MXA-312M

User's Manual

Edge AI PC



Manual Rev.: Rev. 1.1
Revision Date: August 27, 2026
Part Number: 50M-44A02-1010

LEADING EDGE AI COMPUTING

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Revision History

Revision	Description	Date
1.0	Initial release	2026-02-12
1.1	Key capabilities, features, optional accessories updated and mechanical assembly added	2026-08-27

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Preface

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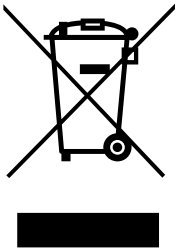
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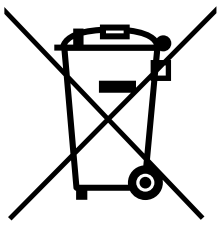
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Battery Labels (for products with battery)









California Proposition 65 Warning



WARNING: This product can expose you to chemicals including acrylamide, arsenic, benzene, cadmium, Tris(1,3-dichloro-2-propyl)phosphate (TDCPP), 1,4-Dioxane, formaldehyde, lead, DEHP, styrene, DINP, BBP, PVC, and vinyl materials, which are known to the State of California to cause cancer, and acrylamide, benzene, cadmium, lead, mercury, phthalates, toluene, DEHP, DIDP, DnHP, DBP, BBP, PVC, and vinyl materials, which are known to the State of California to cause birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

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Conventions

Take note of the following conventions used throughout this manual to make sure that users perform certain tasks and instructions properly.



NOTE: Additional information, aids, and tips that help users perform tasks.



CAUTION: Information to prevent ***minor*** physical injury, component damage, data loss, and/or program corruption when trying to complete a task.

ATTENTION: Informations destinées à prévenir les blessures corporelles mineures, les dommages aux composants, la perte de données et/ou la corruption de programme lors de l'exécu- tion d'une tâche.



WARNING: Information to prevent ***serious*** physical injury, component damage, data loss, and/or program corruption when trying to complete a specific task.

AVERTISSEMENT: Informations destinées à prévenir les bles- sures corporelles graves, les dommages aux composants, la perte de données et/ou la corruption de programme lors de l'exécution d'une tâche spécifique.

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1 Introduction

The MXA-312M is an ultra-compact, high-performance edge computing platform engineered to deliver robust processing power with exceptional energy efficiency. Powered by the MediaTek Genio 700/500 (MT8390/MT8370), featuring high-performance Cortex-A78 and high-efficiency Cortex-A55 cores, the MXA-312M provides a versatile open-platform design for next-generation IoT applications.

Key Capabilities

- **Protocol Conversion & Connectivity:** Supports seamless communication across Ethernet and serial-based interfaces, featuring dual 10/100/1000 Mbps LAN and two RS-232/485 ports.
- **Advanced Visuals:** Delivers high-resolution output optimized for dual-display applications, such as multi-media application.
- **Industrial-Grade Reliability:** Built to withstand harsh environments with a wide operating temperature range of -20°C to 65°C. Storage temperature range: -40°C to 85°C. Storage Humidity: 10% to 90% RH, non-condensing
- **Scalable Expansion:** Equipped with M.2 slots for effortless integration of Wi-Fi, 4G, or 5G wireless modules.

1.1 Features

- MTK Genio 520/720 (Arm Cortex-A78 + 6 Arm Cortex-A55) up to 2.2GHz
- Up to 8GB of DDR5 4800MHz memory
- 2 x RS-232/485 serial ports
- 2 x 10/100/1000 Ethernet ports
- 1 x M.2 2230 E Key with [Wi-Fi(PCIex1), BT(USB2.0)]
- 1 x M.2 3042 B-key (USB2.0) for 4G (option by installed AFM board cus kit)
- Operation Temperature Standard product -20°C to 50°C (Option for -20°C to 65°C with external heatsink.)
- Reserve USB2.0, I2C, UART, GPIO, SPI for AFM option

1.2 Packing List

Before unpacking, inspect the shipping carton for any damage. If the carton or its contents are damaged, inform your dealer immediately. Retain the shipping carton and packing materials for inspection. Obtain authorization from your dealer before returning any product to ADLINK. Ensure that the following items are included in the package.

- 1x MXA-312M Computing
- Fasteners:
  - 3x M3 screws, P-head, L4, Ni for M.2 (P/N: 33-03013-0040)
  - Power terminal connector (P/N: 20-C2010-0030)
- AC-DC adapter 60W 12V (Optional)

1.3 Optional Accessories

- 12V/60W power adaptor (P/N: 31-62156-0000-A0) (only for use at an operating temperature of 0–50 °C)
- DIO Isolation AFM board for MXA-312M (P/N: 91-44A03-0010)
- LTE AFM board for MXA-312M (P/N: 91-44A03-1010)
- 16x GPIO AFM board for MXA-312M (P/N: 91-44A03-3010)
- External heatsink for wide temperature (P/N: 32-60091-0000-A0) and screw (P/N: 33-04203-0050)

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1.4 Connecting DC Power



Please use an approved power source as certified by IEC or UL.

If you need adaptor, optional accessories or further assistance, please contact with ADLINK for further information.

The altitude during operation is up to 5000 m whose output meets LPS and SELV (ES1) circuits.

The output rating of DC power source as following:

- Voltage: 12 VDC
- Current: 3.65A

Before providing DC power to the apparatus, ensure the voltage and polarity provided are compatible with the DC input. Improper input voltage and/or polarity can be responsible for system damage.

Veuillez utiliser une source d'alimentation approuvée et certifiée par IEC ou UL. Si vous avez besoin d'un adaptateur d'appareil, d'accessoires en option ou d'une assistance supplémentaire, veuillez contacter ADLINK pour plus d'informations.

L'altitude pendant le fonctionnement est jusqu'à 5000 m dont la sortie répond aux circuits LPS et SELV (ES1).

La puissance nominale de sortie de la source d'alimentation CC comme suit

Tension : 12 VDC

Courant : 3.65A

Avant de fournir une alimentation CC à l'appareil, assurez-vous que la tension et la polarité fournies sont compatibles avec l'entrée CC. Une tension et/ou une polarité incorrectes peuvent causer des dommages irréversibles sur le système.

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2 Specifications

Processor on MT8371/MT8391	2xArm Cortex-A78; 6x Arm Cortex-A55 Arm Mail G57 MC2 MediaTek NPU 850
Memory Configuration	LPDDR5 DRAM Memory Size: 8GB (up to 16GB)
UFS	UFS 3.1 2-lane for UFS
Ethernet	2 x RJ45 GbE LAN
MSDC	MSDC1: 4-bits for SD connector MSDC2: 4-bits for M.2 E key connector
USB	1x USB 2.0 for M.2 E key connector 1x USB 2.0 for FM board connector 2x USB 2.0, 1x USB 3.0 for USB3.0 and USB2.0 type A connector 1x USB2.0, 1x USB3.0 for USB to Ethernet controller
I2C	4x I2C bus (for RTC, TPM, EEPROM, FM board connector, Camera Connector, DSI to HDMI® converter)
Display	1x HDMI2.0b, Max 4K60 1x HDMI, Max FHD@60
UART	1x UART for debug 1x UART for RS232 1x UART for RS485 1x UART for FM board connector
CSI	CIS 4-lane for Camera connector
DSI	DSI 4-lane for DSI to HDMI converter
eDP	eDP 4-lane for DP to HDMI converter
PCIe	PCIE 1-lane for M.2 E key connector
SPI	2x SPI for FM board connector 1x SPI for NOR flash
I2S	1x I2S for DSI to HDMI converter
GPIO	4x GPIO for FM board connector
Reset	Reset button

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3 Functional Block Diagram

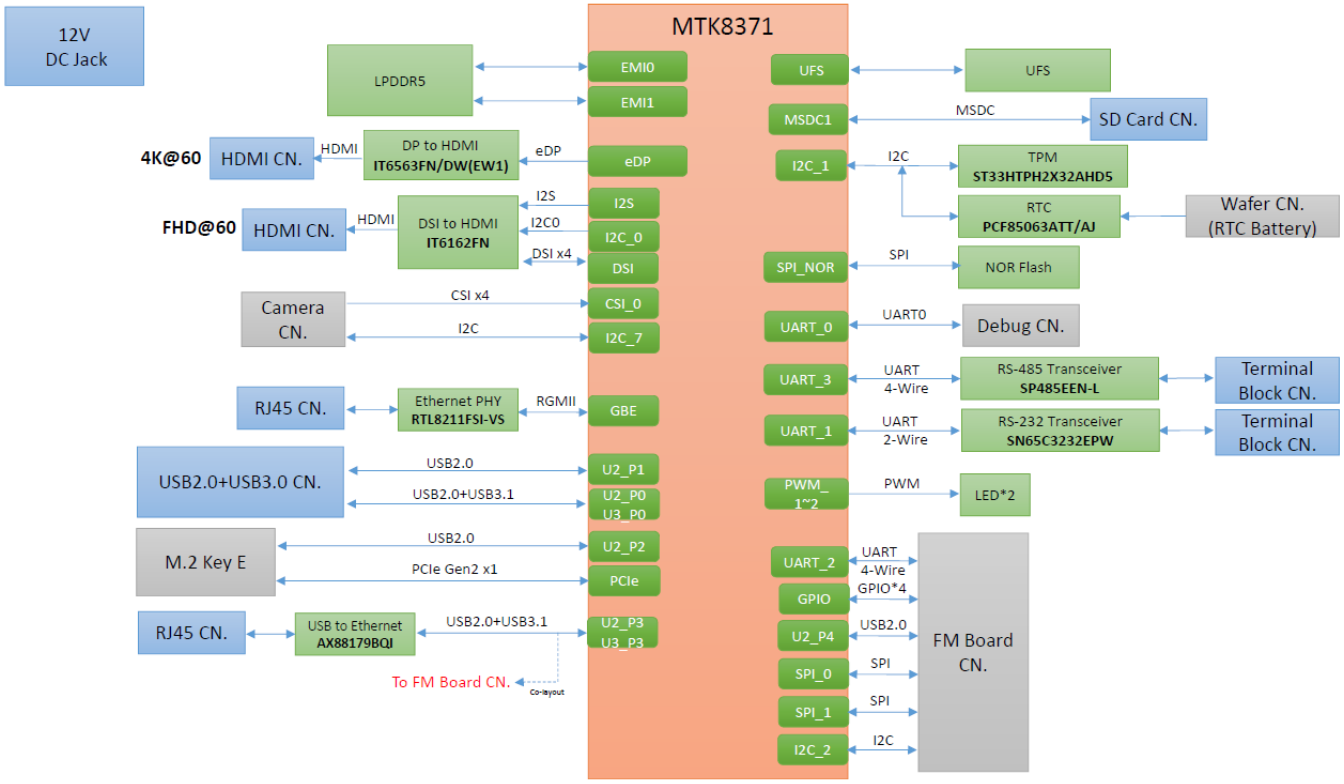


Figure 1: Functional block diagram

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4 Mechanical Layout

4.1 Mechanical Dimensions

NOTE:

All dimensions are in millimeters, unless noted.

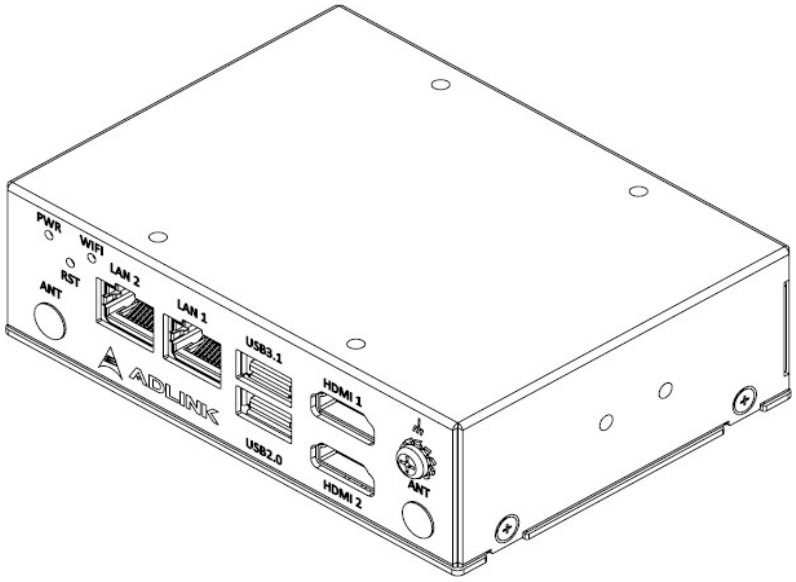


Figure 2: Top view

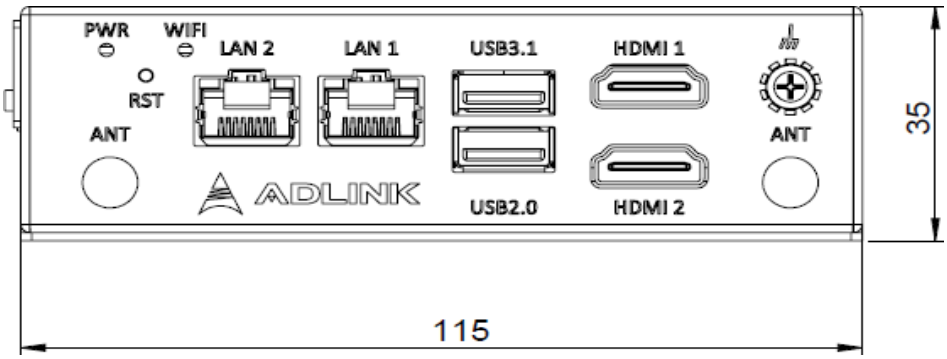


Figure 3: Front view

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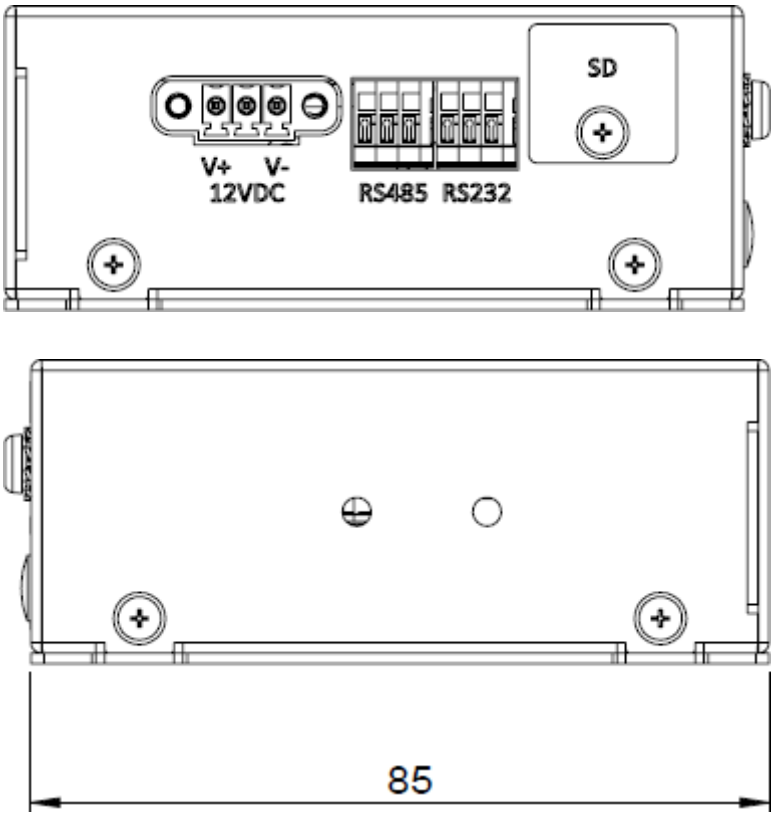


Figure 4: Side view

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4.2 Connector Locations

4.2.1 Front Panel

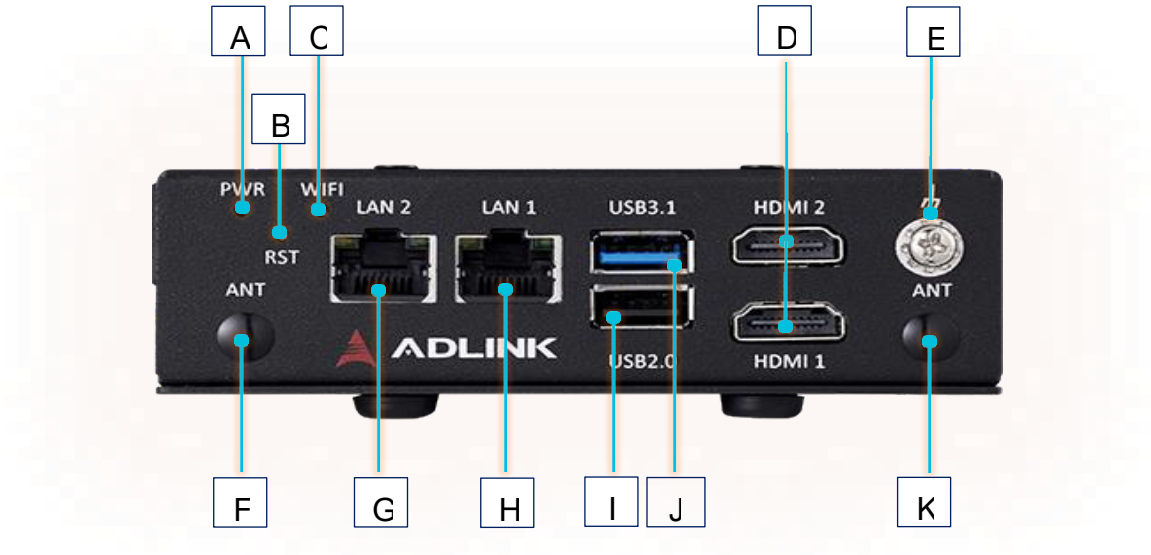


Figure 5: Front panel I/O connectors

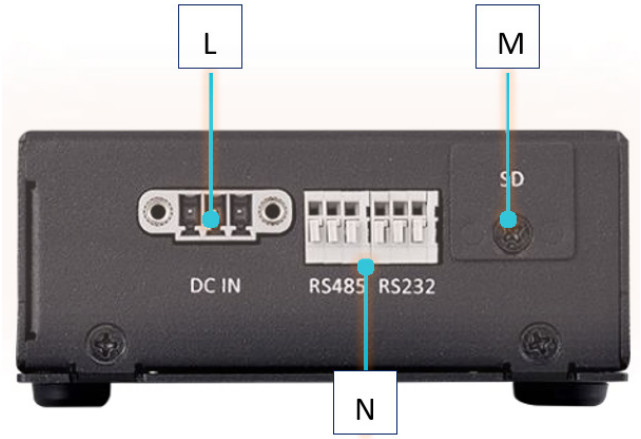


Figure 6: Rear panel I/O connectors

Table 1: Panel I/O connector locations

Item	Name
A	Power LED
B	Reset
C	Wi-Fi LED
D	HDMI
E	Ground Screw
F, K	Antenna
G, H	Gigabit Ethernet (GbE, RJ45)
I, J	USB2.0 USB3.0
L	DC power input
M	Micro SD card
N	RS232/485 2-wire

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4.3 Mechanical Assembly

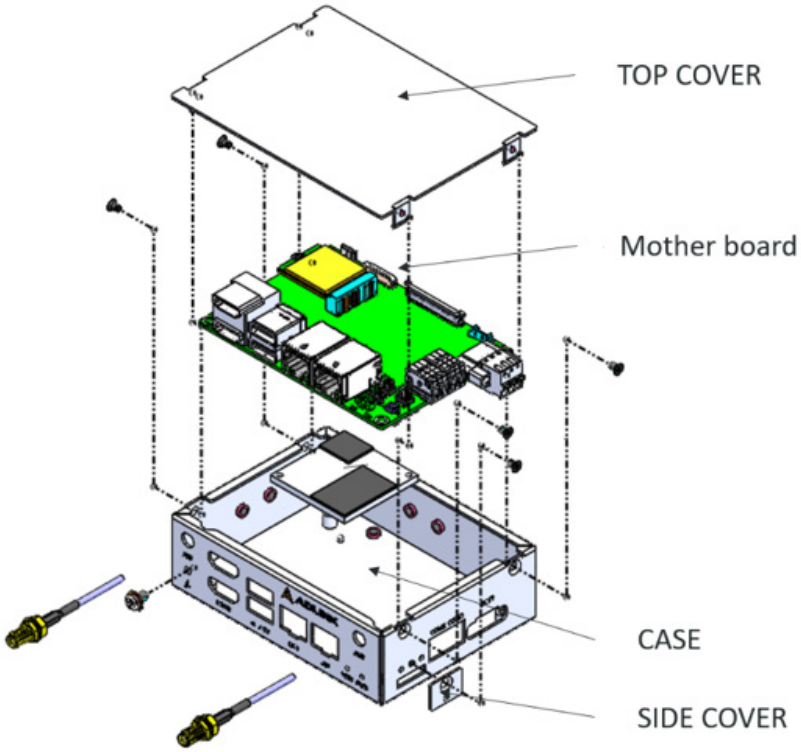


Figure 7: Chassis assembly

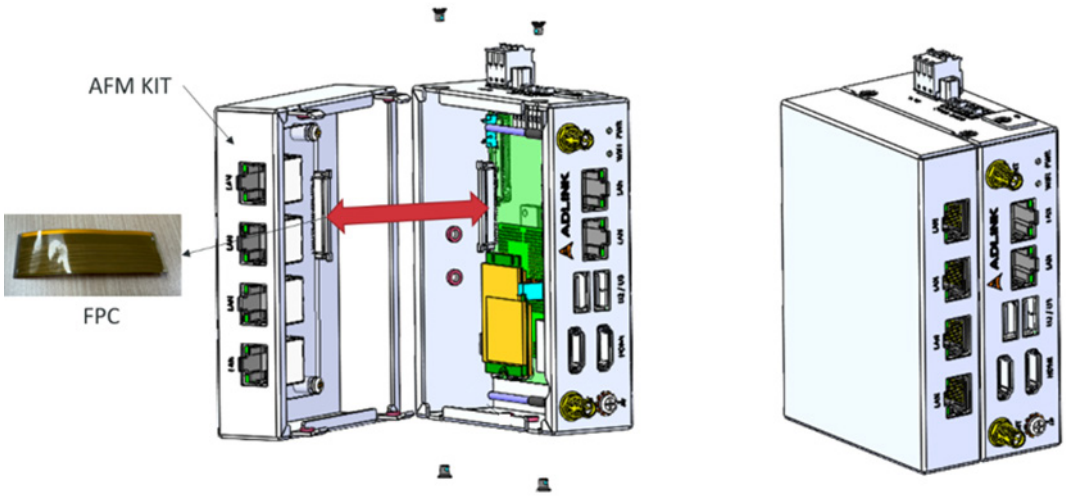


Figure 8: AFM option kit assembly

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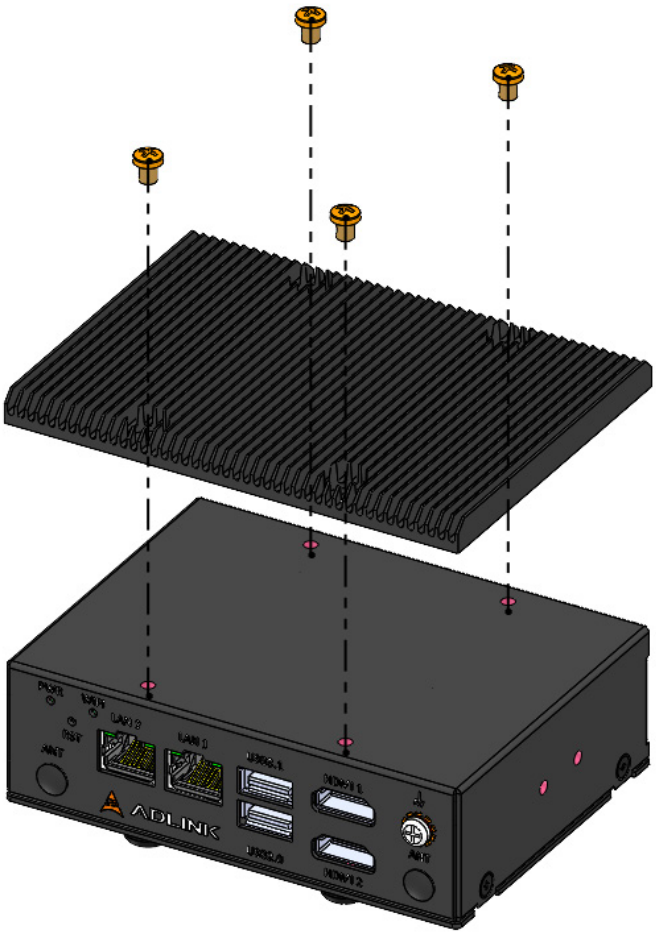


Figure 9: HeatSink kit assembly

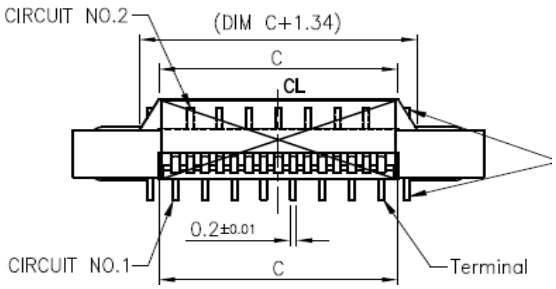
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5 Connector Pinouts and Jumper Settings

5.1 FM Board Connector

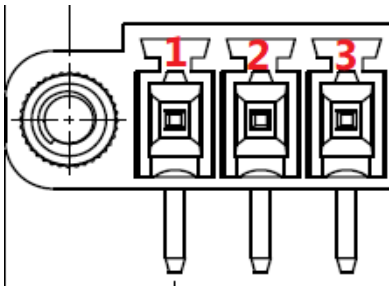


Pin name	Pin description	Pin name	Pin description
1	3.3V	2	3.3V
3	GND	4	3.3V
5	3.3V	6	3.3V
7	UART_RTS	8	UART_CTS
9	UART_RXD	10	UART_TXD
11	SCL	12	SDA
13	M2B_RST_N	14	WWAN_RESET
15	M2_WWAN_LED	16	GPIO_4
17	GPIO_3	18	GPIO_2
19	GPIO_1	20	5V
21	5V	22	5V
23	5V	24	1.8V
25	GND	26	GND
27	SPIM1_MOSI	28	SPIM1_MISO
29	SPIM1_CLK	30	SPIM1_CS_N
31	GND	32	GND
33	1.8V	34	SPIM0_MISO
35	SPIM0_MOSI	36	SPIM0_CS_N
37	SPIM0_CLK	38	GND
39	GND	40	USB_DP_P3
41	USB_DM_P3	42	GND
43	GND	44	SSUSB_RXP_P1
45	SSUSB_RXN_P1	46	SSUSB_TXP_P1
47	SSUSB_TXN_P1	48	USB_DP_P4
49	USB_DM_P4	50	GND

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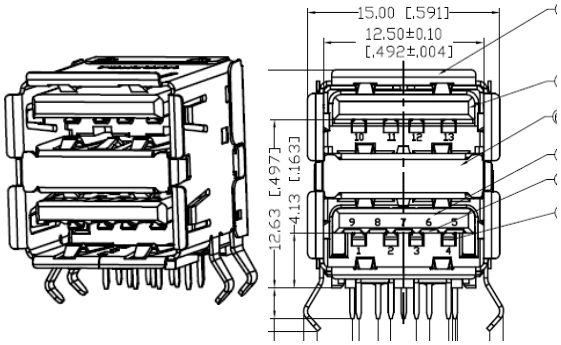
5.2 DC Power Connector

Pin name	Pin description
1	GND
2	CHGND_DCIN
3	ADAPTER_IN



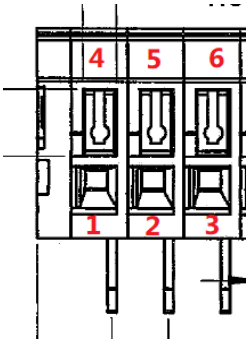
5.3 USB 2.0 and USB 3.0 Type A Connectors

Pin name		Pin description
1	10	VBUS
2	11	DN
3	12	DP
4	13	GND
5		SSRX-
6		SSRX+
7		GND
8		SSTX-
9		SSTX+



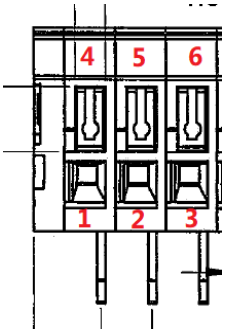
5.4 RS232 COM Port

Pin name	Pin description	Pin name	Pin description
1	GND	4	GND
2	COM1_RXD	5	COM1_RXD
3	COM1_TXD	6	COM1_TXD



5.5 RS485 COM Port (CN3201)

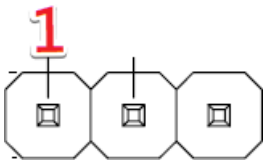
Pin name	Pin description	Pin name	Pin description
1	GND	4	GND
2	COM3_TXD-	5	COM3_TXD-
3	COM3_TXD+	6	COM3_TXD+



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5.6 Debug Pin Header

Pin name	Pin description
1	GND
2	UART0_TXD
3	UART0_RXD



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Safety Instructions

For user safety, please read and follow all instructions, Warnings, Cautions, and Notes marked in this manual and on the associated device before handling/operating the device, to avoid injury or damage.

- Read these safety instructions carefully
- Keep the User's Manual for future reference
- Read the Specifications section of this manual for detailed information on the recommended operating environment
- The device can be operated at an ambient temperature of -20ºC to 60ºC.
- The device can be installed external heatsink for the ambient temperature of -20ºC to 70ºC
- It is recommended that the device be installed in Information Technology Rooms that are in accordance with Article 645 of the National Electrical Code and NFPA 75.
- When installing/mounting or uninstalling/removing device is required: Turn off power and unplug any power cords/cables
- Reinstall all chassis covers before restoring power
- To avoid electrical shock and/or damage to device:

  [> Keep device away from water or liquid sources

  [> Keep device away from high heat or humidity

  [> Keep device properly ventilated (do not block or cover ventilation openings)

  [> Always use recommended voltage and power source settings

  [> Always install and operate device near an easily accessible electrical outlet

  [> Secure the power cord (do not place any object on/over the power cord)

  - Only install/attach and operate device on stable surfaces and/or recommended mountings
  - This apparatus is powered by adapter or DC source. Please ensure adapter or DC source should be keep earth connection if it has protective earthing.
  - If the device will not be used for long periods of time, turn off and unplug from its power source
  - Never attempt to repair the device, which should only be serviced by qualified technical personnel using suitable tools
  - A Lithium-type battery may be provided for uninterrupted backup or emergency power.



Risk of explosion if battery is replaced with one of an incorrect type; please dispose of used batteries appropriately.

Risque d'explosion si la pile est remplacée par une autre de type incorrect. Veuillez jeter les piles usagées de façon appropriée.

- The device must be serviced by authorized technicians when:
  [> The power cord or plug is damaged.
  [> Liquid has entered the device interior.
  [> The device has been exposed to high humidity and/or moisture.
  [> The device is not functioning or does not function according to the User's Manual.
  [> The device has been dropped and/or damaged and/or shows obvious signs of breakage.
- Disconnect the power supply cord before loosening the thumbscrews and always fasten the thumbscrews with a screwdriver before starting the system up.

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[> The equipment is not intended to be installed or used in a home, school, or public area accessible to the general population.
[> The knurled thumb screws with slotted heads for each Node module should be tightened with a tool after both initial installation and subsequent use.

- It is recommended that the device be installed only in a server room or computer room where access is:
  [> Restricted to qualified service personnel or users familiar with restrictions applied to the location, reasons therefore, and any precautions required.
  [> Only afforded by the use of a tool or lock and key, or other means of security, and controlled by the authority responsible for the location.
- Please use an approved power source certified by IEC or UL. If you need an adapter, optional accessories, or further assistance, please contact ADLINK for more information.



BURN HAZARD
Touching this surface could result in bodily injury. To reduce risk, allow the surface to cool before touching.

RISQUE DE BRÛLURES
Ne touchez pas cette surface, cela pourrait entraîner des blessures. Pour éviter tout danger, laissez la surface refroidir avant de la toucher.

- Lisez attentivement ces consignes de sécurité
- *Conservez le manuel de l'utilisateur pour pouvoir le consulter ultérieurement*
- *Lisez la section Spécifications de ce manuel pour des informations détaillées sur l'environnement d'exploitation recommandé*
- Lors de l'installation/montage ou de la désinstallation/retrait de l'appareil ; ou lorsque le retrait d'un boîtier est nécessaire pour l'entretien par l'utilisateur (voir Mise en route) :
  - Éteignez l'alimentation et débranchez tous les cordons/câbles d'alimentation.
  - Réinstallez tous les panneaux du boîtier avant de remettre l'alimentation sous tension.
- *Pour éviter les chocs électriques et/ou d'endommager l'appareil :*

  - *Tenez l'appareil à l'écart de toute source d'eau ou de liquide*
  - *Tenez l'appareil à l'écart d'une forte chaleur ou d'une humidité élevée*
  - *Maintenez l'appareil correctement ventilé (n'obstruer ou ne couvrez pas les ouvertures de ventilation)*
  - *Utilisez toujours les réglages de tension et de source d'alimentation recommandés*
  - *Installez et utilisez toujours l'appareil près d'une prise de courant facilement accessible*
  - Fixez le cordon d'alimentation (ne placez aucun objet sur/au-dessus du cordon d'alimentation) et connectez-le à une prise de courant avec mise à la terre
- N'essayez jamais de réparer l'appareil, qui doit être réparé uniquement par du personnel technique qualifié *et utilisant des outils appropriés.*
  - *Lors de l'installation/montage ou de la désinstallation/retrait d'un périphérique, ou lorsque le retrait d'un couvercle de châssis est requis pour l'entretien par l'utilisateur :*
  - *Coupez l'alimentation et débranchez tous les cordons/câbles d'alimentation.*
- *Réinstallez tous les capots du châssis avant de rétablir l'alimentation. Installez/fixez et utilisez l'appareil uniquement sur des surfaces stables et/ou des supports recommandés.*
- *Si l'appareil n'est pas utilisé pendant une longue période, éteignez-le et débranchez-le de sa source d'alimentation.*
- *Une batterie de type lithium peut être fournie pour une alimentation de secours ou de secours ininterrompue.*

  - *L'appareil doit être réparé par des techniciens agréés lorsque :*
  - *Le cordon d'alimentation ou la fiche est endommagé.*
  - *Du liquide est entré dans l'appareil. € L'appareil a été exposé à une humidité élevée et/ou à l'humidité.*
  - *L'appareil ne fonctionne pas ou ne fonctionne pas conformément au manuel de l'utilisateur.*

- *L'appareil est tombé et/ou a été endommagé et/ou présente des signes évidents de casse.*
- *Débranchez le cordon d'alimentation avant de desserrer les vis moletées et fixez toujours les vis moletées avec un tournevis avant de démarrer le système.*
  - *L'équipement n'est pas destiné à être installé ou utilisé dans une maison, une école ou une zone publique accessible au grand public.*

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- *Les vis à molette avec têtes fendue pour chaque module Node doivent être serrées avec un outil après l'installation initiale et lors de l'utilisation suivante.*

- *Il est recommandé d'installer l'appareil uniquement dans une salle de serveurs ou une salle informatique dont l'accès est :*

  - *Réservé au personnel de service qualifié ou aux utilisateurs familiers avec les restrictions appliquées à l'emplacement, les raisons de celles-ci et les précautions requises.*
  - *Autorisé uniquement par l'utilisation d'un outil ou d'une serrure et d'une clé, ou d'autres moyens de sécurité, et contrôlé par l'autorité responsable du lieu.*

Veuillez utiliser une source d'alimentation approuvée et certifiée par la norme IEC ou UL. Si vous avez besoin d'un adaptateur, d'accessoires en option ou d'une assistance supplémentaire, veuillez contacter ADLINK pour plus d'informations.

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