# eNVP-JAX-AI-V0008

## NVIDIA Jetson® AGX Xavier AI BOX

*User's Manual*

![EverFocus logo]

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## User's Manual

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www.everfocus.com.tw

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# Safety Precautions

Please read the following safety instructions carefully. It is advised that you keep this manual for future references.

➢ All cautions and warnings on the device should be noted.

➢ All cables and adapters supplied by EverFocus are certified and in accordance with the material safety laws and regulations of the country of sale. Do not use any cables or adapters not supplied by EverFocus to prevent system malfunction or fires.

➢ Make sure the power source matches the power rating of the device.

➢ Position the power cord so that people cannot step on it. Do not place anything over the power cord.

➢ Always completely disconnect the power before working on the system's hardware.

➢ No connections should be made when the system is powered as a sudden rush of power may damage sensitive electronic components.

➢ If the device is not to be used for a long time, disconnect it from the power supply to avoid damage by transient over-voltage.

➢ Always disconnect this device from any AC supply before cleaning.

➢ While cleaning, use a damp cloth instead of liquid or spray detergents.

➢ Make sure the device is installed near a power outlet and is easily accessible.

➢ Keep this device away from humidity.

➢ Place the device on a solid surface during installation to prevent falls.

➢ Do not cover the openings on the device to ensure optimal heat dissipation.

➢ Watch out for high temperatures when the system is running.

➢ Do not touch the heat sink or heat spreader when the system is running.

➢ Never pour any liquid into the openings. This could cause fire or electric shock.

➢ As most electronic components are sensitive to static electrical charge, be sure to ground yourself to prevent static charge when installing the internal components. Use a grounding wrist strap and contain all electronic components in any static-shielded containers.

➢ If any of the following situations arises, please contact our service personnel (ts@everfocus.com.tw):

- Damaged power cord or plug
- Liquid intrusion to the device
- Exposure to moisture
- Device is not working as expected or in a manner as described in this manual
- The device is dropped or damaged
- Any obvious signs of damage displayed on the device

➢ DO NOT LEAVE THIS DEVICE IN AN UNCONTROLLED ENVIRONMENT WITH TEMPERATURES BEYOND THE DEVICE'S PERMITTED STORAGE TEMPERATURES (SEE SPECIFICATION) TO PREVENT DAMAGE.

# FCC Statement

**Warning!** This device complies with Part 15 FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received including interference that may cause undesired operation.

Caution:

There is a danger of explosion if the battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions and your local government's recycling or disposal directives.

Attention:

Il y a un risque d'explosion si la batterie est remplacée de façon incorrecte.

Ne la remplacer qu'avec le même modèle ou équivalent recommandé par le constructeur. Recycler les batteries usées en accord avec les instructions du fabricant et les directives gouvernementales de recyclage.

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**Chapter**

# 1

## 1. Introduction

EverFocus eNVP-JAX-AI-V0008 is a compact AI Box based on NVIDIA® Jetson AGX Xavier™, designed for general and commercial markets. With 8-core NVIDIA Carmel Arm® 64-bit CPU and various interfaces, this model aims to deliver high-quality performance for wider computing applications. In addition, this AI Box also comes with EverFocus in-house designed software, providing basic NVR functions of real-time live view, video recording/playback, alarm notifications and etc.

### 1.1 Features

| eNVP-JAX-AI-V0008 |
|---|
| • Fanless AI edge embedded box PC |
| • 8-core NVIDIA Carmel Arm®v8.2 64-bit CPU |
| • 512 NVIDIA CUDA cores and 64 Tensor cores (Volta™ architecture) |
| • Onboard 32/64 GB 256-bit LPDDR4x 136.5GB/s |
| • Supports PoE x 8, GbE x 2 |
| • Supports M.2 M-key 2280 x 1 (for NVMe SSD) |
| • Supports M.2 B-key 3042/3052 x 1 (for 4G/5G module)[1] |
| • Supports M.2 E-key 2230 x 1 (for WiFi/BT module) |
| • Supports SATA x 2, SD Card x 1 |
| • Supports CAN bus x 1, GPS x 1 |
| • Supports RS232 x 2 (SKU1) / RS232 x1, RS485 x 1 (SKU2) |
| • Supports Alarm In x 8, Alarm Out x 8 |
| • Supports 9V to 36V wide-range DC input |
| |
| Refer to *Chapter 3 Specification* for more detail. |

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[1] Please note that 4G or 5G cannot co-exist while in use.

## 1.2   Dimensions
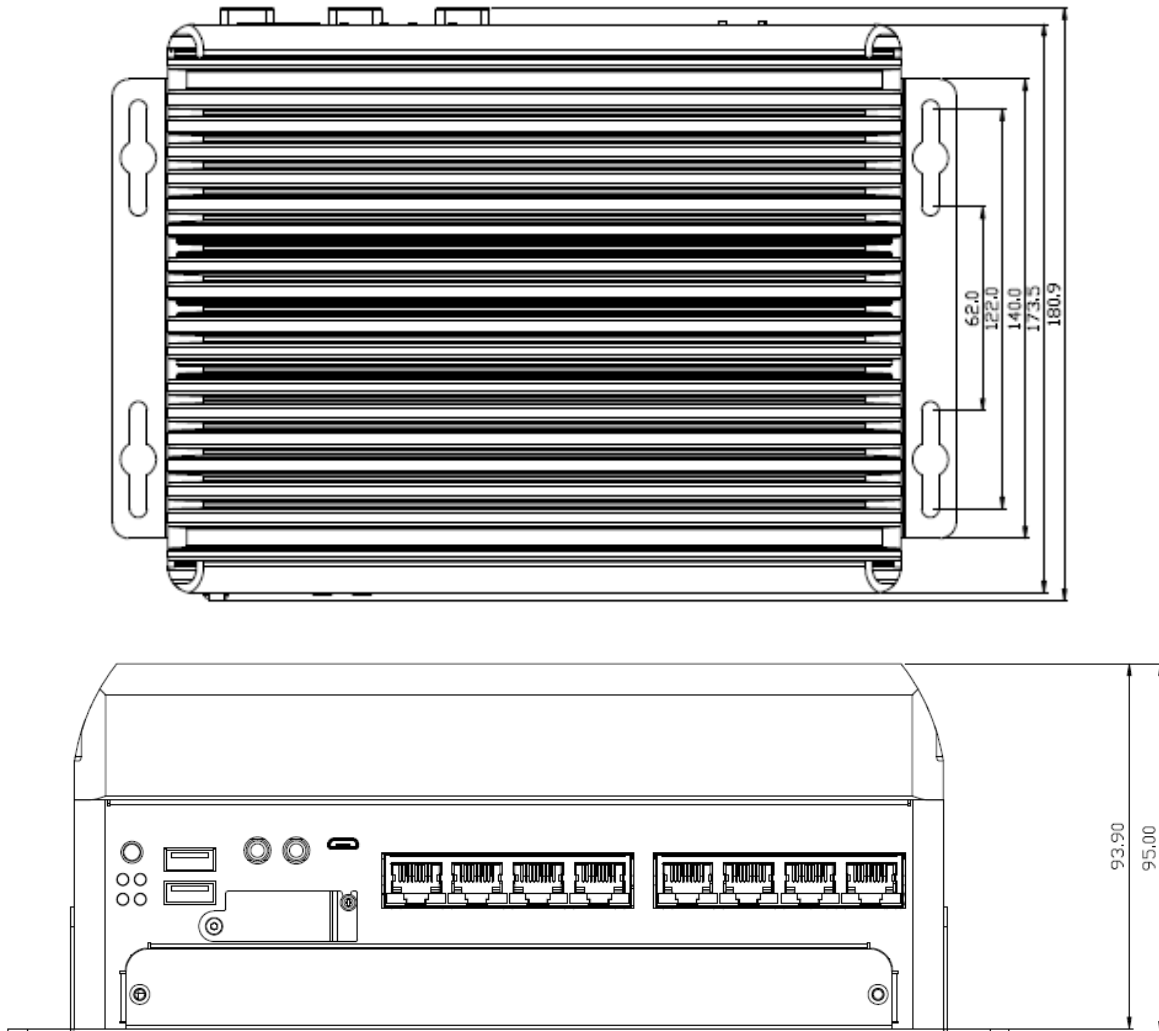


## 1.3   Packing List

- AI BOX x 1
- Power Harness Cable x 1, SATA Cable x 2, Alarm I/O Cable x 2, RS485 Cable x 1
- Mounting Bracket x 2
- Screw Kit x 1:
- 4 screws + 8 spacers (for mounting bracket)
- 8 screws for SATA drive

**Note:**
1. Equipment configurations and supplied accessories vary by country. Please consult your local EverFocus office or agents for more information.
2. If any item appears to have been damaged in the shipping process, please contact the shipper. Please also keep the shipping carton for possible future use.

## 1.4    Physical Description

### 1.4.1. Front I/O Overview
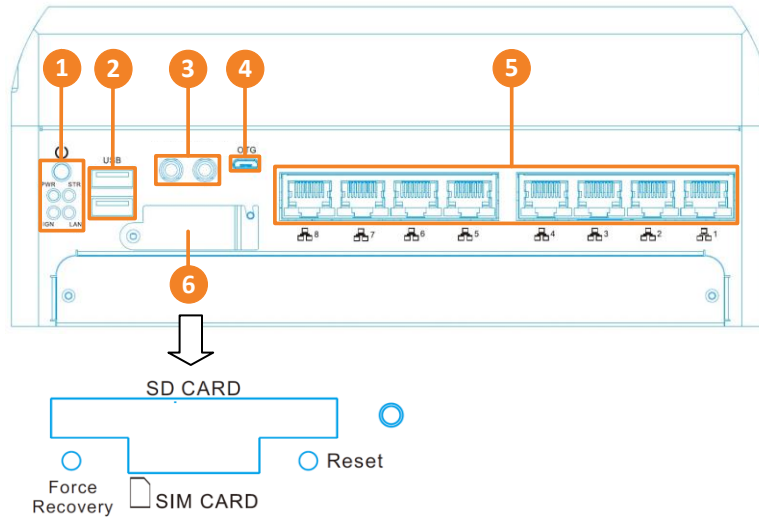


| No. | Name | Description |
|---|---|---|
| 1 | **Button** | PWR x 1 |
|  | **Indicator** | LED x 4 (PWR/LAN/IGN/STR)[2] |
| 2 | **USB** | USB 2.0 x 2 |
| 3 | **Audio In/Out** | Audio In/Out |
| 4 | **OTG** | MicroUSB (for Flash OS) x 1 |
| 5 | **PoE** | PoE x 8 |
| 6 | **Protective Cover** | Remove the cover to access the following slots & buttons: |
|  | **SD CARD** | SD Card x 1 |
|  | **SIM CARD** | SIM Card x 1 |
|  | **Button** | Force Recovery x 1, Reset x 1 |

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[2] STR LED indicates the read/write status of all storage devices, except for certain SD Cards.

## 1.4.2. Rear I/O Overview
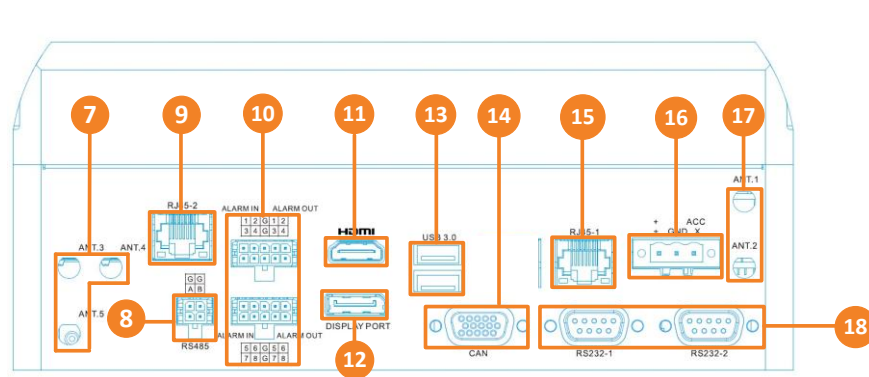


| No. | Name | Description |
|-----|------|-------------|
| 7 | Antenna | ANT.3 ~ ANT.5 |
| 8 | RS485 | RS485 x 1 (SKU2 only) |
| 9 | RJ45-2 | RJ45/GbE x 1 |
| 10 | Alarm In/Out | Alarm In x 8, Alarm Out x 8 |
| 11 | HDMI | HDMI x 1 |
| 12 | DisplayPort | DisplayPort x 1 |
| 13 | USB 3.0 | USB 3.0 x 2 |
| 14 | CAN bus | CAN bus x 1 |
| 15 | RJ45-1 | RJ45/GbE x 1 |
| 16 | PWR Input | Connecting to the power source. Refer to *2.2 Vehicle Connection*. |
| 17 | Antenna | ANT.1 ~ ANT.2 |
| 18 | RS232 | RS232 x 2 |

## 1.5   Carrier Board

To access the carrier board, please unscrew the 6 screws on the cover.

**Chapter**

# 2

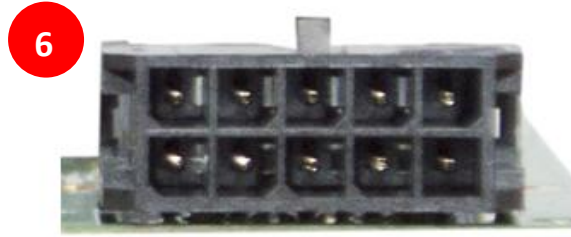## 2. Jumpers and Connectors on the Motherboard
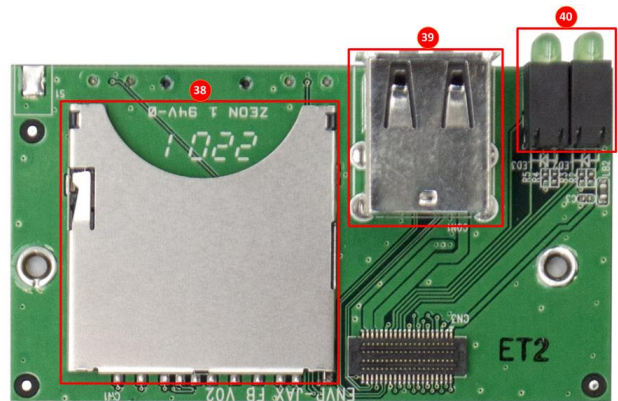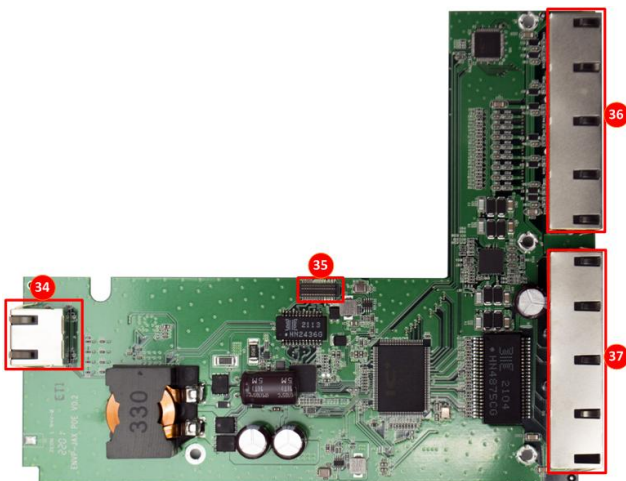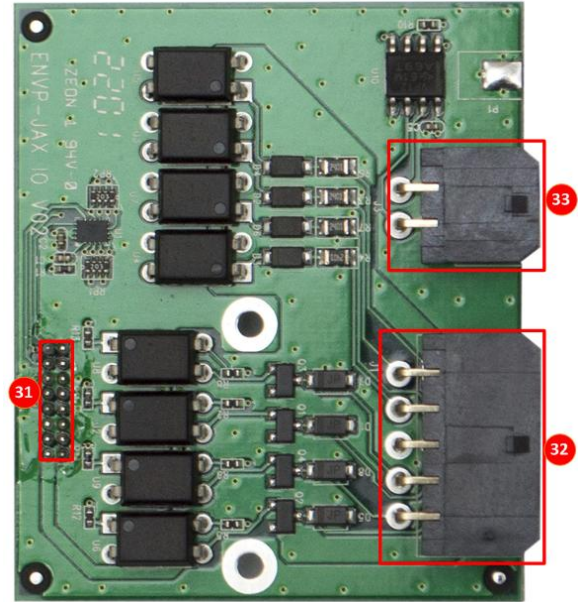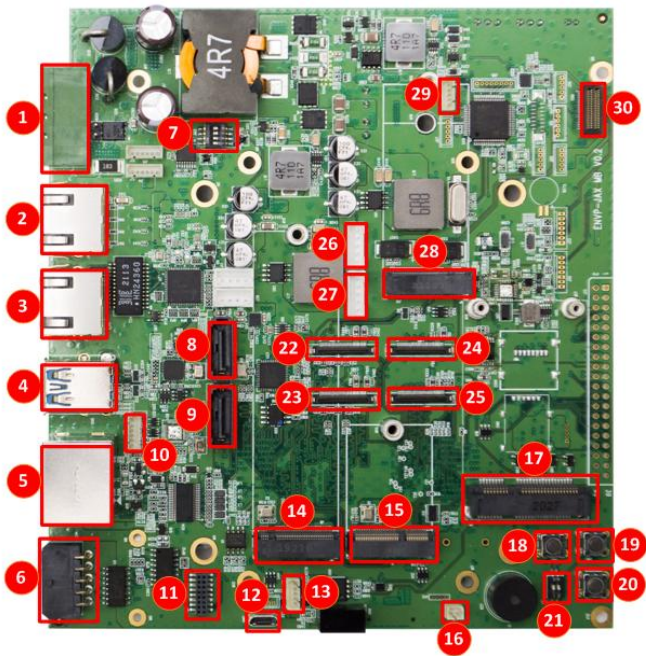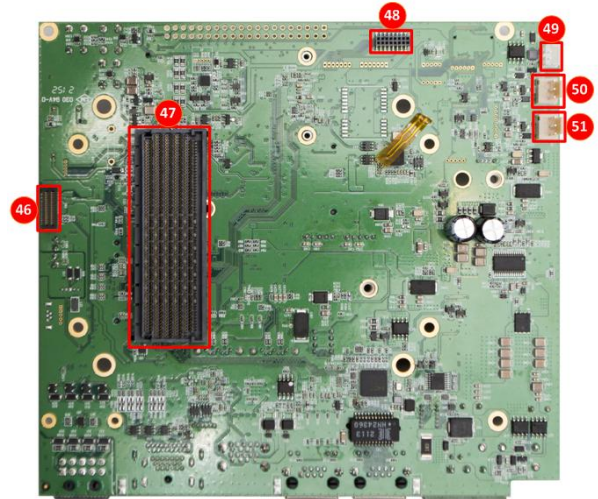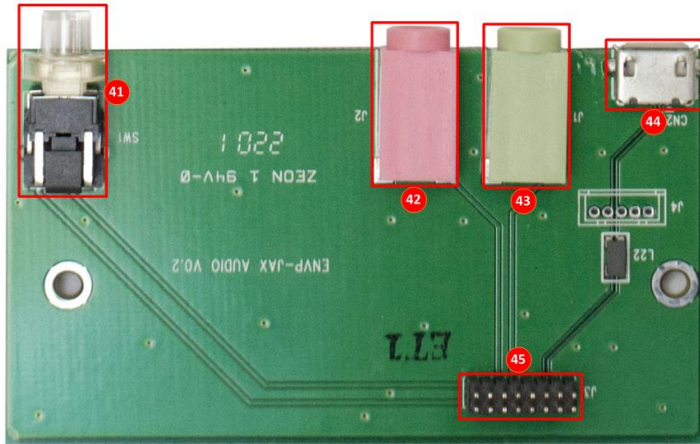
| eNVP-JAX-AI-V0008 | | | |
|---|---|---|---|
| 1 | Power Input | 26 | Camera Power (optional) |
| 2 | RJ45 (optional) | 27 | Camera Power (optional, for MIPI) |
| 3 | RJ45-1/GbE | 28 | M.2 B-Key 3042/3052* |
| 4 | USB 3.0 x 2 | 29 | SATA Power x 2 |
| 5 | Video out (DisplayPort, HDMI) | 30 | Front Board Connector |
| 6 | Alarm I/O 1~4 (4-In, 4-Out) | 31 | Main Board Connector |
| 7 | RS232 Switch (1&2 on) or RS485 Switch (3&4 on, SKU2 only) | 32 | Alarm I/O 5~8 (4-In, 4-Out) |
| 8 | SATA Port | 33 | RS485 (SKU2 only) |
| 9 | SATA Port | 34 | RJ45-2/GbE |
| 10 | VGA Port (optional) | 35 | Main Board Connector |
| 11 | IO Board Connector | 36 | PoE 5 ~ 8 |
| 12 | -- | 37 | PoE 1 ~ 4 |
| 13 | CAN bus | 38 | SD Card |
| 14 | M.2 M-Key 2280 | 39 | USB 2.0 x 2 |
| 15 | M.2 E-Key 2230 | 40 | LED x 4 |
| 16 | Battery (RTC) | 41 | Power Switch |
| 17 | Mini PCIe* | 42 | Audio In |
| 18 | Reset | 43 | Audio Out |
| 19 | Power On | 44 | OS Flash Port |
| 20 | Force Recovery | 45 | Main Board Connector |
| 21 | M.2 B-Key Power Switch (3.3v/3.7) | 46 | PoE Board Connector |
| 21 | Power Auto ON | 47 | AGX SOM Connector |
| 22 | PCIe (optional) | 48 | Audio Board Connector |
| 23 | PCIe (optional) | 49 | HDD Heater Connector |
| 24 | MIPI (optional) | 50 | Fan Connector 1 (by SOM) |
| 25 | MIPI (optional) | 51 | Fan Connector 2 (by SOM) |

* Note: Mini PCIe and M.2 B-Key 3042/3052 can only support one(1) LTE module while in use.

**1**

**Power Input**

**6**

Alarm IO
**Dry Contact
4-In, 4-Out**

| Power Input | | |
|---|---|---|
| Vin+ | GND | ACC / X |

| Alarm In | | | Alarm Out | |
|---|---|---|---|---|
| 1 | 2 | G1 | 1 | 2 |
| 3 | 4 | G2 | 3 | 4 |

| PIN | Level |
|---|---|
| Alarm In 1 | 8~36V |
| Alarm In 2 | 8~36V |
| Alarm In 3 | 8~36V |
| Alarm In 4 | 8~36V |
| GND 1 | -- |
| GND 2 | -- |
| Alarm Out 1 | 8~36V |
| Alarm Out 2 | 8~36V |
| Alarm Out 3 | 8~36V |
| Alarm Out 4 | 8~36V |

**\* Dry Contact:** Dry-contact alarms, also known as passive-contact alarms, refer to volt-free alarms that do not supply voltage. Not connected to circuitry, dry-contact alarms would operate as a single on/off switch outside the major switch. In other words, the relay energizes or de-energizes when a change to its voltage input has occurred. Refer to the "level" above for the input range of this device.

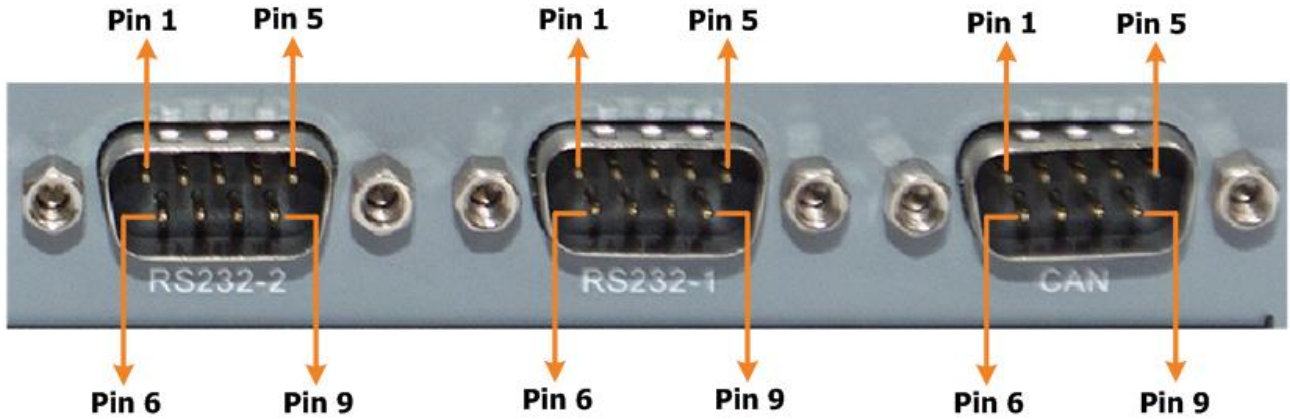**Alarm In/Out**
**Dry Contact**
**4-In, 4-Out**

**RS485 (SKU2)**

| Alarm In | | Alarm Out | | |
|---|---|---|---|---|
| 5 | 6 | G1 | 5 | 6 |
| 7 | 8 | G2 | 7 | 8 |

| RS485 | |
|---|---|
| G1 | G2 |
| A | B |

| PIN | Level |
|---|---|
| Alarm In 5 | 8~36V |
| Alarm In 6 | 8~36V |
| Alarm In 7 | 8~36V |
| Alarm In 8 | 8~36V |
| GND 1 | -- |
| GND 2 | -- |
| Alarm Out 5 | 8~36V |
| Alarm Out 6 | 8~36V |
| Alarm Out 7 | 8~36V |
| Alarm Out 8 | 8~36V |

| PIN | Function |
|---|---|
| GND1 | -- |
| GND2 | -- |
| A | RS485+ |
| B | RS485- |

| RS232 - 1 | | |
|---|---|---|
| PIN No. | Function | Level |
| PIN 1 | N.C | -- |
| PIN 2 | Received Data | ±15V |
| PIN 3 | Transmitted Data | ±15V |
| PIN 4 | N.C | -- |
| PIN 5 | Signal Ground | -- |
| PIN 6 | N.C | -- |
| PIN 7 | Request to Send | ±15V |
| PIN 8 | Clear to Send | ±15V |
| PIN 9 | N.C | -- |

| RS232 - 2 | | |
|---|---|---|
| PIN No. | Function | Level |
| PIN 1 | N.C | -- |
| PIN 2 | Received Data | ±15V |
| PIN 3 | Transmitted Data | ±15V |
| PIN 4 | N.C | -- |
| PIN 5 | Signal Ground | -- |
| PIN 6 | N.C | -- |
| PIN 7 | Request to Send | ±15V |
| PIN 8 | Clear to Send | ±15V |
| PIN 9 | N.C | -- |

| CAN | | |
|---|---|---|
| PIN No. | Function | Level |
| PIN 1 | CAN bus 5V | 5V Output |
| PIN 2 | CAN_L | CAN bus CANL |
| PIN 3 | CAN bus GND | CAN bus GND |
| PIN 4 | N.C | -- |
| PIN 5 | N.V | -- |
| PIN 6 | CAN bus GND | CAN bus GND |
| PIN 7 | CAN_H | CAN bus CANH |
| PIN 8 | N.C | -- |
| PIN 9 | N.C | -- |
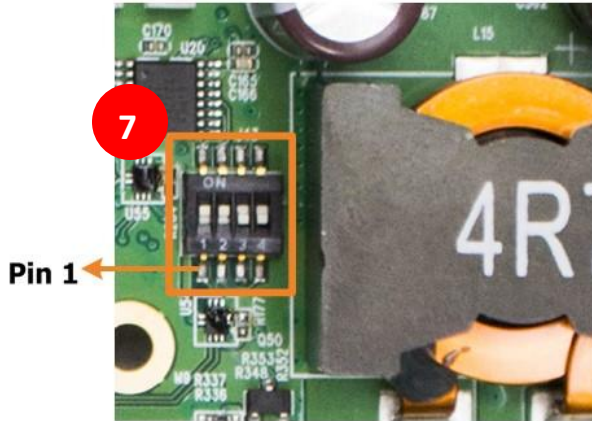
**RS232 / RS485 Switch (1&2 RS232 / 3&4 RS485)**
PIN Label: J43
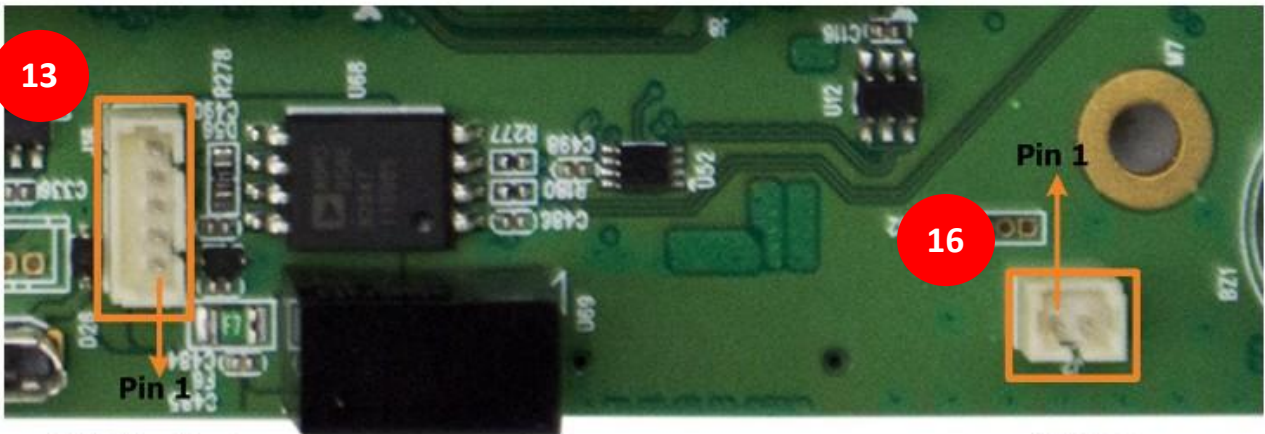**(This Function only for SKU2)**
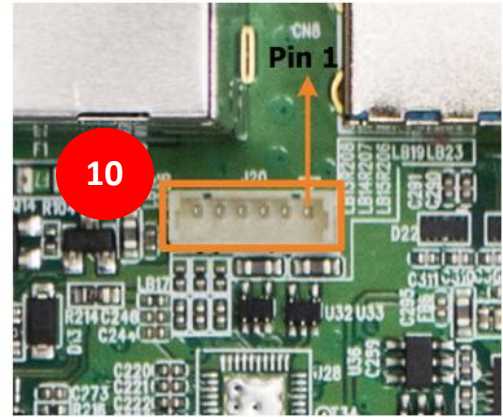


**VGA Port (optional)**
PIN Label: J20

| Label | PIN | PIN Name | Function | Level |
|-------|-----|----------|----------|-------|
| J43 | 1 | UART1_TXD_LS | UART1 to RS232 (1&2 on) | -- |
| J43 | 2 | UART1_RXD_LS | | -- |
| J43 | 3 | UART1_TXD_LS | UART1 to RS485 (3&4 on) | -- |
| J43 | 4 | UART1_RXD_LS | | -- |

| Label | PIN | PIN Name | Function | Level |
|-------|-----|----------|----------|-------|
| J20 | 1 | VGA_VS_OUT | VGA port | -- |
| J20 | 2 | VGA_HS_OUT | VGA port | -- |
| J20 | 3 | VGA_B_OUT | VGA port | -- |
| J20 | 4 | VGA_G_OUT | VGA port | -- |
| J20 | 5 | VGA_R_OUT | VGA port | -- |
| J20 | 6 | GND | -- | -- |

**CAN Bus Port**
PIN Label: J16

**Battery**
PIN Label: J2

| Label | PIN | PIN Name | Function | Level |
|-------|-----|----------|----------|-------|
| J16 | 1 | 5V_CAN | CAN bus | -- |
| J16 | 2 | CAN1-H | CAN bus | -- |
| J16 | 3 | CAN1-L | CAN bus | -- |
| J16 | 4 | GND | CAN bus isolator GND | -- |
| J16 | 5 | GND | CAN bus isolator GND | -- |
| J2 | 1 | BAT+ Battery | Vin 3.3V | -- |
| J2 | 2 | GND | GND | -- |
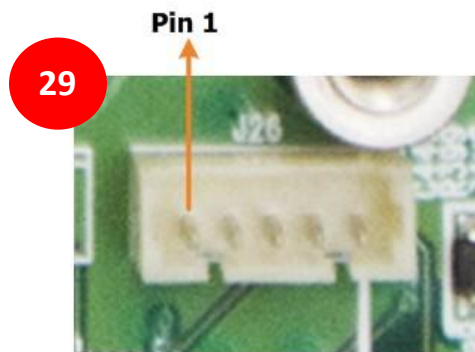


**SATA Power x 2**
PIN Label: J26

| Label | PIN | PIN Name | Function | Level |
|-------|-----|----------|----------|-------|
| J26 | 1 | 3V3_STB | MCU debug port | -- |
| J26 | 2 | SWDIO | MCU debug port | -- |
| J26 | 3 | SWCLK | MCU debug port | -- |
| J26 | 4 | MCU NRST | MCU debug port | -- |
| J26 | 5 | GND | GND | -- |
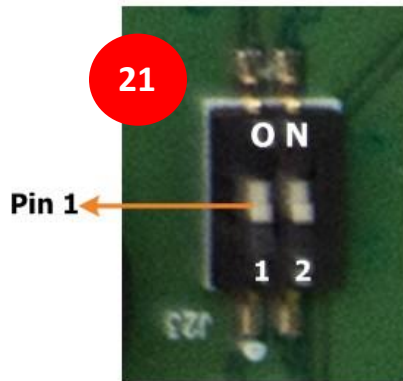
1. M.2 B-Key Power Switch
2. Power Auto ON
PIN Label: J23
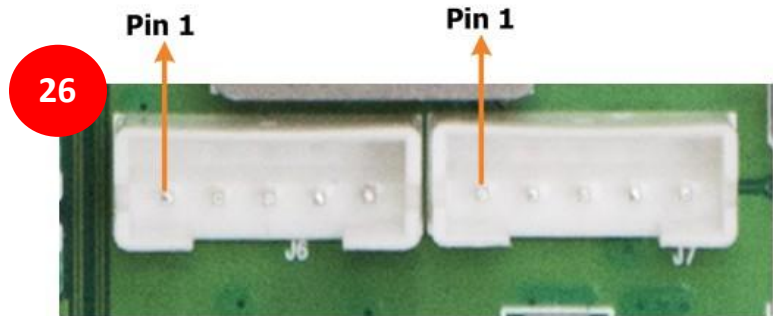


Camera Power
PIN Label: J6/J7

| Label | PIN | PIN Name (On/Off) | Function | Level |
|-------|-----|-------------------|----------|-------|
| J23 | 1 | SW_V3_V7 | M.2 key B power 3V3 / 3V7 | 5V |
| J23 | 2 | ACOK | SOM Auto power ON[3] | 3.3V |

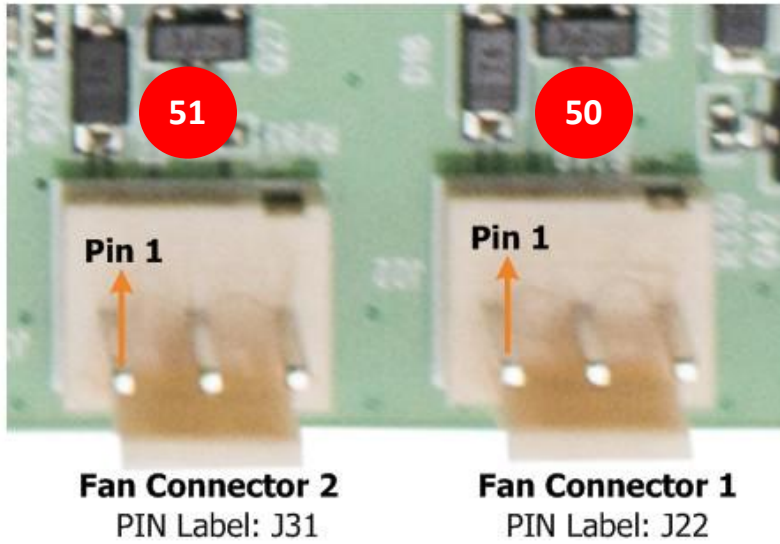| Label | PIN | PIN Name | Function | Level |
|-------|-----|----------|----------|-------|
| J6 / J7 | 1 | 12V | CAMERA power 12V | 12V |
| J6 / J7 | 2 | 5V | CAMERA power 5V | 5V |
| J6 / J7 | 3 | GND | GND | -- |
| J6 / J7 | 4 | GND | GND | -- |
| J6 / J7 | 5 | CTRL_MIPI | MIPI Enable | 3.3V |

---

[3] J23-Pin 2 ACOK setting:
(1) Auto power ON (in-vehicle):
    In connection with electricity, the device will be switched on automatically.
(2) Auto power OFF (desktop, by default):
    In connection with electricity, the device will NOT be switched on. Press the PWR button to switch it on.

**Fan Connector 2**
PIN Label: J31

**Fan Connector 1**
PIN Label: J22

| Label | PIN | PIN Name | Function | Level |
|-------|-----|----------|----------|-------|
| J31 | 1 | FAN_TACH | FAN_TACH_IN | 12V |
| J31 | 2 | 12V Output | FAN_EN | 12V |
| J31 | 3 | GND | GND | -- |

| Label | PIN | PIN Name | Function | Level |
|-------|-----|----------|----------|-------|
| J22 | 1 | FAN_TACH | FAN_TACH_IN | 12V |
| J22 | 2 | 12V Output | FAN_EN | 12V |
| J22 | 3 | GND | GND | -- |
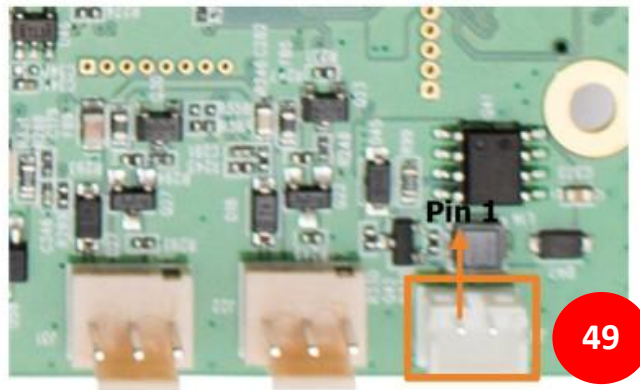
**HDD Heater Connector**
PIN Label: J37

| Label | PIN | PIN Name | Function | Level |
|-------|-----|----------|----------|-------|
| **J37** | 1 | HEATER | HEATER POWER | CARPWR: 12 /24V |
| **J37** | 2 | GND | GND | -- |

**Chapter**

# 3

## 3. Specification

| System | |
|---|---|
| AI Accelerator | NVIDIA® AGX Xavier |
| CPU | 8-core NVIDIA Carmel Arm®v8.2 64-bit CPU |
| GPU | 512 NVIDIA CUDA cores and 64 Tensor cores (Volta™ architecture) |
| Memory | Onboard 32/64 GB 256-bit LPDDR4x |
| **Storage** | |
| Storage | 32 GB eMMC 5.1 |
| SATA | SATA x 2 |
| SD Card | SD Card x 1 |
| NVMe SSD | Supported (via Expansion) |
| **Power** | |
| Power Supply | DC 9-36V |
| **Network** | |
| Ethernet | GbE x 2 |
| PoE | PoE x 8 (10/100 MbE, Single 30W/Total 120W) |
| Antenna | ANT. x 5 |
| Wi-Fi / BT | Supported (via Expansion) |
| 4G / 5G | Supported (via Expansion) |
| GPS | Supported (via Expansion) |
| **Expansion** | |
| M.2 | M.2 M-key 2280 x 1 |
| | M.2 E-key 2230 x 1 |
| | M.2 B-key 3042/3052 x 1 |

| Interface | |
|---|---|
| Button | PWR & Reset Switch x 1, PWR Input x 1 |
| Indicator | LED x 4 (PWR/LAN/IGN/STR) |
| Display | HDMI x 1, DisplayPort x 1 |
| Audio | Audio In/Out x 1 |
| USB | USB 3.0 x 2, USB 2.0 x 2 |
| OTG USB | MicroUSB (for Flash OS) x 1 |
| DIO | Alarm In x 8, Alarm Out x 8 |
| Power | PWR Input x 1 (3-pin terminal block) |
| CAN bus | CAN bus x 1 |
| COM | SKU1: RS232 x 2;<br>SKU2: RS232 x1, RS485 x 1 |
| General | |
| Dimensions | 242 x 177 x 94 mm$^3$ (W x D X H) |
| Weight | 4.5 kg |
| Operating Temp. | -20°C ~ 60°C, according to IEC60068-2 with 0.5 m/s AirFlow |
| Storage Temp. | -40°C ~ 85°C |
| Storage Humidity | 10% ~ 90%, non-condensing |
| Vibration | MIL-STD-810G, Method 514.7, Category 4;<br>MIL-STD-810G, Method 516.7, Procedure I (Shock) |
| Certification | CE/ FCC Class A, according to EN 55032/55035;<br>EN50155, UL, BSMI, PSE, other (by project) |

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