UP Xtreme Lite

Maker Board
UPX-WHL02

User's Manual 1st Ed

Last Updated: August 21, 2020

Copyright Notice

Acknowledgement

Packing List

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

Item	Quantity
UPX-WHL02	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 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

System	
Processor	8th generation Intel® Core i7/i5/i3/Celeron Processor SoC
Graphics	Intel® Graphics, GEN 9
I/O	RJ45 Ethernet Connector x 2 HDMI/DP STACK Connector x 1 Power Button / LED x 1 Audio Jack (Line out + MIC) x 1 DC connector (Lockable) x 1 10 pin USB2.0 [2 set] x 1 / HSUART x 1 SATA Connector with power connector (5V, GND) x 1 4 pin Fan connector x1 Power Button header x 1 Reset Pin header x 1 M.2 2230 E Key x 1 M.2 2280 M Key x 1 40-pin HAT Connector x 1 M.2 3042/3052 B Key x 1 10 pin RS232/422/485 pin header x 2
Camera	—
USB	USB3.2 Gen 2 Type-A x 2 (front) USB3.2 Gen 2 Type-A x 2 (rear) USB2.0 x 1 (header)

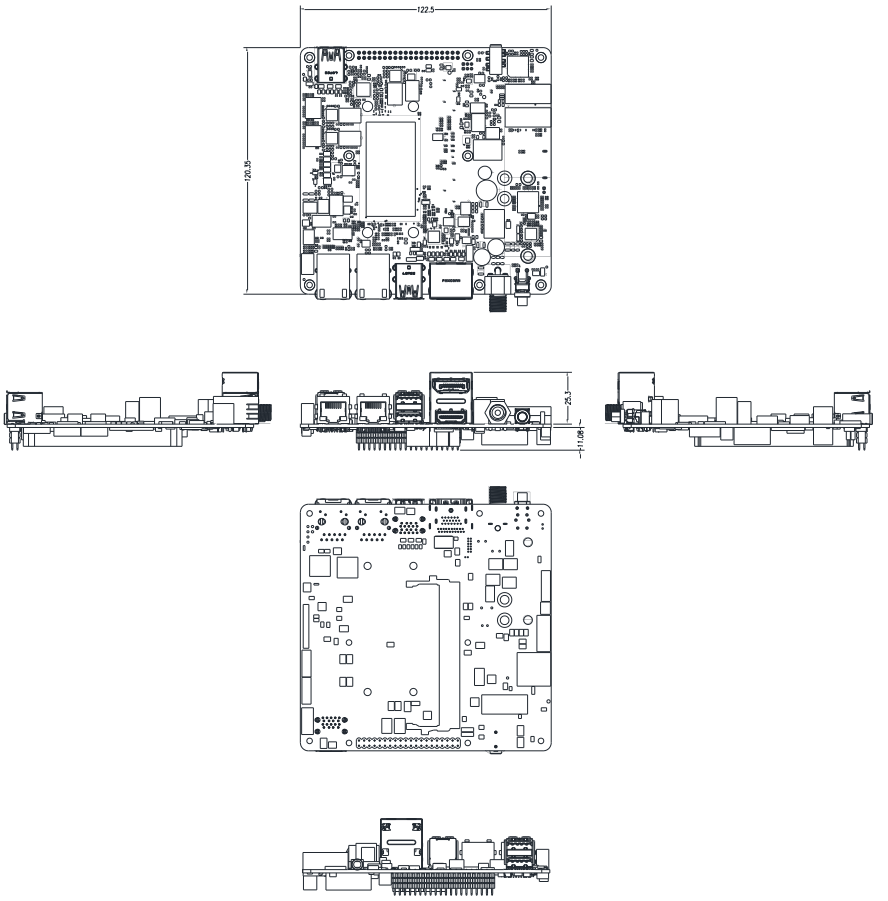
System

Expansion	M.2 2230 E Key x 1
	M.2 2280 M Key x 1
	M.2 3042/3052 B Key x 1
	40-pin HAT Connector x 1
RTC	RTC battery, CR2032 x 1
Power	12V - 24VDC
Dimension	122 x 120 mm
Memory	DDR4 SO-DIMM slot x 1, up to 16GB
Storage	SATA3 (6Gb/s) x 3:
	a. SATA connector x 1
	b. M.2 2280 SATA/PCIe[x2] (option) x 1
Display Interface	HDMI 1.4 x 1
	DP 1.2 x 1
Ethernet	Intel i211 GbE port x2
OS Support	Windows 10
	Linux Ubuntu 18.04 with Kernel 5.0
	Linux Yocto 2.7 with Kernel 4.19
Operating Temperature	32°F ~ 140°F (0°C ~ 60°C)
Operation Humidity	0% ~ 90% relative humidity, non-condensing
Certification	CE/FCC class A, RoHS Compliant, REACH

Chapter 2

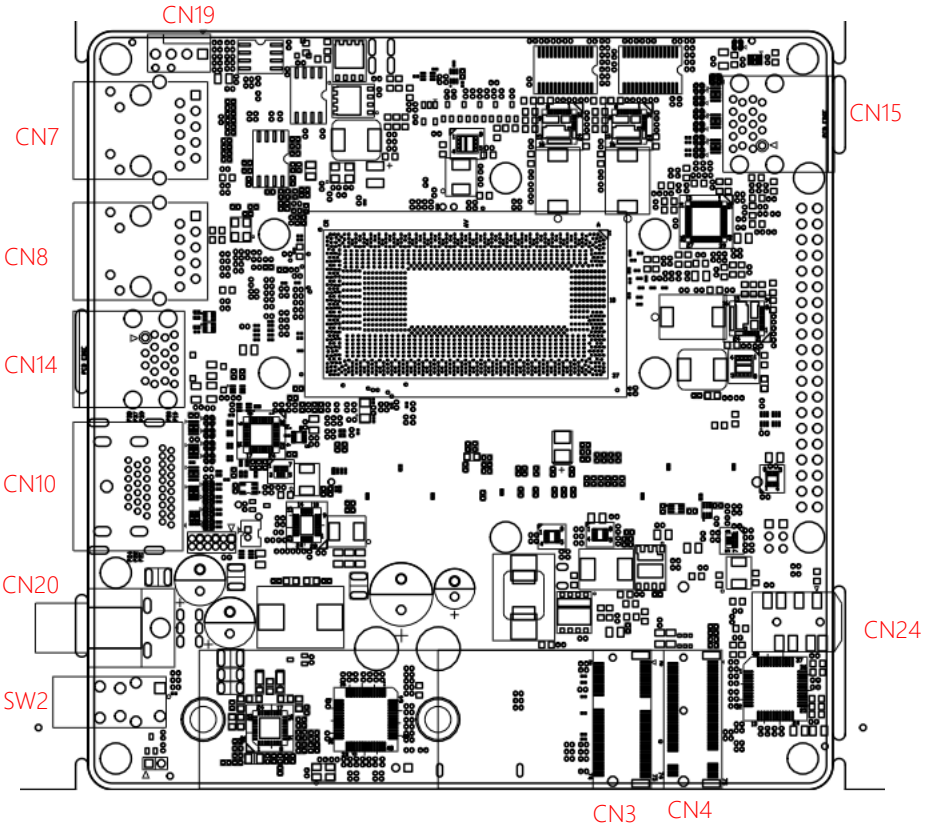
Hardware Information

2.1 Dimensions



2.2 Jumpers and Connectors

Top:



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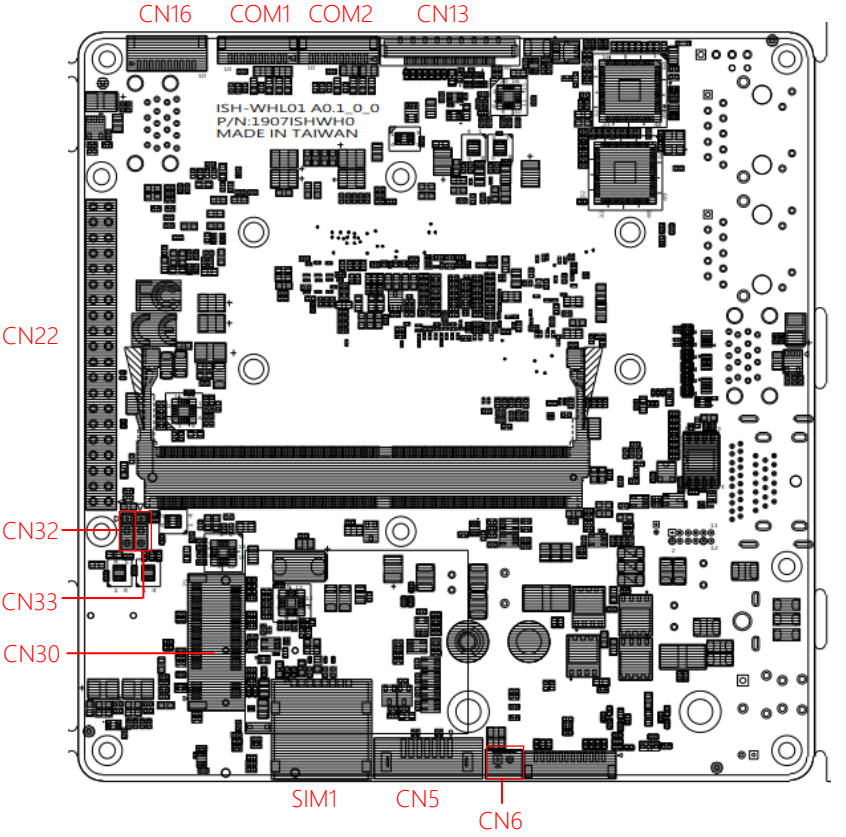
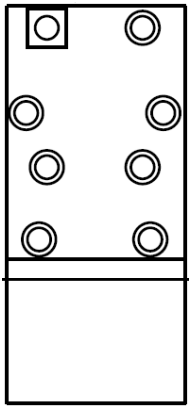

CN16
COM1
COM2
CN13
ISH-WHL01 A0.1_0_0
P/N:1907ISHWH0
MADE IN TAIWAN
CN22
CN32
CN33
CN30
SIM1
CN5
CN6

2.3 List of Jumpers and Connectors

Please refer to the table below for all of the board's jumpers, connectors and switches.

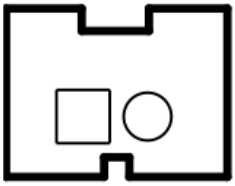
Label	Function
CN1	RTC
CN3	M.2 2230 E Key
CN4	M.2 2280 M Key
CN5	SATA Connector
CN6	SATA Power
CN7	LAN1
CN8	LAN2
CN10	HDMI/DP
CN14	USB Type A Connector 1
CN15	USB Type A Connector 1
CN16	USB 2.0 1x10P Wafer
CN19	FAN
CN20	DC Jack
CN22	HAT 40
CN24	Audio Jack
CN30	M.2 3042/3052 B key
CN32	5V Jumper
CN33	3.3V Jumper
COM1	RS232
COM2	RS232
SIM1	SIM Card
SW2	Power Button

2.3.1 Power Button (SW2)



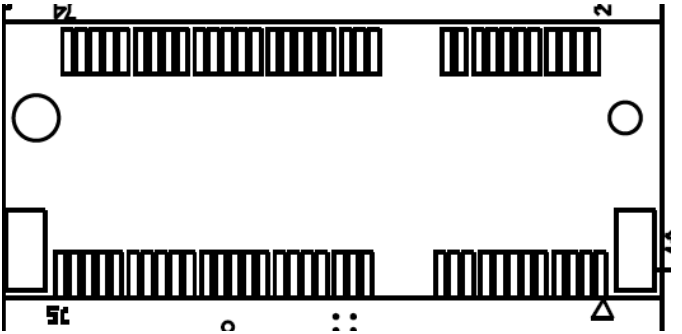
Pin	Signal	Pin	Signal
1	PWR_SW#_CTL_R	2	PWR_SW#_CTL_R
3	GND	4	GND
5	GND	6	GND
L1	SW1_LED_P	L2	SW1_LED_N

2.3.2 RTC (CN1)



Pin	Signal
1	RTC_VCC
2	GND

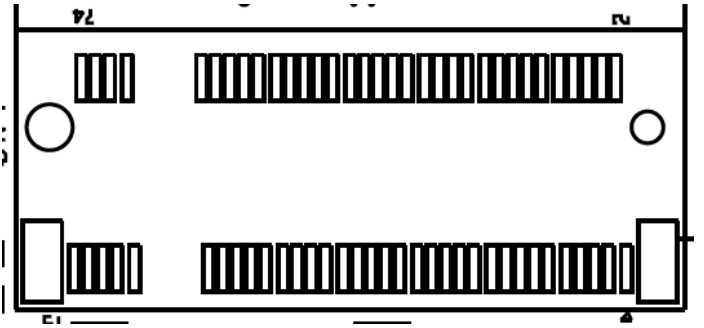
2.3.3 M.2 2230 E Key (CN3)



Pin	Signal	Pin	Signal
1	GND	2	+3.3VAUX_WIFI
3	BT_DP	4	+3.3VAUX_WIFI
5	BT_DM	6	NC
7	GND	8	NC
9	CNV_WR_LANE1_DN	10	CNV_RF_RST#
11	CNV_WR_LANE1_DP	12	NC
13	GND	14	CNV_PCMOUT_CLKREQ_R
15	CNV_WR_LANE0_DN	16	NC
17	CNV_WR_LANE0_DP	18	GND
19	GND	20	NC
21	CNV_WR_CLK_DN	22	CNV_RGI_RSP_R
23	CNV_WR_CLK_DP	24	NC
25	NC	26	NC
27	NC	28	NC
29	NC	30	NC
31	NC	32	GPP_F6_CNV_RGI_DT_UAR
33	GND	34	CNV_BRI_DT_R

Pin	Signal	Pin	Signal
35	PCIE_C_TXP10	36	CNV_BRI_DT
37	PCIE_C_TXN10	38	NC
39	GND	40	NC
41	PCIE_P10_RX_DP	42	NC
43	PCIE_P10_RX_DN	44	NC
45	GND	46	NC
47	PCIE_REFCLK5_P1_P	48	NC
49	PCIE_REFCLK5_P1_N	50	SUS_CLK_CPU
51	GND	52	WIFI_RST#
53	PCIE_M2_CLKREQ#	54	BT_EN
55	WAKE_M2_N	56	WIFI_EN
57	GND	58	NC
59	CNV_WT_LANE1_DN	60	NC
61	CNV_WT_LANE1_DP	62	NC
63	GND	64	CLKIN_XTAL_LCP_R
65	CNV_WT_LANE0_DN	66	NC
67	CNV_WT_LANE0_DP	68	NC
69	GND	70	NC
71	CNV_WT_CLK_DN	72	3.3VAUX_WIFI
73	CNV_WT_CLK_DP	74	3.3VAUX_WIFI
75	GND	76	GND
77	GND	78	

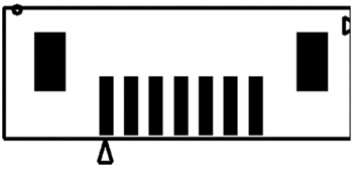
2.3.4 M.2 2280 M Key (CN4)



Pin	Signal	Pin	Signal
1	GND	39	GND
2	+3.3V	40	SOC_I2C1_SCL
3	GND	41	PCIE_TXN0
4	+3.3V	42	SOC_I2C1_SDA
5	NC	43	PCIE_TXP0
6	FULL_CARD_PWR_OFF#	44	NC
7	NC	45	GND
8	NC	46	NC
9	NC	47	PCIE_RXN0
10	NC	48	NC
11	NC	49	PCIE_RXP0
20	NC	50	PLT_RST#
21	GND	51	GND
22	NC	52	PCIE_CLKREQ#
23	NC	53	PCIE_CLK_N
24	NC	54	WAKE_M2
25	NC	55	PCIE_CLK_P

Pin	Signal	Pin	Signal
26	NC	56	NC
27	GND	57	GND
28	NC	58	NC
29	PCIE_P15_SATA_P1B_RXN	67	NC
30	NC	68	NC
31	PCIE_P15_SATA_P1B_RXP	69	NC
32	NC	70	+3.3V
33	GND	71	GND
34	NC	72	+3.3V
35	PCIE_P15_SATA_P1B_TXN	73	GND
36	NC	74	+3.3V
37	PCIE_P15_SATA_P1B_TXP	75	GND
38	VPU_EN		

2.3.5 SATA Connector (CN5)

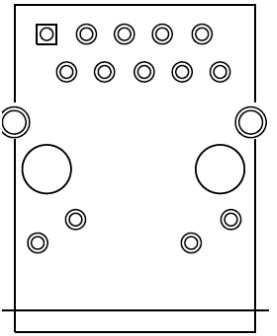


Pin	Signal	Pin	Signal
1	GND	2	SATA_TXP0_C
3	SATA_TXN0_C	4	GND
5	SATA_RXN0_C	6	SATA_RXP0_C
7	GND		

2.3.6 SATA Power (CN6)

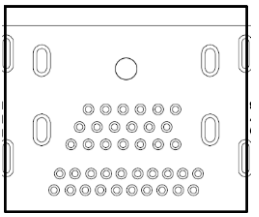
Pin	Signal	Pin	Signal
1	+V5S	2	GND

2.3.7 LAN1/ LAN2 (CN7/CN8)



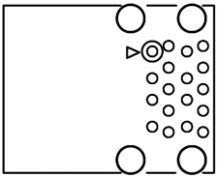
Pin	Signal	Pin	Signal
1	LAN1_TMDI0+	5	LAN1_TMDI2-
2	LAN1_TMDI0-	6	LAN1_TMDI1-
3	LAN1_TMDI1+	7	LAN1_TMDI3+
4	LAN1_TMDI2+	8	LAN1_TMDI3-

2.3.8 HDMI/ DP (CN10)



Pin	Signal	Pin	Signal
P1	DDI0_TXP_DP_0	P2	GND
P3	DDI0_TXN_DP_0	P4	DDI0_TXP_DP_1
P5	GND	P6	DDI0_TXN_DP_1
P7	DDI0_TXP_DP_2	P8	GND
P9	DDI0_TXN_DP_2	P10	PORT0_CLK+
P11	GND	P12	PORT0_CLK-
P13	CONFIG1	P14	CONFIG2
P15	DP_AUX_P	P16	GND
P17	DP_AUX_N	P18	DDI0_TYPE_C_HPD
P19	GND	P20	3.3V
P21	DDI1_TXP_HDMI_0	P22	GND
P23	DDI1_TXN_HDMI_0	P24	DDI1_TXP_HDMI_1
P25	GND	P26	DDI1_TXN_HDMI_1
P27	DDI1_TXP_HDMI_2	P28	GND
P29	DDI1_TXN_HDMI_2	P30	DDI1_CLK+_HDMI
P31	GND	P32	DDI1_CLK-_HDMI
P33	HDMI1_CEC_D	P34	NC
P35	DDC_CLK	P36	DDC_DATA
P37	GND	P38	5V
	DDI1_TYPE_C_HPD		

2.3.9 USB Type A Connector (CN14/ CN15)

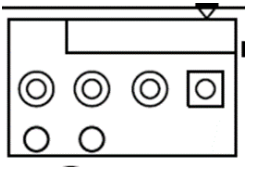


Pin	Signal	Pin	Signal
1	5V	2	USB2_D1-
3	USB2_D1+	4	GND
5	USB3_RX1-	6	USB3_RX1+
7	GND	8	USB3_TX1-
9	USB3_TX1+	10	5V
11	USB2_D2-	12	USB2_D2+
13	GND	14	USB3_RX2-
15	USB3_RX2+	16	GND
17	USB3_TX2-	18	USB3_TX2+

2.3.10 USB 2.0 1x10P Wafer (CN16)

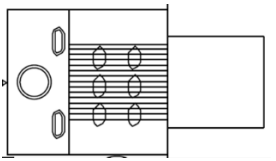
Pin	Signal	Pin	Signal
1	5V	2	USB2_D1-
3	USB2_D1+	4	GND
5	NC	6	NC
7	NC	8	NC
9	UART_RX	10	UART_TX

2.3.11 FAN (CN19)



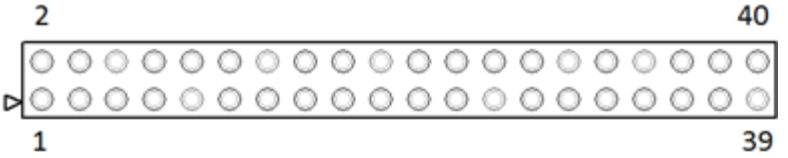
Pin	Signal	Pin	Signal
1	GND	2	VCC_FAN_CPU_CON
3	FAN_TAC_CPU_CON	4	FAN_CTL_CPU_CON

2.3.12 DC Jack (DC: 12~24V) (CN20)



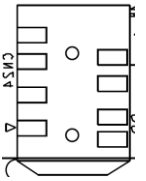
Pin	Signal
1	DC_IN
2	GND
3	GND

2.3.13 HAT 40 (CN22)



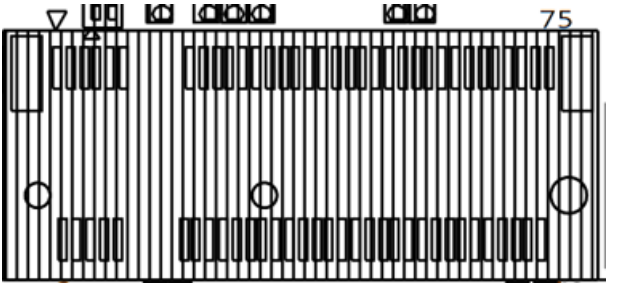
Pin	Signal	Pin	Signal
1	+V3.3_HAT	2	+V5_HAT
3	+V3.3_HAT	4	+V5_HAT
5	+V1.8_HAT	6	VIO_3V3OR1V8
7	+V1.8_HAT	8	ISH_GPIO_0
9	GND	10	ISH_GPIO_1
11	ISH_I2C0_SCL	12	ISH_GPIO_2
13	ISH_I2C0_SDA	14	ISH_GPIO_3
15	GND	16	ISH_GPIO_4
17	ISH_I2C1_SCL	18	ISH_GPIO_5
19	ISH_I2C1_SDA	20	ISH_GPIO_6
21	GND	22	ISH_GPIO_7
23	ISH_I2C2_SCL	24	ISH_GPIO_8
25	ISH_I2C2_SDA	26	ISH_GPIO_9
27	GND	28	ISH_GPIO_10
29	ISH_UART0_TXD	30	GND
31	ISH_UART0_RXD	32	ISH_SPI_CS0#
33	GND	34	ISH_SPI_CS1#
35	ISH_UART1_TXD	36	ISH_SPI_CLK
37	ISH_UART1_RXD	38	ISH_SPI_MISO
39	GND	40	ISH_SPI_MOSI

2.3.14 Audio Jack (CN24)



Pin	Signal	Pin	Signal
1	MIC_LR_CN	2	AGND
3	LOUT_R	4	NC
5	NC	6	NC
7	NC	8	LOUT_L

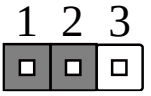
2.3.15 M.2 3042/3052 B Key (CN30)



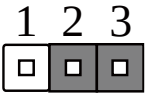
Pin	Signal	Pin	Signal
1	NC	39	GND
2	+3.3V	40	NC
3	GND	41	PCIE_P12_SATA_P1A_RXP
4	+3.3V	42	NC
5	NC	43	PCIE_P12_SATA_P1A_RXN
6	FULL_CARD_PWR_OFF#	44	NC

Pin	Signal	Pin	Signal
7	USB_D+	45	GND
8	3GPW_EN	46	NC
9	USB_D-	47	PCIE_P12_SATA_P1A_TXN
10	NC	48	NC
11	GND	49	PCIE_P12_SATA_P1A_TXP
20	NC	50	PLT_RST#
21	NC	51	GND
22	NC	52	PCIE_CLKREQ#
23	NC	53	PCIE_REFCLK2_N
24	NC	54	WAKE_M2
25	NC	55	PCIE_REFCLK2_P
26	NC	56	NC
27	GND	57	GND
28	NC	58	NC
29	PCIE_P5_USB31_P5_RXN	67	WWAN_RESET
30	P_UIM_RST	68	NC
31	PCIE_P5_USB31_P5_RXP	69	M.2_3052_DET
32	P_UIM_CLK	70	+3.3V
33	GND	71	GND
34	P_UIM_DAT	72	+3.3V
35	PCIE_P5_USB31_P5_TXN	73	GND
36	P_UIM_PWR	74	+3.3V
37	PCIE_P5_USB31_P5_TXP	75	GND
38	M.2_3052_DEV		

2.3.16 5V Jumper (CN32)

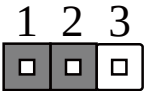


A (Default)

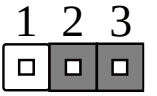


S

2.3.17 3.3V Jumper (CN33)



A (Default)

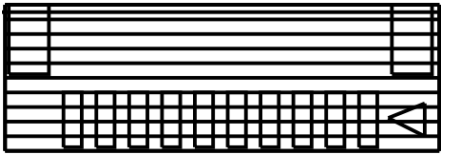


S

2.3.18 SIM Card Slot (SIM1)

Pin	Pin Name	Signal Type	Signal Level
1	UIM_PWR	PWR	
2	UIM_RST	IN	
3	UIM_CLK	IN	
4	GND	GND	
5	UIM_VPP	PWR	
6	UIM_DATA	I/O	

2.3.19 COM Port 1/ Port 2 (COM1/COM2)



Pin	Signal
1	DCDA / RS422TX- / RS485-
2	RXA / RS422TX+ / RS485+
3	TXA / RS422RX+
4	DTRA / RS422RX-
5	GND
6	DSRA
7	RTSA
8	CTSA
9	RIA

Chapter 3

UP Framework SDK Installation

3.1 Introduction

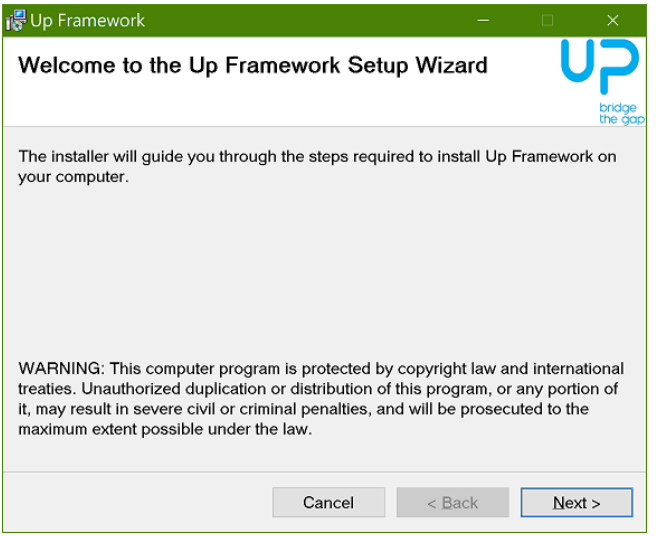
This section provides instructions for the installation of the UP Framework SDK. Instructions are provided for Windows 10 and Windows IoT Core. You can download the latest version of UP Framework SDK from the UP community:

https://downloads.up-community.org/download/up-sdk-for-windows-10-and-windows-iot/

3.2 Installation for Windows 10

Step 1

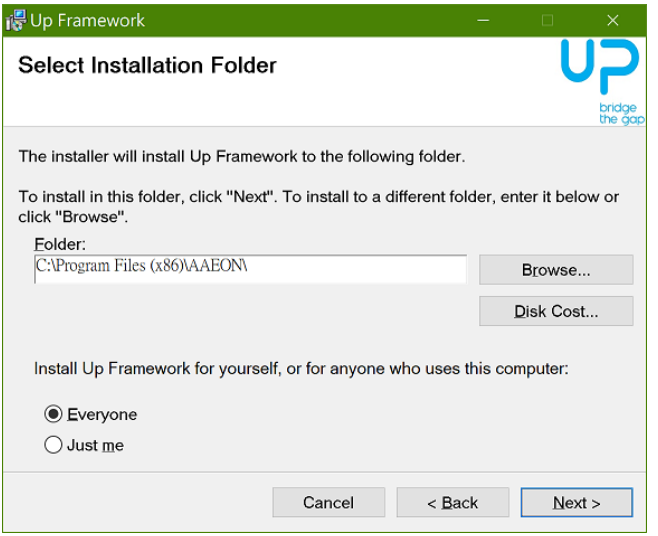
Locate the downloaded file UpFrameworkSetup.msi and run the installer. Press "Next" to begin the setup process.



Step 2

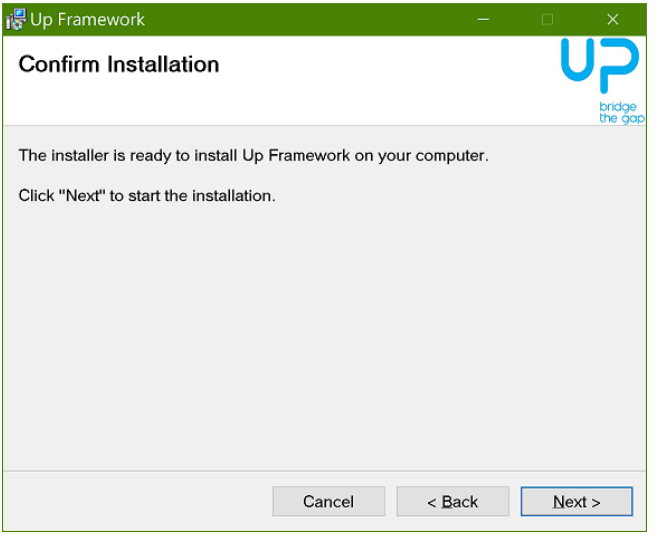
Select the installation folder. Default destination path is C:\Program Files(x86)\AAEON\

You may also choose to install the UP Framework SDK for all users or only the current user. Press "Next" to continue installation.



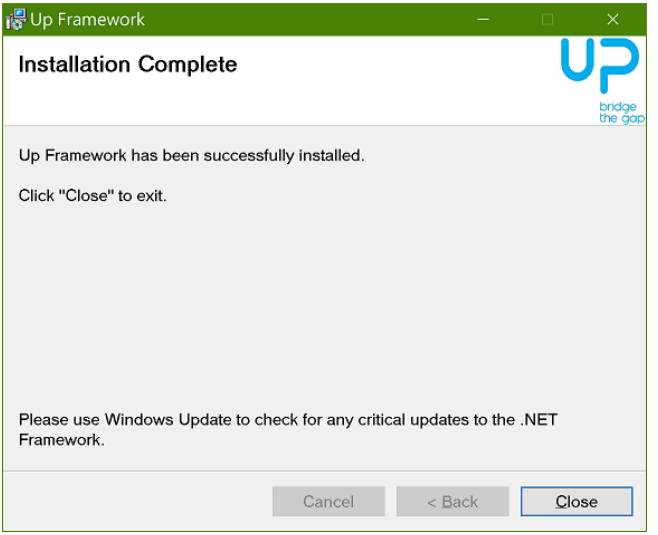
Step 3

Press "Next" to confirm the installation.



Step 4

Press "Close" to exit once setup is complete.



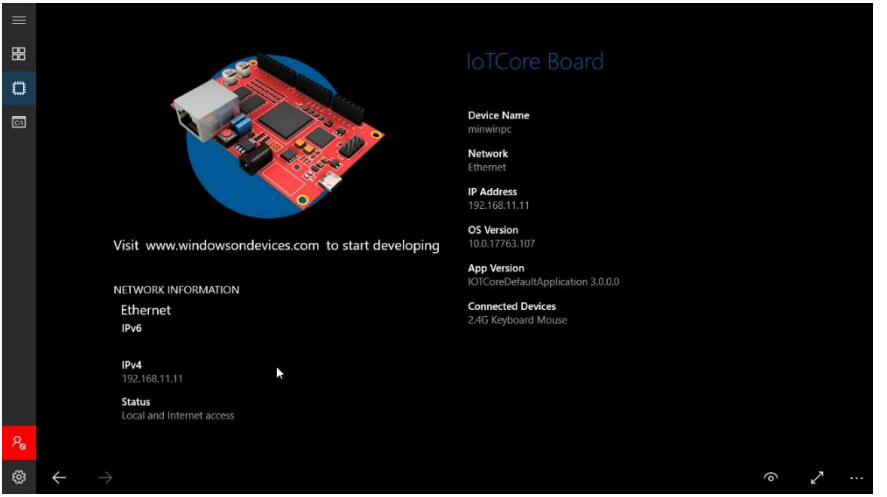
3.3 Installation for Windows IoT Core

Before you begin, make sure you have downloaded and installed the latest version of the Windows IoT Core image from the UP community.

Installation requires using a connected PC with the UP Framework SDK software downloaded and saved. **Note:** Make sure the UP IoT Core device is connected to the same network as the PC you are using to install the software from.

Step 1

Turn on your UP IoT Core device and note the IP address at the home screen.

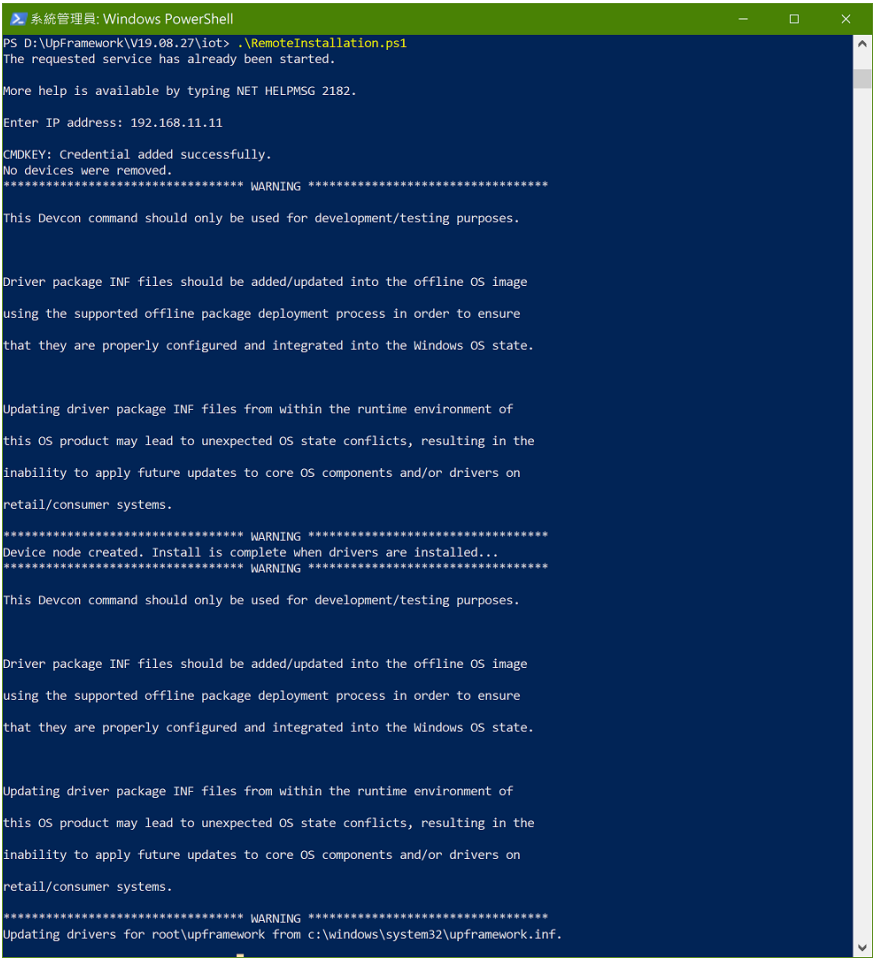


Step 2

Download the UP Framework SDK to your PC and unzip the files.

Open PowerShell as an Administrator. Run the command `RemoteInstallation.ps1` to install the UP Framework SDK.

Enter the IP address of the UP IoT Core device when prompted.



Appendix A

Cables and Connectors

A.1 Cables and Connectors

This table provides detailed information about the cables and connectors used by the UP Xtreme Lite (UPX-WHL02). If you have any questions about the configuration of your board, please contact your AAEON sales representative.

Label	Connector PN	Description	Mating Cable PN	Mating Cable Description
CN1	1655902034	RTC Battery Connector	175011301K	Lithium Battery. CR2032H.3V.240mAH.w/cable 90mm. DIP.Battery power. BP-CR2032-M90-001
CN3	1654207533	M.2 2230 E KEY	N/A	
CN4	165420753B	M.2 2280 M key	N/A	
CN5	1654907009	SATA	N/A	
CN6	1655302025	SATA POWER	N/A	
CN7	1652814207	LAN1 (GbE RJ 45)	N/A	
CN8	1652814207	LAN1 (GbE RJ 45)	N/A	
CN10	1654403931	HDMI 1.4 + DP 1.2	N/A	
CN14	1654801832	2x USB 3.2 Gen2 (10Gbps)	N/A	
CN15	1654801832	2x USB 3.2 Gen2 (10Gbps)	N/A	
CN16	1655810131	10-pin USB 2.0 + HSUART Connector	N/A	
CN19	165500401A	CPU Fan Connector	TH1UISH010	(TF).CPU Cooler.12V.5400RPM.Smart FAN.75X70X27mm
CN20	165250320K	DC JACK (12 ~24 VDC Input)	N/A	
CN22	165302020L	40-pin HAT Connector	N/A	

Label	Connector PN	Description	Mating Cable PN	Mating Cable Description
CN24	1652708203	AUDIO JACK	N/A	
CN30	1654207536	M.2 B key	N/A	
CN32	165300310G	5V JUMP	N/A	
CN33	165300310G	3.3V JUMP	N/A	
SIM1	1654900800	SIM CARD	N/A	
COM1	1655901000	10-pin RS 232 Header	1701100180	COM Cable.D-SUB 9P(M).10P1.0mm Housing.15cm
COM2	1655901000	10-pin RS 232 Header	1701100180	COM Cable.D-SUB 9P(M).10P1.0mm Housing.15cm
SW2	1601615600	Power Button with LED	N/A	