

Edge AI Applied Computing



# IBOX-601-M12X

## User Manual

Version 1.6



# Revision History

| Version | Date       | Description of Changes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1.0     | 2025-04-10 | Initial release.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 1.1     | 2025-07-08 | Added "DSU JST Connector" info in Chapter 4, <i>Expansion</i> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 1.2     | 2025-11-05 | Added a Supported Camera List in Section 1.1, <i>Product Information</i> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 1.3     | 2025-12-05 | Updated the command to flash a BSP image in Section 5.2.5, <i>Executing System Recovery</i> .                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 1.4     | 2025-12-12 | Added Section 2.4, <i>Default Login Credentials</i> .                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 1.5     | 2026-03-02 | Added a note in Section 5.1.1, <i>Setting the GMSL Camera</i> , reminding users that different camera types must not be mixed.                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 1.6     | 2026-05-26 | <ul style="list-style-type: none"><li>• Added descriptions about the StereoLabs cameras in Section 1.1.</li><li>• Added a note about the recommended minimum NVMe SSD storage space in Section 2.1.</li><li>• Added information about Jetson module power modes in Section 2.1.</li><li>• Renamed Section 2.4 to <i>Initial Login</i> and revised the associated content.</li><li>• Added information about the DIP switch for the CAN FD port in Section 3.3.</li><li>• Updated the GMSL camera and COM port configuration in Section 5.1.</li></ul> |
|         |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|         |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|         |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|         |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|         |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

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### Electrical Safety

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- Seek professional assistance before using an adapter or extension cord. These devices could interrupt the grounding circuit.
- Before connecting or removing signal cables from the motherboard, ensure all power cables are unplugged.
- Ensure your power supply is set to the correct voltage in your area. If you are unsure of the voltage of your current electrical outlets, contact your local power company.
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### Operation Safety

- Before installing the motherboard and adding devices, carefully read all the manuals in the package.
- Before using the product, ensure all cables are correctly connected and the power cables are not damaged. If you detect any damage, contact your dealer immediately.
- Keep paper clips, screws, and staples away from connectors, slots, sockets, and circuitry to avoid short circuits.
- Avoid dust, humidity, and temperature extremes. Please do not place the product in any area that may become wet.
- Place the product on a stable surface.
- Contact a qualified service technician or retailer if you encounter technical problems with the product.

### Environmental Safety

- Use this product in environments with ambient temperatures between -25°C and 70°C.
- Do not leave this product in an environment where the storage temperature may be below -40°C or above 80°C. To prevent damage, the product must be used in a controlled environment.



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- E-mail: [sales@sintrones.com](mailto:sales@sintrones.com)

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# 1. Introduction

This chapter introduces SINTRONES® IBOX-601-M12X and gives an overview of its product details.

Topics in this chapter include:

- [Product Information \(on page 8\)](#)
- [Product Photos \(on page 12\)](#)
- [Mechanical Drawings \(on page 13\)](#)
- [Package Contents \(on page 14\)](#)
- [Power Consumption \(on page 16\)](#)

## 1.1. Product Information

**Table 1-1 Specifications**

| System                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Power                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Module</b> <ul style="list-style-type: none"> <li>NVIDIA® Jetson Orin™ NX 16GB (1024 CUDA cores + 8-core ARM Cortex-A78AE CPU + 16 GB LPDDR5)</li> <li>NVIDIA® Jetson Orin™ NX 8GB (1024 CUDA cores + 6-core ARM Cortex-A78AE CPU + 8 GB LPDDR5)</li> </ul> <b>Network</b> <ul style="list-style-type: none"> <li>1 x Intel® 2.5GbE, 1 x GbE (Integrated in SoM)</li> </ul> <b>Security</b> <ul style="list-style-type: none"> <li>Platform Security Controller (PSC), Security Engine (SE)</li> </ul> <b>Watchdog</b> <ul style="list-style-type: none"> <li>Automatic reset for unresponsive system</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>Power Input</b> <ul style="list-style-type: none"> <li>DC 9V ~ 60V via a M12 K-coded connector</li> </ul> <b>Power Protection</b> <ul style="list-style-type: none"> <li>OCP, OVP, surge protection, and reversed polarity protection</li> </ul> <b>Power Management</b> <ul style="list-style-type: none"> <li>Smart power and ignition management for various vehicles</li> </ul> <b>UPS (Optional)</b> <ul style="list-style-type: none"> <li>Backup battery for system power backup <ul style="list-style-type: none"> <li>*UPS backup time varies depending on actual overall system power consumption.</li> <li>**Operating temperature will be -20°C ~ 60°C with the battery kit.</li> <li>Patent No.: M447854 (Built-in Battery)</li> </ul> </li> </ul>       |
| Interface                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | RTC Battery                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Video</b> <ul style="list-style-type: none"> <li>1 x HDMI® Type-A</li> </ul> <b>Audio</b> <ul style="list-style-type: none"> <li>1 x HD audio output from the HDMI®</li> </ul> <b>Ethernet</b> <ul style="list-style-type: none"> <li>2 x M12 X-coded connector (1 x 2.5GbE &amp; 1 x GbE)</li> </ul> <b>USB</b> <ul style="list-style-type: none"> <li>2 x USB 3.2 Type-A <ul style="list-style-type: none"> <li>*Two ports share 10Gbps bandwidth</li> </ul> </li> </ul> <b>Camera</b> <ul style="list-style-type: none"> <li>4 x FAKRA-Z connector for GMSL-2</li> </ul> <b>DIO</b> <ul style="list-style-type: none"> <li>1 x DB-9 for 4 x DI / 4 x DO (12V/100mA)</li> </ul> <b>Serial Port</b> <ul style="list-style-type: none"> <li>1 x DB-9 for RS-232/422/485</li> </ul> <b>CAN Bus</b> <ul style="list-style-type: none"> <li>1 x DB-9 for CAN FD</li> </ul> <b>Mgmt. Port</b> <ul style="list-style-type: none"> <li>1 x USB Type-C for system recovery only (without 5V output)</li> </ul> <b>SIM Card</b> <ul style="list-style-type: none"> <li>1 x Nano SIM card slot</li> </ul> <b>Antenna</b> <ul style="list-style-type: none"> <li>5 x Pre-cut hole for external SMA antenna</li> </ul> | <ul style="list-style-type: none"> <li>High-capacity coin cell battery for RTC</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Internal Expansion                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Software                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>M.2</b> <ul style="list-style-type: none"> <li>1 x M.2 3042/52 Key B slot (USB 3.0) with a Nano SIM card slot</li> <li>1 x M.2 2230 Key E slot with support for PCIe and USB 2.0</li> </ul> <b>mPCIe</b> <ul style="list-style-type: none"> <li>1 x mPCIe full-size slot with support for USB 2.0</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>Operating System / BSP</b> <ul style="list-style-type: none"> <li>NVIDIA® JetPack (Jetson Linux and NVIDIA® development tools included)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Storage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Environmental                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Type</b> <ul style="list-style-type: none"> <li>1 x M.2 2280 Key M slot for NVMe SSD (Pre-installed in system with BSP)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <b>Operating Temp.</b> <ul style="list-style-type: none"> <li>-25°C ~ 70°C (-13°F ~ 158°F) with 0.6 m/s airflow</li> <li>*Operating temperature varies by accessories installed.</li> </ul> <b>Storage Temp.</b> <ul style="list-style-type: none"> <li>-40°C ~ 80°C (-40°F ~ 176°F)</li> </ul> <b>Relative Humidity</b> <ul style="list-style-type: none"> <li>10% ~ 90% RH (non-condensing)</li> </ul> <b>Vibration</b> <ul style="list-style-type: none"> <li>Random - IEC60068-2-64, random, 2.5G@5~500Hz, 1hr/axis with SSD</li> <li>MIL-STD-810G, Method 514.6, Procedure I, Category 4 with SSD</li> </ul> <b>Shock</b> <ul style="list-style-type: none"> <li>MIL-STD-810G, Method 516.6, Procedure I, Trucks and semi-trailers = 15G (11ms) with SSD</li> </ul> |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Certification / Standard                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>Certification</b> <ul style="list-style-type: none"> <li>CE, FCC Class A, E-Mark</li> </ul> <b>Standard</b> <ul style="list-style-type: none"> <li>EN 50155, EN 45545-2 (R25)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Mechanical                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | <b>Construction</b> <ul style="list-style-type: none"> <li>Aluminum alloy</li> </ul> <b>Mounting</b> <ul style="list-style-type: none"> <li>DIN rail, wall</li> </ul> <b>Weight</b> <ul style="list-style-type: none"> <li>1.87 kg (4.13 lb)</li> </ul> <b>Dimensions (L x W x H)</b> <ul style="list-style-type: none"> <li>271 x 271 x 69 mm (10.67 x 10.67 x 2.72 in.)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                     |



**Table 1-2 Ordering Information**

|              |                                                                                                                           |                                                                 |
|--------------|---------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|
| Model Number | IBOX-601-M12X-00-ONX16                                                                                                    | NVIDIA® Jetson Orin™ NX 16GB / VDB-100 / 4 x GMSL-2 / Model M12 |
|              | IBOX-601-M12X-00-ONX8                                                                                                     | NVIDIA® Jetson Orin™ NX 8GB / VDB-100 / 4 x GMSL-2 / Model M12  |
|              | IBOX-601-M12X-01-ONX16                                                                                                    | NVIDIA® Jetson Orin™ NX 16GB / VDB-101 / 4 x GMSL-2 / Model M12 |
|              | IBOX-601-M12X-01-ONX8                                                                                                     | NVIDIA® Jetson Orin™ NX 8GB / VDB-101 / 4 x GMSL-2 / Model M12  |
| Description  | NVIDIA® Jetson Orin™ NX SoM w/ 1x HDMI® / 2 x LAN / 1 x 2.5GbE / 1 x CAN FD / 4 x GMSL-2 / DC 9V ~ 60V / Edge AI Computer |                                                                 |

**Table 1-3 Mandatory Accessory**

|         |                                                                                                                                                                                                                                                                                                        |
|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Storage | M.2 2280 NVMe SSD 240GB / 480GB / 960GB available for selection<br><br> <b>Note:</b><br>It is recommended to install an NVMe SSD with at least 480GB storage capacity for optimal data transmission and processing. |
|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

**Table 1-4 Optional Accessories**

|       |                                                           |
|-------|-----------------------------------------------------------|
| Wi-Fi | M.2 2230 Wi-Fi Module                                     |
| WWAN  | M.2 3042/52 WWAN Modem                                    |
| GPS   | mPCIe GPS module                                          |
| UPS   | BAT-2300v2 (Operating Temp.: -20°C ~ 60°C / -4°F ~ 140°F) |

**Note:**

All items listed in the Optional Accessories table are sold separately.

**Table 1-5 Supported Camera List**

| Brand         | Camera Part Number                                                                                                                                                          | Max. No. of Camera Connections |                  |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|------------------|
|               |                                                                                                                                                                             | IBOX-601-M12X-00               | IBOX-601-M12X-01 |
| oToBrite      | oToCAM264ISP Series<br>(2MP, Sony IMX390)                                                                                                                                   | 4                              | 4                |
|               | oToCAM260ISP Series<br>(5.36MP, Sony IMX490)                                                                                                                                | 4                              | 4                |
|               | oToCAM223 Series<br>(2.95MP, Sony ISX031)                                                                                                                                   | 4                              | 4                |
| e-con Systems | STURDeCAM25<br>(2MP, Omsemi AR0234CS)                                                                                                                                       | -                              | 4                |
|               | STURDeCAM31<br>(3MP, Sony ISX031)                                                                                                                                           | -                              | 4                |
|               | STURDeCAM81<br>(8MP, Omsemi AR0821)                                                                                                                                         | -                              | 4                |
| StereoLabs    | ZED X Stereo<br>(Dual 2MP)<br><br>Supported exclusively on <b>CAM1</b> and <b>CAM3</b> ports.                                                                               | Testing                        | 2                |
|               | ZED X One 4K<br>(8.2MP)<br><br>Adjacent ports cannot be used simultaneously. For dual-camera setups, connect to <b>non-adjacent port pairs</b> : CAM1 + CAM3 or CAM2 + CAM4 | -                              | 4                |

\*BSP versions may vary depending on supported GMSL cameras.

\*\*All brand and product names mentioned are the property of their respective owners.

## 1.2. Product Photos

Figure 1-1 Front View of IBOX-601-M12X

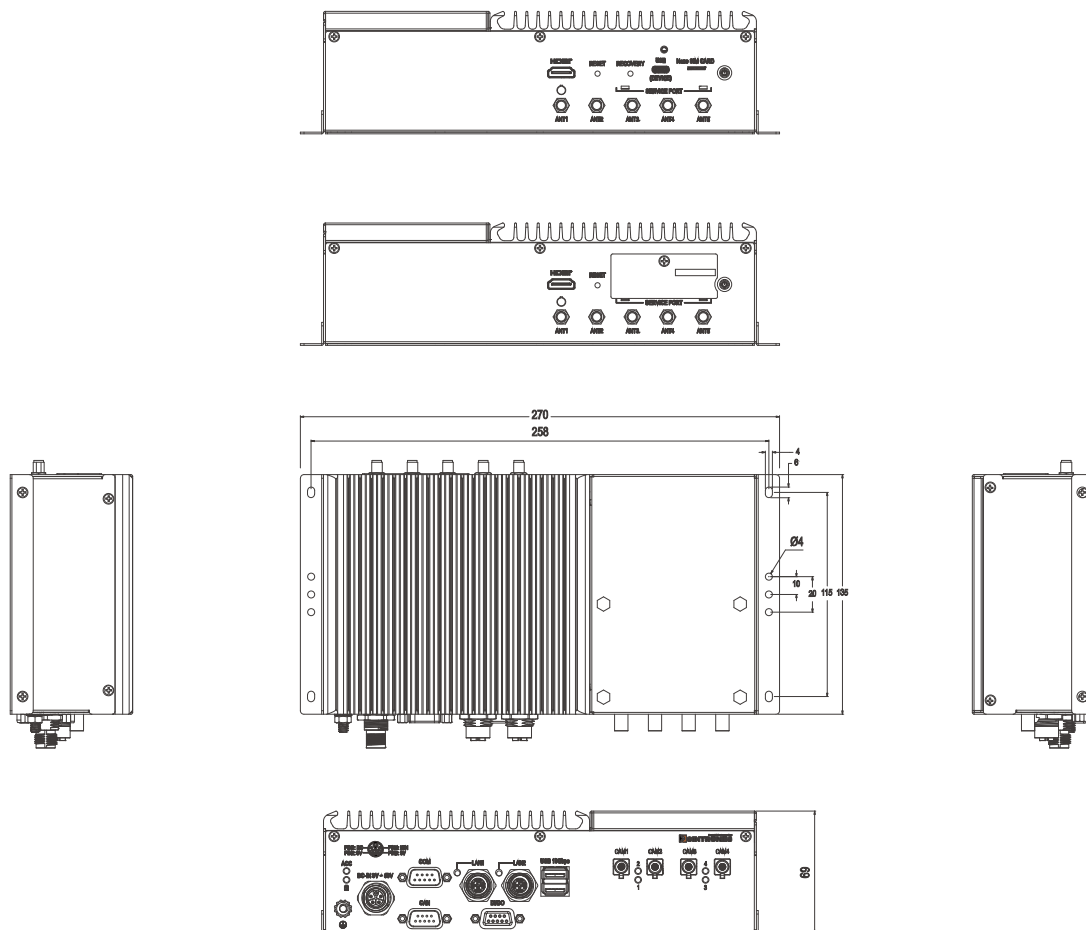


Figure 1-2 Rear View of IBOX-601-M12X



## 1.3. Mechanical Drawings

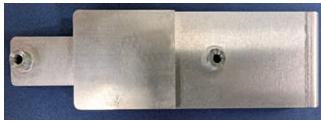
Unit : mm



## 1.4. Package Contents

See the following list to check if it matches your product package contents. Please contact SINTRONES® sales representatives or our sales partners if any of the items is missing.

**Table 1-6 Package Contents for IBOX-601-M12X**

| Item                        | Photo                                                                               | Quantity | Description                                                                                                     |
|-----------------------------|-------------------------------------------------------------------------------------|----------|-----------------------------------------------------------------------------------------------------------------|
| IBOX-601-M12X               | See <a href="#">Product Photos (on page 12)</a>                                     | 1        | The edge AI computer                                                                                            |
| Screw I (Type M2*5L ISO)    |    | 2        | Used to fasten an mPCIe card                                                                                    |
| Screw I (Type M2.5*5L)      |    | 2        | Used to fasten an M.2 module                                                                                    |
| Screw I (Type M2.5*10L)     |   | 2        | Used to fasten a heatsink for an M.2 3042 or 3052 module.                                                       |
| Screw F (Type M3*10L Ni)    |  | 6        | Used to fasten the computer to DIN rail clips                                                                   |
| Standoff screw (H75D50)     |  | 2        | Served as the mounting screw-holes to secure the screw used to fasten a heatsink for an M.2 3042 or 3052 module |
| M.2 WWAN heatsink Type 8    |  | 1        | Used to transfer heat from an installed M.2 3042 or 3052 module                                                 |
| Thermal pad (18x30x1.0T mm) |  | 1        | Used to transfer heat from an installed M.2 3042 or 3052 module                                                 |

| Item                          | Photo                                                                             | Quantity | Description                                                                    |
|-------------------------------|-----------------------------------------------------------------------------------|----------|--------------------------------------------------------------------------------|
| Thermal pad (30x34x1.5T mm)   |  | 1        | Used to transfer heat from an installed M.2 3042 or 3052 module                |
| DIN rail clip                 |  | 2        | Used to mount the computer onto a DIN rail                                     |
| Power cable for IBOX-601-M12X |  | 1        | Used to connect the computer with a M12 K-coded connector to a DC power supply |

## 1.5. Power Consumption

See the following table as the power consumption of IBOX-601-M12X.

**Table 1-7 IBOX-601-M12X-00/01-ONX16**

| Mode                 | Input Voltage |        |        |        |        |
|----------------------|---------------|--------|--------|--------|--------|
|                      | 9V            | 12V    | 24V    | 48V    | 60V    |
| 25W (SoM Power Mode) | 35.55W        | 34.32W | 34.08W | 35.04W | 37.80W |
| Idle                 | 11.7W         | 12.72W | 12.96W | 14.88W | 16.80W |
| Standby              | 1.80W         | 2.52W  | 4.08W  | 6.24W  | 7.20W  |

**Table 1-8 IBOX-601-M12X-00/01-ONX8**

| Mode                 | Input Voltage |        |        |        |        |
|----------------------|---------------|--------|--------|--------|--------|
|                      | 9V            | 12V    | 24V    | 48V    | 60V    |
| 20W (SoM Power Mode) | 30.24W        | 30.48W | 30.24W | 34.08W | 34.80W |
| Idle                 | 9.72W         | 9.24W  | 10.80W | 12.96W | 14.40W |
| Standby              | 2.25W         | 2.64W  | 3.12W  | 5.28W  | 6.00W  |



**Note:**

The above test results are measured based on NVIDIA® JetPack 5.1.3 with 5V voltage supply for the internal Jetson module.



## 2. Getting Started

Topics in this chapter include:

- [SoM and SSD Info \(on page 18\)](#)
- [System Setup \(on page 24\)](#)
- [Booting the System \(on page 36\)](#)
- [Initial Login \(on page 36\)](#)

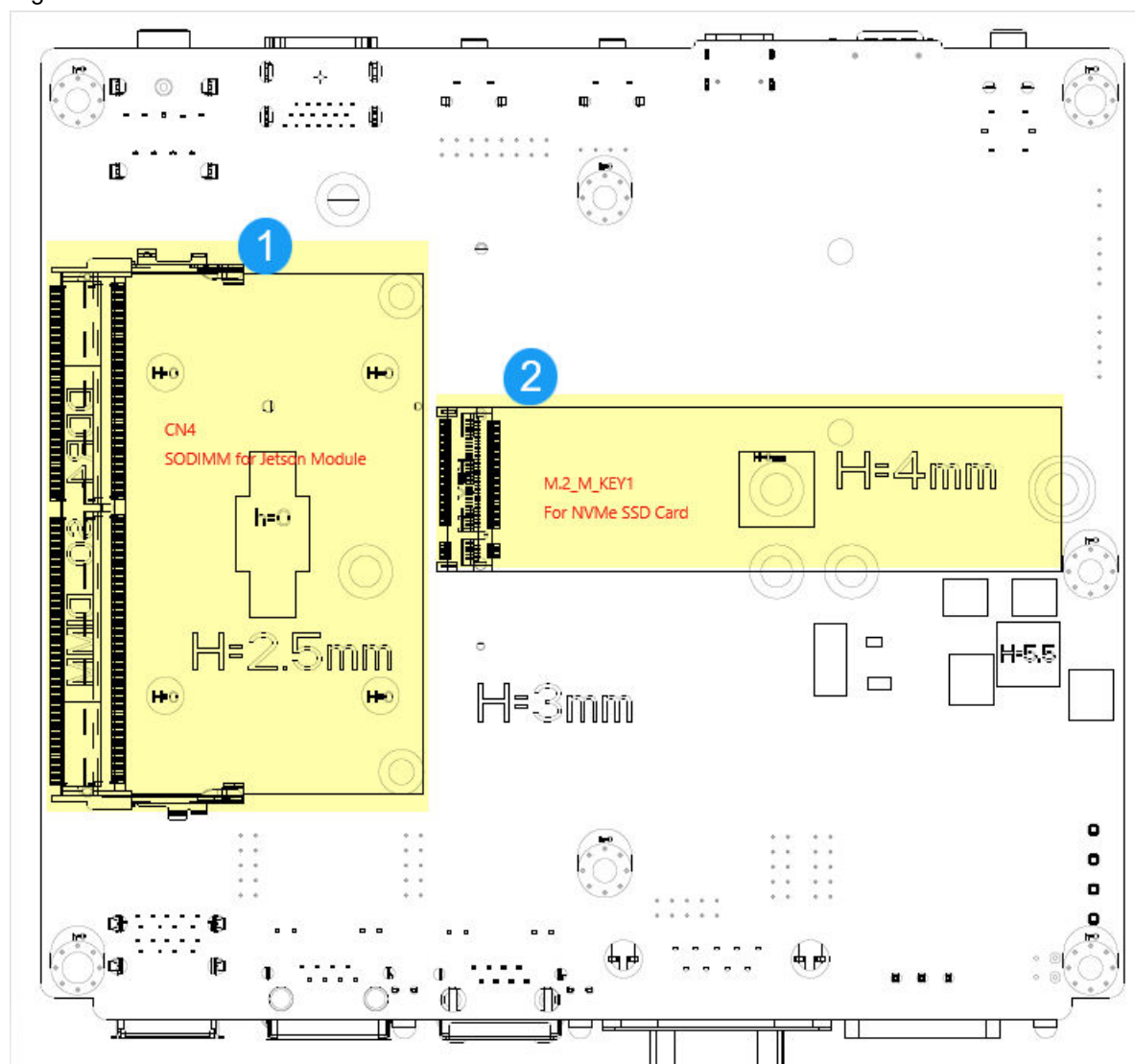
## 2.1. SoM and SSD Info

The pre-installed NVIDIA® Jetson system on modules (SoM) and NVMe SSD are located on the bottom side of the mainboard. It is suggested to consult SINTRONES technical support for expansion requirements for Jetson SoM or an NVMe SSD.

### Important:

- DO NOT remove the pre-installed SoM or SSD, or install an empty one without preparing any backup image in advance.
- A minimum of 256GB space is recommended on the flash drive for NVMe storage.

Figure 2-1 Bottom View of Mainboard



| Item | Internal Connector       | Description                                                                                       | Specification                                                 |
|------|--------------------------|---------------------------------------------------------------------------------------------------|---------------------------------------------------------------|
| 1    | SODIMM for Jetson Module | NVIDIA® Jetson module integrates CPU, GPU, and memory with pre-installed JetPack developer tools. | <a href="#">Information about Jetson Modules (on page 20)</a> |

| Item | Internal Connector | Description                                         | Specification                               |
|------|--------------------|-----------------------------------------------------|---------------------------------------------|
| 2    | M2M1               | M.2 2280 Key M slot used for installing an NVMe SSD | <a href="#">M.2 Key M Slot (on page 22)</a> |

### 2.1.1. Information about Jetson Modules

**Table 2-1 NVIDIA® Jetson Orin™ NX Modules Pre-installed in IBOX-601-M12X**

| Series             | Jetson Orin NX Series                                          |                             |
|--------------------|----------------------------------------------------------------|-----------------------------|
| Model              | Jetson Orin NX 16GB                                            | Jetson Orin NX 8GB          |
| GPU                | 1024-core NVIDIA® Ampere architecture GPU with 32 Tensor Cores |                             |
| CPU Frequency      | 2.0 GHz                                                        |                             |
| Power Consumption  | 25W                                                            | 20W                         |
| CPU                | 8-core Arm® Cortex® - A78AE                                    | 6-core Arm® Cortex® - A78AE |
| DL Accelerator     | 2 x NVDLA v2                                                   | 1 x NVDLA v2                |
| Vision Accelerator | 1 x PVA v2                                                     |                             |
| Memory             | 16GB 128-bit LPDDR5                                            | 8GB 128-bit LPDDR5          |
| Storage            | Supports external NVMe SSD (Pre-installed in system with BSP)  |                             |

## 2.1.2. Configuring Power Mode for Jetson Modules

NVIDIA® Jetson modules support multiple predefined power budgets, allowing users to select the **Power Mode** that best fits their needs via the Jetson Linux GUI or CLI.

By default, SINTRONES® system is not configured at the unconstrained power mode (MAXN or MAXN SUPER\*). The system operating temperature range is validated under **non-MAXN/MAXN SUPER** high-power mode.

Therefore, when the system runs in **MAXN** or **MAXN SUPER** mode, the system's maximum operating temperature may be reduced. It is **NOT recommended to run prolonged operation under heavy workloads** in these modes.



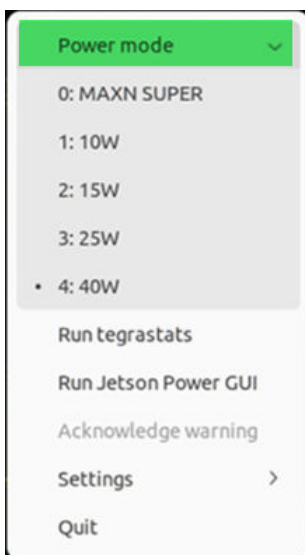
### Note:

\*The MAXN SUPER mode is only available in JetPack 6.2 for Jetson Orin Nano and Orin NX modules.

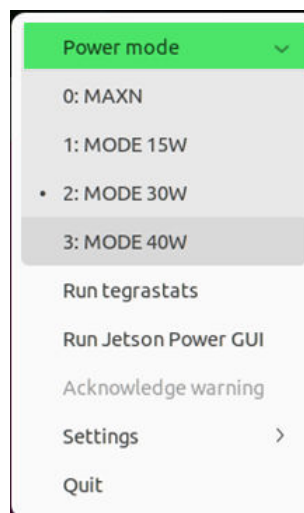
For detailed instructions on configuring power modes to optimize efficiency, please refer to the [official NVIDIA® documentation](#).

Examples of **power mode selection menus** for Jetson Orin NX 16GB and Jetson AGX Orin 32GB:

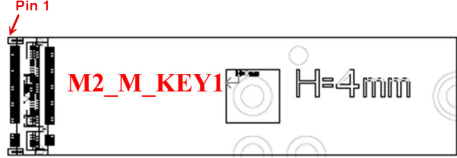
Jetson Orin NX 16GB



Jetson AGX Orin 32GB



### 2.1.3. M.2 Key M Slot

| M.2 Key M Slot | Description                                                                        |
|----------------|------------------------------------------------------------------------------------|
| Size           | NGFF 2280 / 75 Pin                                                                 |
| Type           | M.2 Key M H:8.5mm                                                                  |
| Location       | See <a href="#">SoM and SSD Info (on page 18)</a> for the information.             |
| Drawing        |  |

**Table 2-2 Pin Definition of M.2 Key M Slot**

| Pin | Signal      | Pin | Signal      |
|-----|-------------|-----|-------------|
| 1   | GND         | 2   | 3VSB        |
| 3   | GND         | 4   | 3VSB        |
| 5   | PCIE0_RX3_N | 6   | NC          |
| 7   | PCIE0_RX3_P | 8   | NC          |
| 9   | GND         | 10  | NC          |
| 11  | PCIE0_TX3_N | 12  | 3VSB        |
| 13  | PCIE0_TX3_P | 14  | 3VSB        |
| 15  | GND         | 16  | 3VSB        |
| 17  | PCIE0_RX2_N | 18  | 3VSB        |
| 19  | PCIE0_RX2_P | 20  | NC          |
| 21  | GND         | 22  | NC          |
| 23  | PCIE0_TX2_N | 24  | NC          |
| 25  | PCIE0_TX2_P | 26  | NC          |
| 27  | GND         | 28  | NC          |
| 29  | PCIE0_RX1_N | 30  | NC          |
| 31  | PCIE0_RX1_P | 32  | NC          |
| 33  | GND         | 34  | NC          |
| 35  | PCIE0_TX1_N | 36  | NC          |
| 37  | PCIE0_TX1_P | 38  | NC          |
| 39  | GND         | 40  | JS_I2C2_SCL |
| 41  | PCIE0_RX0_N | 42  | JS_I2C2_SDA |

| Pin | Signal      | Pin | Signal       |
|-----|-------------|-----|--------------|
| 43  | PCIE0_RX0_P | 44  | M2M_ALERT    |
| 45  | GND         | 46  | NC           |
| 47  | PCIE0_TX0_N | 48  | NC           |
| 49  | PCIE0_TX0_P | 50  | PCIE0_RST    |
| 51  | GND         | 52  | PCIE0_CLKREQ |
| 53  | PCIE0_CLK_N | 54  | PCIE_WAKE    |
| 55  | PCIE0_CLK_P | 56  | NC           |
| 57  | GND         | 58  | NC           |
| 59  | KEY         | 60  | KEY          |
| 61  | KEY         | 62  | KEY          |
| 63  | KEY         | 64  | KEY          |
| 65  | KEY         | 66  | KEY          |
| 67  | NC          | 68  | NC           |
| 69  | NGFF3_PEDET | 70  | 3VSB         |
| 71  | GND         | 72  | 3VSB         |
| 73  | GND         | 74  | 3VSB         |
| 75  | GND         |     |              |

## 2.2. System Setup

This section describes how to install expansion modules and the optional backup battery for this computer, as well as how to mount the computer onto a DIN rail.

Before you start the installation, check the following safety instructions:



### Important:

- Ensure the device is not connected to any power source such as a power adapter or a battery.
- Prior to installing any modules on the mainboard, always touch an unpainted and grounded metal object or wear a grounded anti-static wrist strap to prevent electrostatic discharge (ESD).

See the following steps to start the installation:

### 2.2.1. Removing the Bottom Cover

The bottom cover must be removed prior to installing expansion modules or an optional backup battery, or mounting the computer on a din rail.

1. Remove the two screws located on either side of the COM port.



2. Remove the three screws on the front panel.



3. Remove the five screws on the bottom cover.



4. After removing all the specified screws, gently lift the bottom cover and place it carefully.



Figure 2-2 Mainboard of

5. (Optional) To fully detach the bottom cover from the mainboard, gently remove the attached cables from the mainboard, as shown below.

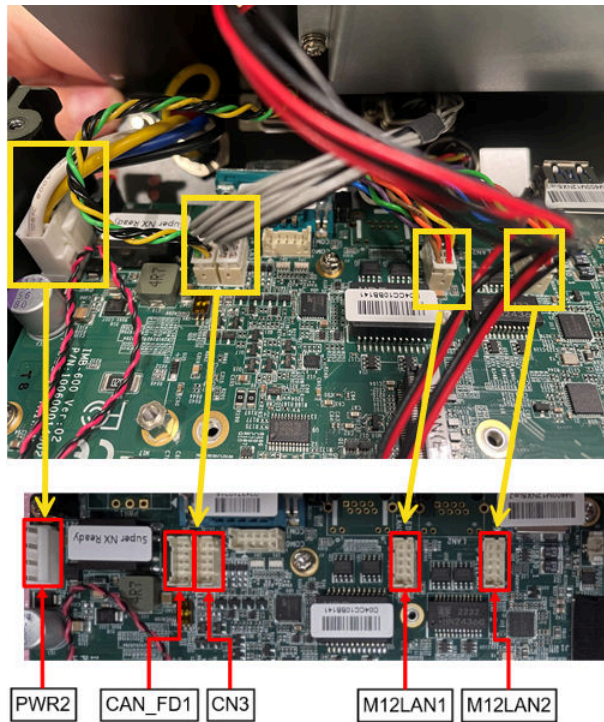


Figure 2-3 Fully-detached bottom cover of IBOX-601-M12X

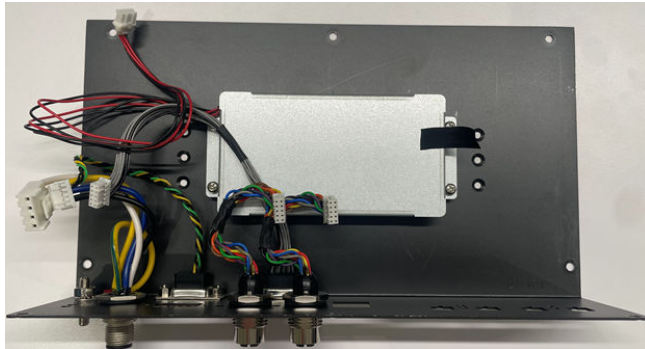
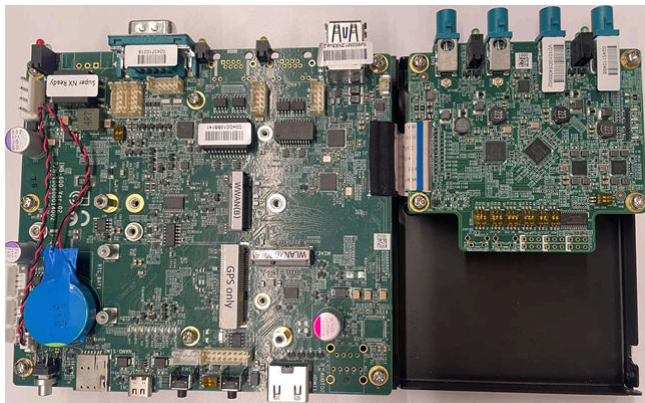


Figure 2-4 Mainboard of IBOX-601-M12X



## 2.2.2. Installing Expansion Modules

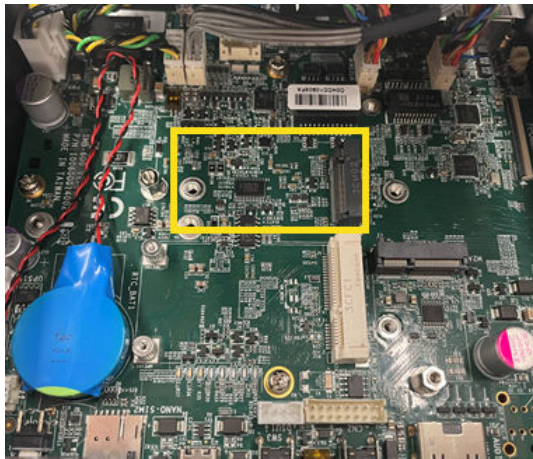
This section provides step-by-step instructions on how to install M.2 3042/3052, M.2 2230, and mPCIe expansion modules. You can also refer to [Expansion \(on page 47\)](#) for more details such as pin definitions about the internal slots or connectors used for expansion purpose.

You need to remove the bottom cover to install expansion modules. See [Removing the Bottom Cover \(on page 24\)](#) for the instructions.

### 2.2.2.1. Installing an M.2 3042 or 3052 Module

#### 1. Installing an M.2 3042 Key B LTE WWAN card (USB 3.0):

- a. Locate the M.2 3042 Key B slot on the mainboard.



- b. Move the standoff screw (H73D50) from location H8 to H9 as shown below:

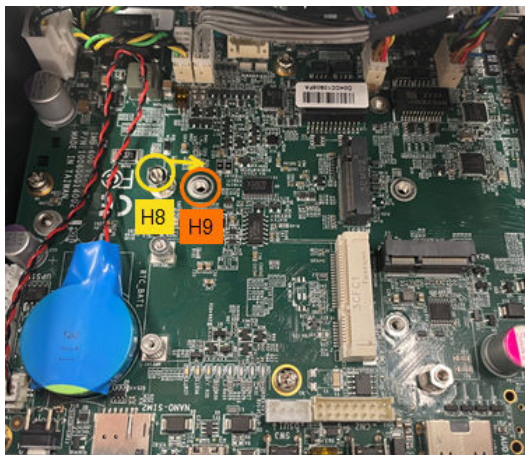


Figure 2-5 Standoff Screw (H73D50)



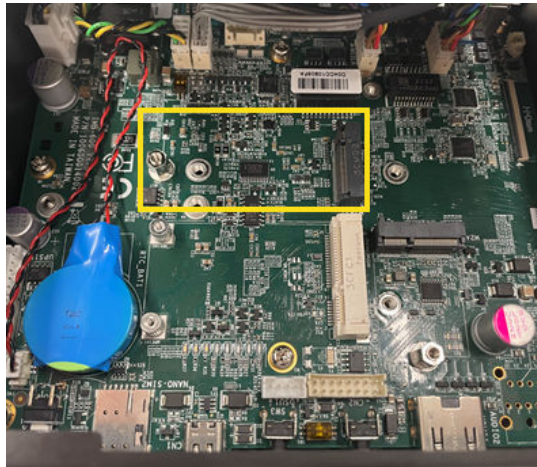
- c. Align the notch on the M.2 3042 WWAN card with the tab in the slot and gently insert the WWAN card at a 30 degree angle until it is fully embedded, and then press it down.
- d. Secure the expansion module to the mainboard with the M2.5x5L screw provided in the package (see [Package Contents \(on page 14\)](#)).



- e. To install a heatsink for the installed M.2 3042 module, go to [Installing a Heatsink for the M.2 3042 or 3052 Module \(on page 27\)](#) for the instructions.

## 2. Installing an M.2 3052 Key B 5G WWAN card (USB 3.0):

- a. Locate the M.2 3052 Key B slot on the mainboard.



- b. Align the notch on the M.2 3052 WWAN card with the tab in the slot and gently insert the WWAN card at a 30 degree angle until it is fully embedded, and then press it down.
- c. To install a heatsink for the installed M.2 3052 module, go to [Installing a Heatsink for the M.2 3042 or 3052 Module \(on page 27\)](#) for the instructions.

### 2.2.2.1.1. Installing a Heatsink for the M.2 3042 or 3052 Module

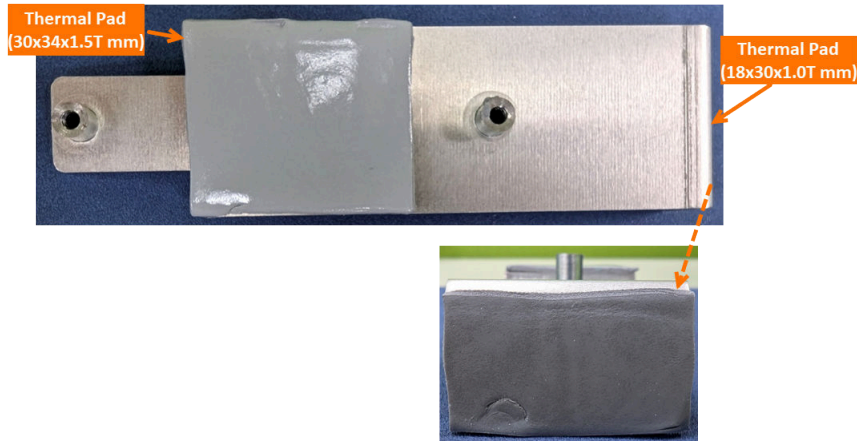
1. Before you begin, check the [Package Contents \(on page 14\)](#) and get the items below:

- 2 x standoff screw (H75D50)
- 1 x M.2 WWAN heatsink Type 8
- 1 x thermal pad (18x30x1.0T mm)
- 1 x thermal pad (30x34x1.5T mm)

2. Attach the thermal pads to the heatsink as shown below.



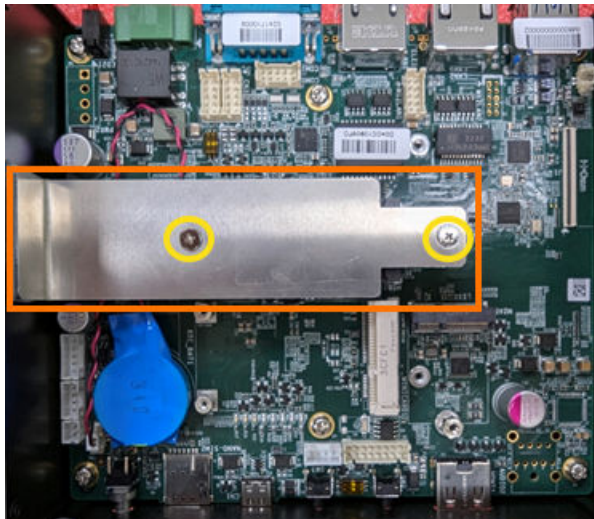
a. Figure 2-6 Thermal pads attached to the heatsink



3. Fasten the standoff screws (H75D50) to the mainboard as indicated in the figure below.



4. Align the two mounting holes on the heatsink with the mounting screw-holes on the mainboard, and then place the heatsink above the installed M.2 3042 or 3052 module.
5. Fasten the heatsink to the mainboard with the M2.5x10L screws.



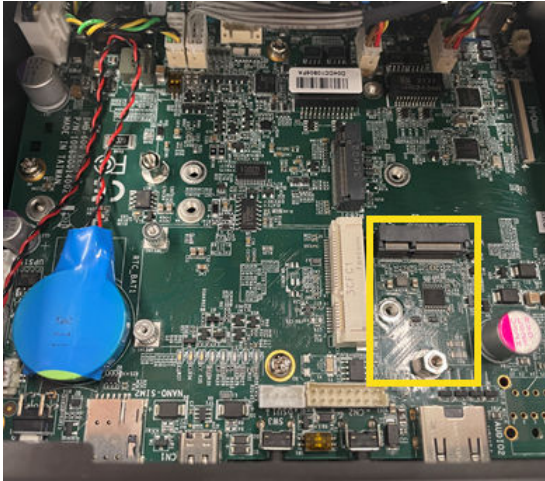
**Note:**

One of the M2.5x10L screw is also used to secure the M.2 3052 module to the mainboard.

6. After completing the installation of the M.2 3042 LTE or 3052 5G module, go to [Installing a Nano SIM Card \(on page 32\)](#) for how to install a SIM card.

### 2.2.2.2. Installing an M.2 2230 Module

1. Locate the M.2 2230 Key E slot on the mainboard.

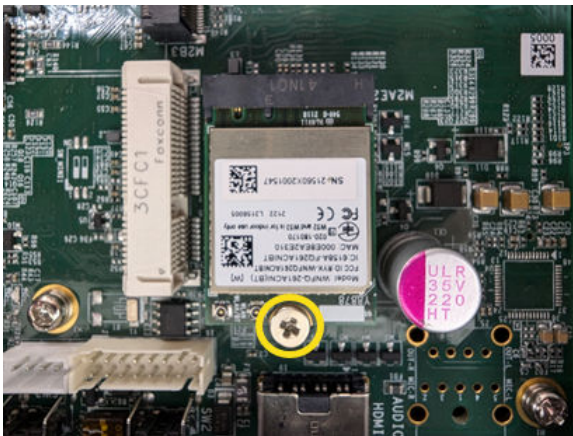


2. Align the notch on the expansion module with the ridge in the slot and gently insert the module at a 30 degree angle until it is fully embedded, and then press it down.

**Note:**

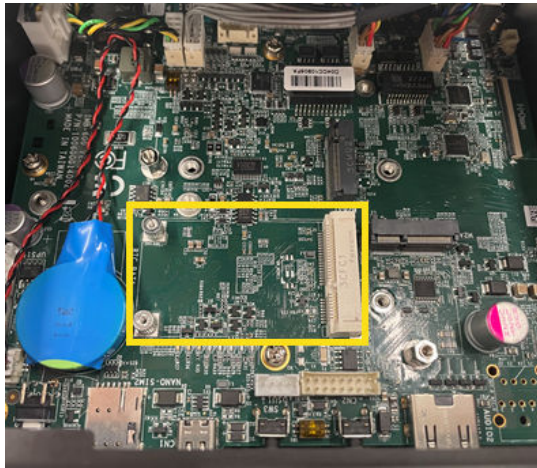
Ensure you align the semicircular mounting hole at the center of the opposite edge on the module with the copper pillar bump when pressing the module down.

3. Secure the expansion module to the mainboard with the M2.5x5L screw included in the package (see [Package Contents \(on page 14\)](#)).

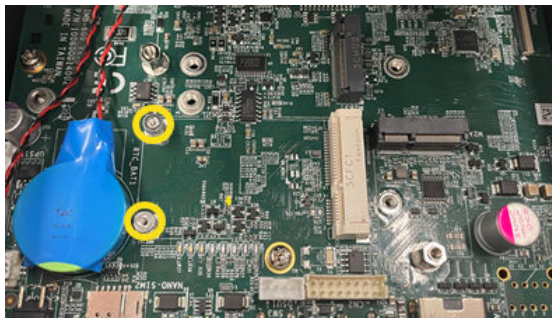


### 2.2.2.3. Installing an mPCIe Module

1. Locate the mPCIe connector on the mainboard.



2. Align the notch on the mPCIe card with the ridge in the slot and gently insert the card at a 30 degree angle until it is fully embedded, and then press it down.
3. Secure the mPCIe card to the mainboard with the M2x5L screw(s) included in the package (see [Package Contents \(on page 14\)](#)).



### 2.2.3. Installing a Backup Battery (BBU)

1. Before you begin, check the optional backup battery kit purchased from SINTRONES®, which includes:
  - 1 x battery cover



- 1 x battery with a power cable



- 4 x screw P3\*6L





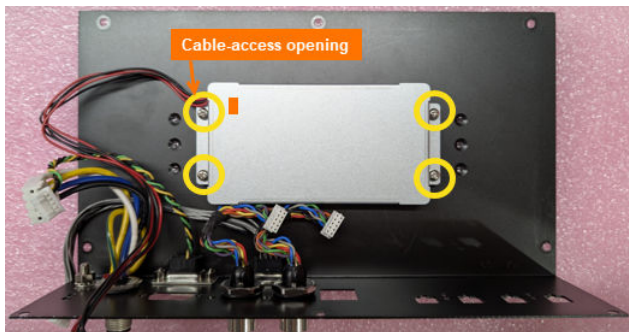
- 1 x sponge



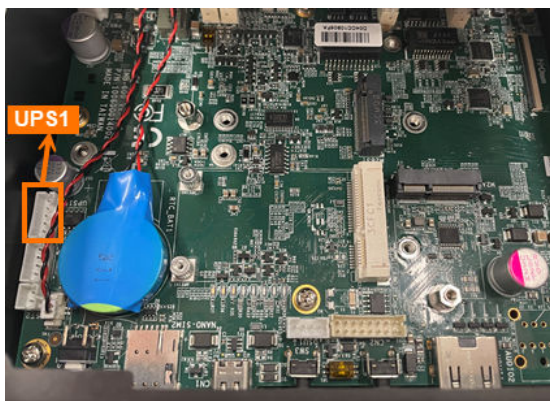
2. On both sides of the battery, peel off the release liners of the double-sided tapes.
3. Turn over the battery and adhere it to the battery cover with the information label face up.



4. Remove the bottom cover of the system to install the backup battery. See [Removing the Bottom Cover \(on page 24\)](#) for the instructions.
5. On both sides of the sponge, peel off the release liners of the double-sided tape.
6. Attach the sponge to the area on the back of the bottom cover.
7. Turn over the battery cover and fasten it to the bottom cover with the P3\*6L screws. Get the power cable out from the cable-access opening as shown below.

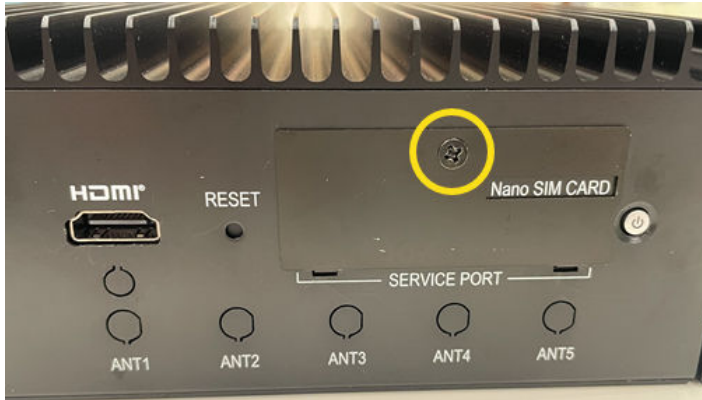


8. Connect the other end of the power cable to the UPS1 position on the mainboard as shown below.



## 2.2.4. Installing a Nano SIM Card

1. Ensure the IBOX-601-M12X is powered off.
2. Remove the screw to remove the protection cover from the rear panel.



3. Locate the **Nano SIM CARD** slot on the panel.



4. With the gold/bronze chip side facing up, insert the nano SIM card into the slot.



5. Use your fingernail or a small paperclip to press the card inwards until it locks in place.

**Note:**

To remove the SIM card, ensure you power off the system, and then use your fingernail or a small paperclip to push the card until it pops out.

6. Fasten the protection cover back onto the rear panel.



### 2.2.5. Mounting the IBOX-601-M12X

The IBOX-601-M12X can be mounted on a DIN rail using the DIN rail clips included in the package.

1. Check the [Package Contents \(on page 14\)](#) and get the items below:

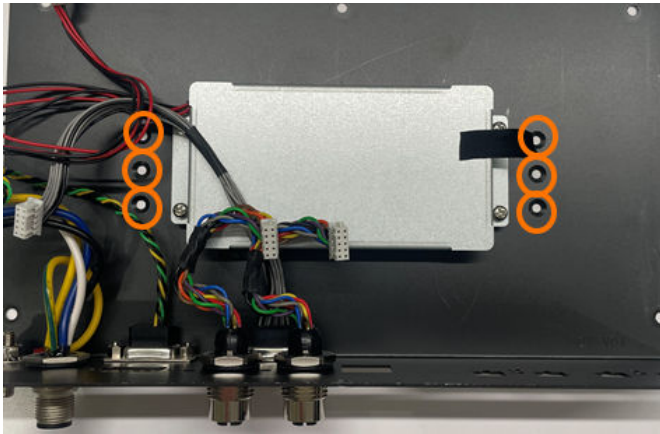
- 6 x Screw F Type M3\*10L Ni
- 2 x DIN rail clip



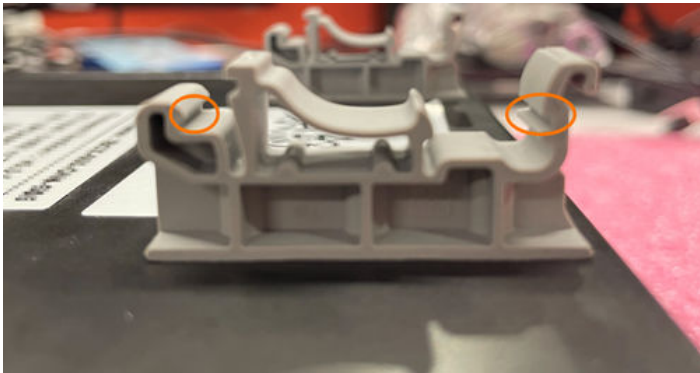
2. To secure the DIN rail clips to the IBOX-601-M12X, you need to remove the bottom cover first. See [Removing the Bottom Cover \(on page 24\)](#) for the instructions.
3. Gently remove the attached cables from the mainboard to fully detach the bottom cover from the mainboard.
4. Align the screw holes on the bottom cover with those on the DIN rail clips, and then place the DIN rail clips on the exterior side of the bottom cover.



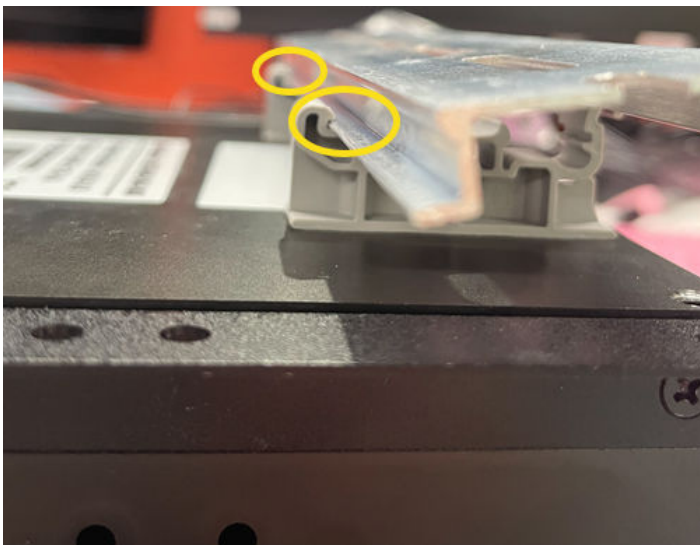
5. Turn over the bottom cover, and then secure the DIN rail clips to the bottom cover with the M3\*10L Ni screws.



6. Reconnect the cables detached in **Step 3** to the mainboard.
7. Reinstall the bottom cover.
8. Locate the notches on the rail clips that are designed to securely lock the DIN rail in place.



9. Align one edge of the DIN rail with the notches on the rail clips and insert it.



10. Press the other edge of the DIN rail firmly until it is fully embedded into the other side of the notches on the rail clips.



## 2.3. Booting the System

This section describes how to boot the system via an ignition switch or the power button.

### 2.3.1. Turning On System By Ignition Switch

1. You can use the power cable that came with the package directly in fields without an ignition system.
2. Plug one end of the power cable into the DC-IN port of the computer and then plug the other end to a power source.
3. When the power is ready, turn on the ignition switch.
4. The system starts checking if there's any incoming ignition signal. It takes about **3 seconds** for the system to run the ignition control process.

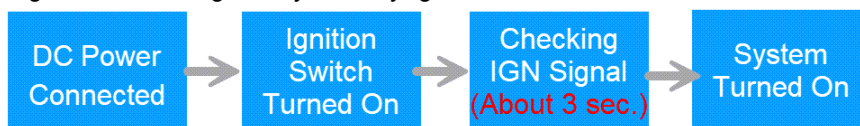


**Note:**

SINTRONES® provides ignition power management that monitors the ignition signal and controls the system boot process to avoid potential risk of downtime or damages to the connected devices and system.

5. After the ignition control process is complete, the system will boot up.

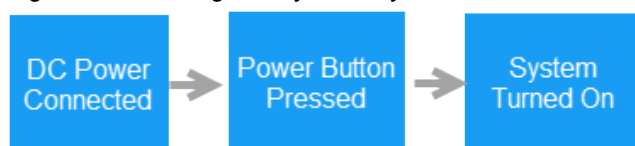
Figure 2-7 Turning On System By Ignition Switch



### 2.3.2. Turning On System By Power Button

1. When the system is connected to a suitable DC power source, press the power button.
2. The **Power Button** turns to blue light when the system boots up.

Figure 2-8 Turning On System By Power Button



## 2.4. Initial Login

For product shipped **before May 1, 2026**, use the following default credentials for initial login:

- **Username:** `sintrones` (enter in lowercase)
- **Password:** `24332747`



**Important:**

For security reasons, change both the username and password immediately after your first login.

To fulfill cybersecurity requirements, **effective May 1, 2026**, default credentials will no longer be provided. Users must create a unique username and password during their initial login.

## 3. External I/O Ports

Topics in this chapter include:

- [Front Panel \(on page 38\)](#)
- [Rear Panel \(on page 40\)](#)
- [Specifications of External I/O Ports \(on page 42\)](#)

### 3.1. Front Panel

This section provides the front panel view and the description of the associated I/O interface.

Figure 3-1 Front Panel of IBOX-601-M12X

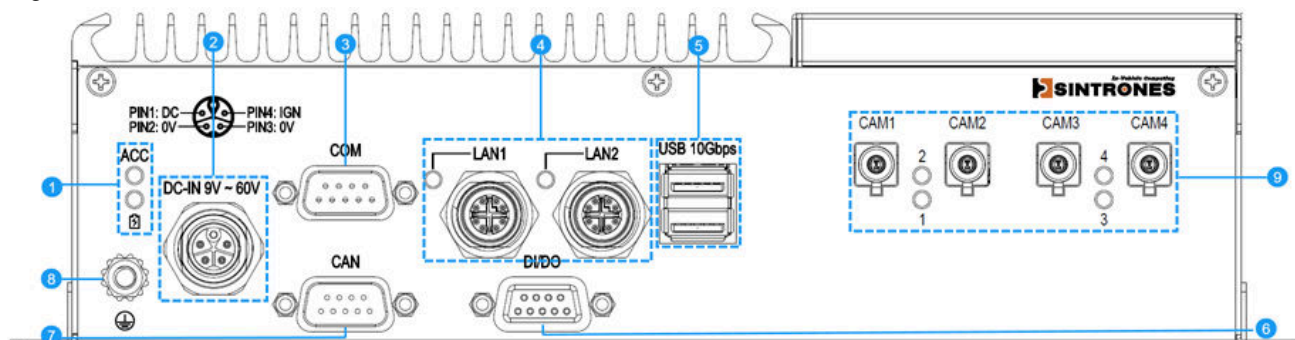


Table 3-1 I/O Interface on Front Panel

| Item | I/O Interface      | Description                                                                                                                                                                                                                                                                      | Specification                                   |
|------|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|
| 1    | LED Indicators     | ACC:<br><ul style="list-style-type: none"> <li>• ON: Ignition enabled</li> <li>• OFF: Ignition disabled</li> </ul>                                                                                                                                                               | -                                               |
|      |                    |  (UPS):<br><ul style="list-style-type: none"> <li>• ON: Internal backup battery enabled</li> <li>• OFF: Powered supplied from external power source or no backup battery installed</li> </ul> | -                                               |
| 2    | DC Input           | M12 K-coded connector:<br><ul style="list-style-type: none"> <li>• Input voltage range: 9 ~ 60 VDC</li> </ul>                                                                                                                                                                    | DC-IN Port (M12 K-coded Connector) (on page 42) |
| 3    | COM Port           | <ul style="list-style-type: none"> <li>• Supports RS-232/422/485 interfaces</li> <li>• Programmable via software configuration</li> </ul>                                                                                                                                        | COM Port (on page 42)                           |
| 4    | LAN Ports          | M12 X-coded connectors:<br><ul style="list-style-type: none"> <li>• LAN/ETH 1: 2.5 GbE (10/100/1000/2500BASE-T)</li> <li>• LAN/ETH 2: GbE (10/100/1000BASE-T)</li> </ul>                                                                                                         | LAN Port (M12 X-coded Connector) (on page 44)   |
| 5    | USB (10Gbps) Ports | USB 3.2 Gen 2 (10 Gbps), 5V / 900mA<br> <b>Note:</b><br>Two USB Type-A ports share 10Gbps bandwidth.                                                                                          | USB 3.2 Port (on page 45)                       |

| Item | I/O Interface      | Description                                                                                                                  | Specification                            |
|------|--------------------|------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|
| 6    | DI/DO Port         | x DI (5 ~ 60 VDC), 4 x DO (12V / 100mA)                                                                                      | <a href="#">DI/DO Port (on page 44)</a>  |
| 7    | CAN FD Port        | <ul style="list-style-type: none"> <li>• Supports CAN FD protocol</li> <li>• Backward compatible with CAN bus 2.0</li> </ul> | <a href="#">CAN FD Port (on page 43)</a> |
| 8    | Grounding Terminal | M5 bolt with nut for connecting a grounding wire                                                                             | -                                        |
| 9    | Camera Ports       | FAKRA-Z connectors for GMSL-2 cameras                                                                                        | -                                        |



## 3.2. Rear Panel

This section provides the rear panel view and the description of the associated I/O interface.

Figure 3-2 Rear Panel of IBOX-601-M12X

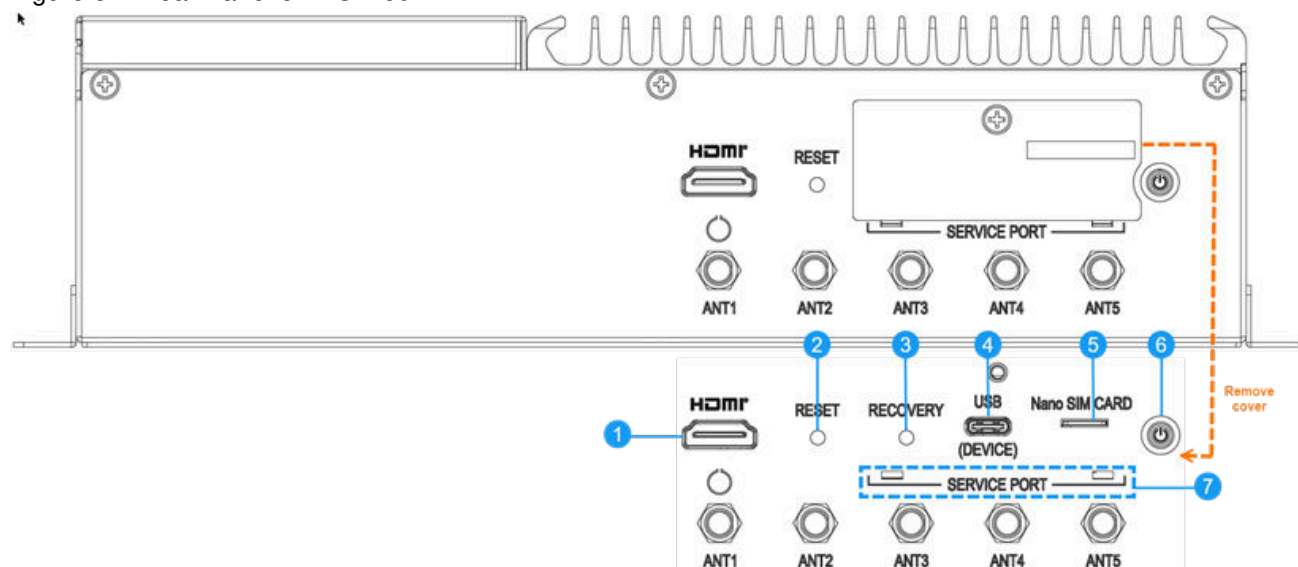


Table 3-2 I/O Interface on Rear Panel

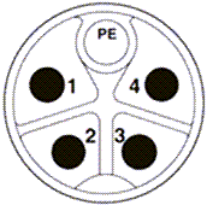
| Item | I/O Interface      | Description                                                                                                                                                                                                                                                                                                                                                                                                                   | Specification                                |
|------|--------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|
| 1    | HDMI® Port         | Supports HD video output via HDMI® Type-A connector                                                                                                                                                                                                                                                                                                                                                                           | <a href="#">HDMI® Port (on page 45)</a>      |
| 2    | Reset Button       | Used for system reboot                                                                                                                                                                                                                                                                                                                                                                                                        | -                                            |
| 3    | Recovery Button    | Used for system recovery<br><br> <b>Note:</b><br>The recovery button works only when the USB (Device) port (as described below) is connected to a host computer.                                                                                                                                                                           | -                                            |
| 4    | USB (Device) Port  | Used for system recovery when connected to a host computer containing certain JetPack BSP image via a USB Type-C cable. See <a href="#">System Recovery (on page 64)</a> for the detailed instructions.<br><br> <b>Note:</b><br>This USB port is used only for system recovery. It does not support power or other kinds of data transfer. | <a href="#">USB Type-C Port (on page 46)</a> |
| 5    | Nano SIM Card Slot | Supports a nano SIM card                                                                                                                                                                                                                                                                                                                                                                                                      | -                                            |

| Item | I/O Interface | Description                                                                                                                                                                   | Specification                                |
|------|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|
|      |               |  <b>Note:</b><br>Ensure you power off the system before installing or removing the SIM card. |                                              |
| 6    | Power Button  | System power status: <ul style="list-style-type: none"> <li>• Red light: Standby mode</li> <li>• Blue light: System turned on</li> </ul>                                      | Power Button (LED Light Status) (on page 46) |
| 7    | Service Port  | Indicates the recovery button and USB (Device) port                                                                                                                           | -                                            |

### 3.3. Specifications of External I/O Ports

This section provides drawings and pin definitions of the external I/O ports.

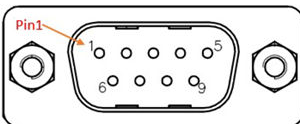
#### 3.3.1. DC-IN Port (M12 K-coded Connector)



**Table 3-3 Pin Definition of DC-IN Port (M12 K-coded Connector)**

| Pin | Signal     |
|-----|------------|
| 1   | 9 ~ 60 VDC |
| 2   | 0V         |
| 3   | 0V         |
| 4   | IGN        |

#### 3.3.2. COM Port



**Table 3-4 Pin Definition of COM Port (D-Sub 9 (Male))**

| Pin | D-Sub 9 (Male) |        |        |
|-----|----------------|--------|--------|
|     | RS-232         | RS-422 | RS-485 |
| 1   | DCD#           | TXD-   | Data-  |
| 2   | RXD            | TXD+   | Data+  |
| 3   | TXD            | RXD+   | NC     |
| 4   | DTR#           | RXD-   | NC     |
| 5   | GND            | GND    | GND    |
| 6   | DSR#           | NC     | NC     |
| 7   | RTS#           | NC     | NC     |
| 8   | CTS#           | NC     | NC     |
| 9   | RI#            | NC     | NC     |

### 3.3.3. CAN FD Port

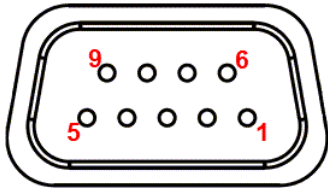


Table 3-5 Pin Definition of CAN Bus Port

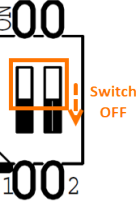
| Pin | D-SUB 9 (Male) |
|-----|----------------|
|     | CAN Bus        |
| 1   | NC             |
| 2   | CAN_L          |
| 3   | GND            |
| 4   | NC             |
| 5   | NC             |
| 6   | NC             |
| 7   | CAN_H          |
| 8   | NC             |
| 9   | NC             |

#### 3.3.3.1. DIP Switch for CAN FD Port

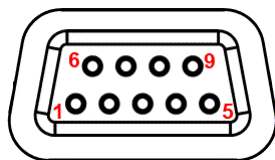
The DIP switch controls the 120Ω terminating resistors for the CAN FD port.

By default, the DIP switch bits are set to **ON**.

Refer to the table below for the bit assignments and corresponding terminating control.

| DIP Switch Illustration                                                             | Description                                                                                          |
|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
|  | <b>Bit 1 and Bit 2 ON:</b> 120Ω termination enabled for the CAN bus (CLI port name: <b>can0</b> ).   |
|  | <b>Bit 1 and Bit 2 OFF:</b> 120Ω termination disabled for the CAN bus (CLI port name: <b>can0</b> ). |

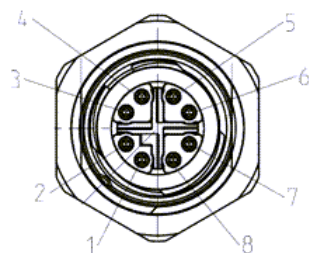
### 3.3.4. DI/DO Port



**Table 3-6 Pin Definition of DI/DO Port**

| Pin | Signal | Pin | Signal |
|-----|--------|-----|--------|
| 1   | GND    | 2   | DI_4   |
| 3   | DI_3   | 4   | DI_2   |
| 5   | DI_1   | 6   | DO_4   |
| 7   | DO_3   | 8   | DO_2   |
| 9   | DO_1   |     |        |

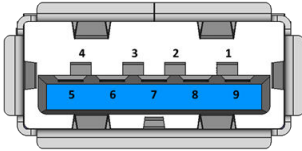
### 3.3.5. LAN Port (M12 X-coded Connector)



**Table 3-7 Pin Definition of LAN Port (M12 X-coded Connector)**

| Pin | Signal    |
|-----|-----------|
| 1   | LAN_MDI0P |
| 2   | LAN_MDI0N |
| 3   | LAN_MDI1P |
| 4   | LAN_MDI1N |
| 5   | LAN_MDI3P |
| 6   | LAN_MDI3N |
| 7   | LAN_MDI2N |
| 8   | LAN_MDI2P |

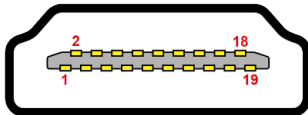
### 3.3.6. USB 3.2 Port



**Table 3-8 Pin Definition of USB 3.2 Port**

| Pin | Signal     |
|-----|------------|
| 1   | VBUS       |
| 2   | D-         |
| 3   | D+         |
| 4   | GND        |
| 5   | StdA_SSRX- |
| 6   | StdA_SSRX+ |
| 7   | GND_DRAIN  |
| 8   | StdA_SSTX- |
| 9   | StdA_SSTX+ |

### 3.3.7. HDMI® Port



**Table 3-9 Pin Definition of HDMI® Port**

| Pin | Signal       | Pin | Signal       |
|-----|--------------|-----|--------------|
| 1   | HDMI_DATA2_P | 2   | GND          |
| 3   | HDMI_DATA2_N | 4   | HDMI_DATA1_P |
| 5   | GND          | 6   | HDMI_DATA1_N |
| 7   | HDMI_DATA0_P | 8   | GND          |
| 9   | HDMI_DATA0_N | 10  | HDMI_CLK_P   |
| 11  | GND          | 12  | HDMI_CLK_N   |
| 13  | NCCEC        | 14  | NC           |
| 15  | HDMI_SCL     | 16  | HDMI_SDA     |
| 17  | GND          | 18  | V5P_S_HDMI   |
| 19  | HDMI_HPDET   |     |              |

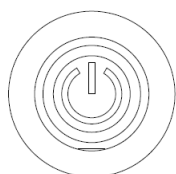
### 3.3.8. USB Type-C Port



**Table 3-10 Pin Definition of USB Type-C Port**

| Pin | Signal | Pin | Signal |
|-----|--------|-----|--------|
| A1  | GND    | B12 | GND    |
| A2  | NC     | B11 | NC     |
| A3  | NC     | B10 | NC     |
| A4  | NC     | B9  | NC     |
| A5  | NC     | B8  | NC     |
| A6  | Dp1    | B7  | Dn2    |
| A7  | Dn1    | B6  | Dp2    |
| A8  | NC     | B5  | NC     |
| A9  | NC     | B4  | NC     |
| A10 | NC     | B3  | NC     |
| A11 | NC     | B2  | NC     |
| A12 | GND    | B1  | GND    |

### 3.3.9. Power Button (LED Light Status)



**Table 3-11 Pin Definition of Power Button (LED Light Status)**

| Pin | Signal     | Pin | Signal     |
|-----|------------|-----|------------|
| LED |            |     |            |
| A1  | POWER_LED+ | C1  | POWER_LED- |



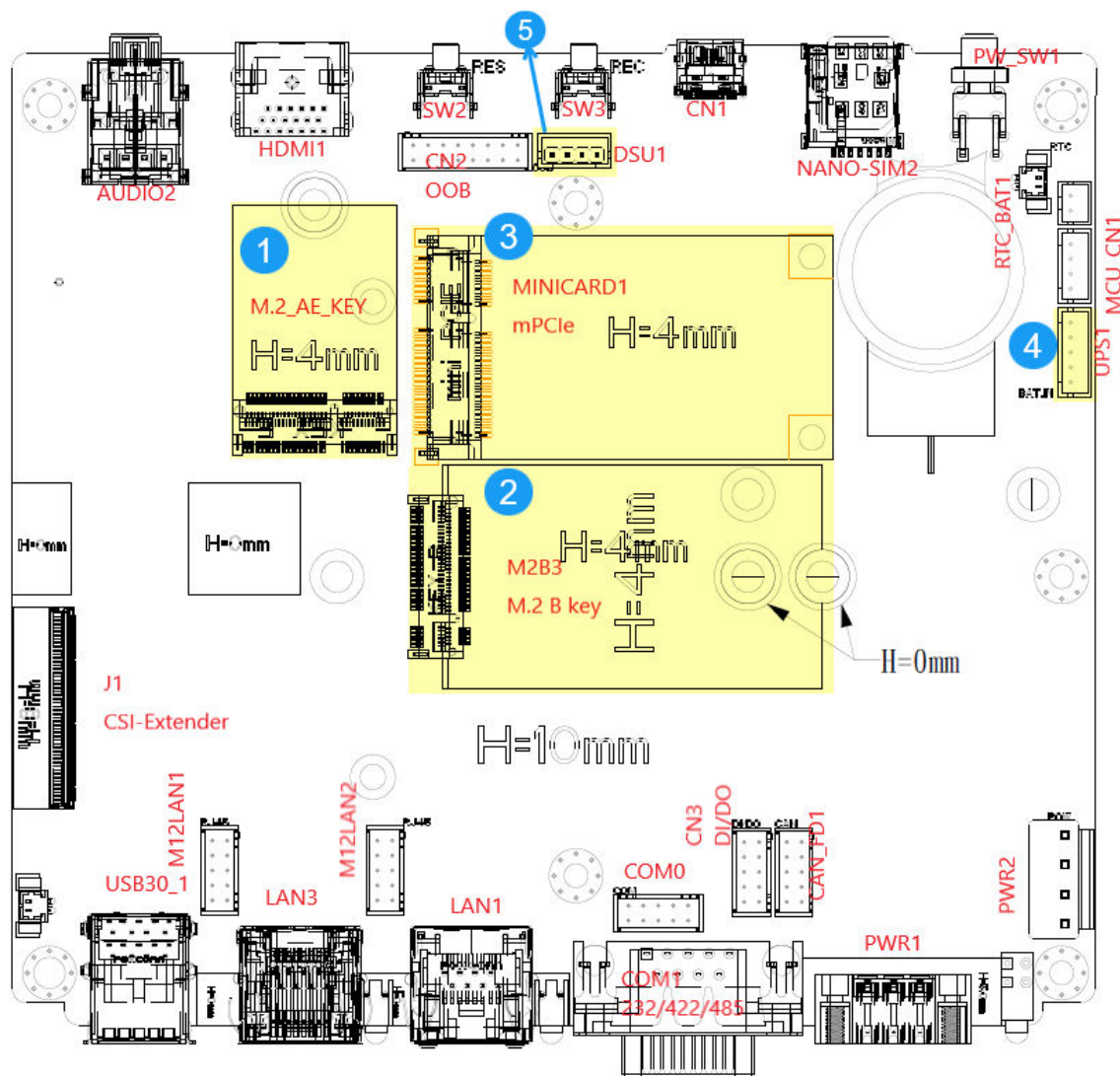
## 4. Expansion

This chapter provides more details about the internal slots or connectors used for expansion purpose.

Topics in this chapter include:

- [Top View of Mainboard \(on page 48\)](#)
- [Specifications of Expansion Slots/Connectors \(on page 49\)](#)

## 4.1. Top View of Mainboard

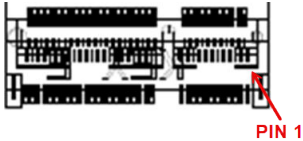


| Item | Internal Connector | Description                                                                                      | Specification                                           |
|------|--------------------|--------------------------------------------------------------------------------------------------|---------------------------------------------------------|
| 1    | M.2_AE_KEY         | M.2 2230 Key E slot used for installing an expansion module such as a WLAN or Bluetooth module   | M.2 Key E Slot ( <a href="#">on page 49</a> )           |
| 2    | M2B3               | M.2 3042/3052 Key B slot used for installing an expansion module such as a WWAN module           | M.2 Key B Slot ( <a href="#">on page 50</a> )           |
| 3    | MINICARD1          | mPCIe full-size slots used for installing up to two mini PCIe cards supporting USB 2.0 interface | mPCIe Connector ( <a href="#">on page 52</a> )          |
| 4    | UPS1               | Used for installing the backup battery                                                           | UPS1 (BBU) JST Connector ( <a href="#">on page 53</a> ) |
| 5    | DSU1               | Used for monitoring system status and collecting debug logs                                      | DSU JST Connector ( <a href="#">on page 54</a> )        |

## 4.2. Specifications of Expansion Slots/Connectors

This section provides drawings and pin definitions about the slots or connectors used to install expansion modules.

### 4.2.1. M.2 Key E Slot

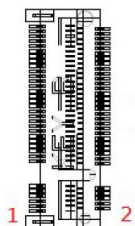
| M.2 Key E Slot | Description                                                                       |
|----------------|-----------------------------------------------------------------------------------|
| Size           | NGFF 2230 / 75 Pin                                                                |
| Type           | M.2 Key E H:8.5mm                                                                 |
| Location       | See <a href="#">Top View of Mainboard (on page 48)</a> for the information.       |
| Drawing        |  |

**Table 4-1 Pin Definition of M.2 Key E Slot**

| Pin | Signal      | Pin | Signal         |
|-----|-------------|-----|----------------|
| 1   | GND         | 2   | V3P3_A         |
| 3   | HUBA_USB_2P | 4   | V3P3_A         |
| 5   | HUBA_USB_2N | 6   | NC             |
| 7   | GND         | 8   | NC             |
| 9   | NC          | 10  | NC             |
| 11  | NC          | 12  | NC             |
| 13  | NC          | 14  | NC             |
| 15  | NC          | 16  | NC             |
| 17  | NC          | 18  | NC             |
| 19  | NC          | 20  | BT_UART_WAKE_B |
| 21  | NC          | 22  | UART0_RXD      |
| 23  | NC          | 24  | KEY            |
| 25  | KEY         | 26  | KEY            |
| 27  | KEY         | 28  | KEY            |
| 29  | KEY         | 30  | KEY            |
| 31  | KEY         | 32  | UART0_TXD      |
| 33  | GND         | 34  | UART0_CTS      |
| 35  | PCIE1_TX0_P | 36  | UART0_RTS      |

| Pin | Signal       | Pin | Signal              |
|-----|--------------|-----|---------------------|
| 37  | PCIE1_TX0_N  | 38  | NC                  |
| 39  | GND          | 40  | NC                  |
| 41  | PCIE1_RX0_P  | 42  | NC                  |
| 43  | PCIE1_RX0_N  | 44  | NC                  |
| 45  | GND          | 46  | NC                  |
| 47  | PCIE1_CLK_P  | 48  | NC                  |
| 49  | PCIE1_CLK_N  | 50  | BT_OSC_32KHZ        |
| 51  | GND          | 52  | PCIE1_RST           |
| 53  | PCIE1_CLKREQ | 54  | M2E_WIFI_DIS2(BT)   |
| 55  | PCIE_WAKE    | 56  | M2E_WIFI_DIS1(WIFI) |
| 57  | GND          | 58  | JS_I2C2_SDA         |
| 59  | NC           | 60  | JS_I2C2_SCL         |
| 61  | NC           | 62  | M2E_ALERT           |
| 63  | GND          | 64  | NC                  |
| 65  | NC           | 66  | NC                  |
| 67  | NC           | 68  | NC                  |
| 69  | GND          | 70  | WIFI_WAKE           |
| 71  | NC           | 72  | V3P3_A              |
| 73  | NC           | 74  | V3P3_A              |
| 75  | GND          |     |                     |

#### 4.2.2. M.2 Key B Slot

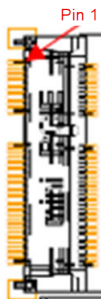
| M.2 Key B Slot | Description                                                                         |
|----------------|-------------------------------------------------------------------------------------|
| Size           | NGFF 3042 / 3052 / 75 Pin                                                           |
| Type           | M.2 Key B H:8.5mm                                                                   |
| Location       | See <a href="#">Top View of Mainboard (on page 48)</a> for the information.         |
| Drawing        |  |

**Table 4-2 Pin Definition of M.2 Key B Slot**

| Pin | Signal         | Pin | Signal      |
|-----|----------------|-----|-------------|
| 1   | NC             | 2   | 3VSB        |
| 3   | GND            | 4   | 3VSB        |
| 5   | GND            | 6   | Reserve     |
| 7   | M2B_USB1_DP    | 8   | Reserve     |
| 9   | M2B_USB1_DN    | 10  | Reserve     |
| 11  | GND            | 12  | KEY         |
| 13  | KEY            | 14  | KEY         |
| 15  | KEY            | 16  | KEY         |
| 17  | KEY            | 18  | KEY         |
| 19  | KEY            | 20  | NC          |
| 21  | NC             | 22  | NC          |
| 23  | WWAN_WAKE      | 24  | NC          |
| 25  | M2B1DPR        | 26  | Reserve     |
| 27  | GND            | 28  | NC          |
| 29  | M2B_USB3.2_RXN | 30  | M2UIM_RST_A |
| 31  | M2B_USB3.2_RXP | 32  | M2UIM_CLK_A |
| 33  | GND            | 34  | M2UIM_DAT_A |
| 35  | M2B_USB3.2_TXN | 36  | M2UIM_PWR_A |
| 37  | M2B_USB3.2_TXP | 38  | NC          |
| 39  | GND            | 40  | NC          |
| 41  | NC             | 42  | NC          |
| 43  | NC             | 44  | M2B_ALERN   |
| 45  | GND            | 46  | NC          |
| 47  | NC             | 48  | NC          |
| 49  | NC             | 50  | DEV_3V3RST# |
| 51  | GND            | 52  | Reserve     |
| 53  | NC             | 54  | WWAN_WAKE   |
| 55  | NC             | 56  | NC          |
| 57  | GND            | 58  | NC          |
| 59  | NC             | 60  | NC          |
| 61  | NC             | 62  | NC          |
| 63  | NC             | 64  | NC          |
| 65  | NC             | 66  | NC          |

| Pin | Signal   | Pin | Signal |
|-----|----------|-----|--------|
| 67  | M2B1RST2 | 68  | NC     |
| 69  | CONFIG_1 | 70  | 3VSB   |
| 71  | GND      | 72  | 3VSB   |
| 73  | GND      | 74  | 3VSB   |
| 75  | NC       |     |        |

#### 4.2.3. mPCIe Connector

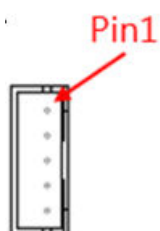
| mPCIe Connector | Description                                                                        |
|-----------------|------------------------------------------------------------------------------------|
| Size            | 2 x 26 / 52 Pin                                                                    |
| Type            | MINI PCI-E CON H:9.2mm                                                             |
| Location        | See <a href="#">Top View of Mainboard (on page 48)</a> for the information.        |
| Drawing         |  |

**Table 4-3 Pin Definition of mPCIe Connector (MINICARD1 & 2)**

| Pin | Signal | Pin | Signal       |
|-----|--------|-----|--------------|
| 1   | WAKE#  | 2   | 3V3_VSB      |
| 3   | NC     | 4   | GND          |
| 5   | NC     | 6   | 1V5(Reserve) |
| 7   | NC     | 8   | NC           |
| 9   | GND    | 10  | NC           |
| 11  | NC     | 12  | NC           |
| 13  | NC     | 14  | NC           |
| 15  | GND    | 16  | NC           |
| 17  | NC     | 18  | GND          |
| 19  | NC     | 20  | W_DIS        |
| 21  | GND    | 22  | RESET#       |
| 23  | NC     | 24  | 3V3_VSB      |

| Pin | Signal  | Pin | Signal       |
|-----|---------|-----|--------------|
| 25  | NC      | 26  | GND          |
| 27  | GND     | 28  | 1V5(Reserve) |
| 29  | GND     | 30  | I2C_SCL      |
| 31  | NC      | 32  | I2C_SDA      |
| 33  | NC      | 34  | GND          |
| 35  | GND     | 36  | USB_DN       |
| 37  | GND     | 38  | USB_DP       |
| 39  | 3V3_VSB | 40  | GND          |
| 41  | 3V3_VSB | 42  | NC           |
| 43  | GND     | 44  | NC           |
| 45  | NC      | 46  | NC           |
| 47  | NC      | 48  | 1V5(Reserve) |
| 49  | NC      | 50  | GND          |
| 51  | NC      | 52  | 3V3_VSB      |

#### 4.2.4. UPS1 (BBU) JST Connector



See [Top View of Mainboard \(on page 48\)](#) for the location of the UPS1 JST connector.

**Table 4-4 Pin Definition**

| Pin | Signal   |
|-----|----------|
| 1   | +12V UPS |
| 2   | +12V UPS |
| 3   | NC       |
| 4   | GND      |
| 5   | GND      |

#### 4.2.5. DSU JST Connector

| DSU JST Connector | Description                                                                       |
|-------------------|-----------------------------------------------------------------------------------|
| Size              | 1 x 4 / 4 Pin                                                                     |
| Type              | JST-2.0mm-M-180                                                                   |
| Location          | See <a href="#">Top View of Mainboard (on page 48)</a> for the information.       |
| Drawing           |  |

**Table 4-5 Pin Definition**

| Pin | Signal          |
|-----|-----------------|
| 1   | Power           |
| 2   | JETSON_UART2_TX |
| 3   | JETSON_UART2_RX |
| 4   | GND             |

The DSU JST connector is used to monitor the system status and collect debug logs via UART protocol by advanced developers. There's no need to use this connector under normal operation.

To retrieve UART logs, connect a host computert to the system with a USB-UART or RS232-UART converter cable (not included in the package), and then configure the UART settings on the host computer as shown below:

- Baud rate: 115,200bps
- Voltage: DC 3.3V
- Data bits: 8
- Parity bit: 0
- Flow control: No



## 5. Software

Topics in this chapter include:

- [System Configuration \(on page 56\)](#)
  - [Smart Power Management Settings \(on page 57\)](#)
  - [Commands for COM Port \(RS-232/422/485 Configuration\) \(on page 60\)](#)
  - [CAN FD Configuration \(on page 61\)](#)
  - [DIO Configuration \(on page 62\)](#)
  - [Setting the GMSL Camera \(on page 56\)](#)
- [System Recovery \(on page 64\)](#)
  - [Hardware and System Requirements \(on page 64\)](#)
  - [Configuring a Host Computer \(on page 64\)](#)
  - [Downloading a BSP Image \(on page 64\)](#)
  - [Setting the System in Recovery Mode \(on page 64\)](#)
  - [Executing System Recovery \(on page 65\)](#)
  - [Configuring the Recovered System \(on page 67\)](#)

## 5.1. System Configuration

This section provides procedures about how to install the GMSL camera driver as well as summarizes commands available for configuring smart power management, COM (RS-232/422/485), CAN FD, and DI/DO interface controllers.

### 5.1.1. Setting the GMSL Camera

This section describes how to install the GMSL camera driver and configure associated settings.

See the following steps:

1. Before connecting GMSL cameras, ensure the system is powered off.
2. Connect the GMSL cameras to the camera ports via the FAKRA-Z cables.



**Important:**

Connect only one type of cameras at a time. Different camera types cannot be mixed because the system does not support running multiple camera drivers simultaneously.

3. Connect the system to an HDMI monitor, a keyboard, and a mouse.
4. Boot the system and check if the green LEDs of the connected cameras light on.



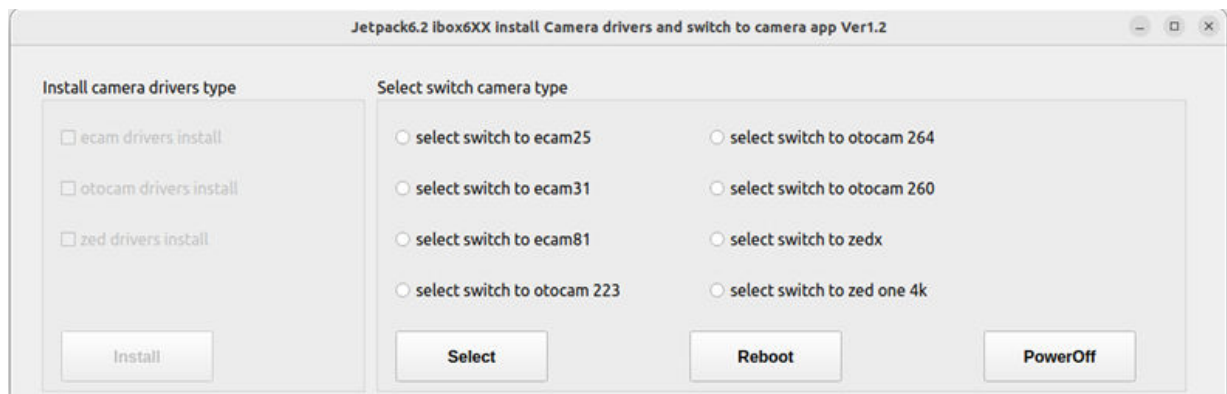
**Note:**

See [Booting the System \(on page 36\)](#) for how to boot the system via an ignition switch or the power button.

5. Open the terminal window.
6. Run the following commands to launch the camera selection utility.

```
sudo camera_driver_install_switch
```

7. Choose the camera you want to initialize, and then click **Select**.



8. Click **Reboot** to reboot the system.
9. After the system reboot, enter the following command to verify whether the connected cameras have been successfully initialized.

```
ls /dev/vi*
```

For example, if you connect three cameras to the system via CAM1, CAM2, and CAM3 ports, the corresponding device names shall appear in the command output.



Port names and corresponding device names shown in CLI:

- CAM1: video0
- CAM2: video1
- CAM3: video2
- CAM4: video3

### 5.1.2. Smart Power Management Settings

This section summarizes the commands available for configuring the Smart Power Management function.

#### 5.1.2.1. Overview of Smart Power Management Commands

The general formats of the Smart Power Management commands are as follows:

`i2cget -y -f <i2c_num> <device_addr> <reg_addr>`: Used to **check** the current state of certain functionality.

`i2cset -f -y <i2c_num> <device_addr> <reg_addr> <value>`: Used to **change or save** the settings of certain functionality.

#### 5.1.2.2. Smart Power Management Commands

See the following tables as the available commands for Smart Power Management.

**Table 5-1 Checking IGN/UPS Status**

| Command                               | Value | Description                         | Outcome                                                                                                           |
|---------------------------------------|-------|-------------------------------------|-------------------------------------------------------------------------------------------------------------------|
| <code>i2cget -y -f 1 0x4a 0x12</code> | -     | Check the ignition (IGN) status     | <ul style="list-style-type: none"> <li>• 0x00: Ignition turned off</li> <li>• 0x01: Ignition turned on</li> </ul> |
| <code>i2cget -y -f 1 0x4a 0x10</code> | -     | Check the UPS backup battery status | <ul style="list-style-type: none"> <li>• 0x07: UPS mode</li> </ul>                                                |

**Table 5-2 Checking and Setting Ignition Power On Delay Time**

| Command                               | Value                | Description                                       | Outcome                                                                                                                                                                                                         |
|---------------------------------------|----------------------|---------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>i2cget -y -f 1 0x4a 0x60</code> | -                    | Check the ignition power on delay time by seconds | If the delay time is set as 3 seconds, the output will be 0x03                                                                                                                                                  |
| <code>i2cset -f -y 1 0x4a 0x60</code> | For example:<br>0x03 | Set the ignition power on delay time by seconds   | For example, if you enter <code>i2cset -f -y 1 0x4a 0x60 0x03</code> , and then <a href="#">save the setting (on page 59)</a> , the system will wait for 3 seconds to power on after the ignition is turned on. |

| Command                               | Value                             | Description                                       | Outcome                                                                                                                                                                                                         |
|---------------------------------------|-----------------------------------|---------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>i2cget -y -f 1 0x4a 0x61</code> | -                                 | Check the ignition power on delay time by minutes | If the delay time is set as 2 minutes, the output will be <code>0x02</code>                                                                                                                                     |
| <code>i2cset -f -y 1 0x4a 0x61</code> | For example:<br><code>0x02</code> | Set the ignition power on delay time by minutes   | For example, if you enter <code>i2cset -f -y 1 0x4a 0x61 0x02</code> , and then <a href="#">save the setting (on page 59)</a> , the system will wait for 2 minutes to power on after the ignition is turned on. |
| <code>i2cget -y -f 1 0x4a 0x62</code> | -                                 | Check the ignition power on delay time by hours   | If the delay time is set as 1 hour, the output will be <code>0x01</code>                                                                                                                                        |
| <code>i2cset -f -y 1 0x4a 0x62</code> | For example:<br><code>0x01</code> | Set the ignition power on delay time by hours     | For example, if you enter <code>i2cset -f -y 1 0x4a 0x62 0x01</code> , and then <a href="#">save the setting (on page 59)</a> , the system will wait for 1 hour to power on after the ignition is turned on.    |

**Table 5-3 Checking and Setting Ignition Power Off Delay Time**

| Command                               | Value                             | Description                                        | Outcome                                                                                                                                                                                                           |
|---------------------------------------|-----------------------------------|----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>i2cget -y -f 1 0x4a 0x66</code> | -                                 | Check the ignition power off delay time by seconds | If the delay time is set as 3 seconds, the output will be <code>0x03</code>                                                                                                                                       |
| <code>i2cset -f -y 1 0x4a 0x66</code> | For example:<br><code>0x03</code> | Set the ignition power off delay time by seconds   | For example, if you enter <code>i2cset -f -y 1 0x4a 0x66 0x03</code> , and then <a href="#">save the setting (on page 59)</a> , the system will wait for 3 seconds to power off after the ignition is turned off. |
| <code>i2cget -y -f 1 0x4a 0x67</code> | -                                 | Check the ignition power off delay time by minutes | If the delay time is set as 2 minutes, the output will be <code>0x02</code>                                                                                                                                       |
| <code>i2cset -f -y 1 0x4a 0x67</code> | For example:<br><code>0x02</code> | Set the ignition power off delay time by minutes   | For example, if you enter <code>i2cset -f -y 1 0x4a 0x67 0x02</code> , and then <a href="#">save the set-</a>                                                                                                     |

| Command                               | Value                             | Description                                      | Outcome                                                                                                                                                                                                        |
|---------------------------------------|-----------------------------------|--------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                       |                                   |                                                  | ting (on page 59), the system will wait for 2 minutes to power off after the ignition is turned off.                                                                                                           |
| <code>i2cget -y -f 1 0x4a 0x68</code> | -                                 | Check the ignition power off delay time by hours | If the delay time is set as 1 hour, the output will be <code>0x01</code>                                                                                                                                       |
| <code>i2cset -f -y 1 0x4a 0x68</code> | For example:<br><code>0x01</code> | Set the ignition power off delay time by hours   | For example, if you enter <code>i2cset -f -y 1 0x4a 0x68 0x01</code> , and then <a href="#">save the setting (on page 59)</a> , the system will wait for 1 hour to power off after the ignition is turned off. |

**Table 5-4 Saving the Setting**

| Command                                    | Description       | Outcome                                                                                                                                                                                                     |
|--------------------------------------------|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <code>i2cset -f -y 1 0x4a 0x28 0x02</code> | Save the setting. | <p>The specified setting will be saved.</p> <p><b>!</b> <b>Important:</b><br/>Ensure you enter <code>i2cset -f -y 1 0x4a 0x28 0x02</code> to save and allow the system to excute the specified setting.</p> |

### 5.1.3. Commands for COM Port (RS-232/422/485 Configuration)

The name of the COM port: **ttyTHS1**

See the following tables as the available commands list for the COM port.

**Table 5-5 Running RS-232/422/485 Test Program**

| Command                  | Description                 |
|--------------------------|-----------------------------|
| <code>rs232a-demo</code> | Run the RS-232 test program |
| <code>rs422a-demo</code> | Run the RS-422 test program |
| <code>rs485a-demo</code> | Run the RS-485 test program |

**Table 5-6 Switching between RS-232/422/485**

| Command                     | Outcome        | Description            |
|-----------------------------|----------------|------------------------|
| <code>sudo rs232_set</code> | RS232 Mode Set | Enable the RS-232 mode |
| <code>sudo rs422_set</code> | RS422 Mode Set | Enable the RS-422 mode |
| <code>sudo rs485_set</code> | RS485 Mode Set | Enable the RS-485 mode |

**Table 5-7 Checking the Status**

| Command                               | Outcome                                                                                                    | Description                                   |
|---------------------------------------|------------------------------------------------------------------------------------------------------------|-----------------------------------------------|
| <code>i2cget -f -y 1 0x4a 0x3c</code> | <ul style="list-style-type: none"> <li>• 0x09 rs232</li> <li>• 0x1b rs422</li> <li>• 0x12 rs485</li> </ul> | Check which mode (RS-232/422/485) is enabled. |

#### 5.1.4. CAN FD Configuration

The name of the CAN FD port: **can0**

See the following table as the available commands list for the CAN FD port.

| Command                                                                                    | Description                                                                                                                                                                                                                | Outcome               |
|--------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| <code>sudo can_set</code>                                                                  | Enable the CAN bus mode                                                                                                                                                                                                    | CAN Bus set completed |
| <code>candump can0 &amp;</code>                                                            | Receive data                                                                                                                                                                                                               | N/A                   |
| <code>cansend can0 123#abcdabcd</code>                                                     | Send data                                                                                                                                                                                                                  | N/A                   |
| <code>sudo ip link set down can0</code>                                                    | Disable the transmission function of the CAN bus                                                                                                                                                                           | N/A                   |
| <code>sudo ip link set can0 type can<br/>bitrate 1000000 dbitrate 2000000<br/>fd on</code> | Set the standard bit rate for the CAN bus as 1 Mbps and the data phase bit rate for CAN FD (Flexible Data Rate) as 2 Mbps. Enable CAN FD for faster transmission rate and larger data payloads (up to 64 bytes per frame). | N/A                   |
| <code>sudo ip link set up can0</code>                                                      | Enable the transmission function of the CAN bus                                                                                                                                                                            | N/A                   |

### 5.1.5. DIO Configuration

The system supports 4 channels of programmable digital input (DI) and digital output (DO), which can be configured to communicate or exchange data with the connected peripheral devices.



**Note:**

The DIO pins will be reset to default settings after a cold boot.

The general formats of the DIO commands are as follows:

# i2cget -f -y <i2c\_num> <device\_addr> <reg\_addr>: Used to **check** the current state of certain DI or DO channel.

# i2cset -f -y <i2c\_num> <device\_addr> <reg\_addr> <value>: Used to **change or save** the settings of certain DI or DO channel.

See the following as the DO data register table:

**Table 5-8 DO Data Register – 0x31**

| Bit | Pin  | Value             |
|-----|------|-------------------|
| 3   | DO_4 | Low: 0<br>High: 1 |
| 2   | DO_3 |                   |
| 1   | DO_2 |                   |
| 0   | DO_1 |                   |

#### 5.1.5.1. DIO Commands

See the following table as the available commands list for the DIO port.

**Table 5-9 Checking Digital Input (DI) Status**

| Command                  | Value | Description                                 |
|--------------------------|-------|---------------------------------------------|
| i2cget -f -y 1 0x4A 0x30 | N/A   | Get the state of all the digital input pins |

**Table 5-10 Examples of Configuring Digital Outputs (DO)**

| Command                          | Value | Description                        |
|----------------------------------|-------|------------------------------------|
| i2cset -f -y 1 0x4A 0x31 <value> | 0xf   | Set DO1 ~ DO4 as High (1111)       |
|                                  | 0x0   | Set DO1 ~ DO4 as Low (0000)        |
|                                  | 0x1   | Set DO1 as High<br>(0001: DO1 = 1) |



| Command | Value | Description                        |
|---------|-------|------------------------------------|
|         | 0x2   | Set DO2 as High<br>(0010: DO2 = 1) |
|         | 0x4   | Set DO3 as High<br>(0100: DO3 = 1) |
|         | 0x8   | Set DO4 as High<br>(1000: DO4 = 1) |

## 5.2. System Recovery

This section describes how to recover the system when needed.

### 5.2.1. Hardware and System Requirements

A host computer and some accessories are required to perform a system recovery. Before you begin, check the following list as the hardware and system requirements for the host computer and accessories.

#### Host Computer:

- Memory size: 4GB or above
- Storage space: 256GB or above
- Recommended OS: Ubuntu 20.04

#### Accessories:

- A USB Type-C cable
- An HDMI cable
- A monitor supporting HDMI inputs

### 5.2.2. Configuring a Host Computer

Follow the procedures below to configure the host computer.

1. Connect the host computer to the internet.
2. Open the terminal window.
3. Enter the following commands to install the required dependencies.

```
$ sudo apt-get update
$ sudo apt-get install sshpass
$ sudo apt-get install abootimg
$ sudo apt-get install nfs-kernel-server
$ sudo apt-get install libxml2-utils
$ sudo apt-get install binutils
```

### 5.2.3. Downloading a BSP Image

You must install a board support package (BSP) image on the host computer before performing the system recovery. Follow the procedures below to download the BSP image.

1. Download the BSP image from SINTRONES® website or contact our sales representative for the BSP image.
2. Save the downloaded BSP image in the host computer.

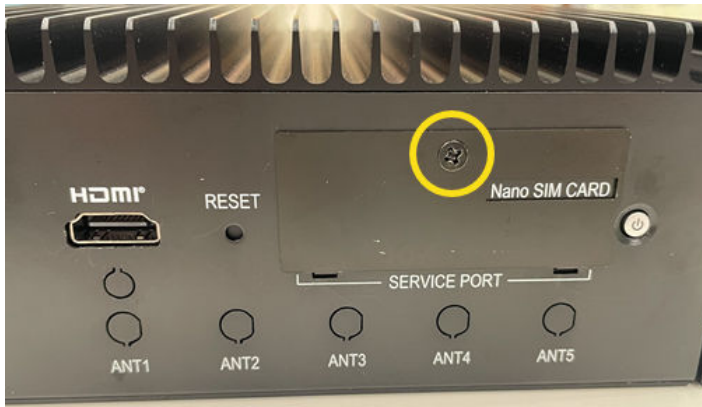
**Note:**

Do not extract the compressed **.tbz2** file.

### 5.2.4. Setting the System in Recovery Mode

Follow the procedures to set the system in recovery mode and connect it to the host computer.

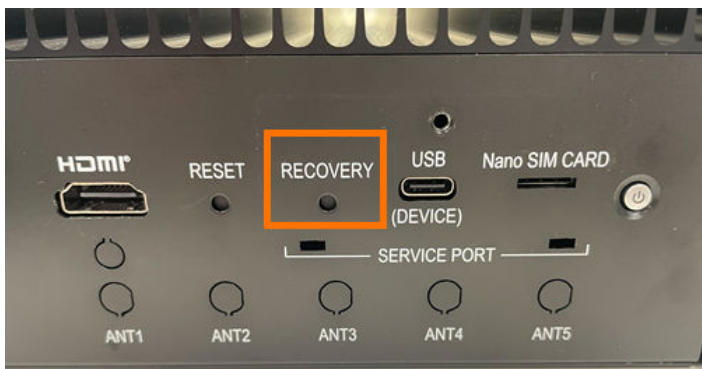
1. Ensure the system is powered off.
2. Remove the screw to remove the protection cover on the rear panel.



3. Locate the **USB (DEVICE)** Type-C port on the rear panel.
4. Plug one end of a USB Type-C cable into the port, and then plug the other end of the cable to the host computer.



5. Locate the **RECOVERY** button on the rear panel.



6. Press and hold the **RECOVERY** button, at the same time, connect the system to a power source and enable ignition if any.



**Note:**

If the system is not connected with any ignition system, simply press the power button.

7. After powering on the system, hold the **RECOVERY** button for more than 5 seconds, and then release it.

### 5.2.5. Executing System Recovery

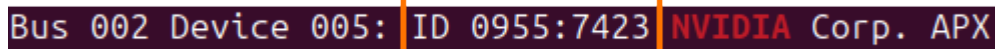
Follow the steps below to run the recovery commands on the host computer and flash the BSP image to the system.

1. On the host computer, enter the following command in the terminal to check if the system is set in recovery mode.

```
$ lsusb | grep NVIDIA
```

2. The following strings with the VID/PID info appear, indicating the system is in recovery mode. If these strings do not appear, repeat the steps in [Setting the System in Recovery Mode \(on page 64\)](#).

Figure 5-1 An Example of Strings with the VID/PID Info




**Note:**

The VID/PID varies depending on different models.

VID/PID by built-in NVIDIA® Jetson modules:

- Orin™ NX 8GB: ID 0955:7423
- Orin™ NX 16GB: ID 0955:7323



**Important:**

Ensure the system is in recovery mode before you perform the flashing process.

3. Open the downloaded BSP image on the host computer.
4. Enter the following command to decompress the BSP image.

```
$ sudo tar -jxvf <ProjectName-KernelVersion-JetpackVersion-BuildSystem-BuildVersion-  
PackageVersion>.tbz2
```



**Note:**

Replace the texts within the brackets with the actual BSP file name. For example, if the BSP image file name is `IBOX-600-5.10.192-5.1.3-ubuntu20.04-R2.00-00`, enter

```
$ sudo tar -jxvf IBOX-600-5.10.192-5.1.3-ubuntu20.04-R2.00-00.tbz2
```



**Tip:**

After entering the first few characters of a command or file name, you can enter the **[tab]** key to autocomplete the command or filename.

5. After the BSP image is decompressed, the folder `Linux_for_Tegra` will be automatically generated. Enter the following command to navigate to the folder.

```
$ cd Linux_for_Tegra
```

6. Enter one of the following mode-specific commands to flash the BSP image to the system.

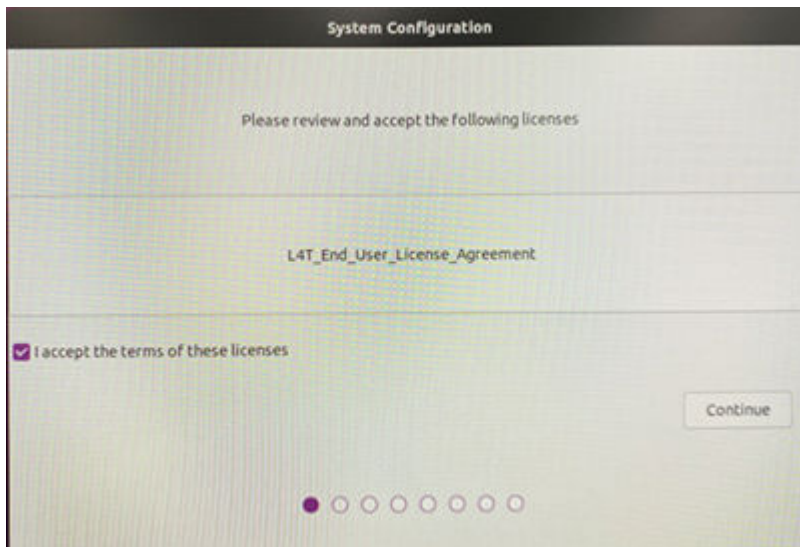
- Original Mode: `$ sudo ./ibox600_na_flash.sh`
- Super Mode: `$ sudo ./ibox600_nx_flash.sh`

7. Connect the system to a monitor via an HDMI cable for later use.
8. When the BSP image is successfully flashed to the system, the system will reboot and the configuration window will then appear on the connected monitor screen.

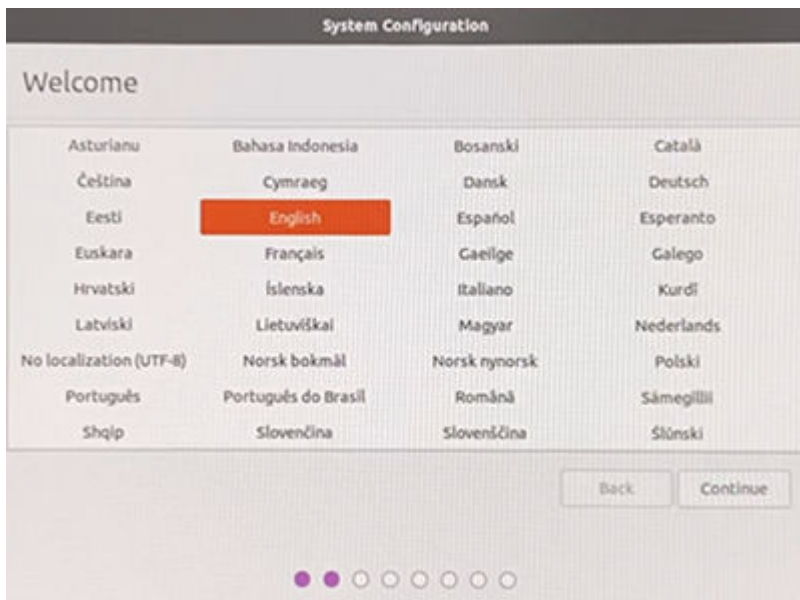
### 5.2.6. Configuring the Recovered System

After the system is recovered, initial settings must be configured prior to using the system. Follow the procedures below to start the configuration.

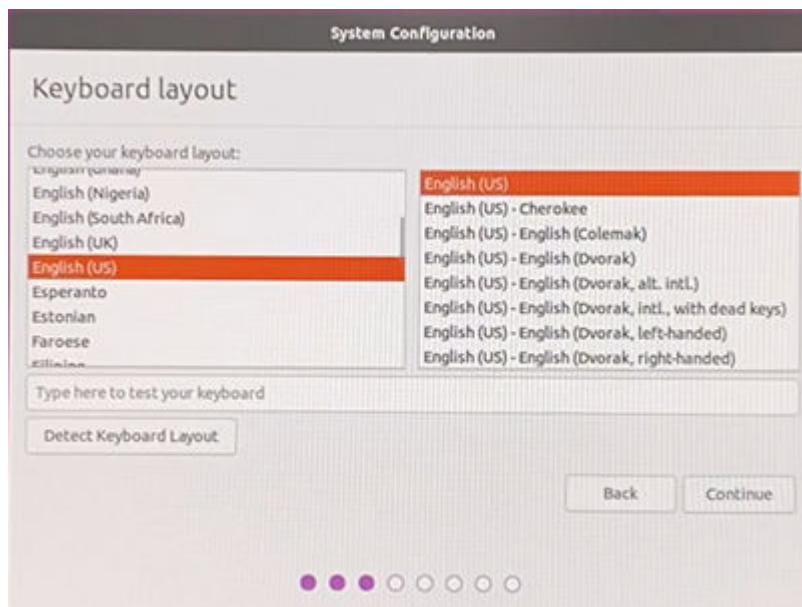
1. After the system reboot, the **System Configuration** wizard appears to guide users to complete the initial basic settings for the Linux for Tegra (LT4) platform.
2. Select **I accept the terms of these licenses** and then select **Continue**.



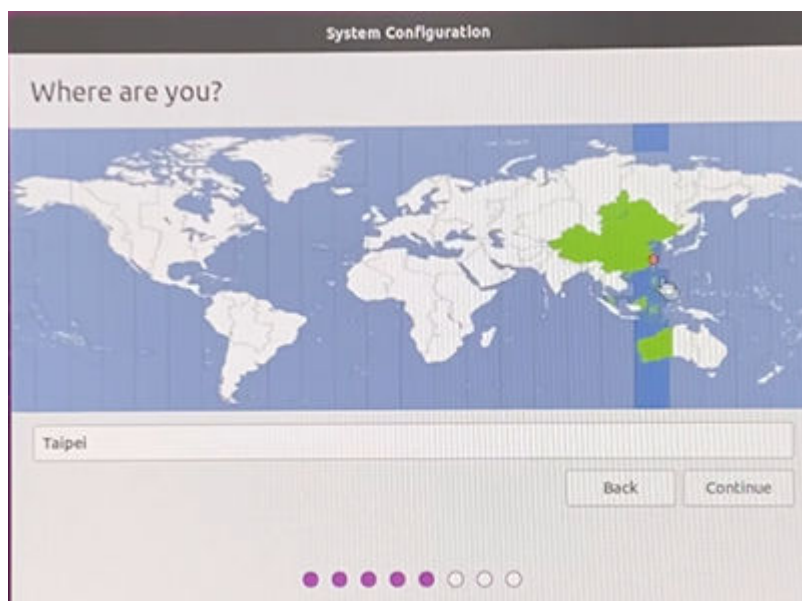
3. Select the preferred language setting and then select **Continue**.



4. Select the preferred keyboard layout and then select **Continue**.



5. Select your location and then select **Continue**.



6. Specify the credentials such as a username and a password to create a user account. It is suggested to select **Require my password to log in** for security reasons. Select **Continue** to proceed to next step.

**System Configuration**

Who are you?

Your name:

Your computer's name:   
The name it uses when it talks to other computers.

Pick a username:

Choose a password:

Confirm your password:

☐ Log in automatically  
☒ Require my password to log in

Progress indicator: 6 dots, 5th dot is active.

7. Choose **Install Chromium Browser** or **Do not install...** based on your needs, and then select **Continue**.
8. The system starts running the specified configuration and will reboot to complete the system configuration.

**System Configuration**

Configuring system locales...

---

**Applying changes**

Applying changes

Running post-installation trigger dpkg-exec

[Details](#)

9. The **NVIDIA** logo appears and then the restored system will enter the welcome screen, ready to use now.

## 6. Appendix

**Table 6-1 Decimal to Hexadecimal**

| Time | 0    | 1    | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 9    |
|------|------|------|------|------|------|------|------|------|------|------|
| 0    | None | 0x01 | 0x02 | 0x03 | 0x04 | 0x05 | 0x06 | 0x07 | 0x08 | 0x09 |
| 10   | 0x0a | 0x0b | 0x0c | 0x0d | 0x0e | 0x0f | 0x10 | 0x11 | 0x12 | 0x13 |
| 20   | 0x14 | 0x15 | 0x16 | 0x17 | 0x18 | 0x19 | 0x1a | 0x1b | 0x1c | 0x1d |
| 30   | 0x1e | 0x1f | 0x20 | 0x21 | 0x22 | 0x23 | 0x24 | 0x25 | 0x26 | 0x27 |
| 40   | 0x28 | 0x29 | 0x2a | 0x2b | 0x2c | 0x2d | 0x2e | 0x2f | 0x30 | 0x31 |
| 50   | 0x32 | 0x33 | 0x34 | 0x35 | 0x36 | 0x37 | 0x38 | 0x39 | 0x3a | 0x3b |