



KUBER-2000 Series User Manual

Preliminary Version

Table of Contents

1	REVISION.....	4
2	PREFACE	5
2.1	Copyright.....	5
2.2	Acknowledgement	5
2.3	Warranty	5
2.4	Declaration of conformity	6
2.5	Technical support	6
3	INTRODUCTION	7
3.1	Product overview	7
3.2	Safety Precautions.....	8
3.3	Hardware Specification	9
3.4	Appearance	11
3.4.1	KUBER-2110	11
3.4.2	KUBER-212A	11
3.4.3	KUBER-212B	11
3.4.4	KUBER-212D	12
3.4.5	KUBER-212E	12
3.5	Interface	13
3.5.1	USB 3.0	13
3.5.2	DP	13
3.5.3	Ethernet	13
3.5.4	LED indicator	14
3.5.5	COM	14
3.5.6	Power terminal.....	15
3.5.7	M.2 and mini PCI-e card slot.....	15
3.5.8	Antenna.....	15
3.6	Dimensions.....	16
3.6.1	One layer	16
3.6.2	Two layer	17
4	SYSTEM INSTALLATION.....	19
4.1	Wall mount.....	19
4.2	DIN-Rail mount.....	21
5	INITIAL SETUP.....	23
5.1	Chassis Grounding.....	23

5.2	Connecting Power	23
5.3	External Antenna installation.....	24
6	MAINTENANCE	25
6.1	M.2 2230 Wifi Module Installation	25
6.2	M.2 2242 and Mini PCI-e card installation.....	27
6.3	Battery change	29
A	APPENDIX.....	30
A.1	Naming rule.....	30
A.2	System ordering information	31
A.3	Accessory ordering information.....	32
A.4	Golden finger pin-out table	32

1 REVISION

Revision	Date	Page	Description
R1.0	20190731		Initial document release (Preliminary)

2 PREFACE

2.1 Copyright

This document is released and copyrighted are reserved by MiTwell, Inc. No parts of this document may be copied, reproduced by mechanical, electronics or other means in any form, for any purpose, without prior authorization by MiTwell, Inc.

The information contained within this user manual, including but not limited to any other product specification, MiTwell, Inc reserves its right to modify them at any time without notice.

2.2 Acknowledgement

Intel®, Core™ and Atom™ are the trademarks of Intel Corporation. Microsoft Windows and MS-DOS are registered trademarks of Microsoft Corp. All other product names or trademarks are properties of their respective owners. All product names, logos, brands, trademarks and registered trademarks in this user's manual or the MiTwell website are the property of their respective owners.

2.3 Warranty

MiTwell warrants that each product failing to function properly under normal use for 12 months from the invoice date. Due to an effect in materials, workmanship or due to nonconformance upon specifications, will be repaired or exchanged at MiTwell's option and expense.

For RMA and DOA goods, customers should follow the standard procedure and send back the goods. For detail please see the warranty policy by below link:
<http://rma.portwell.com.tw:10007/mitwellrma/Default.aspx>

2.4 Declaration of conformity

CE (European Union)



This equipment is in conformity with the requirement of the following EU legislations and harmonized standards. Product also complies with the Council directions. (EN 61000-6-4, Class A, EN 61000-6-2)

FCC (Federal Communications Commission Radio Frequency Interface Statement)



This device complies with part 15 FCC rules. This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. (CFR Title 47 Part15 Subpart B: 2018 Class A)

Operation is subject to the following two conditions: one is the device may not cause harmful interference, and second is that the device must accept any interference received including interference that may cause undesired operation.

2.5 Technical support

MiTwell are committed to provide the best support and service for our customers, which can help customer implement and use MiTwell's products easily.

We suggest that you download the latest documentation, utilities and drivers which have been made available to assist you on MiTwell website. If you still require assistance after visiting our website, you can contact your local sales and technical support team for further assistance.

For more information on this and other products, please visit our websites at: <http://www.mitwell.com.tw>

3 INTRODUCTION

3.1 Product overview



KUBER-2000 series is a new generation of palm-sized, flexible and ready-to-use industrial PC designed for a variety of applications in the industrial 4.0 world. Within 10cm length, you can expect scalable Apollo Lake processors up to 4 cores, robust aluminum housing and common industrial features.

The state-of-the-art expansion design ensures various I/O choices for different applications are fulfilled with minimal investment. Leveraging KUBER-2000's Eco system, you can shorten the time to market when building your own solutions.

No matter to perform data collection and transition, edge computing or communication tasks in applications like industrial automation, intralogistics or smart retailers, KUBER-2000 series are proved to be your best choice.

3.2 Safety Precautions

Warning note

This symbol indicates hazards that could lead to personal injury. There are three signal words indicating the severity of a potential injury.

	DANGER Indicates a hazard with a high risk level. If this hazardous situation is not avoided, it will result in death or serious injury. WARNING Indicates a hazard with a medium risk level. If this hazardous situation is not avoided, it could result in death or serious injury. CAUTION Indicates a hazard with a low risk level. If this hazardous situation is not avoided, it could result in minor or moderate injury.
	This symbol together with the NOTE signal word alerts the reader to a situation which may cause damage or malfunction to the device, hardware/software, or surrounding property.
	Here you will find additional information or detailed sources of information.

3.3 Hardware Specification

						
Model Name	KUBER- 2110	KUBER - 212A	KUBER - 212B	KUBER - 212D	KUBER - 212E	KUBER - 212G
CPU	Intel® Celeron N3350, 2 cores, 1.1GHz/2.4 GHz, 6W TDP					
Memory	4GB onboard LPDDR4, 2400MT/S memory					
Mass Storage	32GB onboard eMMC 5.0 flash; up to 256 GB (optional)					
Power Input	12-30VDC (+/- 20%)					
Indicator LED	Power (Green), Run (Green)					
Operating Systems	Windows® 10 IoT Enterprise LTSB 2016 (64-bit) / Linux Yocto v2.5.1					
Expansion	1 x M.2 Key E 2230					
Basic I/O Interface						
Power Connection	1 x 2-pin screw-type terminal block					
Ethernet	2 x 10/100/1000 GbE (Intel® i210)					
USB	2 x USB 3.0					
Display	1 x DP v1.4 4096 x 2160 @ 60Hz					
Environment						
Operating Temperature	0 °C ~ 50 °C @ 5~85% RH with no airflow					
Storage Temperature	-40 °C ~ 85 °C					
Vibration	1g (DIN EN 60068-2-6)					
Shock	15g (EN 60068-2-27)					
Certification	CE, FCC (EN55022, EN55032) CE (EN 61000-6-4, Class A, EN 61000-6-2) FCC (CFR Title 47 Part15 Subpart B: 2018 Class A)					
Mechanical						
Degree of Protection	IP30					
Dimension (mm)	99x 46x 92	99 x 63 x 92				
Net Weight (Kg)	0.55	0.65				
Mounting	DIN rail and wall mounting options					
Cooling	Fanless					

Extended I/O Interface					
Model Name					
	KUBER - 212A	KUBER - 212B	KUBER - 212D	KUBER - 212E	KUBER - 212G
Power connection	N/A	N/A	1 x 2-pin screw-type terminal block (48VDC)	N/A	N/A
Ethernet/ POE	2 x 10/100/1000 GbE (Intel® i210), with isolation	2 x 10/100/1000 GbE (Intel® i210)	2 x 802.3af PoE GbE (15.4W)	N/A	N/A
COM/Console	1 x RS-232/422/485 (BIOS configurable, 5V & 12V selectable), with isolation	1 x CANbus	N/A	1 x RS-232 1 x RS-232/422/485 (BIOS Configurable)	2 x RS-232 By RJ45
USB	N/A	N/A	N/A	N/A	4 x USB 2.0
I/O	N/A	4 x GPIO	N/A	N/A	N/A
Expansion Slot	N/A	1 x Mini-PCle/mSATA 1 x M.2 Key E 2230	N/A	1 x M.2 Key B 2242 1 x Mini-PCle	1 x M.2 Key B 2242 1 x Mini-PCle

3.4 Appearance

3.4.1 KUBER-2110



**Core interface with 2x USB3.0, 1x DisplayPort,
2xGiga LAN, Power connectors**

3.4.2 KUBER-212A



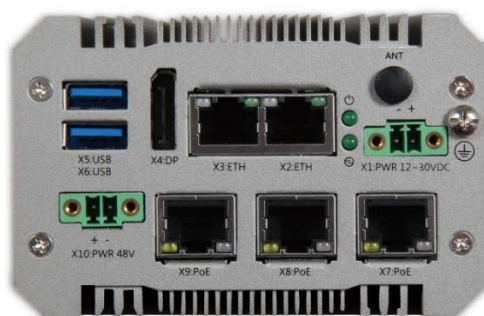
**Expanded interface with 2x isolated LAN
1 x RS-232/422/485 (BIOS configurable, 5V & 12V selectable)**

3.4.3 KUBER-212B



Expanded interface with 4x GPIO, 1x CANBus, 2x Giga LAN

3.4.4 KUBER-212D



**Expanded interface with 1 x 2-pin screw Terminal block (48VDC)
3 x 10/100/1000 GbE with PoE (15.4W)**

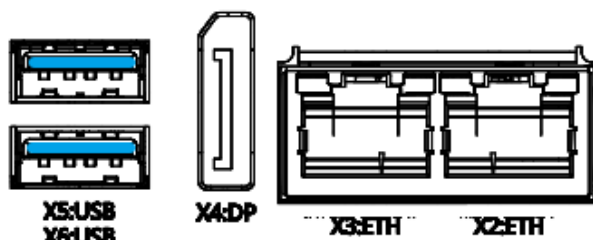
3.4.5 KUBER-212E



**Expanded interface with 1 x RS-232
1 x RS-232/422/485 (BIOS Configurable)**

3.5 Interface

3.5.1 USB 3.0



USB 3.0 ports utilize a blue connector. USB 2.0 ports are black.

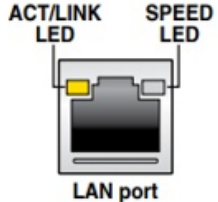
KUBER-2000 core computing part provides two USB Type-A 3.0 to connect external device such as mouse, keyboard or external storage device. Two ports are USB 3.0. USB 3.0 ports utilize a blue connector.

3.5.2 DP

DisplayPort (DP): These ports connect KUBER-2000 to external digital displays with a corresponding DP++ connector.

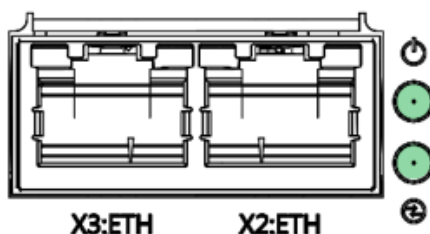
3.5.3 Ethernet

KUBER-2000 series are equipped with Intel® i210 Gigabit LAN controller, which fully compliant with 10/100/1000 Base-T Ethernet network. Two RJ45 connectors allow the computer to communicate on a 10/100/1000 Base-T Gigabit LAN Ethernet network.

	Activity Link LED		Speed LED	
	Status	Description	Status	Description
	Off	No link	Off	10 Mbps connection
	Orange	Linked	Orange	100Mbps connection
	Orange(blink)	Data activity	Green	1 Gbps connection

3.5.4 LED indicator

Two LEDs are provided on the KUBER-2000. These LEDs provide operating information.



Function*	Status	Description
Power	Power ON	Solid Green
	Power Off	Off
Run Status (GPIO)	Run	Flash Green
	off	Off
*: Need to auto detection functionality while power applied		

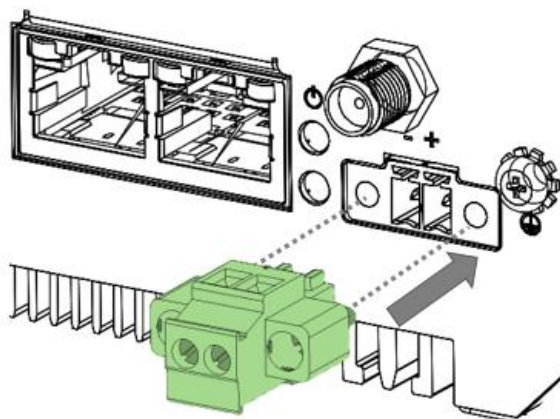
3.5.5 COM

Serial (COM): D-SUB 9 serial ports are available for use, which is configurable as either RS-232, RS-422, or RS-485 by BIOS setting. The function of the pins in the D-SUB 9 connector varies with the different configuration settings on different model, please check it on the datasheet.

D-SUB 9 pin	RS-232	RS-422	RS-485
1	DCD	TXD-	TXD-/RXD-
2	RXD	TXD+	TXD+/RXD+
3	TXD	RXD+	-
4	DTR	RXD-	-
5	GND	GND	GND
6	DSR	-	-
7	TRS	-	-
8	CTS	-	-
9	Ring indicator	-	-

3.5.6 Power terminal

2-pin screw-type terminal block is provided for connecting power to the KUBER-2000



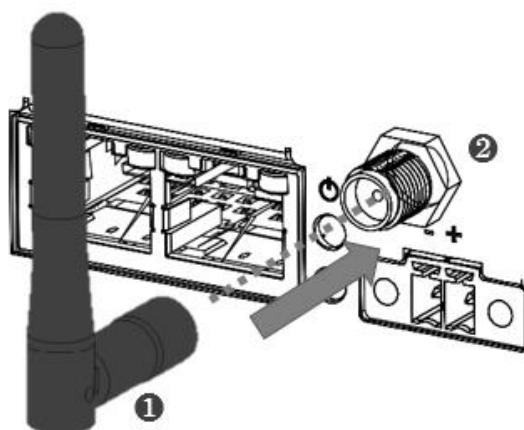
Pin No.	Description
-	0 V DC
+	12-30VDC (+/- 20%)

3.5.7 M.2 and mini PCI-e card slot

Release the screw and disassemble the chassis of KUBER-2000, you can see the M.2 and miniPCI-e card slot on the main board/carrier board. The slot varies with the different models.

3.5.8 Antenna

A mini PCIe card/M.2 2230 card slot is available to allow KUBER-2000 to be placed on a wireless network.

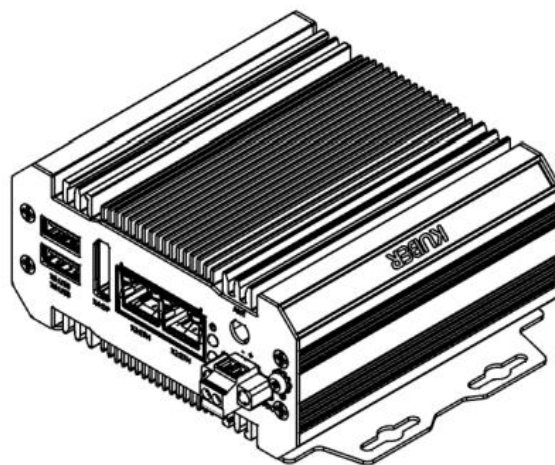


3.6 Dimensions

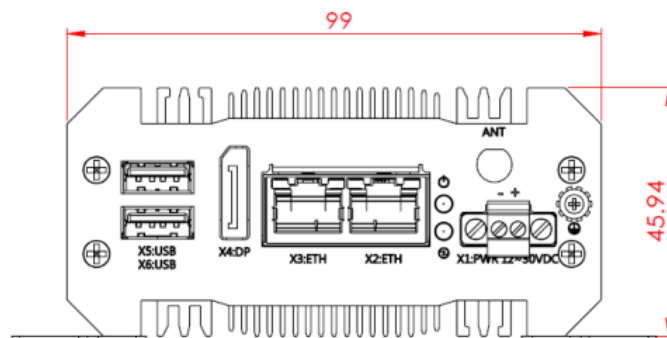
All dimensions shown in mm (millimeters)

3.6.1 One layer

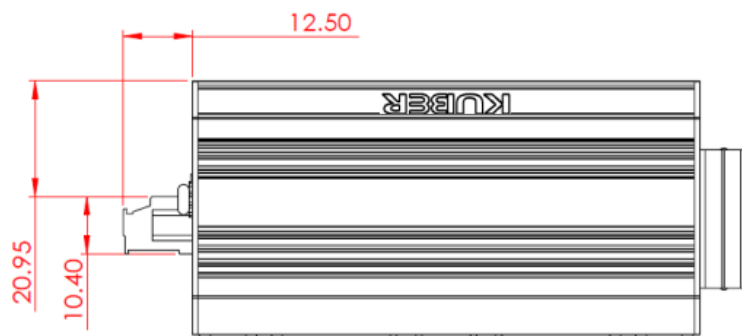
Dimension: 99x 46x 92(mm)

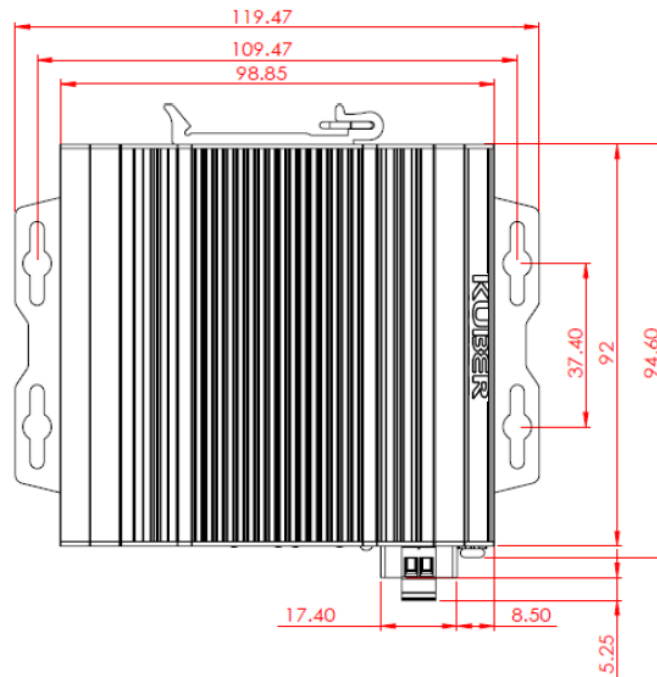


Front view

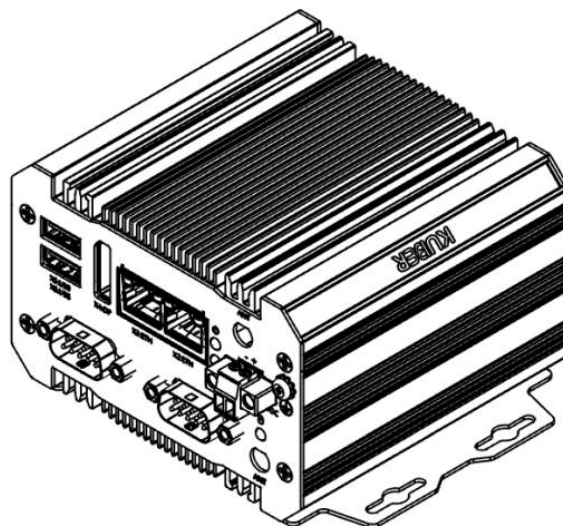


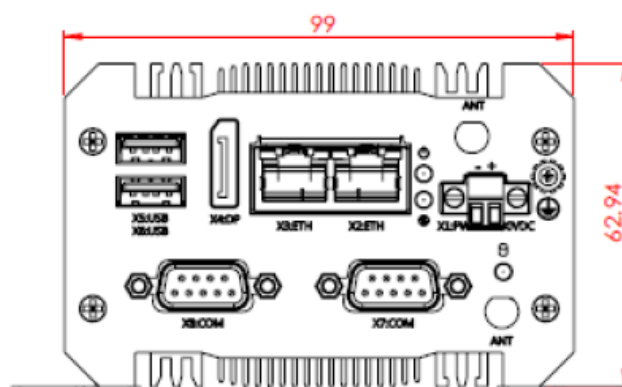
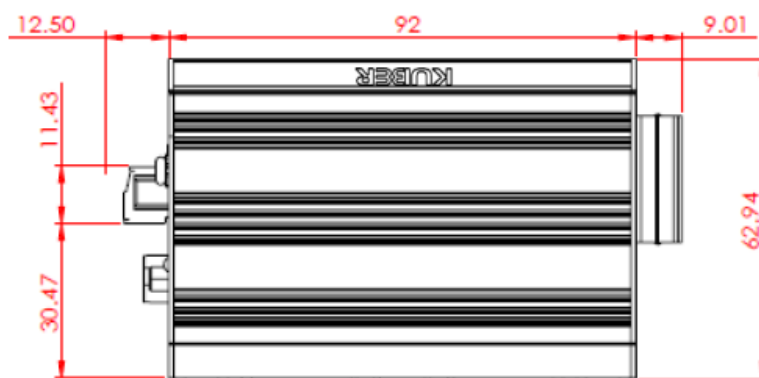
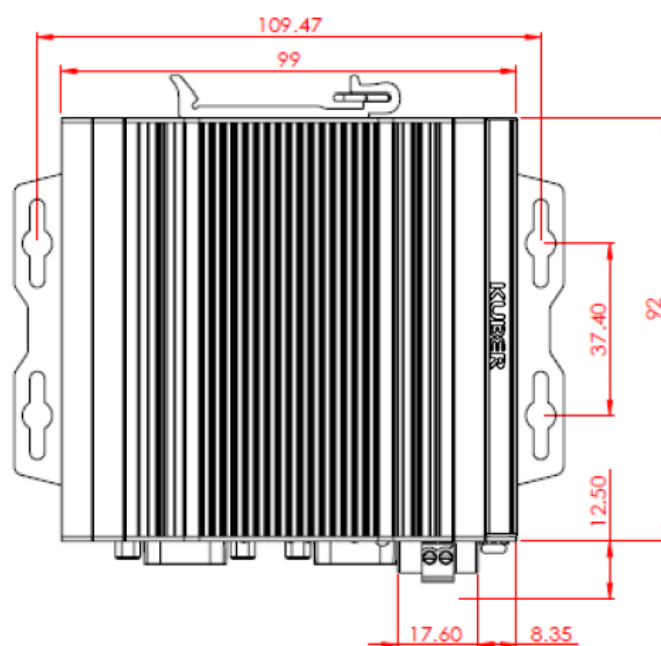
Side view



Top view**3.6.2 Two layer**

Dimension: 99 x 63 x 92 (mm)



Front view**Side view****Top view**

4 SYSTEM INSTALLATION

KUBER-2000 support two types of mounting: wall mount bracket and DIN-rail mounting bracket. You can purchase mounting kit from MiTwell as an optional accessory. This chapter provide step-by-step mounting guide for the mounting options.

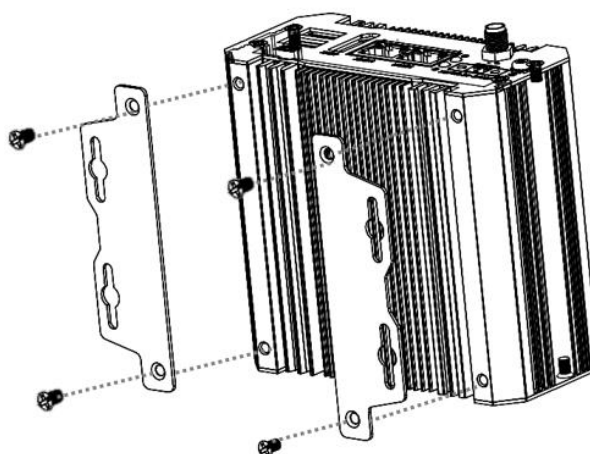


Make sure to fasten the screw (**M3 x 5L**) with proper torque (**5kgf-cm**) by torque wrench on KUBER-2000. Improper torque may cause the damage of screw thread on the aluminum chassis.

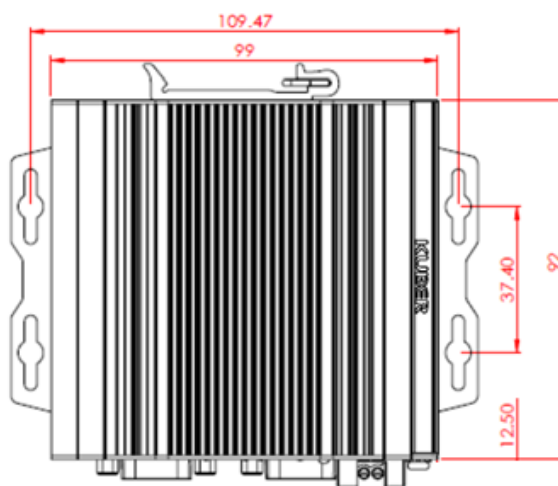
4.1 Wall mount

Installation

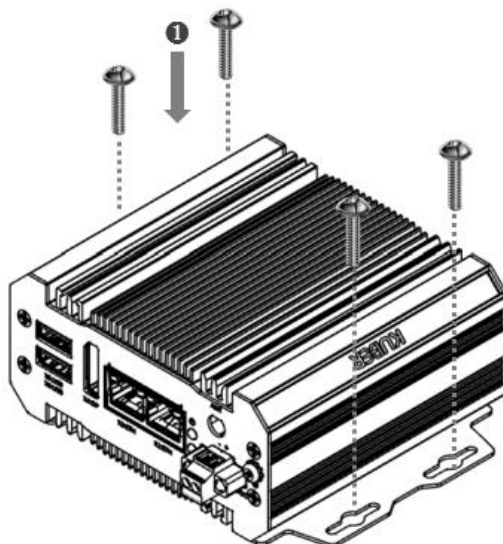
Fasten the Wall mount bracket by screws (**M3 x 5L**) on the KUBER-2000.



1. See the dimensions as below, and mark the locations of the holes on the mounting surface.

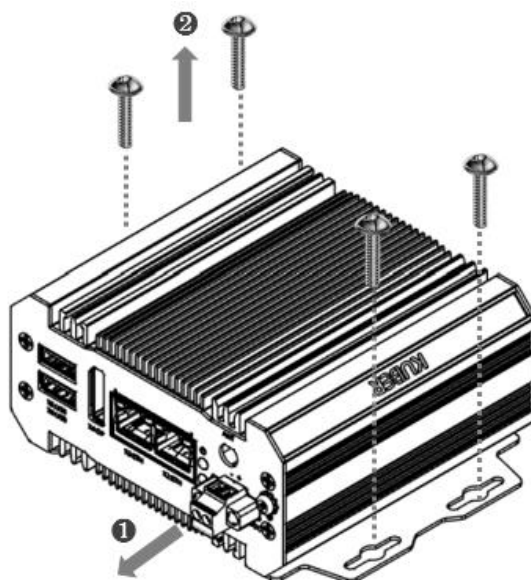


2. Use the correct anchor type for the mounting surface and securely attach the KUBER-2000 series IPC on the mounting surface (desk/wall). Ensure that the attaching hardware is in the small section of the keyholes.



Removal

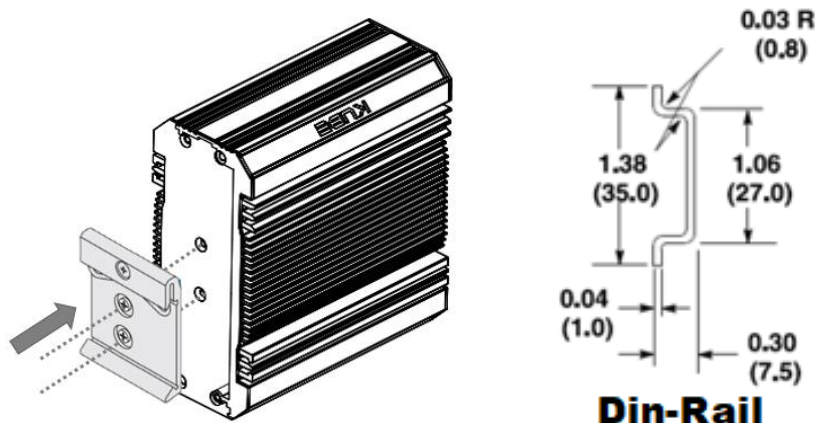
1. Remove power and disconnect cables to the IPC.
2. Loosen and remove the screws securing the IPC to the mounting surface.



4.2 DIN-Rail mount

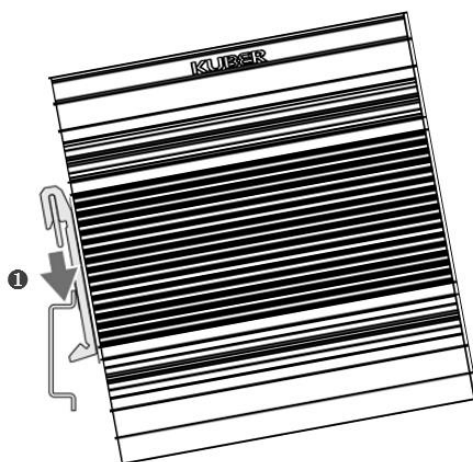
Fasten the DIN-rail bracket by screws (**M3 x 5L**) on the KUBER-2000

Suitable for 35mm (W), 7.5mm(H) DIN-rail

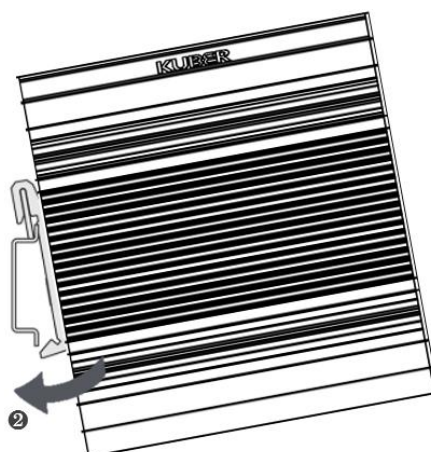


Install

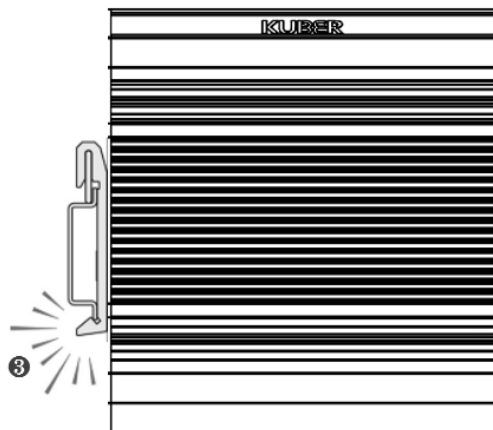
1. Angle the KUBER-2000 IPC so the top edge of the mounting plate hangs on the top edge of the DIN rail.



2. Rotate the KUBER-2000 IPC down against the lower edge of the DIN rail.

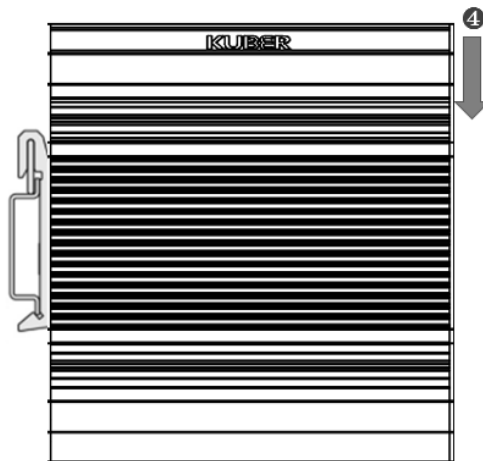


3. Press in until the latch snaps closed.

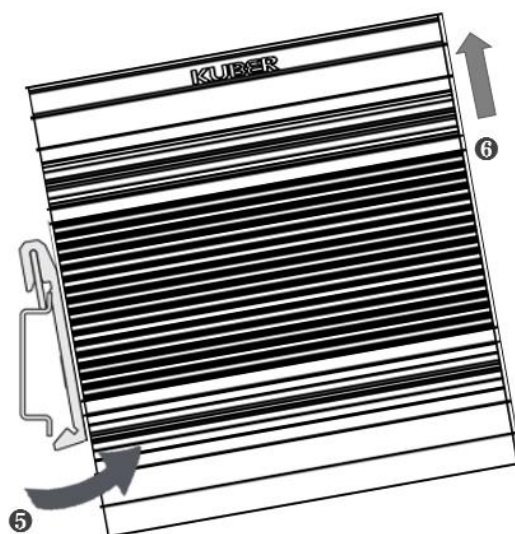


Remove

4. Press to un-secure the device on the rail.



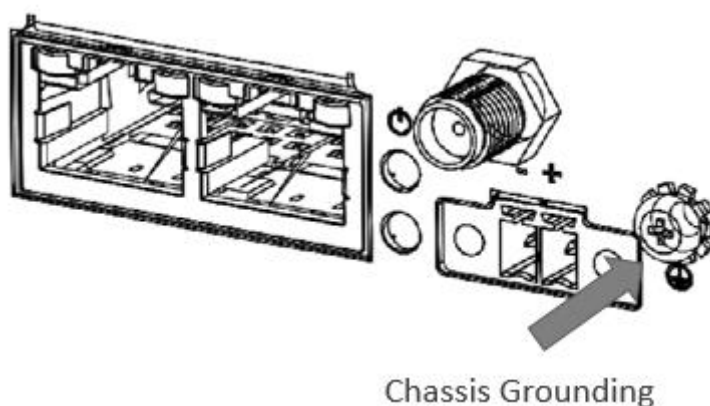
5. Release the latch and rotate the device away from the rail.



5 INITIAL SETUP

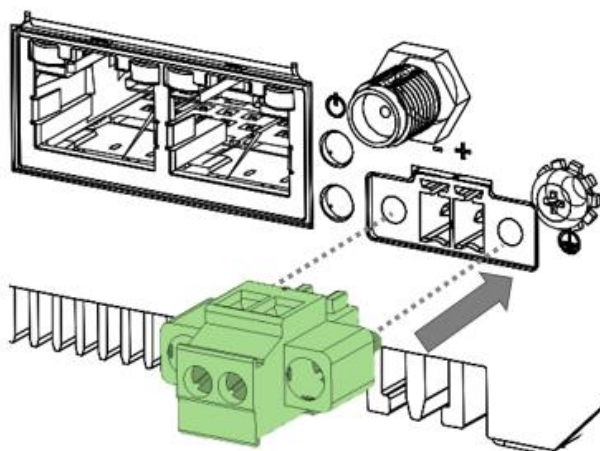
5.1 Chassis Grounding

KUBER-2000 provides good EMI protection and a stable grounding base. There is an easy-to-connect chassis grounding point to use



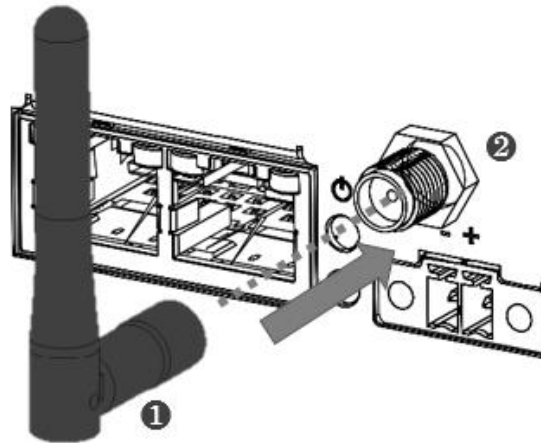
5.2 Connecting Power

This product is intended to be supplied by a Listed Power Adapter or DC power source, rated 10-30Vdc, 2A and Tma 50 degree C, if need further assistance, please contact us for further information.



5.3 External Antenna installation

Included with the installed card is an antenna (1) that attaches to a connector on the front of the unit (2). Since the KUBER-2000 is often installed within an enclosure, it may be advisable to install the antenna on the exterior of the enclosure with appropriate length antenna cable rather than directly to the IPC.



6 MAINTENANCE


NOTE: Electrostatic discharge

Electrostatic discharge can damage or destroy components. When handling, observe the necessary safety precautions against electrostatic discharge (ESD) according to EN 61340-5-1 and IEC 61340-5-1.

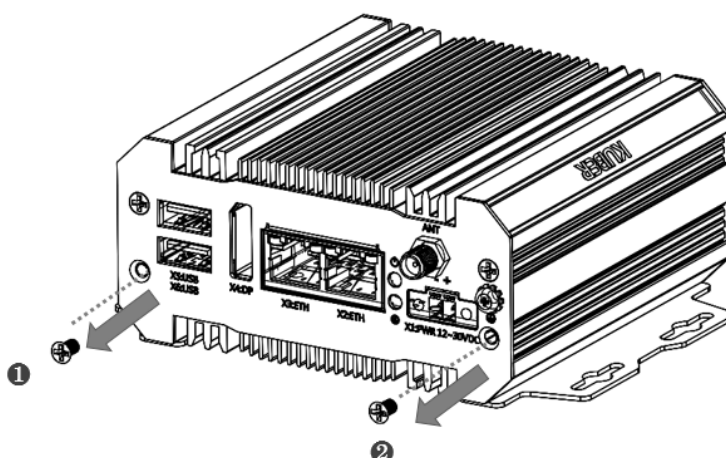
The KUBER-2000 series can be disassembled and install the additional storage, Wifi module,...etc. by M.2 2242 slot and mini-PCIe slot.



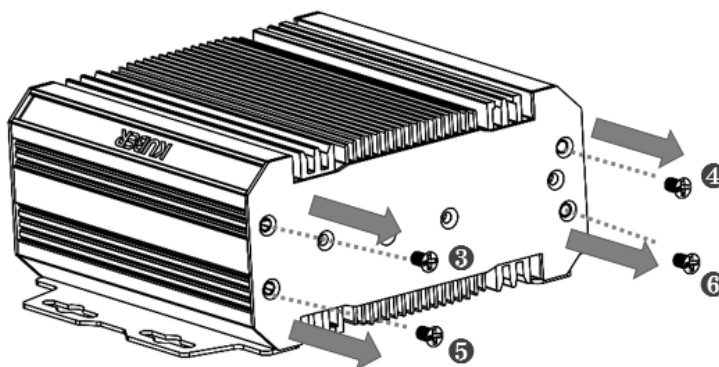
NOTE: Failure to ensure thermal pads are properly positioned may result in performance loss.

6.1 M.2 2230 Wifi Module Installation

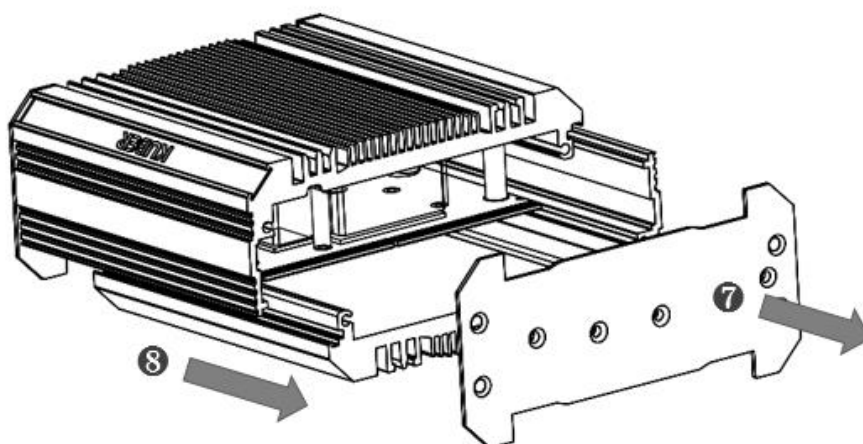
- 1 Remove 2 screws (1, 2) at the bottom of the front bracket.



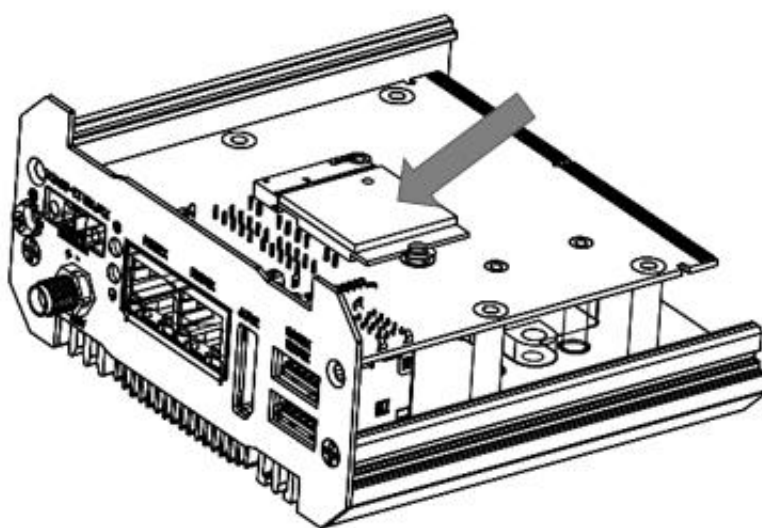
- 2 Remove 4 screws (3, 4, 5, 6) from the rear bracket.



- 3 Remove the rear bracket(7).
- 4 Pull out the bottom heat sink (8).



- 5 Turn around the system, M.2 2230 wifi card can be installed on it.
- 6 Finishing card's installation, put the bottom heat sink back to the initial position. Lock the front/rear bracket by screws (1, 2, 3, 4, 5, 6).



Make sure to fasten the screw back with proper torque (**5kgf-cm**) by torque wrench on KUBER-2000. Improper torque may cause the damage of screw thread on the aluminum chassis.

6.2 M.2 2242 and Mini PCI-e card installation

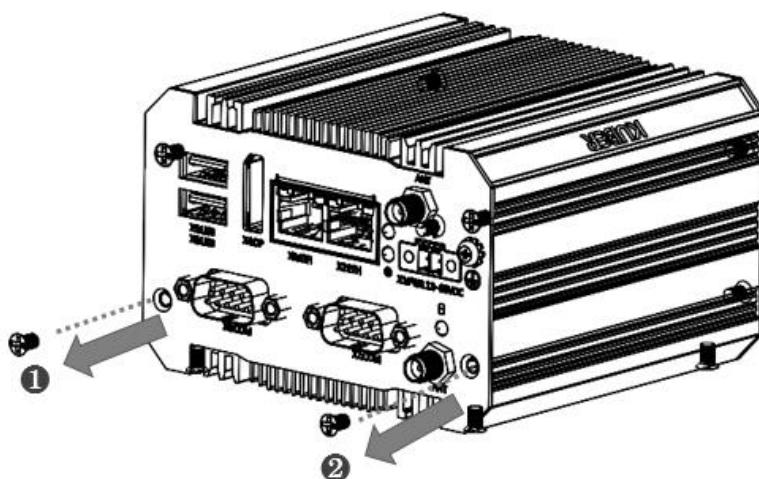


NOTE: expansion card may various for different model, please check specification for each model.

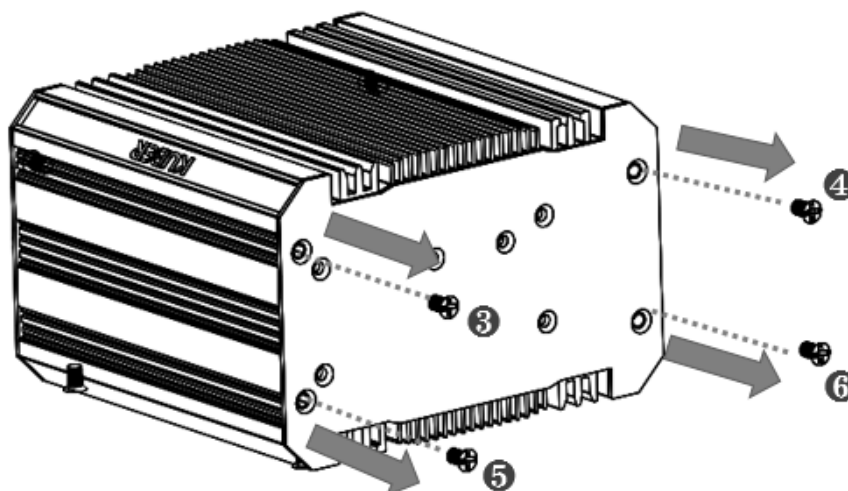
- 1 Remove 2 screws (1, 2) at the bottom of the front bracket.



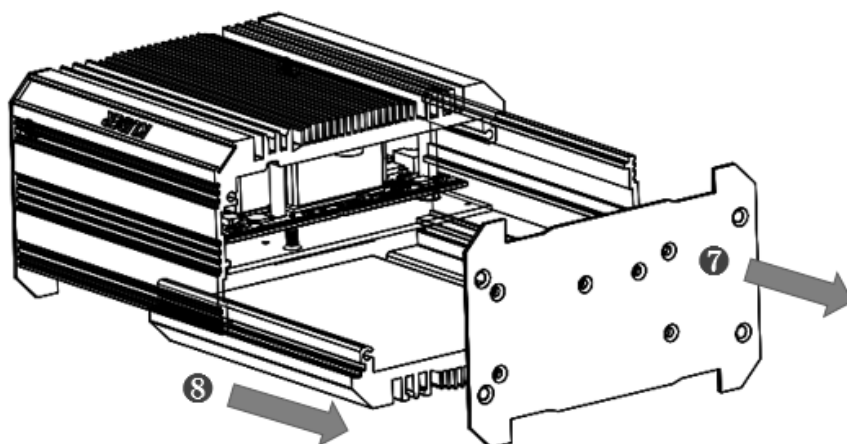
NOTE: need to remove the screw of COM port for some specific model.



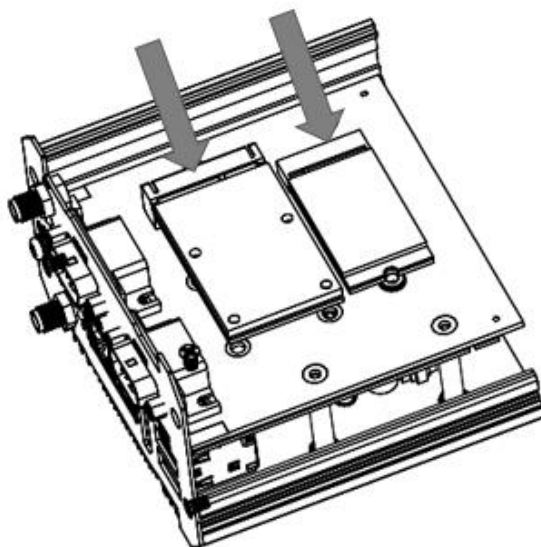
- 2 Remove 4 screws (3, 4, 5, 6) from the rear bracket.



- 3 Remove the rear bracket(7).
- 4 Pull out the bottom heat sink (8).



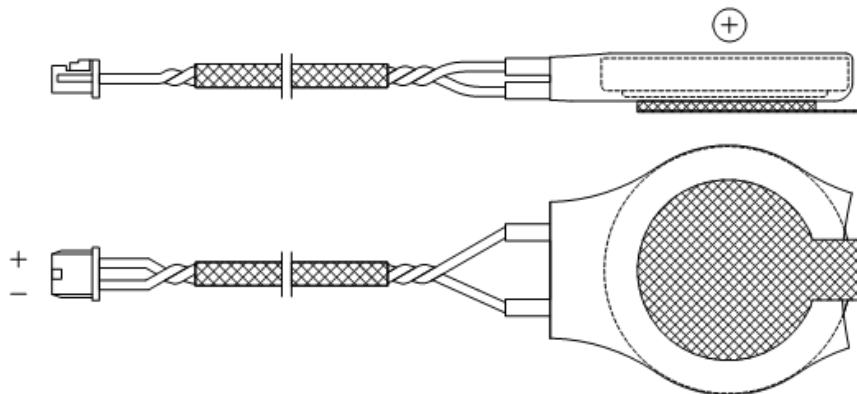
- 5 Turn around the system, you can find the miniPCI-e and M.2 2242 card slot can be installed on it.
- 6 Finishing card's installation, put the bottom heat sink back to the initial position. Lock the front/rear bracket by screws (1, 2, 3, 4, 5, 6).



Make sure to fasten the screw back with proper torque (**5kgf-cm**) by torque wrench on KUBER-2000. Improper torque may cause the damage of screw thread on the aluminum chassis.

6.3 Battery change

- 1 Follow the same procedure to open the chasses of KUBER-2000.
- 2 Change and replace the battery kit.
- 3 You can purchase the battery kit from MiTwell, please check table of ordering information.



Dispose of used batteries properly. Always adhere to currently valid national regulations for battery disposal.

A APPENDIX

A.1 Naming rule

KUBER- 2 **A** **B** **C** – **D** G - **E** G

KUBER- 2 A x x – x G - x G	
Sector A	Processor Type
1	Intel® Celeron® processor N3350 (0~50°C)
3	Intel® Atom™ processor E3930 (-20~60°C) (Optional)

KUBER- 2 x B x – x G - x G	
Sector B	Mechanical Layer
1	One Layer
2	Two Layers (with extension board A/-G)

KUBER- 2 x x C – x G - x G	
Sector C	Carrier Board Type
0	N/A
A	PSMC-C302T-1
B	PSMC-C302T-2
D	PSMC-C304T
E	PSMC-C303
G	PSMC-C305

KUBER- 2 x x x – D G - x G	
Sector D	Memory
2	LPDDR4 2G
4	LPDDR4 4G (default)

KUBER- 2 x x x – x G - E G	
Sector E	Storage
32	eMMC 32G (default)
64	eMMC 64G

A.2 System ordering information

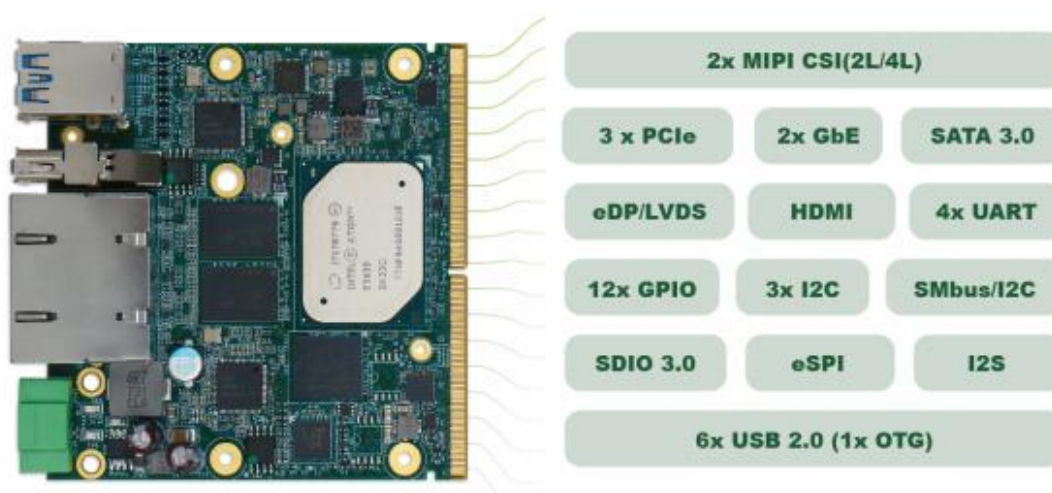
KUBER-2000 series		
Model Name	Part Number	Description
KUBER-2110-4G-32G	AS7-3050	1x 2-Pin terminal block 24VDC +/- 20% power input, 1x DP, 2x USB 3.0, 2x RJ-45, 1x M.2 2230 Key E
KUBER-212A-4G-32G	AS7-3054	Expended with Carrier Board A (PSMC-C302T), 1x 2-Pin terminal block 24VDC +/- 20% power input, 1x DP, 2x USB 3.0, 4x RJ-45, 1 x M.2 2230 Key E, 1x COM RS232/422/485 (BIOS configurable)
KUBER-212B-4G-32G	AS7-3057	Expended with Carrier Board B (PSMC-C302T), 1 x 2-Pin terminal block 24VDC +/- 20% power input, 1x DP, 2x USB 3.0, 4x RJ-45, 1 x M.2 2230 Key E, 1x CAN bus, 4x DI/DO
KUBER-212D-4G-32G	AS7-3063	Expended with Carrier Board D (PSMC-C304T), 2x 2-Pin terminal block (24VDC & 48VDC +/-20%) power input, 1x DP, 2x USB 3.0, 2x RJ-45, 3x RJ-45(PoE), 1x M.2 2230 Key E
KUBER-212E-4G-32G	AS7-3066	Expended with Carrier Board E(PSMC-C303), 1x 2-Pin terminal block 24VDC +/- 20% power input, 1 x DP, 2 x USB 3.0, 2x R45, 1x M.2 2242 Key B (PCIe2.0/SATA3.0/USB2.0), 1x M.2 2230 Key E (PCIe2.0/USB2.0), 1x mini-PCIe(PCIe/USB interface), 1x COM (RS232), 1x COM (RS-232/422/485 (BIOS configurable)
KUBER-212G-4G-32G	AS7-3070	Expended with Carrier Board G (PSMC-C305), 1x 2-Pin terminal block 24VDC +/- 20% power input, 1 x DP, 2 x USB 3.0, 2x R45, 1x M.2 2242 Key B PCIe2.0/SATA3.0/USB2.0), 1x M.2 2230 Key E (PCIe2.0/USB2.0), 1x mini-PCIe(PCIe/USB interface), 2x Console ports (RS232), 4x USB 4.0

A.3 Accessory ordering information

Accessory		
Model Name	Part Number	Description
Battery kit	B3600250	CMOS Battery kit
Power adaptor	APH-8000	60W Power Adapter, 24V/2.5A , with 2pin connector
Wall mount bracket	B787J130	Wall mount bracket
DIN Rail bracket	B787J240	DIN Rail bracket
DP to VGA	B786M820	DP to VGA Video Adaptor
DP to DVI	B786M810	DP to DVI Video Adaptor

A.4 Golden finger pin-out table

Open golden finger pinout help user quick buildup their own solution.



P-Pin	Primary (Top) Side	Type / Tolerance	S-Pin	Secondary (Bottom) Side	Type / Tolerance
P1	SMB_ALERT_1V8#	CMOS 1.8V	S1	CSI1_TX+ / I2C_CAM1_CK	CMOS 1.8V
P2	GND		S2	CSI1_TX- / I2C_CAM1_DAT	CMOS 1.8V
P3	CSI1_CK+		S3	GND	
P4	CSI1_CK-		S4	ICH_SERIRQ	CMOS 3.3V
P5	No Connect		S5	CSIO_TX- / I2C_CAM0_CK	CMOS 1.8V
P6	No Connect		S6	CAM_MCK	CMOS 1.8V
P7	CSI1_RX0+		S7	CSIO_TX+ / I2C_CAM0_DAT	CMOS 1.8V
P8	CSI1_RX0-		S8	CSIO_CK+	

P9	GND		S9	CSIO_CK-	
P10	CSI1_RX1+		S10	GND	
P11	CSI1_RX1-		S11	CSIO_RX0+	
P12	GND		S12	CSIO_RX0-	
P13	CSI1_RX2+		S13	GND	
P14	CSI1_RX2-		S14	CSIO_RX1+	
P15	GND		S15	CSIO_RX1-	
P16	CSI1_RX3+		S16	GND	
P17	CSI1_RX3-		S17	Co-Lay	
P18	GND		S18	Co-Lay	
P19	Co-Lay		S19	Co-Lay	
P20	Co-Lay		S20	Co-Lay	
P21	Co-Lay		S21	Co-Lay	
P22	Co-Lay		S22	Co-Lay	
P23	Co-Lay		S23	Co-Lay	
P24	Co-Lay		S24	Co-Lay	
P25	Co-Lay		S25	GND	
P26	Co-Lay		S26	Co-Lay	
P27	Co-Lay		S27	Co-Lay	
P28	Co-Lay		S28	No Connect	
P29	Co-Lay		S29	PCIE_D_TX+	
P30	Co-Lay		S30	PCIE_D_TX-	
P31	SPI0_CS1#	CMOS 1.8V	S31	Co-Lay	
P32	GND		S32	PCIE_D_RX+	
P33	SDIO_WP	CMOS 3.3V	S33	PCIE_D_RX-	
P34	SDIO_CMD	CMOS 3.3V	S34	GND	
P35	SDIO_CD#	CMOS 3.3V	S35	No Connect	
P36	SDIO_CK	CMOS 3.3V	S36	No Connect	
P37	SDIO_PWR_EN	CMOS 3.3V	S37	USB3_VBUS_DET	CMOS 5V
P38	GND		S38	AUDIO_MCK	CMOS 1.8V
P39	SDIO_D0	CMOS 3.3V	S39	I2S0_LRCK	CMOS 1.8V
P40	SDIO_D1	CMOS 3.3V	S40	I2S0_SDOUT	CMOS 1.8V
P41	SDIO_D2	CMOS 3.3V	S41	I2S0_SDIN	CMOS 1.8V
P42	SDIO_D3	CMOS 3.3V	S42	I2S0_CK	CMOS 1.8V
P43	SPI0_CS0#	CMOS 1.8V	S43	No Connect	
P44	SPI0_CK	CMOS 1.8V	S44	No Connect	
P45	SPI0_DIN	CMOS 1.8V	S45	LPC_CLKOUT1	CMOS 3.3V

P46	SPI0_DO	CMOS 1.8V	S46	LFRAME_N	CMOS 3.3V
P47	GND		S47	GND	
P48	SATA_TX+		S48	I2C_GP_CK	CMOS 1.8V
P49	SATA_TX-		S49	I2C_GP_DAT	CMOS 1.8V
P50	GND		S50	HDA_SYNC / I2S2_LRCK	CMOS 1.8V
P51	SATA_RX+		S51	HDA_SDO / I2S2_SDOUT	CMOS 1.8V
P52	SATA_RX-		S52	HDA_SDI / I2S2_SDIN	CMOS 1.8V
P53	GND		S53	HDA_CK / I2S2_CK	CMOS 1.8V
P54	No Connect		S54	SATA_ACT#	CMOS 3.3V
P55	No Connect		S55	No Connect	
P56	No Connect		S56	No Connect	
P57	No Connect		S57	No Connect	
P58	No Connect		S58	No Connect	
P59	GND		S59	USB5+	
P60	USB0+		S60	USB5-	
P61	USB0-		S61	GND	
P62	USB0_EN_OC#	CMOS 3.3V	S62	No Connect	
P63	No Connect		S63	No Connect	
P64	No Connect		S64	GND	
P65	USB1+		S65	No Connect	
P66	USB1-		S66	No Connect	
P67	USB1_EN_OC#	CMOS 3.3V	S67	GND	
P68	GND		S68	USB3+	
P69	USB2+		S69	USB3-	
P70	USB2-		S70	GND	
P71	No Connect		S71	No Connect	
P72	LAD3	CMOS 3.3V	S72	No Connect	
P73	LAD2	CMOS 3.3V	S73	GND	
P74	No Connect		S74	No Connect	
			S75	No Connect	
P75	PCIE_A_RST#	CMOS 3.3V			
P76	No Connect		S76	No Connect	
P77	LAD1	CMOS 3.3V	S77	PCIE_C_RST#	CMOS 3.3V
P78	LAD0	CMOS 3.3V	S78	PCIE_C_RX+	
P79	GND		S79	PCIE_C_RX-	
P80	No Connect		S80	GND	
P81	No Connect		S81	PCIE_C_TX+	

P82	GND		S82	PCIE_C_TX-	
P83	PCIE_A_REFCK+		S83	GND	
P84	PCIE_A_REFCK-		S84	No Connect	
P85	GND		S85	No Connect	
P86	PCIE_A_RX+		S86	GND	
P87	PCIE_A_RX-		S87	No Connect	
P88	GND		S88	No Connect	
P89	PCIE_A_TX+		S89	GND	
P90	PCIE_A_TX-		S90	No Connect	
P91	GND		S91	No Connect	
P92	HDMI_D2+ / DP1_LANE0+		S92	GND	
P93	HDMI_D2- / DP1_LANE0-		S93	No Connect	
P94	GND		S94	No Connect	
P95	HDMI_D1+ / DP1_LANE1+		S95	No Connect	
P96	HDMI_D1- / DP1_LANE1-		S96	No Connect	
P97	GND		S97	No Connect	
P98	HDMI_D0+ / DP1_LANE2+		S98	No Connect	
P99	HDMI_D0- / DP1_LANE2-		S99	No Connect	
P100	GND		S100	No Connect	
P101	HDMI_CK+ / DP1_LANE3+		S101	GND	
P102	HDMI_CK- / DP1_LANE3-		S102	No Connect	
P103	GND		S103	No Connect	
P104	HDMI_HPD / DP1_HPD	CMOS 1.8V	S104	USB3_OTG_ID	CMOS 3.3V
P105	HDMI_CTRL_CK / DP1_AUX+	CMOS 1.8V	S105	No Connect	
P106	HDMI_CTRL_DAT / DP1_AUX-	CMOS 1.8V	S106	No Connect	
P107	No Connect		S107	LCD1_BKLT_EN	CMOS 1.8V
P108	GPIO0 / CAM0_PWR#	CMOS 1.8V	S108	LVDS1_CK+ / eDP1_AUX+ / DSI1_CLK+	
P109	GPIO1 / CAM1_PWR#	CMOS 1.8V	S109	LVDS1_CK- / eDP1_AUX- / DSI1_CLK-	
P110	GPIO2 / CAM0_RST#	CMOS 1.8V	S110	GND	

P111	GPIO3 / CAM1_RST#	CMOS 1.8V	S111	LVDS1_0+ / eDP1_TX0+ / DSI1_D0+	
P112	GPIO4 / HDA_RST#	CMOS 1.8V	S112	LVDS1_0- / eDP1_TX0- / DSI1_D0-	
P113	GPIO5 / PWM_OUT	CMOS 1.8V	S113	No Connect	
P114	GPIO6 / TACHIN	CMOS 1.8V	S114	LVDS1_1+ / eDP1_TX1+ / DSI1_D1+	
P115	GPIO7	CMOS 1.8V	S115	LVDS1_1- / eDP1_TX1- / DSI1_D1-	
P116	GPIO8	CMOS 1.8V	S116	LCD1_VDD_EN	CMOS 1.8V
P117	GPIO9	CMOS 1.8V	S117	LVDS1_2+ / eDP1_TX2+ / DSI1_D2+	
P118	GPIO10	CMOS 1.8V	S118	LVDS1_2- / eDP1_TX2- / DSI1_D2-	
P119	GPIO11	CMOS 1.8V	S119	GND	
P120	GND		S120	LVDS1_3+ / eDP1_TX3+ / DSI1_D3+	
P121	I2C_PM_CK	CMOS 1.8V	S121	LVDS1_3- / eDP1_TX3- / DSI1_D3-	
P122	I2C_PM_DAT	CMOS 1.8V	S122	LCD1_BKLT_PWM	CMOS 1.8V
P123	No Connect		S123	RSVD	
P124	No Connect		S124	GND	
P125	BOOT_SEL2#	CMOS 1.8V	S125	LVDS0_0+ / eDP0_TX0+ / DSI0_D0+	
P126	RESET_OUT#	CMOS 1.8V	S126	LVDS0_0- / eDP0_TX0- / DSI0_D0-	
P127	RESET_IN#	CMOS 1.8V	S127	LCD0_BKLT_EN	CMOS 3.3V
P128	POWER_BTN#	CMOS 3.3V	S128	LVDS0_1+ / eDP0_TX1+ / DSI0_D1+	
P129	SER0_TX	CMOS 1.8V	S129	LVDS0_1- / eDP0_TX1- / DSI0_D1-	
P130	SER0_RX	CMOS 1.8V	S130	GND	
P131	SER0_RTS#	CMOS 1.8V	S131	LVDS0_2+ / eDP0_TX2+ / DSI0_D2+	
P132	SER0_CTS#	CMOS 1.8V	S132	LVDS0_2- / eDP0_TX2- / DSI0_D2-	
P133	GND		S133	LCD0_VDD_EN	CMOS 3.3V
P134	SER1_TX	CMOS 1.8V	S134	LVDS0_CK+ / eDP0_AUX+ /	

				DSIO_CLK+	
P135	SER1_RX	CMOS 1.8V	S135	LVDS0_CK- / eDP0_AUX- / DSIO_CLK-	
P136	SER2_TX	CMOS 1.8V	S136	GND	
P137	SER2_RX	CMOS 1.8V	S137	LVDS0_3+ / eDP0_TX3+ / DSIO_D3+	
P138	SER2_RTS#	CMOS 1.8V	S138	LVDS0_3- / eDP0_TX3- / DSIO_D3-	
P139	SER2_CTS#	CMOS 1.8V	S139	I2C_LCD_CK	CMOS 3.3V
P140	SER3_TX	CMOS 1.8V	S140	I2C_LCD_DAT	CMOS 3.3V
P141	SER3_RX	CMOS 1.8V	S141	LCD0_BKLT_PWM	CMOS 1.8V
P142	GND		S142	RSVD	
P143	No Connect		S143	GND	
P144	No Connect		S144	eDP0_HPD	CMOS 1.8V
P145	No Connect		S145	WDT_TIME_OUT#	CMOS 1.8V
P146	No Connect		S146	PCIE_WAKE#	CMOS 1.8V
P147	VDD_IN	Power In	S147	VDD_RTC	CMOS 3V
P148	VDD_IN	Power In	S148	LID#	CMOS 1.8V
P149	VDD_IN	Power In	S149	SLEEP#	CMOS 1.8V
P150	VDD_IN	Power In	S150	VIN_PWR_BAD#	CMOS VDD_IN
P151	VDD_IN	Power In	S151	CHARGING#	CMOS 1.8V
P152	VDD_IN	Power In	S152	CHARGER_PRSENT#	CMOS 1.8V
P153	VDD_IN	Power In	S153	CARRIER_STBY#	CMOS 1.8V
P154	VDD_IN	Power In	S154	CARRIER_PWR_ON	CMOS 1.8V
P155	VDD_IN	Power In	S155	FORCE_RECOV#	CMOS 1.8V
P156	VDD_IN	Power In	S156	BATLOW#	CMOS 3.3V
			S157	No Connect	
			S158	GND	