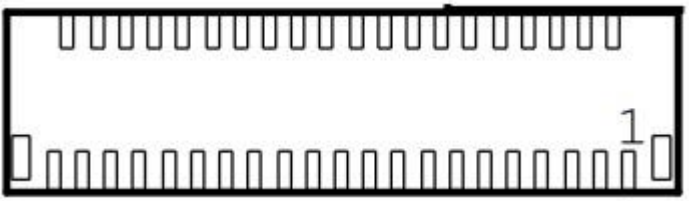
Pin	Signal Description	Pin	Signal Description
1	FAN_PWR(5V)	2	GND

2.3.3 Internal USB UART (CN2)



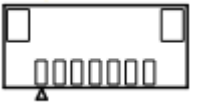
Pin	Signal	Pin	Signal
1	+5V	2	USB2_DN6
3	USB2_DP6	4	GND
5	+5V	6	USB2_DN7
7	USB2_DP7	8	GND
9	UART0_RXD_3V3	10	UART0_TXD_3V3

2.3.4 eDP (CN3)



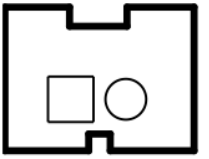
Pin	Signal	Pin	Signal
1	NC	2	NC
3	GND	4	NC
5	NC	6	GND
7	NC	8	NC
9	GND	10	NC
11	NC	12	GND
13	NC	14	NC
15	GND	16	EDP_TXP_0
17	EDP_TXN_0	18	GND
19	EDP_TXP_1	20	EDP_TXN_1
21	GND	22	EDP_TXP_2
23	EDP_TXN_2	24	GND
25	EDP_TXP_3	26	EDP_TXN_3
27	GND	28	EDP_AUXP
29	EDP_AUXN	30	GND
31	EDP_HPD_CONN	32	DDI0_BKLT_CTRL
33	DDI0_VDD_EN	34	DDI0_BKLT_EN
35	I2C_3V3_SCL7	36	I2C_3V3_SDA7
37	+3.3V	38	+3.3V
39	+3.3V	40	+3.3V
41	+3.3V		

2.3.5 BIOS PROGRAM (CN4)



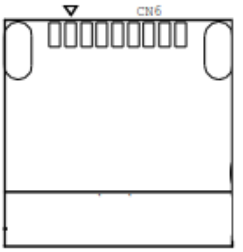
Pin	Signal	Pin	Signal
1	SPI_MISO	2	GND
3	SPI_CLK	4	+VCC_SPI
5	SPI_MOSI	6	SPI_CS0#
7	NC		

2.3.6 RTC (CN5)



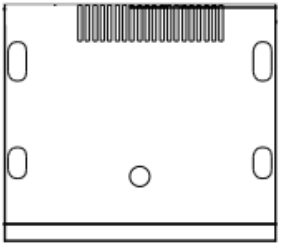
Pin	Signal	Pin	Signal
1	RTC_VCC	2	GND

2.3.7 USB 3.0 (CN6)



Pin	Signal	Pin	Signal
1	+V5P0_USB_1	2	USB2_C_DN1
3	USB2_C_DP1	4	GND
5	USB3_RXN_CON_P1	6	USB3_RXP_CON_P1
7	GND	8	USB3_TXN_CON_P1
9	USB3_TXP_CON_P1		

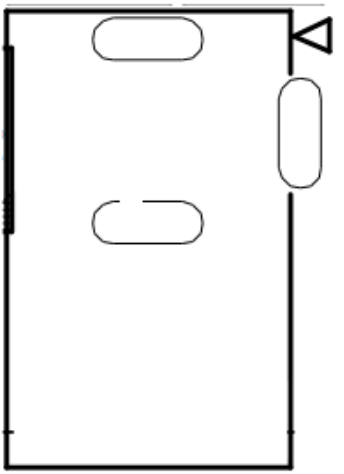
2.3.8 DP Connector (CN7)



Pin	Signal	Pin	Signal
1	DDI1_TXP_DP_0	2	GND
3	DDI1_TXN_DP_0	4	DDI1_TXP_DP_1
5	GND	6	DDI1_TXN_DP_1
7	DDI1_TXP_DP_2	8	GND
9	DDI1_TXN_DP_2	10	DDI1_TXP_DP_3

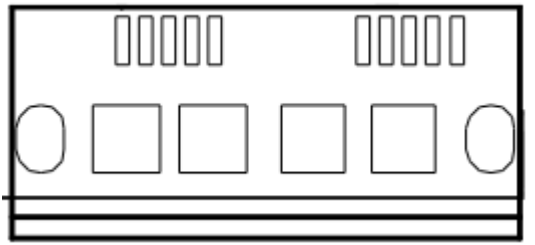
Pin	Signal	Pin	Signal
11	GND	12	DDI1_TXN_DP_3
13	GND	14	DDI1_AUXP_C
15	DDI1_AUXP_C	16	GND
17	DDI1_AUXN_C	18	DDI1_HPD
19	GND	20	+3.3V

2.3.9 Power Input (CN8)



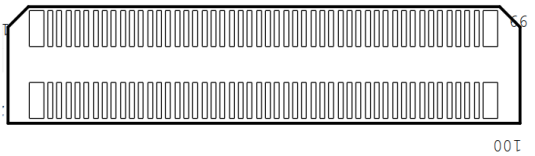
Pin	Signal	Pin	Signal
1	+12V	2	GND
3	GND		

2.3.10 Micro USB3.0 (CN9)



Pin	Signal	Pin	Signal
1	+V5P0_USB_OTG	2	USB2_C_DN0
3	USB2_C_DP0	4	USB_OTG_R_ID
5	GND	6	USB3_RXN_CON_P0
7	USB3_RXP_CON_P0	8	GND
9	USB3_TXN_CON_P0	10	USB3_TXP_CON_P0

2.3.11 DOCKING I (CN10)

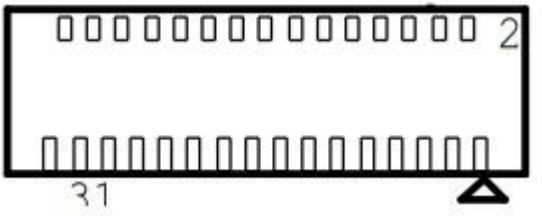


Pin	Signal	Pin	Signal
1	+V5A	2	+V5A
3	+V5A	4	+V5A
5	+V5A	6	+V5A
7	+V5A	8	+V5A
9	GND	10	GND
11	BUF_PLT_RST#	12	LPSS_UART1_RTS
13	PMU_PWRBTN_N	14	LPSS_UART1_CTS

Pin	Signal	Pin	Signal
15	PM_SLP_S3#_3P3	16	LPSS_UART1_TXD
17	PCIE_CLKREQ3#	18	LPSS_UART1_RXD
19	PCIE_WAKE3_N	20	GND
21	GND	22	CPU_prog_JTAG_TDO
23	SIO_SPI_0_TXD	24	CPU_prog_JTAG_TMS
25	SIO_SPI_0_RXD	26	HDMI1_CEC_D
27	SIO_SPI_0_CLK	28	CPU_prog_JTAG_TCK
29	SIO_SPI_0_FS0	30	CPU_prog_JTAG_TDI
31	SIO_SPI_0_FS1	32	ISH_GPIO_0
33	GND	34	ISH_GPIO_1
35	LPC_R_AD0	36	ISH_GPIO_2
37	LPC_R_AD1	38	ISH_GPIO_3
39	LPC_R_AD2	40	ISH_GPIO_4
41	LPC_R_AD3	42	ISH_GPIO_5
43	GND	44	ISH_GPIO_6
45	AVS_I2S2_MCLK	46	PWM0
47	AVS_I2S2_WS_SYNC	48	PWM1
49	AVS_I2S2_SDI	50	GND
51	AVS_I2S2_SDO	52	I2C_SDA6
53	GND	54	I2C_SCL6
55	PCIE_P5_USB3_P2_TXP	56	GND
57	PCIE_P5_USB3_P2_TXN	58	AVS_I2S2_BCLK
59	GND	60	BT_HOST_WAKE
61	PCIE_P5_USB3_P2_RXP	62	GND
63	PCIE_P5_USB3_P2_RXN	64	USB2_DP2
65	GND	66	USB2_DN2
67	PCIE_REFCLK3_P	68	GND

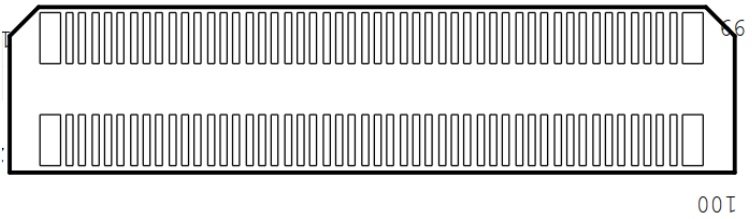
Pin	Signal	Pin	Signal
69	PCIE_REFCLK3_N	70	nSTATUS
71	GND	72	GND
73	I2C_SDA0	74	ISH_GPIO_7
75	I2C_SCL0	76	ISH_GPIO_8
77	GND	78	ISH_GPIO_9
79	I2C_SDA1	80	ISH_GPIO_10
81	I2C_SCL1	82	ISH_GPIO_11
83	GND	84	ISH_GPIO_12
85	GPIO_2	86	ISH_GPIO_13
87	GPIO_3	88	ISH_GPIO_14
89	GND	90	PMIC_IRQ_N
91	LPC_FRAME_R	92	FPGA_CLR
93	LPC_R_CLKOUT0	94	GND
95	LPC_CLKRU_N	96	FPGA_RST
97	INT_SERIRQ_R	98	FPGA_OE
99	CONFIG_SEL	100	FPGA_fw_reload

2.3.12 MIPI CSI (CN11)



Pin	Signal	Pin	Signal
1	GND	2	CAM1_RST_N
3	NC	4	I2C_SDA4
5	I2C_SCL4	6	GND
7	OSC_CLK_OUT_2	8	GND
9	USB3_TXN_CON_P0	10	MCSI_RX_DATAP_0
11	GND	12	MCSI_RX_DATAP_0
13	MCSI_RX_DATAP_1	14	GND
15	MCSI_RX_CLKN_0	16	MCSI_RX_CLKP_0
17	GND	18	MCSI_RX_DATAN_2
19	MCSI_RX_DATAP_2	20	GND
21	MCSI_RX_DATAN_3	22	MCSI_RX_DATAP_3
23	GND	24	+AVDD_CAM
25	GND_CAM	26	GND
27	+V1P8_CAM	28	GND
29	+V2P8_CAM	30	+V2P8_CAM
31	GND		

2.3.13 DOCKING II (CN12)

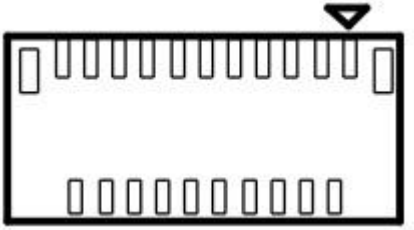


Pin	Signal	Pin	Signal
1	+12V	2	+12V
3	+12V	4	+12V
5	+12V	6	+12V
7	+12V	8	+12V
9	NC	10	NC
11	DDI0_HPD	12	GND
13	DDI0_TXP_1	14	DDI0_TXP_0
15	DDI0_TXN_1	16	DDI0_TXN_0
17	GND	18	GND
19	DDI0_TXP_2	20	DDI0_TXP_3
21	DDI0_TXN_2	22	DDI0_TXN_3
23	GND	24	GND
25	DDI0_AUXP	26	DDI0_DDCCLK
27	DDI0_AUXN	28	DDI0_DDCDATA
29	GND	30	GND
31	PCIE_REFCLK0_P	32	PCIE_REFCLK1_P
33	PCIE_REFCLK0_N	34	PCIE_REFCLK1_N
35	GND	36	GND
37	PCIE_RXP0	38	PCIE_RXP1
39	PCIE_RXN0	40	PCIE_RXN1
41	GND	42	GND

Pin	Signal	Pin	Signal
43	PCIE_TXP0	44	PCIE_TXP1
45	PCIE_TXN0	46	PCIE_TXN1
47	GND	48	GND
49	PCIE_REFCLK2_P	50	PCIE_P3_USB3_P4_TXP
51	PCIE_REFCLK2_N	52	PCIE_P3_USB3_P4_TXN
53	GND	54	GND
55	PCIE_TXP2	56	PCIE_P3_USB3_P4_RXP
57	PCIE_TXN2	58	PCIE_P3_USB3_P4_RXN
59	GND	60	GND
61	PCIE_RXP2	62	SATA_P1_USB3_P5_RXN
63	PCIE_RXN2	64	SATA_P1_USB3_P5_RXP
65	GND	66	GND
67	PCIE_P4_USB3_P3_TXP	68	SATA_P1_USB3_P5_TXN
69	PCIE_P4_USB3_P3_TXN	70	SATA_P1_USB3_P5_TXP
71	GND	72	GND
73	PCIE_P4_USB3_P3_RXP	74	SATA_RXN0
75	PCIE_P4_USB3_P3_RXN	76	SATA_RXP0
77	GND	78	GND
79	USB2_DP3	80	SATA_TXP0
81	USB2_DN3	82	SATA_TXN0
83	GND	84	GND
85	USB2_DP4	86	USB2_DP5
87	USB2_DN4	88	USB2_DN5
89	GND	90	GND
91	PWRON_PNLVDDEN	92	SATA_LED_N
93	PMU_RSTBTN_N	94	DDI0_BKLTCTL
95	PCIE_WAKE0_N	96	PCIE_CLKREQ0#

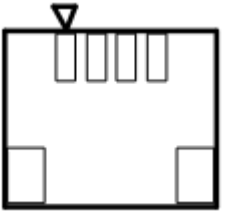
Pin	Signal	Pin	Signal
97	PCIE_WAKE1_N	98	PCIE_CLKREQ1#
99	PCIE_WAKE2_N	100	PCIE_CLKREQ2#

2.3.14 MIPI CSI 2CH (CN13)



Pin	Signal	Pin	Signal
1	GND	2	MCSI_DN_1
3	MCSI_DP_1	4	GND
5	MCSI_CLKN_0	6	MCSI_CLKP_0
7	GND	8	MCSI_DN_0
9	MCSI_DP_0	10	GND
11	+V1P2_CAM	12	+V1P8_CAM
13	GND	14	OSC_CLK_OUT_3
15	GND	16	I2C_SCL4
17	I2C_SDA4	18	CAM2_RST_N
19	FLASH_RESET_N	20	+V2P8_CAM
21	GND_CAM		

2.3.15 PWR Button Pin Header (CN14)



Pin	Signal	Pin	Signal
1	PWRBTN_N	2	GND
3	RSTBTN_N	4	GND

Chapter 3

Drivers Installation

3.1 Driver Download and Installation

**Please access https://up-community.org and go to the Downloads section to find the relevant driver.*