UP 710S

Maker Board
UP-ASL02

User's Manual 1st Ed

Last Updated: November 14, 2024

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Packing List

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

Item	Quantity
● UP 710S with Passive Heatsink	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	X	X	O	O	O	O
外部信号连接器及线材	X	X	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	X	X	O	O	O	O
Wires & Connectors for External Connections	X	X	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

Product Specifications

1.1 Specifications

System	
Processor	Intel® Processor N200
	Intel® Processor N97
	Intel® Processor N100
	Intel® Processor N50
Graphics	Intel® UHD Graphics for 12th Gen Intel® Processors
Memory	Up to 8GB LPDDR5
Storage	Up to 128GB eMMC
I/O	HDMI 1.4b
	3.3V I2C x 2 + PWM x 2 via 8-Pin Wafer
	3.3V SPI x 2 via 10-Pin Wafer
	GPIO x 8 via 10-Pin Wafer
	RS-232/422/485 x 1 via 10-Pin Wafer
Camera	—
USB	USB 2.0 x 2 (from 10-Pin Wafer x 1)
	USB 3.2 Gen 2 (Type-A) x 3
Expansion	M.2 2230 E-Key x 1
Display Interface	HDMI 1.4b x 1
Ethernet	RJ-45, GbE x 1
Security	Onboard TPM 2.0
RTC	Yes
OS Support	Microsoft® Windows 10/11
	Ubuntu 22.04 LTS
	Yocto 5.1

Power Requirement

Power	12V DC-in, 5A
Power Supply Type	AT/ATX
Power Consumption (Typical)	30W ~ 36W

Mechanical

Dimension	3.34" x 2.20" (85mm x 56mm)
Net Weight	0.33 lb. (0.15Kg)
Gross Weight	0.44 lb. (0.20Kg)

Environmental

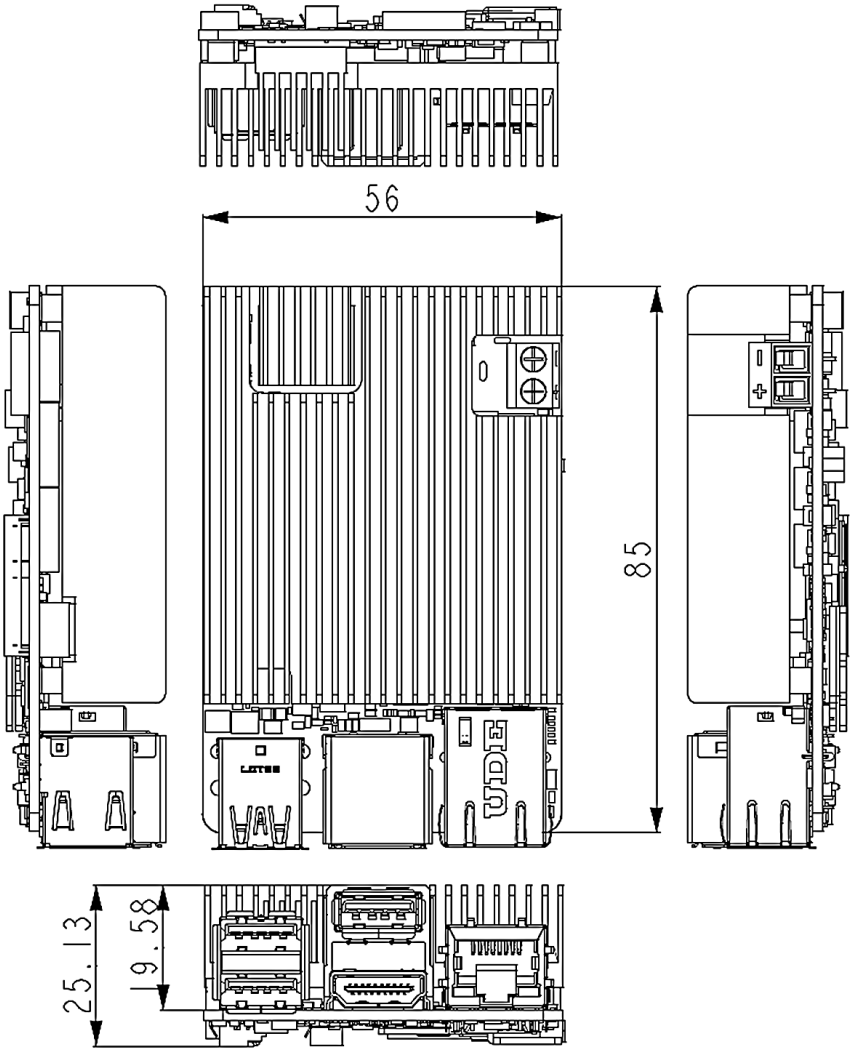
Operating Temperature	32°F ~ 140°F (0°C ~ 60°C) / 0.5 airflow
Operation Humidity	0% ~ 90% relative humidity, non-condensing
MTBF	685,218 Hours
Certification	CE/FCC Class A, RoHS Compliant, REACH

Chapter 2

Hardware Information

2.1 Dimensions

Top



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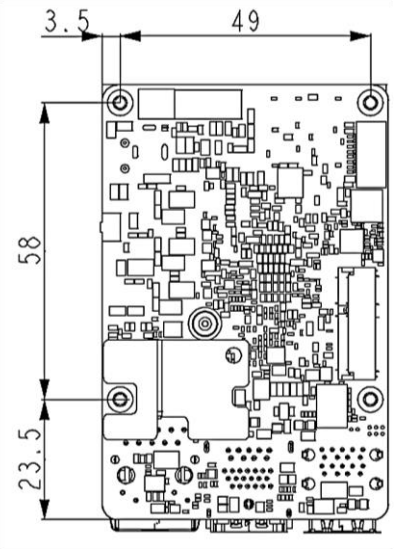
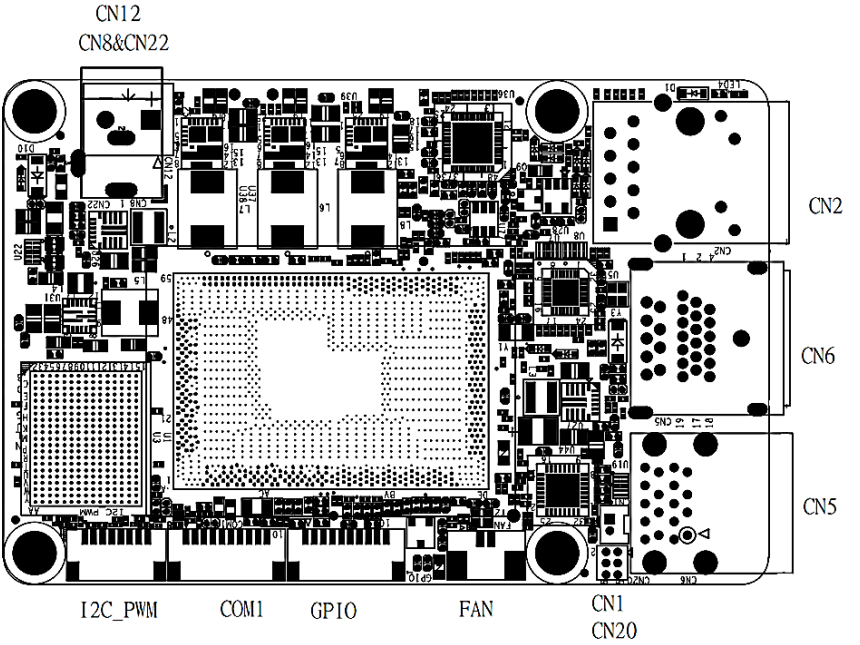


2.2 Jumpers and Connectors

Top:



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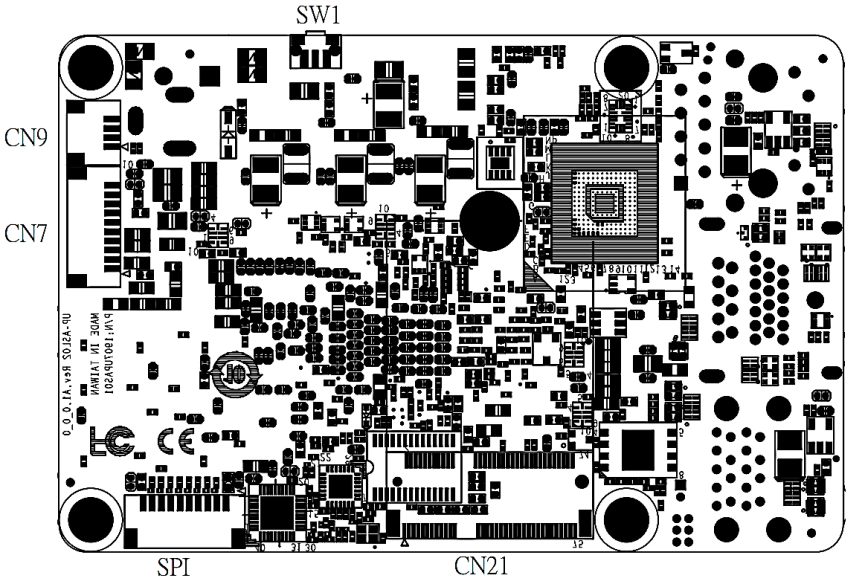
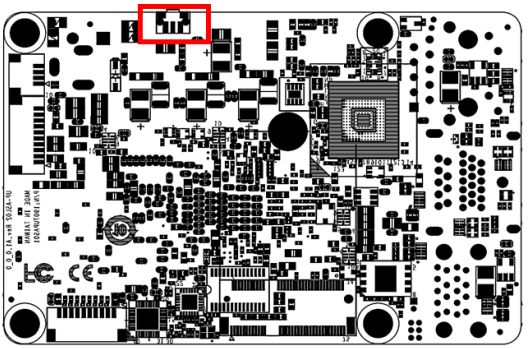


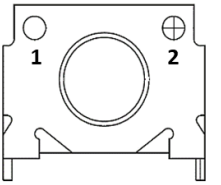
2.3 List of Jumpers and Connectors

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

Label	Function
SW1	Power Button
CN1	RTC
CN2	LAN Port
CN5	HDMI/USB Type-A
CN6	Dual USB Type-A Port
CN7	USB 2.0/UART 1x10P Wafer
CN8	DC Power Jack
CN9	Front Panel 1x4P Wafer
CN12	DC Terminal Block
CN20	BIOS Update
CN21	M.2 2280 E-Key Slot
CN22	DC Power Jack
FAN	Fan Connector
SPI	SPI x 2
COM1	RS-232/422/485
GPIO	GPIO x 8
I2C_PWM	I2C x 2 & PWM x 1

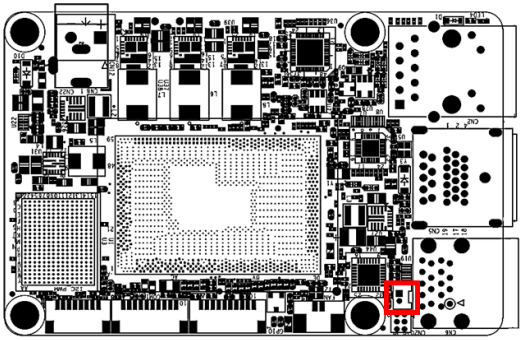
2.3.1 Power Button (SW1)

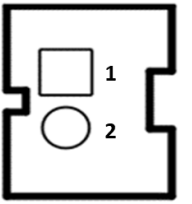




Pin	Signal	Pin	Signal
1	PWR_SW#	2	GND

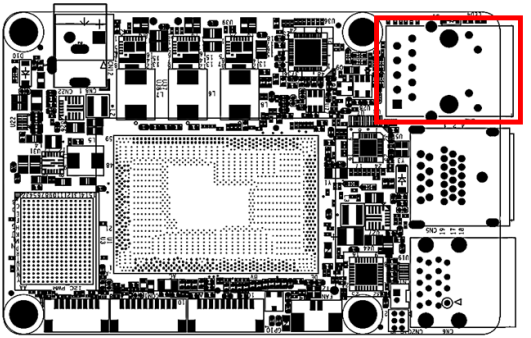
2.3.2 RTC (CN1)

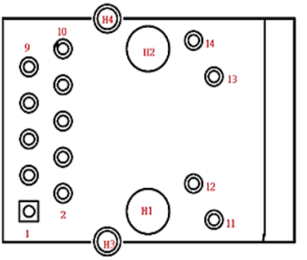




Pin	Signal	Pin	Signal
1	RTC_VCC	2	GND

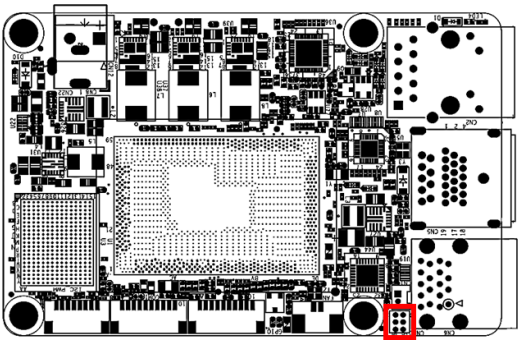
2.3.3 LAN Port (CN2)

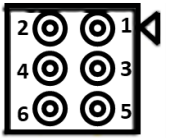




Pin	Signal	Pin	Signal
1	LAN1_MDI0+	2	LAN1_MDI0-
3	LAN1_MDI1+	4	LAN1_MDI1-
5	CT_GND	6	CT_GND
7	LAN1_MDI2+	8	LAN1_MDI2-
9	LAN1_MDI3+	10	LAN1_MDI3-
11	LAN Link LED 1000#	12	LAN Link LED 100#
13	LAN Active LED_N	14	LAN Active LED_P
H1	NC	H2	NC
H3	Chassis GND	H4	Chassis GND

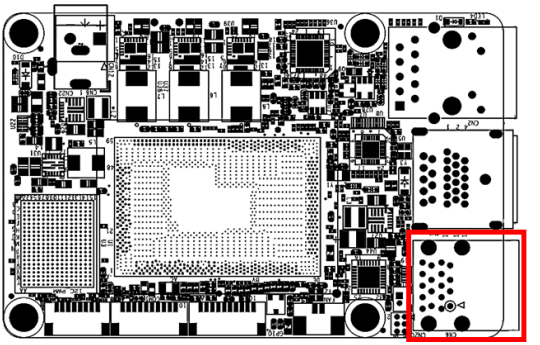
2.3.4 BIOS Update (CN20)

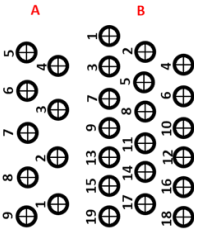




Pin	Signal	Pin	Signal
1	SPI _MISO	2	SPI _CLK
3	GND	4	SPI _CS0#
5	1.8V for SPI Flash	6	SPI _MOSI

2.3.5 HDMI/USB Type-A (CN5)

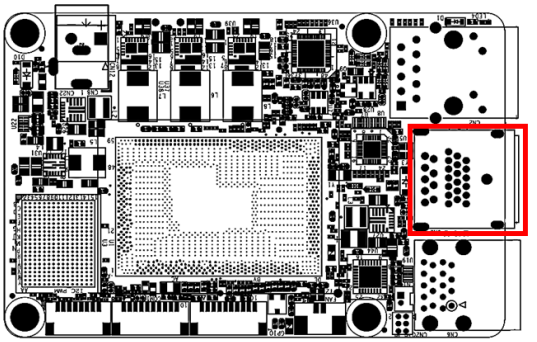


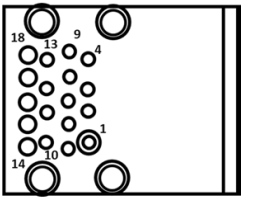


Pin	Signal	Pin	Signal
A1	HDMI_TMDS_TXP2	A2	GND
A3	HDMI_TMDS_TXN2	A4	HDMI_TMDS_TXP1
A5	GND	A6	HDMI_TMDS_TXN1
A7	HDMI_TMDS_TXP0	A8	GND

Pin	Signal	Pin	Signal
A9	HDMI_TMDS_TXN0	A10	HDMI_TMDS_Clock_P
A11	GND	A12	HDMI_TMDS_Clock_N
A13	NC	A14	NC
A15	HDMI_DDC_Clock	A16	HDMI_DDC_Data
A17	GND	A18	5V@1A for HDMI
A19	HDMI Hot Plug detect pin		
B1	5V@0.9A for USB 3.2	B2	USB2.0_DN3
B3	USB2.0_DP3	B4	GND
B5	USB3.2_RXN3	B6	USB3.2_RXP3
B7	GND	B8	USB3.2_TXN3
B9	USB3.2_TXP3		

2.3.6 Dual USB Type-A Port (CN6)

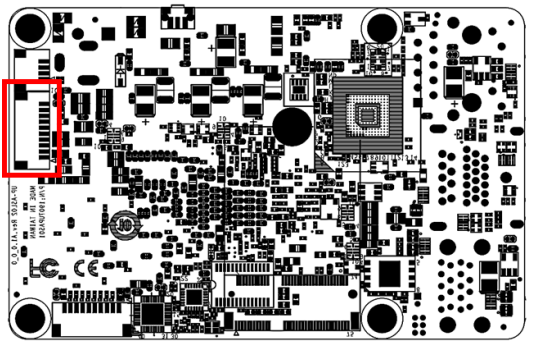


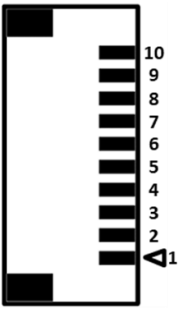


Pin	Signal	Pin	Signal
1	5V@0.9A for USB 3.2	2	USB2.0_DN1
3	USB2.0_DP1	4	GND
5	USB3.2_RXN1	6	USB3.2_RXP1
7	GND	8	USB3.2_TXN1
9	USB3.2_TXP1	10	5V@0.9A for USB 3.2
11	USB2.0_DN2	12	USB2.0_DP2
13	GND	14	USB3.2_RXN2
15	USB3.2_RXP2	16	GND
17	USB3.2_TXN2	18	USB3.2_TXP2

Pin	Signal	Pin	Signal
H1	GND	H2	GND
H3	GND	H4	GND

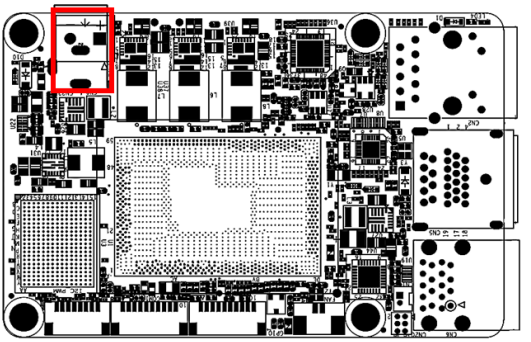
2.3.7 USB 2.0/UART 1x10P Wafer (CN7)

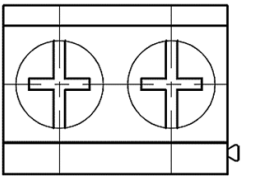




Pin	Signal	Pin	Signal	Pin	Signal
1	UART_TX	2	UART_RX	3	GND
4	USB2.0_DP4	5	USB2.0_DN4	6	5V@0.5A for USB2.0
7	GND	8	USB2.0_DP5	9	USB2.0_DN5
10	5V@0.5A for USB2.0				

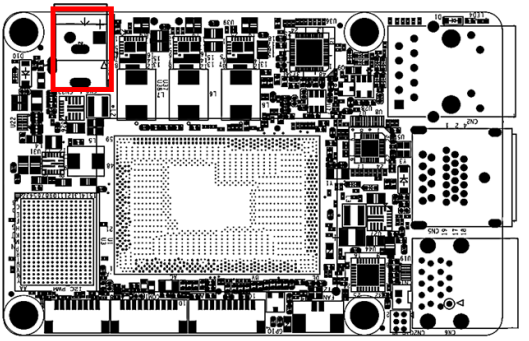
2.3.8 DC Terminal Block (CN12)

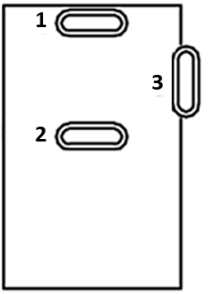




Pin	Signal	Pin	Signal
1	+12V	2	GND

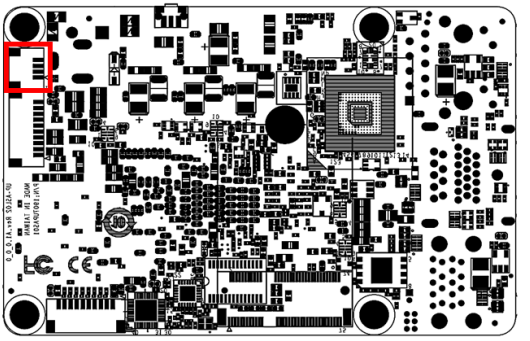
2.3.9 DC Power Jack (CN8/CN22)

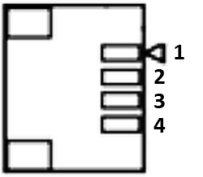




Pin	Signal	Pin	Signal
1	+12V	2	GND
3	GND		

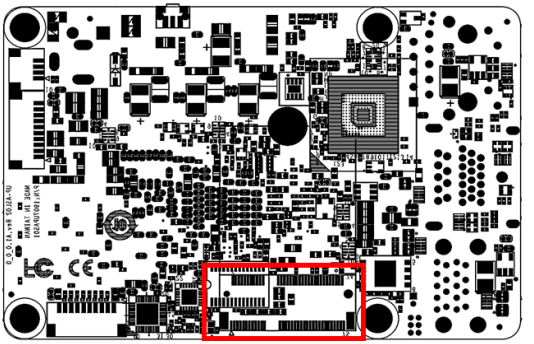
2.3.10 Front Panel Wafer (CN9)

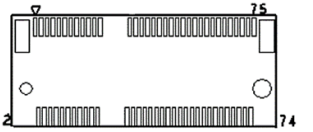




Pin	Signal	Pin	Signal
1	Power Button#	2	GND
3	Reset Button#	4	GND

2.3.11 M.2 2280 E-Key Slot (CN21)

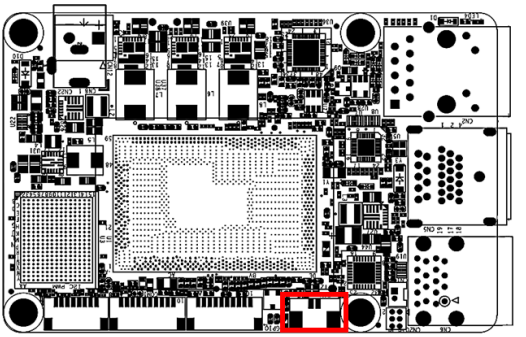


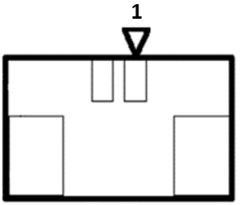


Pin	Signal	Pin	Signal	Pin	Signal
1	GND	2	3.3V	3	USB2_P8_DP
4	3.3V	5	USB2_ P8_DN	6	NC
7	GND	8	NC	9	CNV_WR_LANE1_DN
10	CNV_RF_RESET	11	CNV_WR_LANE1_DP	12	NC

Pin	Signal	Pin	Signal	Pin	Signal
13	GND	14	CNV_MODEM_CLKREQ	15	CNV_WR_LANE0_DN
16	NC	17	CNV_WR_LANE0_DP	18	GND
19	GND	20	CNV_UART_WAKE	21	CNV_WR_CLK_DN
22	CNV_BRI_RSP	23	CNV_WR_CLK_DP	24	NC
25	NC	26	NC	27	NC
28	NC	29	NC	30	NC
31	NC	32	CNV_RGI_DT	33	GND
34	CNV_RGI_RSP	35	PCIE11_TXP	36	CNV_BRI_DT
37	PCIE11_TXN	38	NC	39	GND
40	NC	41	PCIE11_RXP	42	NC
43	PCIE11_RXN	44	NC	45	GND
46	NC	47	PCIE_CLK2_DP	48	NC
49	PCIE_CLK2_DN	50	SUS_CLK	51	GND
52	BUF_PLT_RST#	53	NC	54	BT_EN
55	PCIE_WAKE#	56	WIFI_EN	57	GND
58	NC	59	CNV_WT_LANE1_DN	60	NC
61	CNV_WT_LANE1_DP	62	NC	63	GND
64	NC	65	CNV_WT_LANE0_DN	66	NC
67	CNV_WT_LANE0_DP	68	NC	69	GND
70	NC	71	CNV_WT_CLK_DN	72	3.3V
73	CNV_WT_CLK_DP	74	3.3V	75	GND

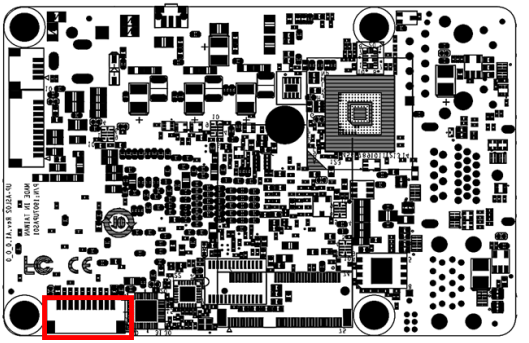
2.3.12 Fan Connector (FAN)

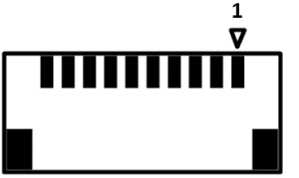




Pin	Signal	Pin	Signal
1	+12V	2	GND

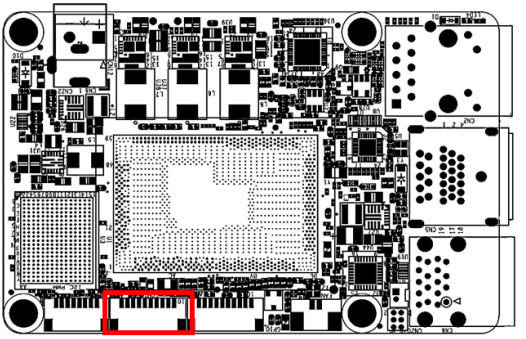
2.3.13 SPI Wafer (SPI)

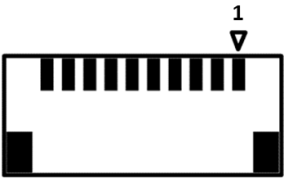




Pin	Signal	Pin	Signal	Pin	Signal
1	3.3V@0.5A	2	SPI2 _CS0#	3	SPI2 _CLK
4	SPI2 _MOSI	5	SPI2 _MISO	6	SPI1 _CS0#
7	SPI1_CLK	8	SPI1 _MOSI	9	SPI1 _MISO
10	GND				

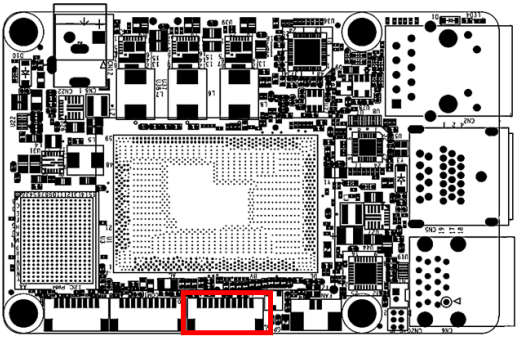
2.3.14 RS-232/422/485 (COM1)

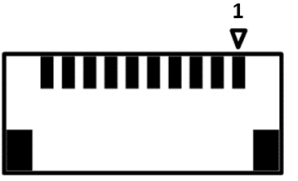




Pin	Signal	Pin	Signal
1	NC	2	RIA
3	CTSA	4	RTSA
5	DSRA	6	GND
7	DTRA / RS422RX-	8	TXA / RS422RX+
9	RXA/RS422TX+/ RS485+	10	DCDA/RS422TX-/RS485-

2.3.15 GPIO Wafer (GPIO)

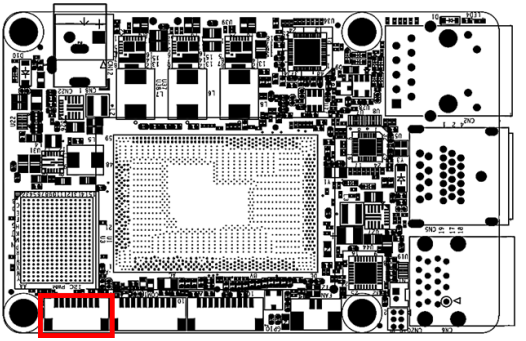


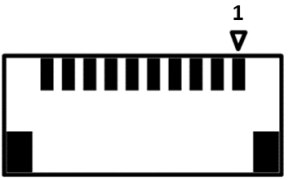


Pin	Signal	Pin	Signal	Pin	Signal
1	5V @0.5A	2	GPIO0	3	GPIO1
4	GPIO2	5	GPIO3	6	GPIO4
7	GPIO5	8	GPIO6	9	GPIO7

Pin	Signal	Pin	Signal	Pin	Signal
10	GND				

2.3.16 I2C x 2 & PWM x 1 (I2C_PWM)





Pin	Signal	Pin	Signal
1	3.3V @0.5A	2	I2C_SCL1
3	I2C_SDA1	4	I2C_SCL0
5	I2C_SDA0	6	PWM0
7	PWM1	8	GND

Chapter 3

Software Installation

3.1 Linux Setup

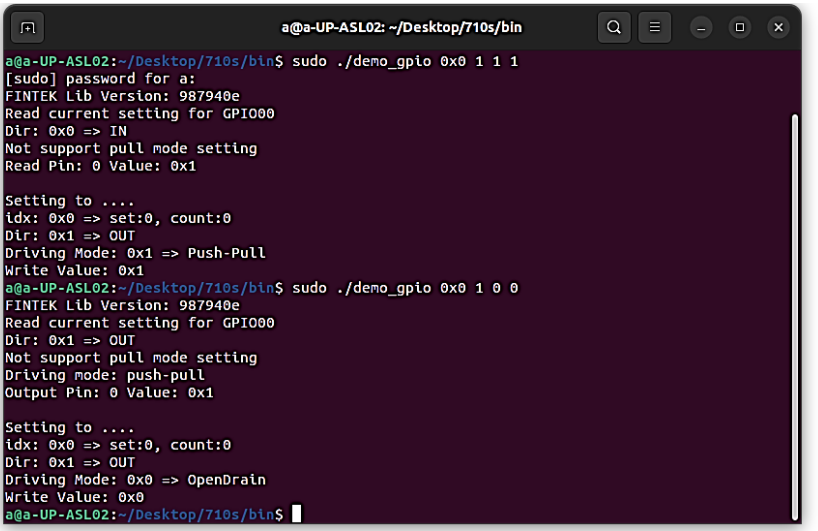
3.1.1 GPIO

To test GPIO functionality, execute the **demo_gpio** binary file using the following command:

```
sudo ./demo_gpio <idx>(0x0~0x7) <dir> <type> <value>
```

Parameter Definitions:

- idx: Specifies the GPIO number. For example, GPIO17 is represented as idx=0x17.
- dir: Sets the direction of the GPIO.
  0: Input, 1: Output
- type: Configures the output type.
  0: Open Drain, 1: Push-Pull
- value: Specifies the output state.
  For single GPIO mode, use 0 or 1., for group GPIO mode, use bitwise values.



3.1.2 SPI

Wiring

Connect the jumper wire:

- From Pin 3 (SPI1_MOSI) to Pin 2 (SPI1_MISO).
- From Pin 7 (SPI2_MOSI) to Pin 6 (SPI2_MISO).

Install and run spi-pipe tool:

- Install the spi-tools package, command:

```
sudo apt-get -y install spi-tools
```

SPI1

- Open a new terminal.
- Run the following command to test SPI1:

```
printf '\x11\x22\x33' | sudo spi-pipe -d /dev/spidev1.0 | hexdump -C
```

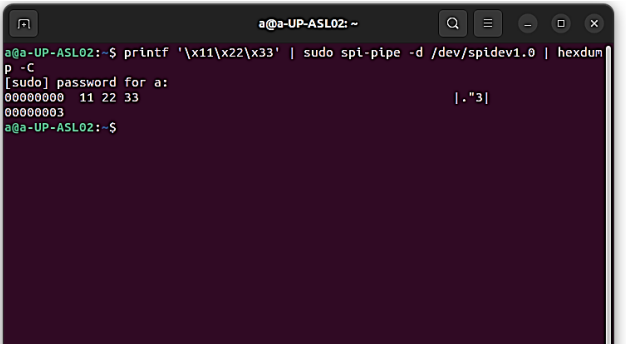
Verify that the sequence of sent bytes matches the received bytes. If the output matches, Pin 3 (SPI1_MOSI), Pin 2 (SPI1_MISO), and Pin 4 (SPI1_CLK) are functioning correctly.

SPI2

To test SPI2, change the device in the command to `/dev/spidev2.0`:

```
printf '\x11\x22\x33' | sudo spi-pipe -d /dev/spidev2.0 | hexdump -C
```

The remaining steps are the same as above. Verify that the bytes are transmitted and received correctly.



3.1.3 I2C

I2C Configuration and Testing

To detect the I2C address of the ADXL345 module, follow these wiring and setup instructions.

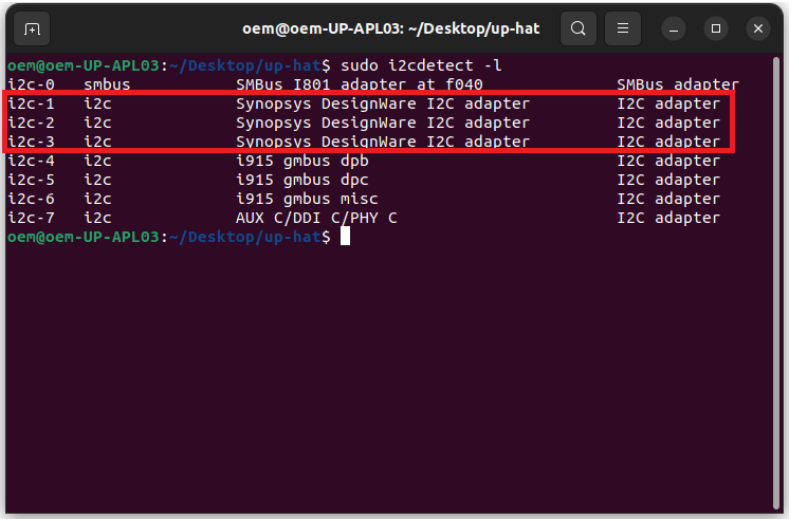
Wiring Instructions:

- Connect the jumper wire as follows:

  1. Pin 1 (Ground) to GND on the ADXL345 module.
  2. Pin 8 (3.3V) to VCC on the ADXL345 module.
  3. Pin 4 (I2C_SDA0) to SDA on the ADXL345 module.
  4. Pin 5 (I2C_SCL0) to SCL on the ADXL345 module.

Install and run i2cdetect tool:

```
sudo apt-get -y install i2c-tools
sudo i2cdetect -l
```



Test the Synopsys DesignWare I2C adapter (replace [I2CBUS] with the specific bus number identified from the previous command):

```
sudo i2cdetect -y -r [I2CBUS]
```

The ADXL345 module should appear at the default I2C address, 0x53.

3.1.4 PWM

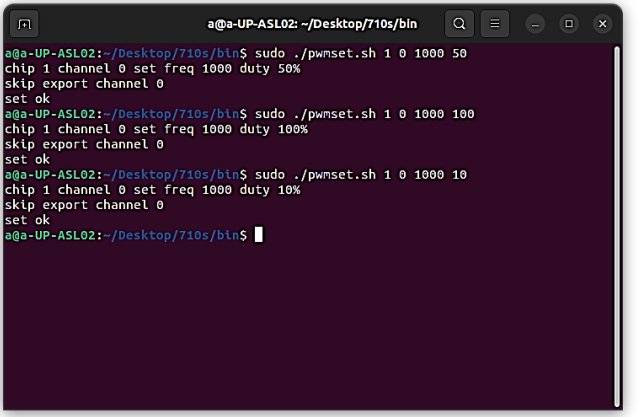
Installation

Run the following command to install the PWM setup:

```
sudo ./install.sh
```

To test PWM functionality, refer to the bin file:

```
sudo ./pwmset.sh <chip> <channel> <frequence> <duty>(0~99)
```

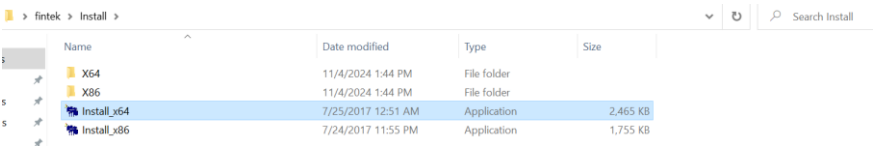


3.2 Windows Setup

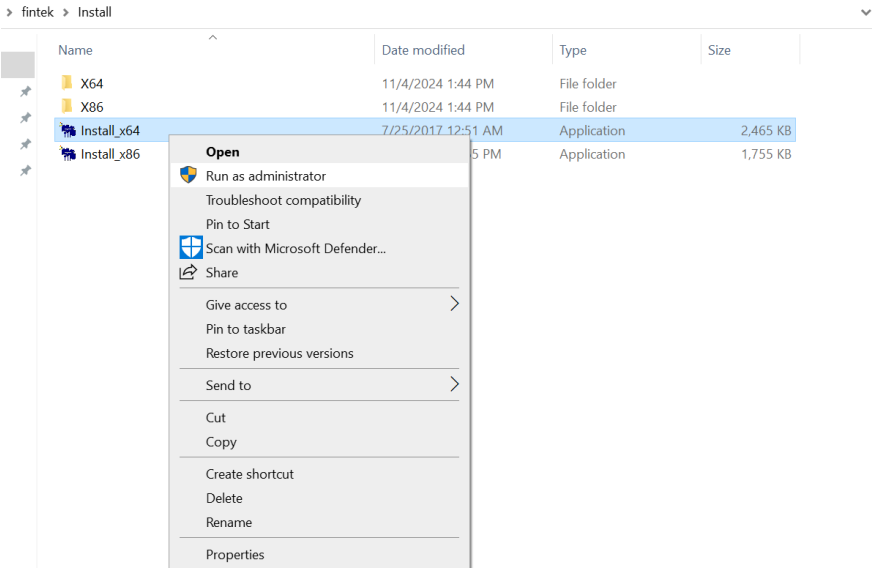
Drivers for the UP 710S can be downloaded from the UP Board website by following the link https://www.aaeon.com/en/product/detail/up-boards-up-710s.

3.2.1 GPIO Installation

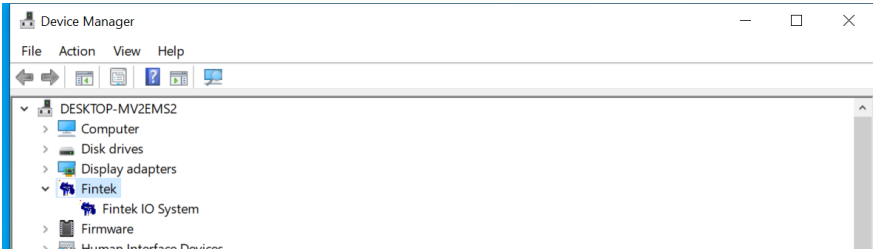
1. Enter the "**install**" folder.



2. Right-click and select "**Run as administrator**" to install driver.

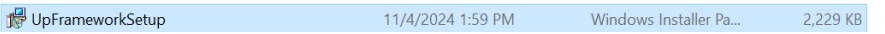


3. When installation is complete, open device manager to locate device:

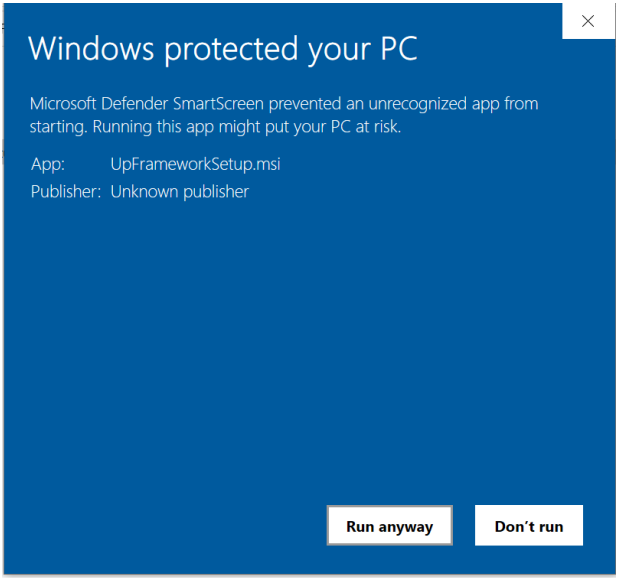


3.2.2 UPFramework Setup

1. Download driver and double-click to install

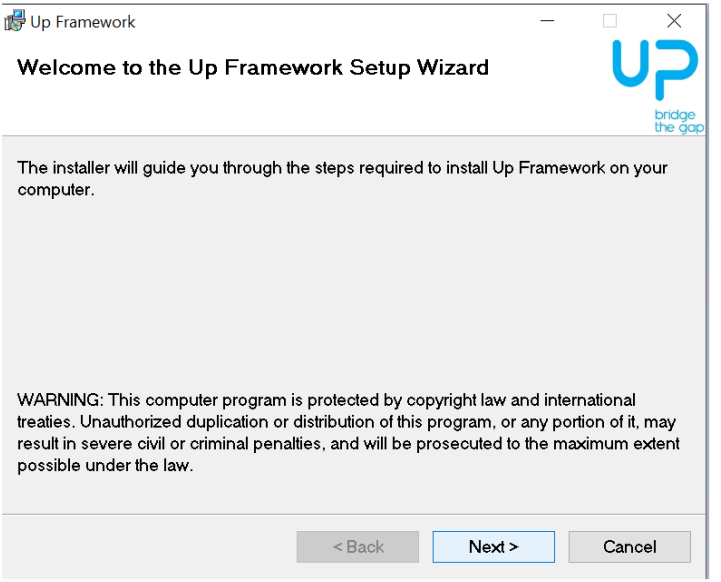


2. Click "**Run anyway**"



3. Locate the downloaded UpFrameworkSetup.msi file and run the installer.

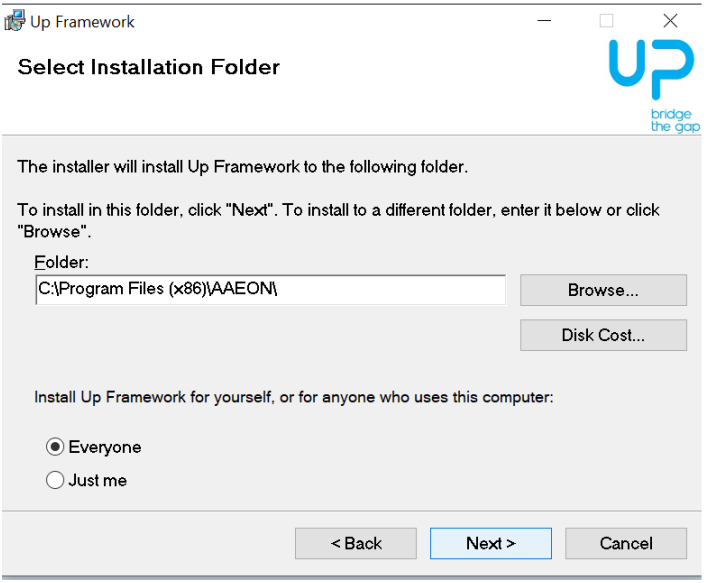
   Press "Next" to begin the setup process.



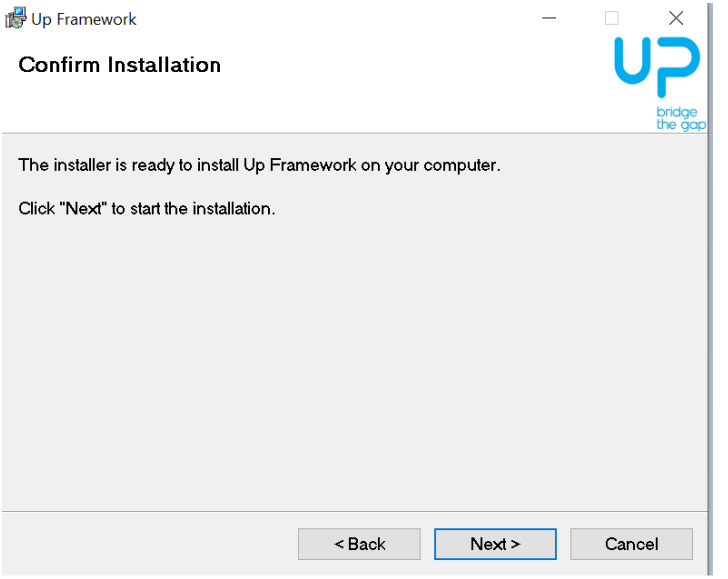
4. Select the installation folder.

   Default destination path is C:\Program Files(x86)\AAEON\.

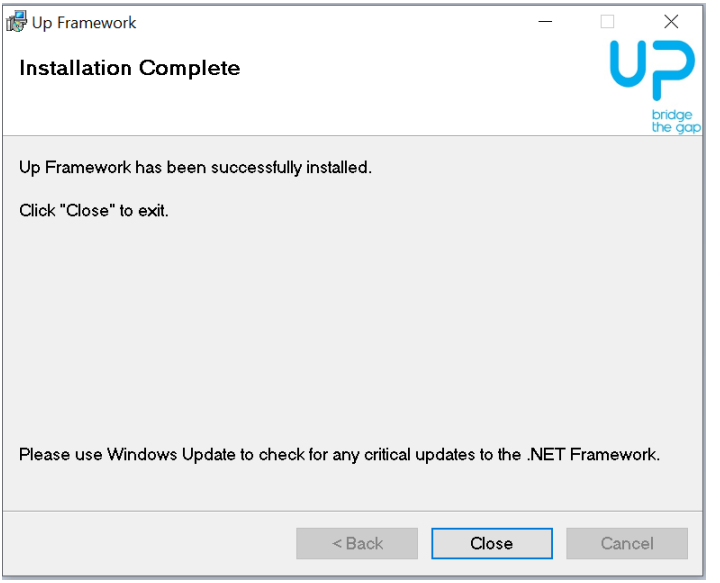
   You may also choose to install the UP Framework SDK for all users or only the current user. Press "Next" to continue installation.



5. Press "Next" to confirm the installation.



Press "Close" to exit once setup is complete.



6. When installation is complete, open device manager to locate device:

Appendix A

Cables and Connectors

A.1 Cables and Connectors

This table provides detailed information about the cables and connectors used by the UP 710S. If you have any questions about the configuration of your board, please contact your AAEON sales representative.

Label	Function	Mating Connector		Cable AAEON P/N
		Vendor	Model No.	
CN20	BIOS Update Connector	JVE	21N21540-06S10B-01G-3.5/2.1*A	170X000553
COM1	COM Port Wafer	CATCH	710-74-10TWRG	1701100180
CN9	Front Panel	PINREX	710-74-04TWRG.NY9T	170X000543
CN7	USB2*2 & UART	CATCH	710-74-10TWRG	170010015G