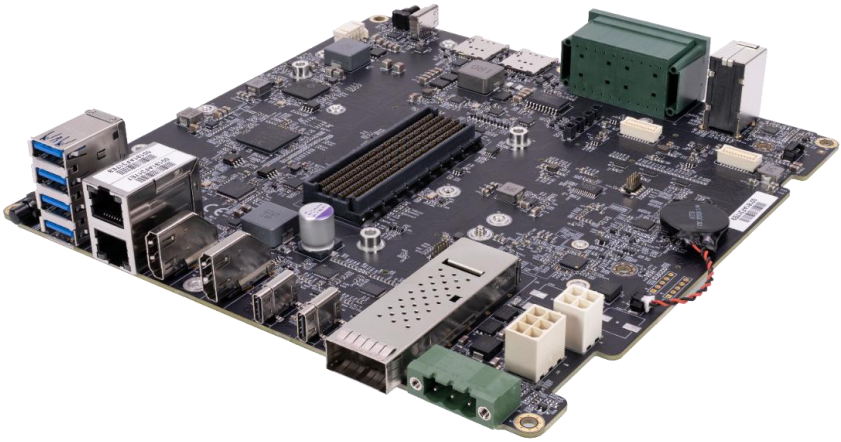
# AVerMedia D331

Applies to NVIDIA Jetson T5000™/Jetson T4000™



AVerMedia Technologies, Inc.
No. 135, Jian 1st Rd., Zhonghe Dist., New Taipei City 23585, Taiwan
Tel: 886-2-2226-3630

Fax: 886-2-3234-4842
Sales and Marketing: Contact
Technical Support: Professional User

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## Preface

### Disclaimer

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If you experience the difficulty after reading this manual and/or using the product, please contact the reseller from which you purchased the product. In most cases, the reseller can help you with the product installation and the difficulty you encountered.

In case the reseller is not able to resolve your problem, our highly capable global technical support team can certainly assist you. Our technical support section is available 24 hours a day and 7 days a week through our website, with the click here. For more contact information, you may find it in the section of AVerMedia Global Offices.

### Contact Enquiry

For more information of our products, pricing, and order placement, please fill in our inquiry form here, we will contact you within 24 hours.

### Download User Manual

Please click the link here to download the file of this user manual from AVerMedia website.

**Revision History**

| Revision | Date | Updates |
|---|---|---|
| V0.1 | Jan 29, 2026 | 1st Released |
| V0.2 | Feb 2, 2026 | Remove Fan Module Power Adapter Power Cord wrong information |
| V1.0 | Feb 13,2026 | Update<br>2.0 Feature Description<br>9.0 Daughter board introduction |
| V1.1 | Feb 23,2026 | Error Fix<br>Add OOB demo connection |
| V1.2 | Mar 3,2026 | Error Fix<br>Add 2.17 2.18 pinout/pin definition |
| V1.3 | Mar 5,2026 | Error Fix |
| V1.4 | Mar 25,2026 | Product spec change<br>2.6 USB Type C Power Supply Connector |
| V1.5 | Mar 26,2026 | Error Fix |
| V1.6 | Apr 21,2026 | Error Fix |
| V1.7 | May 12,2026 | Error Fix P.11~P.12 |
| V1.8 | May 27, 2026 | Updated SSD Storage Spec Gen5 → Gen4 |
| V1.9 | June 22, 2026 | Updated as D331 B version |
| V2.0 | July 6, 2026 | Updated P.26 Table |
| V2.1 | Aug 18, 2026 | Updated Specification. |
| V2.2 | Aug 20, 2026 | Updated J38 |
| V2.3 | Aug 31, 2026 | Updated J33 |
| V2.4 | Sep 04, 2026 | Updated Power requirement |

## AVerMedia Global Offices

https://www.avermedia.com/professional/contact

### Headquarters

**Taiwan Office**

No. 135, Jian 1st Rd., Zhonghe Dist., New Taipei City 23585,Taiwan

Tel: +886-2-2226-3630

Fax: +886-2-3234-4842

Sales & Marketing: Contact

Technical Support: Home users / Professional users

### The Americas

**USA Office**

4038 Clipper Court Fremont, CA 94538

Tel: (510) 403-0006

Fax: (510) 403-0022

Sales & Marketing: Contact

Technical Support: Home users / Professional users

**Brazil Office**

Sales & Marketing: Contact

Technical Support: Home users / Professional users

**Latin America Office**

Sales & Marketing: Contact

Technical Support: Home users / Professional users

### Europe

**Head Office EU**

AVT Solutions GmbH

Hanauer Landstrasse 291 B 60314 Frankfurt Hessen

Germany

: technicalsupport_120

Sales & Marketing: Contact

Technical Support: Home users / Professional users

**Russia Office**

Sales & Marketing: Contact

Technical Support: Home users / Professional users

Professional Solutions Support Tel:

+7 (925) 834-0310

**Spain Office**

AVerMedia Europe Group

Ronda de Poniente no. 4 segundo H

28760 Tres cantos, Madrid

Spain:

: technicalsupport_120

Sales & Marketing: Contact

Technical Support: Home users / Professional users

### Asia-Pacific

**China Office**

Room 1510, No.488, Hitech Plaza, South Wuning Rd., Jingan District, Shanghai, China

Tel: +86-021-5298 7985

Fax: +86-021-5298 7981

Sales & Marketing: Contact

Technical Support: Home users / Professional users

**Japan Office**

6F,Kojimachi Syuei Bldg,4-3-13 Kudan-minami, Chiyoda-ku, Tokyo ,102-0074, Japan

Sales & Marketing: Contact

Technical Support: Home users / Professional users

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## ESD Warning

Electronic components and circuits are sensitive to Electrostatic Discharge (ESD). When handling any circuit board assemblies including AVerMedia products, it is highly recommended that ESD safety precautions can be observed. ESD safe best practices can include but are not limited to the following ones.

1. Leave the circuit board in the antistatic package until it is ready to be installed.
2. Use a grounded wrist strap when handling the circuit board. At a minimum, you need to touch a grounded metal object to dissipate any static charge, which may be present on you.
3. Avoid handling the circuit board in the carpeted areas.
4. Handle the board by the edges and avoid contact with the components.
5. Only handle the circuit boards in ESD safe areas, which may include ESD floor and/or table mats, wrist strap stations, and ESD safe lab coats.

## Safety Precaution:

1. All cautions and warnings on the device should be noted.
2. For safety consideration, do NOT open the device if not a qualified service stuff.
3. Place the device on a solid surface during installation to prevent falls.
4. Keep the device away from humidity.
5. Do NOT leave this device in an un-controlled environment with temperatures beyond the device's permitted storage temperature to avoid damage.
6. All adaptors and cables supplied by AVerMedia are verified. Do NOT use any others not supplied by AVerMedia to avoid any malfunction or fires.
7. Make sure the power source matches the power rating of the device.
8. Place the power cord where people cannot step on it. Do not put anything on the power cord.
9. Always completely disconnect the power while the device is not used or idle for a long time.
10. Disconnect the device from any AC supply before cleaning. While cleaning, use damp cloth instead of liquid or spray detergents.
11. Make sure the device is installed near a power outlet and easy for accessibility.
12. Do not cover the openings on the device to ensure optimal heat dissipation.
13. Watch out the heatsink or heat spreader of the device when the system is running.
14. Never pour any liquid into the openings. This could cause fire or electrical shock.
15. The static electricity should be noted while installing any internal components. Consider using a grounding wrist strap and put all electronic parts in static-shielded containers.

    If the following situations occur, please contact our service personnel:

    (1) The device is dropped or damaged
    (2) Damaged power cord or plug
    (3) Exposure to moisture
    (4) Liquid intrusion into the device
    (5) Any obvious signs of damage displayed on the device
    (6) The device is not working as expected or in a manner as described in this manual
16. The static electricity should be noted while installing any internal components. Consider to

## 1.0 Introduction

AVerMedia D331 is a high-performance carrier board designed to support the NVIDIA® Jetson Thor™ module industry platform. Built with a comprehensive set of I/O interfaces including dual GbE, QSFP for high-speed networking, multiple M.2 expansion slots, rich peripheral connectivity, and robust industrial-grade design, the D331 enables rapid development and deployment of AI-driven embedded IoT solutions.

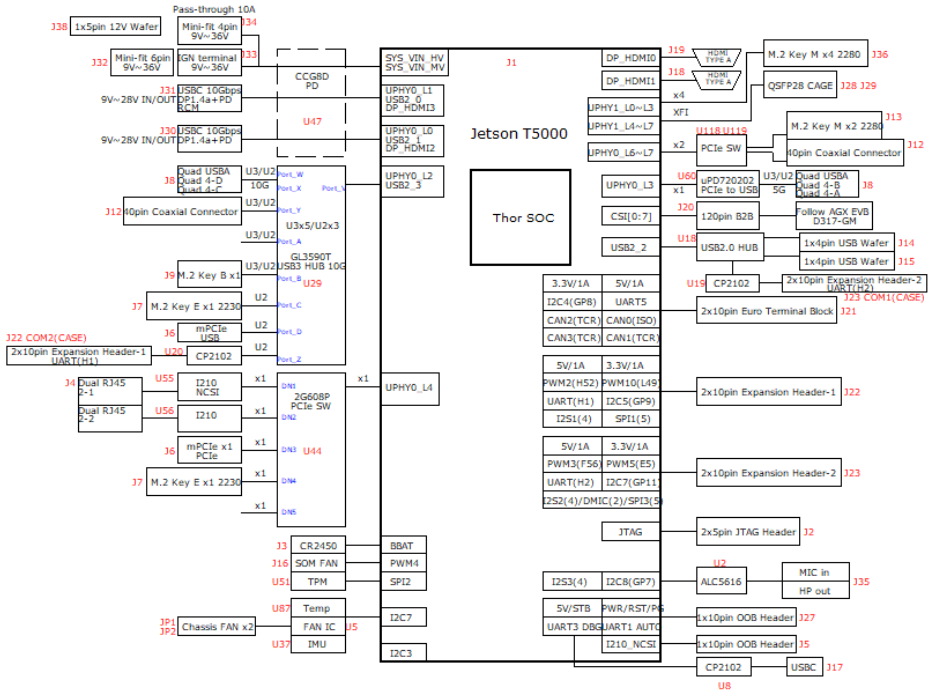
Equipped with a powerful NVIDIA Jetson T5000™/T4000™ system-on-module and a wide range of connectivity options such as HDMI, USB 3.2, CAN bus, PWM, and camera interfaces, the D331 carrier board delivers a flexible and scalable platform for demanding applications in autonomous mobile robotics (AMRs), smart security, smart inspection, and other edge computing use cases.

## 1.1 Product Specifications

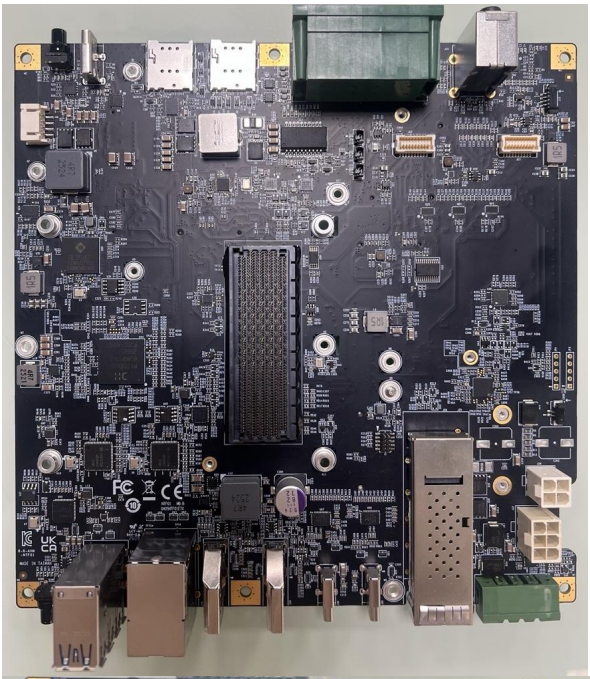
| | |
|---|---|
| **NVIDIA Jetson SoM** | NVIDIA Jetson T5000™/Jetson T4000™ |
| **Networking** | • 2x GbE RJ-45 (1 × port supports OOB NCSI for optional OOB module)<br>• 1x QSFP (4× 10 GbE)<br>• 1x M.2. key E 2230 for Wi-Fi 6<br>• 1x M.2 Key B 3042/3052 for 4G/5G |
| **SIM Slot** | • 2x SIM slots for 4G/5G module; dual SIM capability depends on the installed cellular module |
| **Display Output** | 2 x HDMI output (3840 x 2160 at 60Hz) |
| **Temperature** | Operating temperature: -40 to 85°C (carrier board, W/O audio)<br>Operating temperature: -25 to 85°C (carrier board, W/ audio)<br>Operating temperature: -25 to 60°C (Box PC)<br>Operating temperature: -25 to 50°C (Box PC with 8x POE Board)<br><br>Storage temperature -40°C ~ 85°C<br>Relative humidity 40 °C @ 95%, Non-Condensing |
| **GMSL camera board** | 1x 120pin for GMSL camera board |
| **USB** | • 1x USB 3.2 Type-C for BSP install<br>• 1x USB 3.2 Type-C (usage limitations apply; refer to User Manual for details)<br>• 4x USB 3.2 Type-A (5Gbps x2 ; 10Gbps x2)<br>• Optional 8x USB3.2 Type-A (via daughter board) |
| **Storage** | • 2x NVMe M.2 Key M 2280<br>-1x NVMe M.2 Key M 2280 x2 PCIe Gen4 (For Carrier Board SKU: 8xPoE, 8xUSB board, either one)<br>-1x NVMe M.2 Key M 2280 x4 PCIe Gen4 |
| **Expansion Header** | • 2x10 Euro Terminal Block 1x CAN-FD (Isolated 3KV), 3x CAN-FD with Transceiver, +5V output 1A, +3.3V output 1A,UART, I2C<br>• 20pin expansion header-1: 1x5V(Maximum 1A), 1x3.3V(Maximum 1A) power Output, UARTH1, I2C, GPO(4), GPI(5), PWM(2)<br>• 20pin expansion header-2: 1x5V(Maximum 1A), 1x3.3V(Maximum 1A) power Output, UARTH2, I2C, GPO(4), GPI(5), PWM(2)<br>• 2x 5-pin JTAG connector<br>• 1x 40pin coaxial connector for PCIe expansion (For Carrier Board SKU: Daughter board 8xPSE/8xUSB ) |
| **Power requirement** | • Terminal block 3Pin & Mini-fit 6pin (Internal)<br>• USB Type C Power Supply, USB-C 9V~28V 40W-130W<br>• 9~36V DC Input, 90~180W (36V absolute maximum), DC IN terminal block:10A Max, ATX 6pin: 10A Max<br>• ACC IN / IGN Control (ACC optional, via switch)<br><br>Note: If there is more than one power supply (e.g., Terminal block or USB |

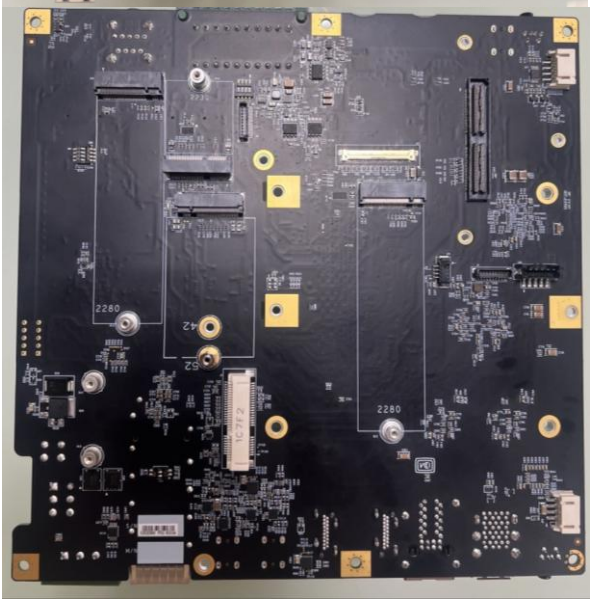
| | |
|---|---|
| | Type-C) connected, then the USB PD Controller (CYPD8225) will let the first power supply through, also known as First come first serve. |
| **Thermal Solution** | • 1x SOM FAN<br>• 2x Chassis Fan (12V fan wafer) |
| **Buttons** | Power and Recovery |
| **RTC Battery** | Support RTC Battery and Battery Life Monitoring by MCU |
| **Dimensions** | Carrier Board: W: 190mm x L: 190mm<br>Devkit: W: 192.2mm x L: 195mm x H: 87mm<br>Box PC: W: 211mm x L: 194mm x H: 115mm |
| **Certifications** | CE, FCC,VCCI, KC (TBA) |
| **GPS** | 1x mPCIe for Optional Dual-RTK GNSS support (via daughter board) |
| **Sensor** | Temperature sensor for PCB top/bot Temperature measure |
| **LED** | 1x system power，1x input power |
| **MISC** | • 1x Mini-fit 4Pin DC output for PSE expansion (Pass-through 10A)<br>• 1x DC output wafer (9~12V) for GMSL<br>• 1x USB-C for Debug_UART (Share with OOB)<br>• DIP Switch for function control , AT/ATX Mode select, ACC Enable / Ignore ACC for Development (default) |
| **Package** | 1x Carrier board or Devkit or Box PC<br>1x 240W Adapter (360W with 8x POE Board)<br>1x Power Cord (By region)<br>2x Terminal Block |

## 1.2 Product Overview


Pass-through 10A
J38 1x5pin 12V Wafer
Mini-fit 4pin 9V~36V J34
J32 Mini-fit 6pin 9V~36V
IGN terminal 9V~36V J33
J31 USBC 10Gbps 9V~28V IN/OUT DP1.4a+PD BCM
J30 USBC 10Gbps 9V~28V IN/OUT DP1.4a+PD
CCG8D PD
U47
J8 Quad USBA Quad 4-D Quad 4-C
U3/U2 10G
J12 40pin Coaxial Connector
U3/U2
U3x5/U2x3
GL3590T USB3 HUB 10G
J9 M.2 Key B x1
U29
J7 M.2 Key E x1 2230
J6 mPCIe USB
J22 COM2(CASE)
2x10pin Expansion Header-1 UART(H1)
U20 CP2102
J4 Dual RJ45 2-1
U55 I210 NCSI
Dual RJ45 2-2
U56 I210
J6 mPCIe x1 PCIe
J7 M.2 Key E x1 2230
2G608P PCIe SW
U44
J3 CR2450
J16 SOM FAN
U51 TPM
U87 Temp
JP1 JP2 Chassis FAN x2
FAN IC J5
U37 IMU
SYS_VIN_HV
SYS_VIN_MV
J1
UPHY0_L1 USB2_0 DP_HDMI3
UPHY0_L0 USB2_1 DP_HDMI2
UPHY0_L2 USB2_3
UPHY0_L4
BBAT
PWM4
SPI2
I2C7
I2C3
Jetson T5000
Thor SOC
DP_HDMI0
DP_HDMI1
HDMI TYPE A
J19
J18
M.2 Key M x4 2280 J36
QSFP28 CAGE J28 J29
x4
XFI
UPHY1_L0~L3
UPHY1_L4~L7
UPHY0_L6~L7
x2
U118 U119
PCIe SW
M.2 Key M x2 2280 J13
40pin Coaxial Connector J12
UPHY0_L3
x1
U60 uPD720202 PCIe to USB
U3/U2 5G
Quad USBA Quad 4-B Quad 4-A J8
CSI[0:7]
J20 120pin B2B
Follow AGX EVB D317-GM
USB2_2
U18 USB2.0 HUB
1x4pin USB Wafer J14
1x4pin USB Wafer J15
U19 CP2102
2x10pin Expansion Header-2 UART(H2) J23 COM1(CASE)
3.3V/1A 5V/1A
I2C4(GP8) UART5
CAN2(TCR) CAN0(ISO)
CAN3(TCR) CAN1(TCR)
2x10pin Euro Terminal Block J21
5V/1A 3.3V/1A
PWM2(H52) PWM10(L49)
UART(H1) I2C5(GP9)
I2S1(4) SPI1(5)
2x10pin Expansion Header-1 J22
5V/1A 3.3V/1A
PWM3(F56) PWM5(E5)
UART(H2) I2C7(GP11)
I2S2(4)/DMIC(2)/SPI3(5)
2x10pin Expansion Header-2 J23
JTAG
2x5pin JTAG Header J2
U2
I2S3(4) I2C8(GP7)
ALC5616
MIC in
HP out
J35
5V/STB PWR/RST/PG
UART3 DBG UART1 AUTO
1x10pin OOB Header J27
I210_NCSI
1x10pin OOB Header J5
CP2102
USBC J17
U8

**Front View and Back View of Carrier board**





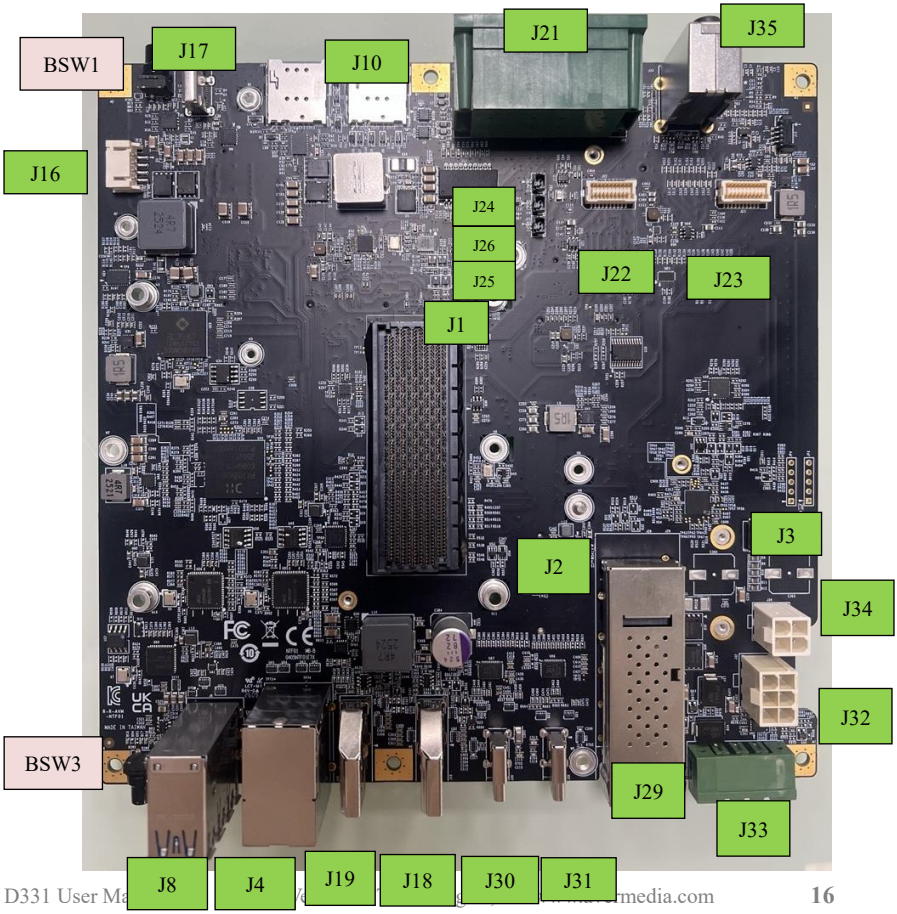
## 1.3 Connector Summary

| | |
|---|---|
| J1 | 699-pin high-speed/high-density connector |
| J16 | Fan Wafer |
| J3 | External RTC Battery wafer |
| J18 | HDMI output Type-A Vertical Side Connector (Female) |
| J19 | HDMI output Type-A Vertical Side Connector (Female) |
| J31 | USB 3.2 Gen2 Type C Connector (supports Nvidia Jetson flashing) |
| J30 | USB Type C Power Supply Connector |
| J17 | USB 2.0 Type C Connector (Debug UART) |
| J4 | Gigabit Ethernet Connector w/LEDs |
| J10 | Micro SIM card socket (Push-Push) |
| J21 | 2x10 Euro Terminal Block 1x CAN-FD |
| J22 | 20pin expansion header-1 |
| J23 | 20pin expansion header-2 |
| J29 | QSFP |
| J32 | Input Power – 4.2mm Pitch ATX Power 6P |
| J33 | Input Power – Terminal block 3Pin |
| J34 | Input Power – 4.2mm Pitch ATX Power 4P |
| J35 | 3.5mm audio Jack |
| J2 | 5 pin JTAG Header |
| J24 | OOB board connector (Power) |
| J25 | OOB board connector (Reset) |
| J26 | OOB board connector (Recover) |
| BSW1 | Recovery Button w/LEDs |
| BSW3 | Power Button w/LEDs |
| J36 | M.2 M-Key Socket |
| J8 | USB 3.2 Gen2 Type A Connector |
| J7 | M.2 E-Key Socket |
| J9 | M.2 B-Key Socket |
| J6 | Mini card socket |
| J27 | OOB connector |
| J5 | OOB NCSI connector |
| J14 | 4-pin USB wafer |

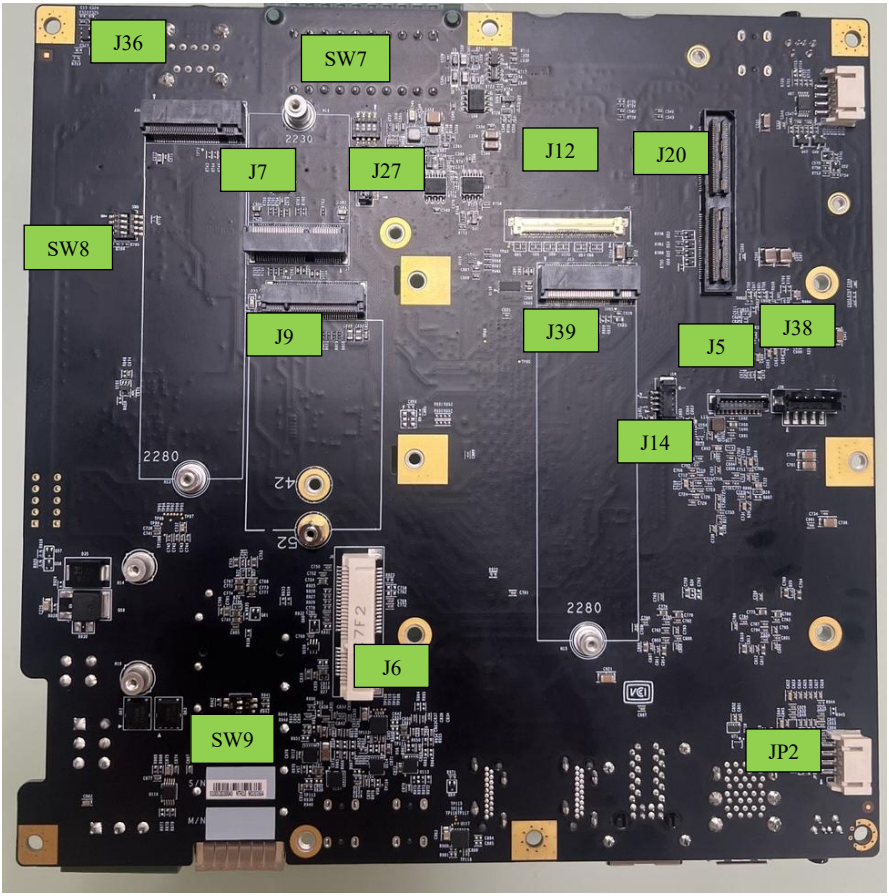
| | |
|---|---|
| J38 | 5-pin 12V DC output wafer |
| J39 | M.2 M-Key Socket |
| J20 | 120-pin high speed board to board connector (to Camera board) |
| J12 | 40-pin coaxial connector |
| JP1 | Fan Wafer |
| JP2 | Fan Wafer |
| SW7 | Switch Button |
| SW8 | Switch Button |
| SW9 | Switch Button |

## 1.4 Carrier Board Interface

Top View Interface



**Buttom iew Interface**



## 2.0 Feature Description

### 2.1 Jetson module Connector

| | | |
|---|---|---|
| Function | Provide connection with NVIDIA® Jetson™ AGX Thor™ module | |
| Location | J1 | |
| Type Description | MOLEX 699pin socket | |
| Manufacturer and Part Number | MOLEX,203456-0003 | |
| Mating Connector | MOLEX,203456-0003 | |
| Pinout | Please refer to NVIDIA Jetson™ AGX Thor™ System-on-Module datasheet for pinout details. | |
| Remarks | https://developer.nvidia.com/ embedded/downloads | |

### 2.2 Fan Power connector

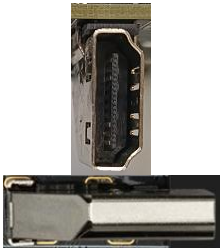
| | | |
|---|---|---|
| Function | Fan Power Connector | |
| Location | J16 / JP1 / JP2 | |
| Type Description | WAFER_1*4PIN_2 ㎜_90°_SMD | |
| Manufacturer and Part Number | JOINT TECH 燦達<br>A2001WR-S-04PNLNT1T00R | |
| Mating Connector | JOINT TECH 燦達<br>A2001 Series Housing | |
| Pinout | | |
| Remarks | None | |

| Pin # | Description |
|---|---|
| PIN 1 | GND |
| PIN 2 | +12V Power |
| PIN 3 | FAN_TACH |
| PIN 4 | FAN_PWM |

## 2.3 RTC Battery Connector

| | | |
|---|---|---|
| Function | RTC battery for module | |
| Location | J3 | |
| Type Description | 1.25mm wire-to-board header | |
| Manufacturer and Part Number | 宏致_ACES<br>50271-00201-001_BLACK | |
| Mating Connector | Molex, 51021-8602 | |
| Pinout | Pin # / Description<br>PIN1 / GND<br>PIN2 / 3V Power | |
| Remarks | RTC Battery:, CR2032 3V | |

## 2.4 HDMI OUTPUT

| | | |
|---|---|---|
| Function | HDMI output connector |  |
| Location | J19/J18 | |
| Type Description | HDMI Type-A female connector | |
| Manufacturer and Part Number | 捷湧 EDL TECHNOLOGY CO.<br>HM-FVD480B | |
| Mating Connector | Any HDMI standard Type-A interface cable or device. | |
| Pinout | Please refer to HDMI standard. | |
| Remarks | None | |

## 2.5 USB 3.2 Gen2 Type C Connector (supports Nvidia Jetson flashing)

| | | |
|---|---|---|
| Function | BSP Installation as recovery mode | |
| Location | J31 | |
| Type Description | USB3.2 Type-C female connector | |
| Manufacturer and Part Number | GM9-HF_JACK_建倚_SBC-240P-31HF-S277_-55+85℃ | |
| Mating Connector | Any Standard Type-C interface cable or device. | |
| Pinout | Please refer to USB 3.2 Gen 2 standard. | |
| Remarks | J31 supports Nvidia Jetson flashing | |

## 2.6 USB Type C Power Supply Connector

| | | |
|---|---|---|
| Function | USB Type -C power supply | |
| Location | J30 | |
| Type Description | USB3.1 Type-C female connector | |
| Manufacturer and Part Number | GM9-HF_JACK_建倚_SBC-240P-31HF-S277_-55+85℃ | |
| Mating Connector | Any Standard Type-C interface cable or device. | |
| Pinout | Please refer to USB 3.1 type- C standard | |
| Remarks | NONE | |

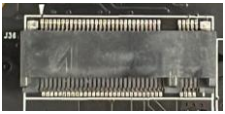
## 2.7 USB 2.0 Type C Connector (Debug UART)

| | | |
|---|---|---|
| Function | For dumping debug UART | |
| Location | J17 | |
| Type Description | USB2 .0 Type-C female connector | |
| Manufacturer and Part Number | GM9-HF_JACK_建倚_SBC-240P-31HF-S277_-55+85℃ | |
| Mating Connector | Any Standard Type-C interface cable or device. | |
| Pinout | Please refer to USB 2.0 standard. | |
| Remarks | None | |

## 2.8 M.2 E key 2230

| | | |
|---|---|---|
| Function | M.2 E-Key for wifi module | |
| Location | J7 | |
| Type Description | SOCKET_M.2-KEY E_75PIN 90°_SMD | |
| Manufacturer and Part Number | 宏致_ACES 51748-07502-005_P0.5 ㎜-H8.5 ㎜ | |
| Mating Connector | Any M.2 E key 2230 card standard interface device. | |
| Pinout | Please refer to M.2 E key card standard for the pinout details. | |
| Remarks | None | |

## 2.9 M.2 M key 2280

| | | |
|---|---|---|
| Function | M.2 M-Key |  |
| Location | J36/J39 | |
| Type Description | SOCKET_M.2-M KEY _75PIN _90°_SMD | |
| Manufacturer and Part Number | 宏致_ACES 51757-0750C-012_P0.5 ㎜-H5.5 ㎜ | |
| Mating Connector | Any M.2 M key 2280 card standard interface device. | |
| Pinout | Please refer to M.2 M key card standard for the pinout details. | |
| Remarks | J39 only support PCIe 2-Lane | |

## 2.10 M.2 B key 3042/3052

| | | |
|---|---|---|
| Function | M.2 B-Key for 4G/5G module | |
| Location | J9 | |
| Type Description | SOCKET_M.2-KEY B_75PIN_90°_SMD | |
| Manufacturer and Part Number | 鴻海_Foxconn 2E0BC21-S85BB-7H_90°_ H8.5 ㎜ | |
| Mating Connector | Any M.2 B key 2280 card standard interface device. | |
| Pinout | Please refer to M.2 B key card standard for the pinout details. | |
| Remarks | None | |

## 2.11 Mini card socket

| | | |
|---|---|---|
| Function | Mini Card (PCIe) interface | |
| Location | J6 | |
| Type Description | SOCKET_MINI PCIE_52PIN | |
| Manufacturer and Part Number | FOXCONN, AS0B221-S68Q 7H_H=6.8MM-062AL6 | |
| Mating Connector | Any Mini Card standard interface device. | |
| Pinout | Please refer to Mini Card standard for the pinout details. | |
| Remarks | None | |

## 2.12 Gigabit Ethernet Connector

| | | |
|---|---|---|
| Function | 1Gb single-port Ethernet connector, used to connect to the host system. | |
| Location | J4 | |
| Type Description | JACK_RJ45*2_TRANSFOMER+LED_90°_DIP | |
| Manufacturer and Part Number | 鋐運_JDKA1S826-G/D1_1G-LED L(G)+R(G/Y) | |
| Mating Connector | Any standard 1Gb Ethernet mating connector can be applicable. | |
| Pinout | Comply with Ethernet standards. | |
| Remarks | None | |

## 2.13QSFP Connector

| | | |
|---|---|---|
| Function | QSFP Connector | |
| Location | J29 | |
| Type Description | OTHERS_CAGE_20.99*61.17 ㎜ _QSFP28-STYLE A | |
| Manufacturer and Part Number | GM9_OTHERS_湧德_PRESS FIT-90°-W/O LED & HEATSINK | |
| Mating Connector | Any standard QSFP mating connector can be applicable | |
| Pinout | N/A | |
| Remarks | None | |

## 2.14 USB 3.2 Gen2 Type A Connector

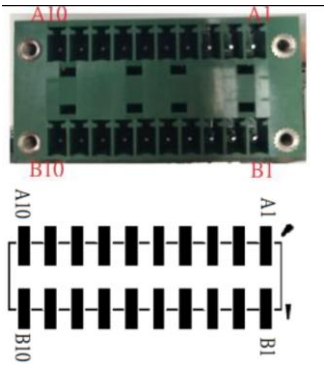
| | | |
|---|---|---|
| Function | General-purpose input/output | |
| Location | J8 | |
| Type Description | USB 3.2 Gen2 Type A female connector | |
| Manufacturer and Part Number | GM9-HF_JACK_鴻海_UEA11123-QHD6-4H_-55+85℃ | |
| Mating Connector | Any Standard Type-A interface cable or device. | |
| Pinout | Please refer to USB 3.2 standard. | |
| Note | None | |

## 2.15 Micro SIM Card Slot

| | | |
|---|---|---|
| Function | Micro SIM Card | |
| Location | J10 | |
| Type Description | SOCKET_MICRO SIM_8PIN_90°_SMD | |
| Manufacturer and Part Number | 福軒_FG-0271AAAG06A_PUSH PUSH 1.42H | |
| Pinout | Refer to Micro SIM card standard Remark | |
| Note | *Push Push type<br>*Inserting directing as below | |

## 2.16 2x10 Euro Terminal Block 1x CAN-FD

| | |
|---|---|
| Function | General-purpose input/output |
| Location | J21 |
| Type Description | Expansion I/O Connector |
| Manufacturer and Part Number | ME252-35020-1 |
| Mating Connector | 2x10 Euro Terminal Block 1x CAN-FD |




**Pinout**

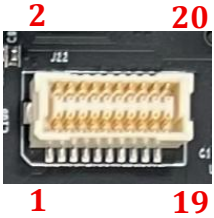
| Address JP7 | Pin Name | 20-pin Index (Devkit Index) | | Pin Name | Address JP7 |
|---|---|---|---|---|---|
| | 5V | A1 | B1 | 3V3 | |
| | GND | A2 | B2 | GND | |
| /dev/ttyAMA5 | UART5_TX_3V3 J58(UF3_TXD) | A3 | B3 | I2C_GP8_DAT_3V3 (E60) | i2c-3 |
| /dev/ttyAMA5 | UART5_RX_3V3 H58(UF3_RXD) | A4 | B4 | I2C_GP8_CLK_3V3 (D61) | i2c-3 |
| | ISO_GND | A5 | B5 | GND | |
| | CANL0_ISO | A6 | B6 | CANL2 | |
| | CANH0_ISO | A7 | B7 | CANH2 | |
| | GND | A8 | B8 | CANL3 | |
| | CANL1 | A9 | B9 | CANH3 | |
| | CANH1 | A10 | B10 | GND | |

| | |
|---|---|
| Note | None |

## 2.17 2x10pin expansion header-1

| | |
|---|---|
| Function | General-purpose input/output |
| Location | J22 |
| Type Description | WAFER_2*10PIN_1 ㎜_180°_SMD |
| Manufacturer and Part Number | GM2_WAFER_JST_BM20B-SHLDS-G-TFT(LF)(SN) |
| Mating Connector | Any Standard interface cable or device. |
| Pinout | |

| Address JP7 | Pin Name | 20-pin Index (Devkit Index) | | Pin Name | Address JP7 |
|---|---|---|---|---|---|
| | 3V3 | 1 | 2 | 5V | |
| | GND | 3 | 4 | GND | |
| i2c-9 | I2C_GP9_DAT_3V3 (C53) | 5 | 6 | UART1_TX_3V3 | GL3590 未動作 |
| i2c-9 | I2C_GP9_CLK_3V3 (A53) | 7 | 8 | UART1_RX_3V3 | GL3590 未動作 |
| chip 2 gpio 127 | GPIO27_PWM2_3V3 PF.07 J22.9, PWM | 9 | 10 | GND | |
| chip 2 gpio 16 | I2S7_LRCK_PWM10_3V3 GPIO3_PV.01 (devkit Usage: SFIO 3V3_DP_EN) J22.11, PWM | 11 | 12 | SPI1_SCK_3V3 GPIO3_PJ.07 J22.12, GPI | chip 2 gpio 71 |
| chip 2 gpio 112 | I2S1_SCLK_3V3 GPIO3_PR.02 J22.13, GPO High | 13 | 14 | SPI1_MISO_3V3 GPIO3_PK.00 J22.14 GPI | chip 2 gpio 72 |
| chip 2 gpio 113 | I2S1_SDOUT_3V3 GPIO3_PR.03 J22.15, GPO High | 15 | 16 | SPI1_MOSI_3V3 GPIO3_PK.01 J22.16, GPI | chip 2 gpio 73 |
| chip 2 gpio 114 | I2S1_SDIN_3V3 GPIO3_PR.04 J22.17, GPO High | 17 | 18 | SPI1_CS0_3V3 GPIO3_PK.02 J22.18, GPI | chip 2 gpio 74 |
| chip 2 gpio 115 | I2S1_LRCK_3V3 GPIO3_PR.05 J22.19, GPO High | 19 | 20 | SPI1_CS1_3V3 GPIO3_PK.03 J22.20, GPI | chip 2 gpio 75 |

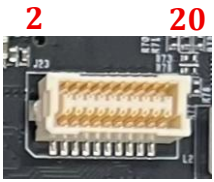



| | |
|---|---|
| Remarks | |

## 2.18 2x10pin expansion header-2

| | |
|---|---|
| Function | General-purpose input/output |
| Location | J23 |
| Type Description | WAFER_2*10PIN_1 ㎜_180°_SMD |
| Manufacturer and Part Number | GM2_WAFER_JST_BM20B-SHLDS-G-TFT(LF)(SN) |
| Mating Connector | Any Standard interface cable or device. |
| Pinout | |

| Address JP7 | Pin Name | 20-pin Index (Devkit Index) | | Pin Name | Address JP7 |
|---|---|---|---|---|---|
| | 3V3 | 1 | 2 | 5V | |
| | GND | 3 | 4 | GND | |
| i2c-11 | I2C_GP11_DAT_3V3 (E26) | 5 | 6 | UART2_TX_3V3 | /dev/ttyUSB0 |
| i2c-11 | I2C_GP11_CLK_3V3 (E27) | 7 | 8 | UART2_RX_3V3 | /dev/ttyUSB0 |
| chip 2 gpio 128 | GPIO36_PWM3_3V3 PG.00 J23.9, PWM | 9 | 10 | GND | |
| chip 2 gpio 14 | GPIO44_PWM5_3V3 PU.07 J23.11, PWM | 11 | 12 | SPI3_SCK_3V3 GPIO3_PH.06 J23.12, GPI | chip 2 gpio 62 |
| chip 2 gpio 21 | I2S2_SCLK_3V3 GPIO3_PV.06 J23.13, GPO High | 13 | 14 | SPI3_MISO_3V3 GPIO3_PH.07 J23.14 GPI | chip 2 gpio 63 |
| chip 2 gpio 22 | I2S2_SDOUT_3V3 GPIO3_PV.07 J23.15, GPO High | 15 | 16 | SPI3_MOSI_3V3 GPIO3_PJ.00 J23.16, GPI | chip 2 gpio 64 |
| chip 2 gpio 23 | I2S2_SDIN_3V3 GPIO3_PW.00 J23.17, GPO High | 17 | 18 | SPI3_CS0_3V3 GPIO3_PJ.01 J23.18, GPI | chip 2 gpio 65 |
| chip 2 gpio 24 | I2S2_LRCK_3V3 GPIO3_PW.01 J23.19, GPO High | 19 | 20 | SPI3_CS1_3V3 GPIO3_PJ.02 J23.20, GPI | chip 2 gpio 66 |

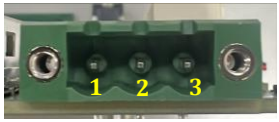



| | |
|---|---|
| Remarks | |

## 2.19 Terminal block 3Pin

| | |
|---|---|
| Function | DC power input |
| Location | J33 |
| Type Description | SOCKET_TERMINAL BLOCK_1*3PIN_90°_DIP |
| Manufacturer and Part Number | GM9_SOCKET_進聯_ME050-50803_GREEN-P5.08 ㎜-PIN L4.5 ㎜ |
| Mating Connector | QSFP Connector |
| Pinout | |

| Pin Number | Description |
|---|---|
| 1 | ACC=>9~36V |
| 2 | GND |
| 3 | DC IN=>9~36V |

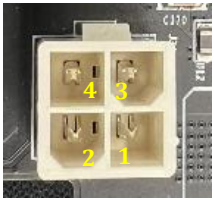


| | |
|---|---|
| Remarks | None |

## 2.20 Output Power – 4.2mm Pitch ATX Power 4P

| | |
|---|---|
| Function | ATX 4P |
| Location | J34 |
| Type Description | WAFER_2*2PIN_4.2 ㎜_DIP |
| Manufacturer and Part Number | 福軒 Fullglory FPWD-42R2-04NAT |
| Mating Connector | Follow ATX 4pin power standard |
| Pinout | |

| Pin Number | Description |
|---|---|
| 1 | GND |
| 2 | GND |
| 3 | 9-36V Power |
| 4 | 9-36V Power |

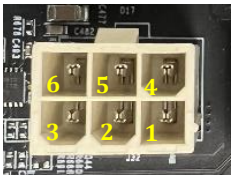



| | |
|---|---|
| Remarks | None |

## 2.21 Input Power – 4.2mm Pitch ATX Power 6P

| | |
|---|---|
| Function | DC power input |
| Location | J32 |
| Type Description | WAFER_2*3PIN_4.2 ㎜_180°_DIP-L3.5 ㎜ |
| Manufacturer and Part Number | GM1-HF_WAFER_宏致_56973-0060N-001_ATX POWER-NATURAL |
| Mating Connector | Follow ATX 6pin power standard |
| Pinout | |

| Pin Number | Description |
|---|---|
| 1 | 12-54V Power |
| 2 | 12-54V Power |
| 3 | ACC |
| 4 | GND |
| 5 | GND |
| 6 | GND |




| | |
|---|---|
| Remarks | None |

## 2.22 Board to board connector (to Camera board)

| | |
|---|---|
| Function | Board to board connector |
| Location | J20 |
| Type Description | WAFER_2*60PIN_0.5 ㎜_180°_SMD |
| Manufacturer and Part Number | SAMTEC<br>QSH-060-01-L-D-A-K-TR<br>BTB-RECEPTACLE |
| Mating Connector | SAMTEC<br>QTH-060-03-H-A-D BTB-PLUG<br>QTH-060-04-H-A-D BTB-PLUG |
| Pinout | Comply with NVIDIA Devkit pinout. |
| Remarks | None |

## 2.23 40pin coaxial connector

| | | |
|---|---|---|
| Function | 40pin coaxial connector for | |

| | | |
|---|---|---|
| | daughter board | |
| Location | J12 | |
| Type Description | WAFER_40PIN_0.5 ㎜ _90°_SMD | |
| Manufacturer and Part Number | I-PEX 20455-040E-12 | |
| Mating Connector | I-PEX 20453-240T-03 | |
| Pinout | Any Standard coaxial connector interface cable or device. | |
| Remark | NA | |

## 2.24 OOB Board Connector #1 (for optional OOB board)

| | | |
|---|---|---|
| Function | OOB Board Connector (for NC-SI) | |
| Location | J5 | |
| Type Description | WAFER_1*10PIN_1 ㎜_180°_SMD | |
| Manufacturer and Part Number | ACES 50228-01071-001 | |
| Mating Connector | ACES 50233-010H0H0-001 | |

Pinout

| PIN# | Description | Module Pin# | Type/ Dir |
|---|---|---|---|
| 1 | NC_SI_TXD0 | | Input, 3.3V |
| 2 | NC_SI_TXD1 | | Input, 3.3V |
| 3 | NC_SI_TX_EN | | Input, 3.3V |
| 4 | GND | | Ground |
| 5 | NC_SI_CLK_IN | | Input, 3.3V |
| 6 | GND | | Ground |
| 7 | NC_SI_RXD0 | | Output, 3.3V |
| 8 | NC_SI_RXD1 | | Output, 3.3V |
| 9 | N C_SI_CRS_DV | | Output, 3.3V |
| 10 | GND | | Ground |

| | |
|---|---|
| Remark | For optional OOB with NCSI board |

## 2.25 OOB Board Connector #2 (for optional OOB board)

| | | |
|---|---|---|
| Function | OOB Board Connector(basic function) | |
| Location | J27 | |
| Type Description | WAFER_1*10PIN_1 ㎜_180°_SMD | |
| Manufacturer and Part Number | ACES 50228-01071-001 | |
| Mating Connector | ACES 50233-010H0H0-001 | |

Pinout

| PIN# | Description | Module Pin# | Type/ Dir |
|---|---|---|---|
| 1 | GND | | Ground |
| 2 | | | Input, 3.3V |
| 3 | UART3_RX (Debug OOB) | | Input, 3.3V |
| 4 | UART3_TX (Debug OOB) | | Ground |
| 5 | UART1_RX_3V3 | | Input, 3.3V |
| 6 | UART1_TX_3V3 | | Ground |
| 7 | +5V_SOM_PG | | Output, 3.3V |
| 8 | RST_OOB | | Output, 3.3V |
| 9 | POWER_BTN | | Output, 3.3V |
| 10 | +5V_STANDBY | | Ground |

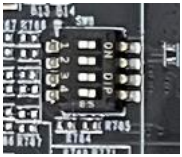
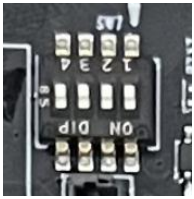
| | |
|---|---|
| Remark | For optional OOB with NCSI board |

## 2.26 OOB board connector (Power)

| | | |
|---|---|---|
| Function | Connector of OOB board | |
| Location | J24 J26 J25 | |
| Type Description | WAFER_1*2PIN_1 ㎜_180°_SMD | |
| Manufacturer and Part Number | 宏致 ACES 50228-00271-001_WTB | |
| Mating Connector | 宏致 ACES 50233-002H0H0-001 | |
| Pinout | | |
| Remark | NA | |

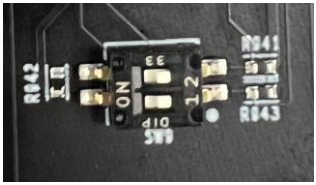
| J24 | Description |
|---|---|
| PIN 1 | Power |
| PIN 2 | GND |
| **J26** | **Description** |
| PIN 1 | Reset |
| PIN 2 | GND |
| **J25** | **Description** |
| PIN 1 | Recovery |
| PIN 2 | GND |

## 2.27 Switch Button

| | | |
|---|---|---|
| Function | Switch Button |  |
| Location | SW7，SW8 | |
| Type Description | 4 SPST DIP switch | |
| Manufacturer and Part Number | 圜達 DIPTRONICS IN OFF-SWITCHING 0.025A/24VDC |  |

<table>
<tr><td>Pinout</td><td>
SW7
<table>
<tr><th>Pin #</th><th>Description</th></tr>
<tr><td>1</td><td>OFF=>CAN0 W/O Terminal<br>ON=> CAN0 W Terminal</td></tr>
<tr><td>2</td><td>OFF=>CAN1 W/O Terminal<br>ON=> CAN1 W Terminal</td></tr>
<tr><td>3</td><td>OFF=>CAN2 W/O Terminal<br>ON=> CAN2 W Terminal</td></tr>
<tr><td>4</td><td>OFF=>CAN3 W/O Terminal<br>ON=> CAN3 W Terminal</td></tr>
</table>
SW8
<table>
<tr><th>Pin #</th><th>Description</th></tr>
<tr><td>1</td><td>OFF=>Auto Power<br>ON=>Button Power</td></tr>
<tr><td>2</td><td>OFF=>FAN PWM<br>ON=>FAN Always</td></tr>
<tr><td>3</td><td>OFF=>Always Powser ON Disable<br>ON=> Always Powser ON Enable</td></tr>
<tr><td>4</td><td>OFF=>Ignore ACC for Development<br>ON=> ACC Enable</td></tr>
</table>
</td></tr>
<tr><td>Remark</td><td>NA</td></tr>
</table>

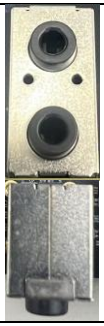
## 2.28 Switch Button

| | | |
|---|---|---|
| Function | Switch Button |  |
| Location | SW9 | |
| Type Description | SW_DIP_NDSVM-02Q-T-R_SMD4 | |
| Manufacturer and Part Number | GM1-HF_SWITCH_冠泰_IN OFF-SWITCHING 0.025A/24VDC | |
| Pinout | SW9<br>Pin # / Description<br>1 / OFF=>PCIe x8<br>ON=> PCIe x<br>2 / OFF=>Mini Card set as GPS<br>ON=> Mini Card set as PCIe | |
| Remark | None | |

## 2.29 Power & Recovery Button

| | | |
|---|---|---|
| Function | Power & Recovery control button | |
| Location | BSW1, BSW3 | |
| Type Description | Button | |
| Manufacturer and Part Number | 冠泰 Champway 12VDC/0.05A-160G-H1.8 ㎜-BLACK | |
| Pinout | N/A | |
| Remark | None | |

## 2.30 3.5 mm audio jack

| | | |
|---|---|---|
| Function | MIC in / Headphone output |  |
| Location | J35 | |
| Type Description | JACK_PHONE*2_D3.5-BLACK_90°_DIP | |
| Manufacturer and Part Number | GM1_JACK_京政_PJD-035-87HAB | |
| Top : MIC in | Top : MIC in | |

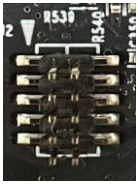
| | |
|---|---|
| Buttom : Headphone out | Buttom : Headphone out |
| Remark | None |

## 2.31 5-pin 12V DC wafer header

| | | |
|---|---|---|
| Function | **5-pin 12V DC** | 1 2 3 4 5 |
| Location | J38 | |
| Type Description | WAFER_1*5PIN_2 ㎜_180°_SMD | |
| Manufacturer and Part Number | 宏致_50310-0057N-001_WTB HEADER-H6.5 ㎜ | |
| Pinout | | |
| Remark | None | |

| Pin | Description |
|---|---|
| 1/2 | Power 12V/4A |
| 3/4 | GND |
| 5 | floating |

## 2.32 10-pin JTAG Header

| | | |
|---|---|---|
| Function | **JTAG** |  |
| Location | J2 | |
| Type Description | HEADER_PIN_2*5PIN_1.27 ㎜ _180°_SMD | |
| Manufacturer and Part Number | 冠泰_PH13-10VM1002CU8-06 | |
| Pinout | | |

| Pin | Description | Pin | Description |
|---|---|---|---|
| 1 | JTAG_TMS | 2 | +1.8V |
| 3 | JTAG_TCK | 4 | GND |
| 5 | JTAG_TDO | 6 | GND |
| 7 | JTAG_TDI | 8 | GND |
| 9 | RESET_IN | 10 | GND |

| | |
|---|---|
| Remark | None |

## Other Switches and Jumpers

Other switches and jumpers listed on the board but not mentioned in this manual are reserved for internal use by AVerMedia. They are not open to the client application.

## 3.0 Installation

- Check and ensure all external system power supplies are turned off.
- Connect the power cord to CB/devkit/Box PC DC in jack or ATX 4pin
- Connect the USB Type-C cable to CB/devkit/Box PC connector.
- Press and hold on the Recover button
- Plug in AC power

(Since the DCINJACK is slightly tight, be careful not to shake it when inserting the CB/devkit/Box PC)

### 3.1 BSP Setup Instructions

BSP (board support package) file: AVERMEDIA_JETPACK-R2.*.*.*.* _desktop.tar.gz for D331

If you want to get the BSP download link, please contact AVerMedia FAE.

Default login username/password of the BSP is nvidia/nvidia

If you have difficulties to access the BSP download link, please visit AVerMedia website at https://www.avermedia.com/professional/download, or contact technical support at https://www.avermedia.com/professional/technical_support or e-mail us at eusupport@avermedia.com for further assistance.

BSP Installation steps for NVIDIA Jetson board: (Important Note: Please backup your personal files before re-flashing BSP)
After you download the BSP file and put the file in a Linux PC, please refer to the steps below to re-flash BSP.

**1. Let the JETSON AGX Thor initiate recovery mode.**

You have to keep pressing “Recovery” button and then power on the NVIDIA Jetson board to initiate recovery mode.

When connecting a NVIDIA Jetson board to a Linux PC via a USB Type-C to USB cable, you can check kernel messages with `dmesg` command in the Linux PC.
Once you see similar messages as below, it means that the NVIDIA Jetson board is in the recovery mode.
[24685.229129] usb 1-7: Product: APX
[24685.229132] usb 1-7: Manufacturer: NVIDIA Corp

**2. Using the commands below in the Linux PC to start re-flashing BSP.**

# sudo is required to extract BSP

$ sudo tar zxvf AVERMEDIA_JETPACK- R2.*.*.*.*_desktop.tar.gz

$ cd JetPack_*.**_desktop/Linux_for_Tegra

$ installation steps: refer to AVERMEDIA_JETPACK- R2.*.*.*.*_ReleaseNote.txt

## 4.0 Software

This section describes BSP's features for D331

1. Support optional M.2 WI-FI/Bluetooth modules (Intel® Wireless-AX210), the manager UI of AX210 WiFi/Bluetooth is located on the upper-right corner of Ubuntu desktop. It can be also controlled by nmcli/bluetoothctl in command line.

2. Power Mode

   Power mode can be modified by the UI on the upper-right corner of Ubuntu or the following commands.

```
# get current power mode
$ sudo nvpmodel -q
# setup power mode
# where <x> is power mode number, please refer to
https://docs.nvidia.com/jetson/archives/r36.4.3/DeveloperGuide/SD/PlatformPowerAndPerformance/JetsonOrinNanoSeriesJetsonOrinNxSeriesAndJetsonAgxOrinSeries.html#supported-modes-and-power-efficiency for more information
$ sudo nvpmodel -m <x>
```

   RTC Battery

   The following command can get RTC battery voltage.

```
$ sudo avt_tool -a | grep -oP "AIN5.*\[\K[^\]]*"
```

3. Fan Speed

   The following commands can get PWM fan information.

```
# get current speed setting of PWM Fan (0 ~ 255)
$ cat /sys/devices/platform/pwm-fan/hwmon/hwmon<x>/pwm1

# get Fan RPM value
```

```
$ cat /sys/class/hwmon/hwmon<y>/rpm

* Where <x> and <y> are dynamic hwmon indexes.
```

4. CAN Bus (removed to daughter board)

5. Camera (removed to daughter board)

6. GPIO usage

(1) Locate the GPIO Pin:

Use the gpiofind command to determine the pin's location in the system. For example,

to locate the SODIMM Pin 99, which corresponds to PX.04, execute:

```
$ sudo gpiofind PX.04
```

# This command will return the GPIO chip and offset. For example, it might return gpiochip0 118, indicating that PX.04 is at offset 118 on gpiochip0

(2) Set the GPIO Pin Voltage:

Set High Voltage: To set the pin to a high voltage (logic level 1), use the following command:

```
$ sudo gpioset --mode=wait 0 118=1
```

Set Low Voltage: To set the pin to a low voltage (logic level 0), use this command:

```
$ sudo gpioset --mode=wait 0 118=0
```

For L4T (Linux for Tegra) BSP support and the other software support associated with NVIDIA® Jetson AGX Thor, please visit AVerMedia website to contact our technical support function. (https://www.avermedia.com/tw/support/contact)

## 5.0 Force Recovery Mode

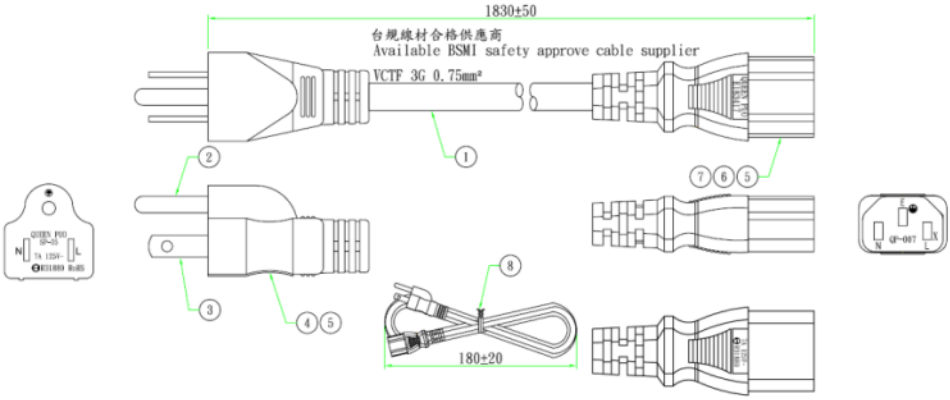
USB Type-C port (J31) of D331 can be used to re-program NVIDIA® Jetson AGX Thor by using the other host system running NVIDIA Jetpack, as the procedure described below.

1. Before you start
   - Please make sure to use a Linux host PC with Ubuntu 22.04 or 20.04 operating system.
   - Please use a native setup (no virtual machine) installation file in the following steps.
   - You will also need a high-quality standard USB Type C connector.
   - Download installation file from Avermedia.
2. Connect carrier board to host PC
3. Connect the system to the Linux host PC. Please use a USB Type C cable (J31 on the carrier board).
4. After connecting to the host PC powering up the system. The system will detect the host PC and automatically enter the flashing state (also called force recovery mode).
5. Check that the connection is established with the lsusb command. You should find one entry with Nvidia Corp. as highlighted below.
6. Flashing of system
   - Use the flash cmd script in the extracted bootloader folder to transfer the software into the Jetson compute module and flash it.
   - Please connect a monitor to the system. After the flashing process has completed the should automatically boot and show the Ubuntu desktop.
   - You now have a functioning system ready for your needs.

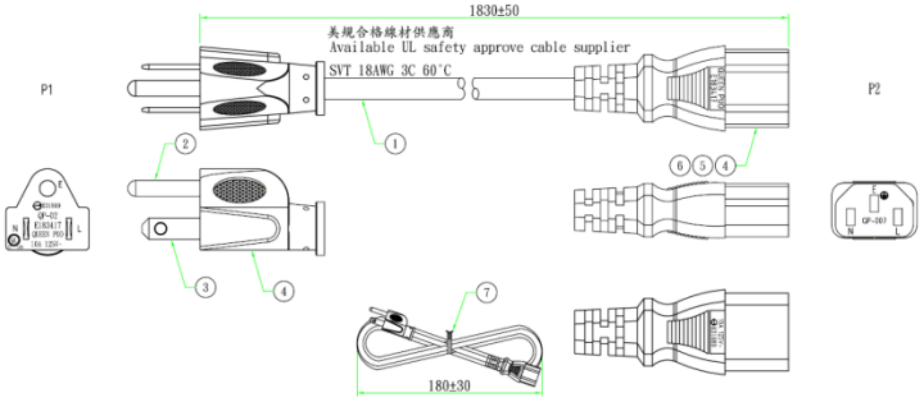
# 6.0 Accessory Drawings

## 6.1 Power Cord

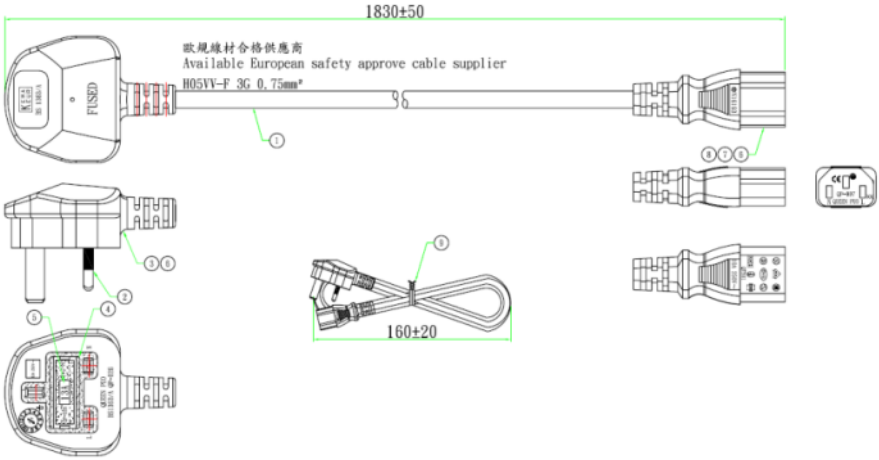
### 64APOWERBRX-IPD (TW version)



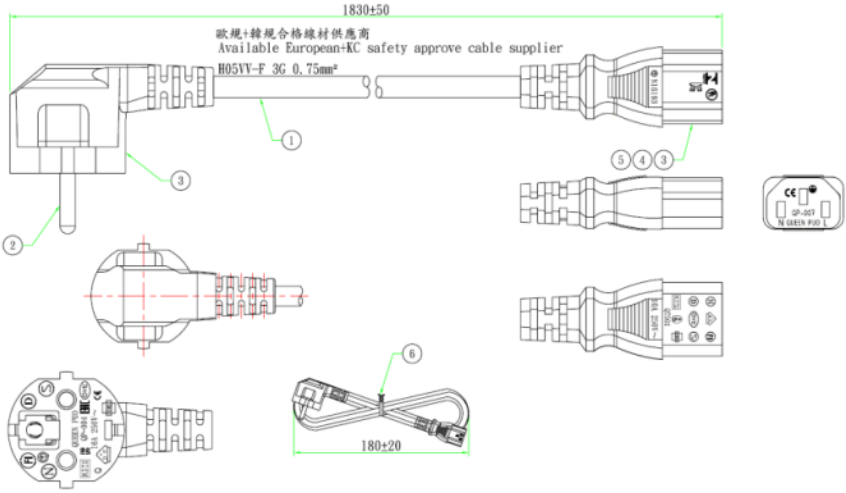

064APOWERBR2-IPD (US version)



064APOWERBRW-IPD (UK version)

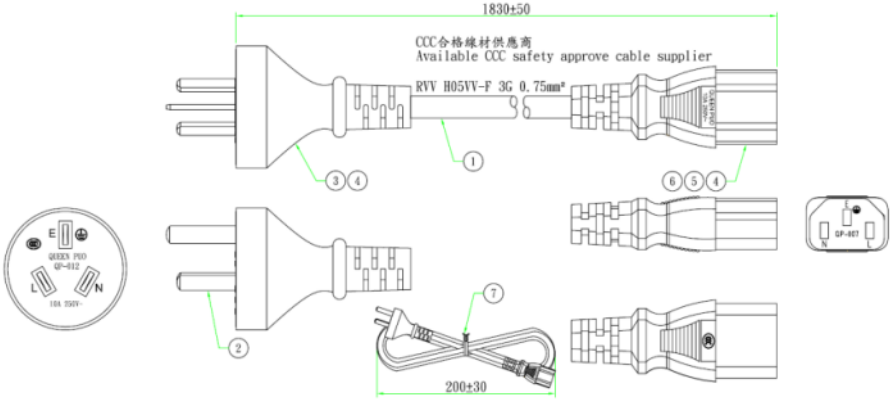



064APOWERBR5-IPD (EU version)



Dd

064APOWERBR4-IPD (CN version)

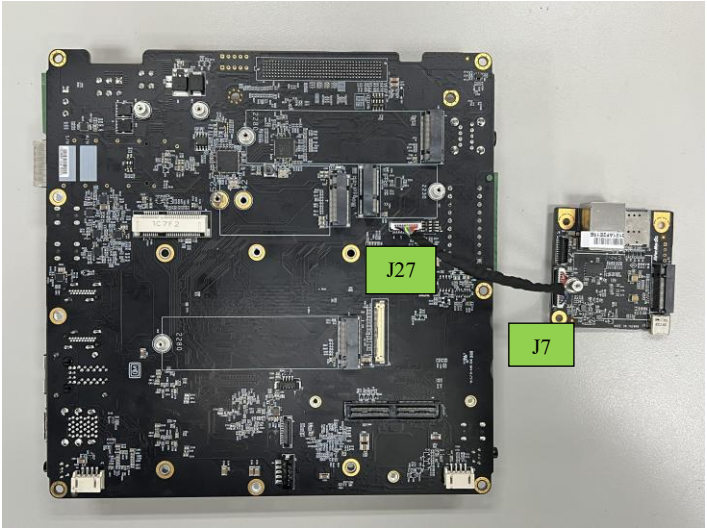


# 7.0 Daughter board introduction

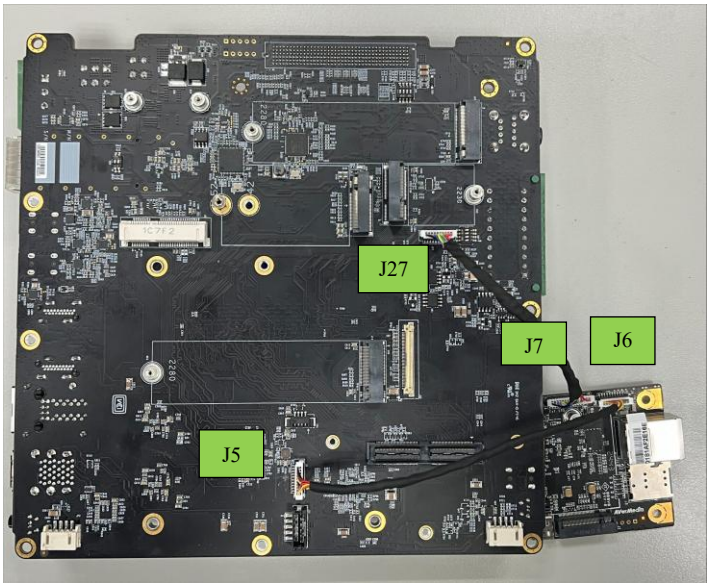
## 7.1 D331 + ERMI Module

Please refer to ERMI Module | Out-of-Band Management | AVerMedia

OOB demo connection

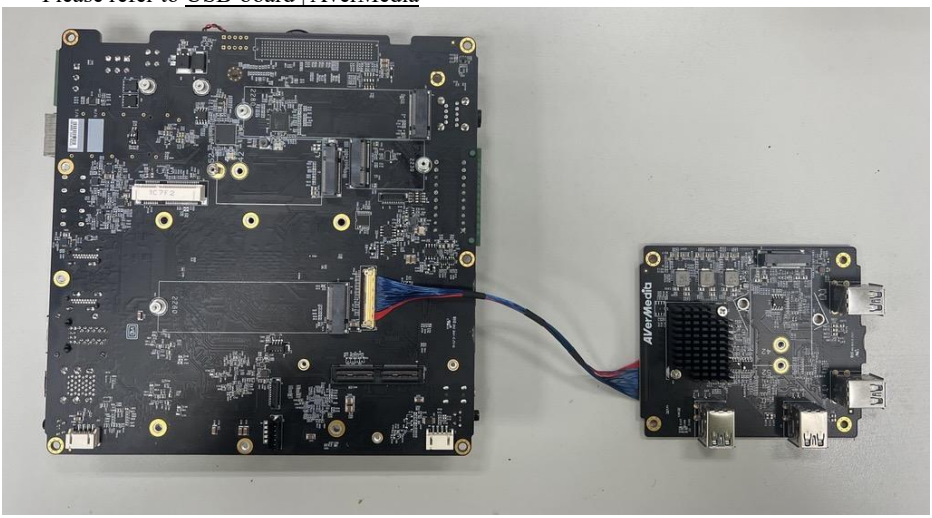



NCSI OOB demo connection



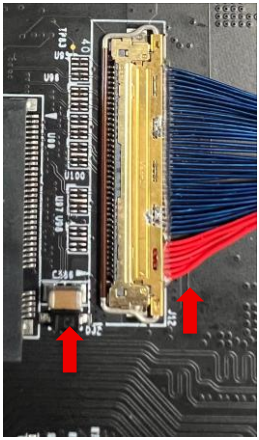
## 7.2 D331 + USB Daughter Board

Please refer to USB-board | AVerMedia

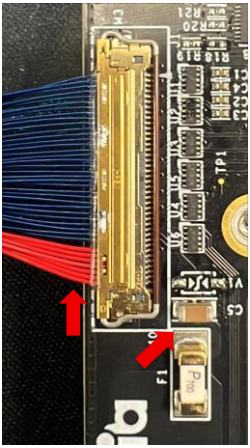



On D331, The red end of the cable must be aligned with the resistor indicated by the yellow arrow and properly connected.

On USB Daughter Board, The red end of the cable must be aligned with the resistor indicated by the yellow arrow and properly connected.



(On D331)

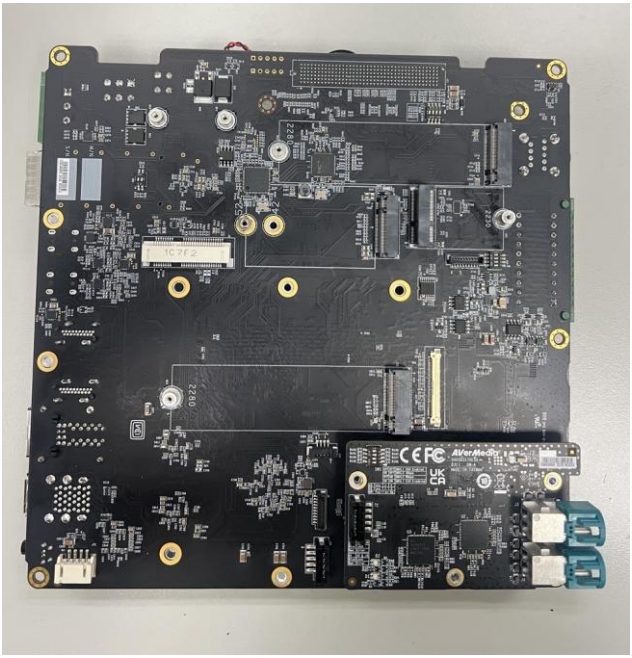


(On USB Daughter Board)

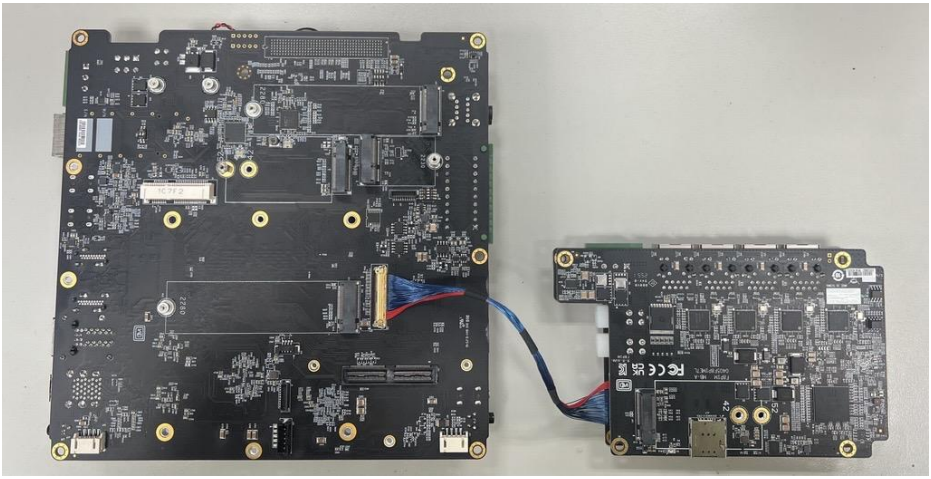
## 7.3 D331 + GMSL Daughter Board

Please refer to GMSL Board | AVerMedia

Connect GMSL Daughter Board with J20

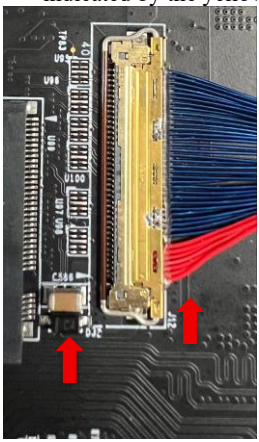


## 7.4 D331 + POE Daughter Board (TBD)

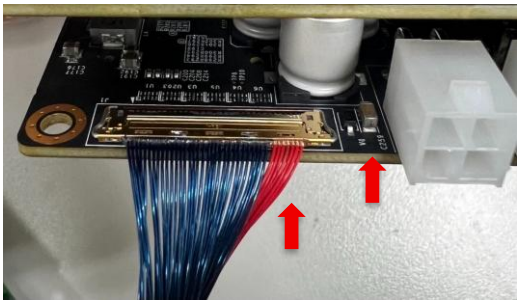


On D331, The red end of the cable must be aligned with the resistor indicated by the yellow arrow and properly connected.

On POE Daughter Board, The red end of the cable must be aligned with the resistor indicated by the yellow arrow and properly connected.



(On D331)



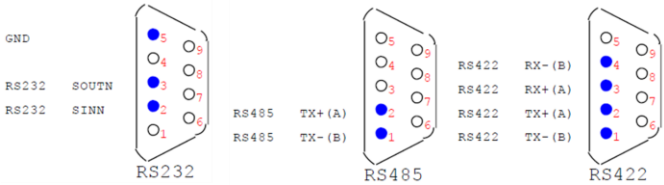
(On POE Daughter Board)

## 7.5 F1R4D Daughter Board

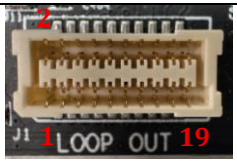
| | | |
|---|---|---|
| Function | Serial Port | |
| Location | CN1 | |
| Type Description | JACK_D-SUB_9PIN(M)-BLACK_90°_DIP-L3.2 ㎜ | |
| Manufacturer and Part Number | 光桀 DBMRx002-09 | |
| Mating Connector | N/A | |
| Pinout | | |

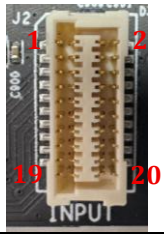
| Pin # | Description |
|---|---|
| 1 | SPI1_CS1_GPI |
| 2 | SPI1_MOSI_GPI |
| 3 | I2S1_LRCK_GPO |
| 4 | I2S1_SDOUT_GPO |
| 5 | GND |
| 6 | SPI1_CS0_GPI |
| 7 | SPI1_MISO_GPI |
| 8 | I2S1_SDIN_GPO |
| 9 | I2S1_SCLK_GPO |

| | |
|---|---|
| Note | |

| | | |
|---|---|---|
| Function | DI/DO | |
| Location | CN2 | |
| Type Description | JACK_D-SUB_9PIN(M)-BLACK_90°_DIP-L3.2 ㎜ | |
| Manufacturer and Part Number | 光桀 DBMRx002-09 | |
| Mating Connector | N/A | |
| Pinout | <table><tr><th>Pin #</th><th>Description</th></tr><tr><td>1</td><td>TX_N</td></tr><tr><td>2</td><td>TX_P</td></tr><tr><td>3</td><td>RX_P</td></tr><tr><td>4</td><td>RX_N</td></tr><tr><td>5</td><td>GND</td></tr><tr><td>6</td><td>NC</td></tr><tr><td>7</td><td>NC</td></tr><tr><td>8</td><td>NC</td></tr><tr><td>9</td><td>NC</td></tr></table>   | |
| Note | | |

| | |
|---|---|
| Function | Pass-Through 20Pin for GPIOs |
| Location | J1 & J2 |
| Type Description | WAFER_2*10PIN_1 ㎜_180°_SMD |
| Manufacturer and Part Number | JST BM20B-SHLDS-G-TFT(LF)(SN) |
| Mating Connector | N/A |
| Pinout | |
| Note | |




| Pin# | Description | Pin# | Description |
|---|---|---|---|
| 1 | +3V3_EXP2 | 2 | +5V_EXP2 |
| 3 | GND | 4 | GND |
| 5 | I2C_GP9_DAT_3V3 | 6 | UARTH1_TX_3V3 |
| 7 | I2C_GP9_CLK_3V3 | 8 | UARTH1_RX_3V3 |
| 9 | GPIO27_PWM2_3V3 | 10 | GND |
| 11 | I2S7_LRCK_PWM10_3V3 | 12 | SPI1_SCK_3V3 |
| 13 | I2S1_SCLK_3V3 | 14 | SPI1_MISO_3V3 |
| 15 | I2S1_SDOUT_3V3 | 16 | SPI1_MOSI_3V3 |
| 17 | I2S1_SDIN_3V3 | 18 | SPI1_CS0_3V3 |
| 19 | I2S1_LRCK_3V3 | 20 | SPI1_CS1_3V3 |