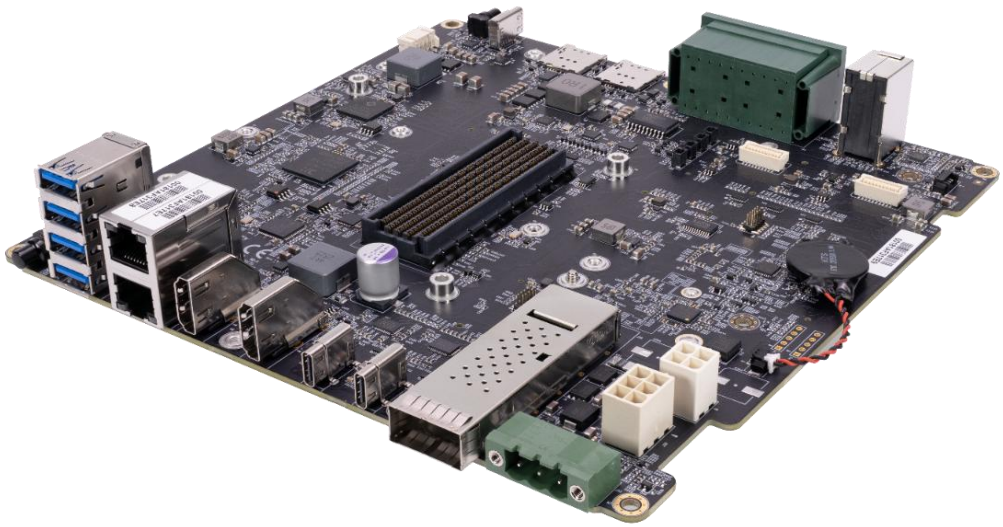
AVerMedia D331

Applies to NVIDIA® Jetson Thor T5000/T4000 module



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TABLE OF CONTENTS

1. Introdction....8
2. Feature Description....9
   - 2.1 Specification....9
   - 2.2 Block Diagram....11
   - 2.3 Front View and Back View of Carrier board....12
   - 2.4 Carrier Board Interface....13
   - 2.5 Feature Description....16
   - 2.5.1 Jetson module Connector....16
   - 2.5.2 Fan Wafer....16
   - 2.5.3 RTC Battery Connector....17
   - 2.5.4 HDMI OUTPUT....17
   - 2.5.5 USB 3.2 Gen2 Type C Connector (supports Nvidia Jetson flashing)....18
   - 2.5.6 USB Type C Power Supply Connector....18
   - 2.5.7 USB 2.0 Type C Connector (Debug UART)....18
   - 2.5.8 M.2 E key 2230....20
   - 2.5.9 M.2 M key 2280....20
   - 2.5.10 M.2 B key 3042/3052....20
   - 2.5.11 Mini card socket....21
   - 2.5.12 Gigabit Ethernet Connector....21
   - 2.5.13 QSFP Connector....21
   - 2.5.14 USB 3.2 Gen2 Type A Connector....22
   - 2.5.15 Micro SIM Card Slot....22
   - 2.5.16 2x10 Euro Terminal Block 4x CAN-FD....23
   - 2.5.17 2x10pin expansion header-1....24
   - 2.5.18 2x10pin expansion header-2....25
   - 2.5.19 Terminal block 3Pin....26
   - 2.5.20 Output Power – 4.2mm Pitch ATX Power 4P....26
   - 2.5.21 Input Power – 4.2mm Pitch ATX Power 6P....27
   - 2.5.22 Board to board connector (to Camera board)....27
   - 2.5.23 40pin Micro coaxial connector....28
   - 2.5.24 OOB Board Connector #1 (for optional OOB board)....28
   - 2.5.25 OOB Board Connector #2 (for optional OOB board)....29
   - 2.5.26 Board Connector (Power/Reset/Recovery)....29
   - 2.5.27 DIP Switch....30
   - 2.5.28 DIP Switch....31
   - 2.5.29 Power & Recovery Button....31
   - 2.5.30 3.5 mm audio jack....33
   - 2.5.31 5-pin 12V DC wafer header....33
   - 2.5.32 10-pin JTAG Header....34
3.0 Installation....34

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3.1 BSP Setup Instructions 34
4.0 Software 35
5.0 Force Recovery Mode 37
6.0 Accessory Drawings 38
6.1 Power Cord, Power Adapter & Converter Cable 38
7.0 Daughter board introduction 41
7.1 D331 + ERMI Module 41
7.2 D331 + USB Daughter Board 42
7.3 D331 + GMSL Daughter Board 43
7.4 D331 + POE Daughter Board 43
7.5 F1R4D Daughter Board (RS232/RS485/RS422) 45

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PREFACE

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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.

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REVISION HISTORY

Revision	Date	Updates
V0.1	29-Jan-26	1st Released
V0.2	2-Feb-26	Remove Fan Module Power Adapter Power Cord wrong information
V1.0	13-Feb-26	Update: 2.0 Feature Description; 9.0 Daughter board introduction
V1.1	23-Feb-26	Error Fix; Add OOB demo connection
V1.2	3-Mar-26	Error Fix; Add 2.17 2.18 pinout/pin definition
V1.3	5-Mar-26	Error Fix
V1.4	25-Mar-26	Product spec change; 2.6 USB Type C Power Supply Connector
V1.5	26-Mar-26	Error Fix
V1.6	21-Apr-26	Error Fix
V1.7	12-May-26	Error Fix P.11~P.12
V1.8	27-May-26	Updated SSD Storage Spec Gen5 → Gen4
V1.9	22-Jun-26	Updated as D331 B version
V2.0	6-Jul-26	Updated P.26 Table
V2.1	18-Aug-26	Updated Specification.
V2.2	20-Aug-26	Updated J38
V2.3	31-Aug-26	Updated J33
V2.4	4-Sep-26	Updated Power requirement
V2.5	03-Oct-26	Updated Content
V2.6	19-Oct-26	Updated Content

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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.

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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.

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1. Introduction

AVerMedia AVerMedia D331 includes fully featured carrier board which is all developed for NVIDIA® Jetson Thor T5000/T4000 modules. D331 provide multiple I/O include one HDMI video output, 4x USB 3.2 ports, 1x QSFP port…etc.

Operating with NVIDIA® Jetson Thor T5000/T4000 modules and the rich I/O functions, AVerMedia D331 is the perfect choice for high-end performance AI edge computing platform for intelligent video analytics applications.

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2. Feature Description

2.1 Specification

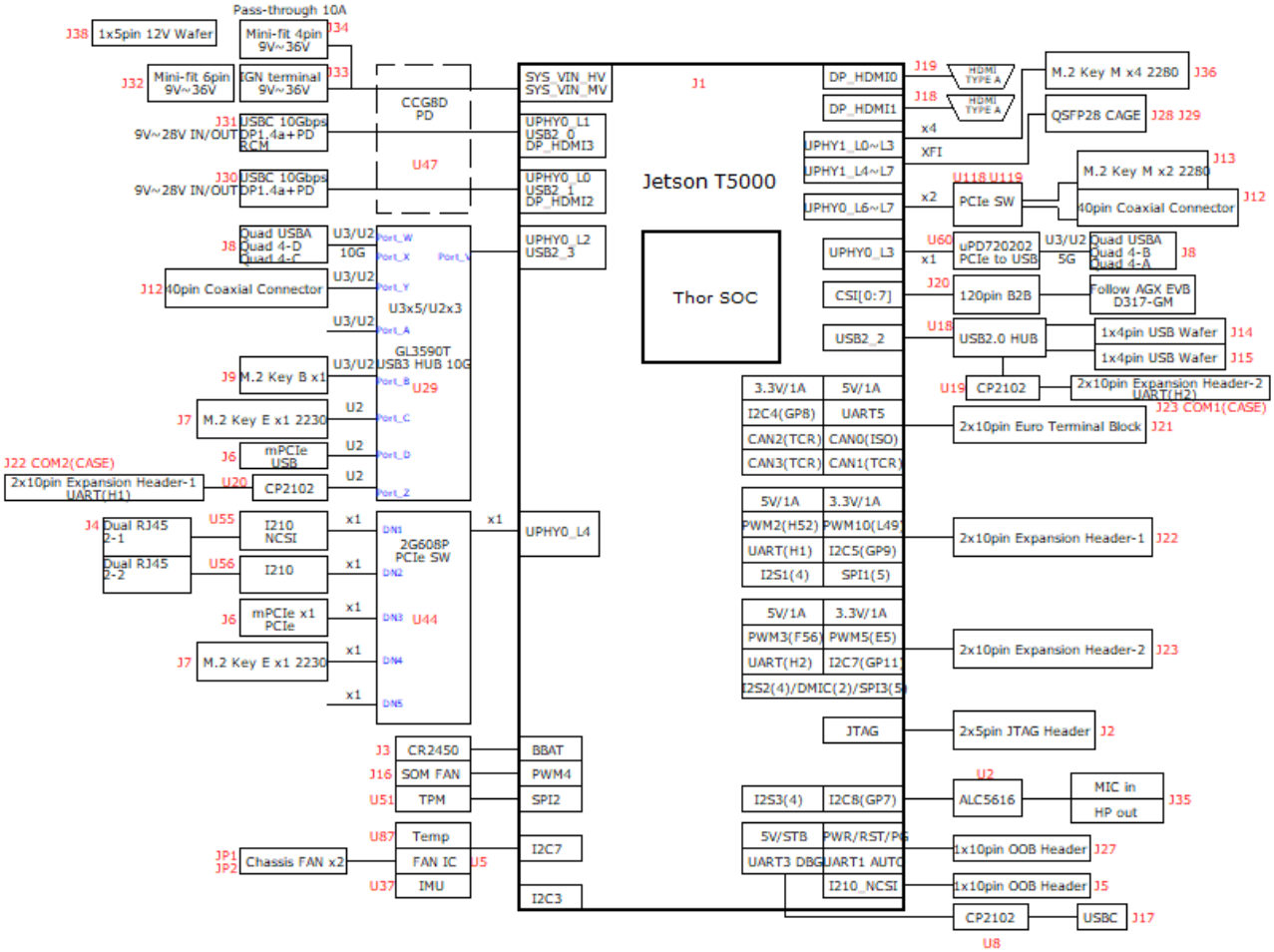
Item	Specification
NVIDIA Jetson SoM	NVIDIA Jetson T5000™/Jetson T4000™
Networking	2x GbE RJ-45 (1 × port supports OOB NCSI for optional OOB module) 1x QSFP (4x 10 GbE for T5000, 3x 10 GbE for T4000) 1x M.2. key E 2230 for Wi-Fi 6 1x M.2 Key B 3042/3052 for 4G/5G
SIM Slot	2x SIM slots for 4G/5G module; 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) Operating temperature: -25 to 85°C (carrier board, W/ audio) Operating temperature: -25 to 60°C (Box PC) Operating temperature: -25 to 50°C (Box PC with 8x POE Board) Storage temperature -40°C ~ 85°C 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 1x USB 3.2 Type-C (usage limitations apply; refer to User Manual for details) 4x USB 3.2 Type-A (5Gbps x2 ; 10Gbps x2) Optional 8x USB3.2 Type-A (via daughter board)
Storage	2x NVMe M.2 Key M 2280 -1x NVMe M.2 Key M 2280 x2 PCIe Gen4 (For Carrier Board SKU: 8xPoE, 8xUSB board, either one) -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 (Isolation, Support for T5000 only) 20pin expansion header-1: 1x5V(Maximum 1A), 1x3.3V(Maximum 1A) power Output, UARTH1, I2C, GPO(4), GPI(5), PWM(2) 20pin expansion header-2: 1x5V(Maximum 1A), 1x3.3V(Maximum 1A) power Output, UARTH2, I2C, GPO(4), GPI(5), PWM(2) 2x 5-pin JTAG connector 1x 40pin coaxial connector for PCIe expansion (For Carrier Board SKU: Daughter board 8xPSE/8xUSB)

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Power requirement	Terminal block 3Pin & Mini-fit 6pin (Internal) USB Type C Power Supply, USB-C 9V~28V 40W-130W 9~36V DC Input, 90~180W (36V absolute maximum), DC IN terminal block:10A Max, ATX 6pin: 10A Max ACC IN / IGN Control (ACC optional, via switch) 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 (Box PC or Devkit) 2x Chassis Fan (Box PC, 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 Devkit: W: 192.2mm x L: 195mm x H: 87mm 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) 1x DC output wafer (9~12V) for GMSL 1x USB-C for Debug_UART (Share with OOB) 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 1x 240W Adapter (360W with 8x POE Board) 1x Power Cord (By region) 2x Terminal Block

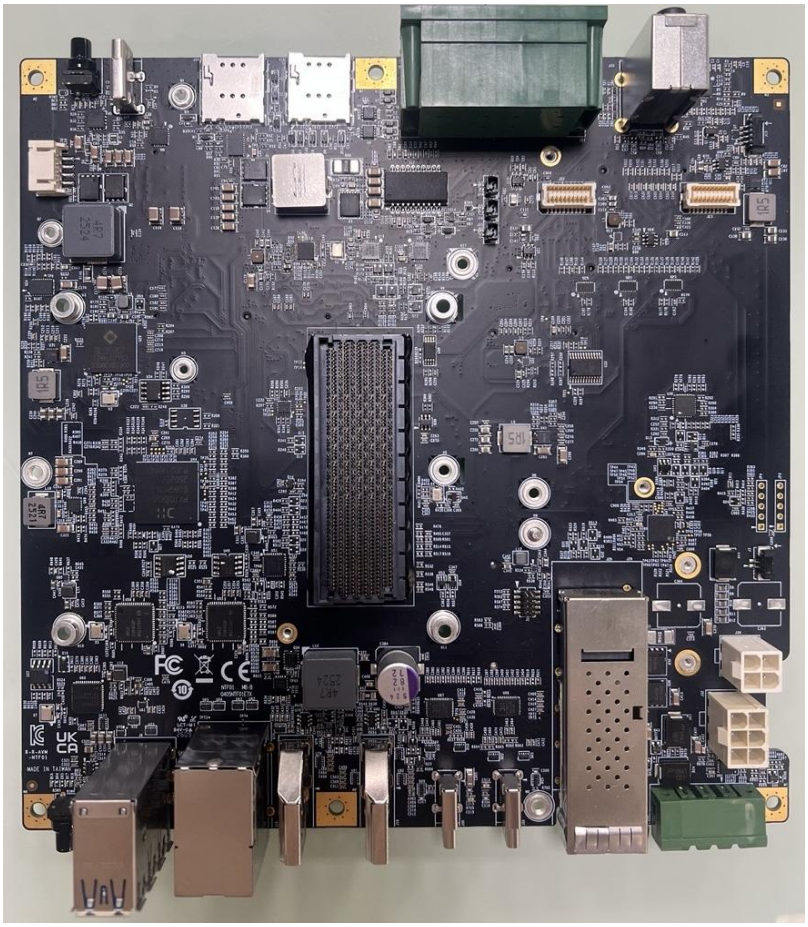
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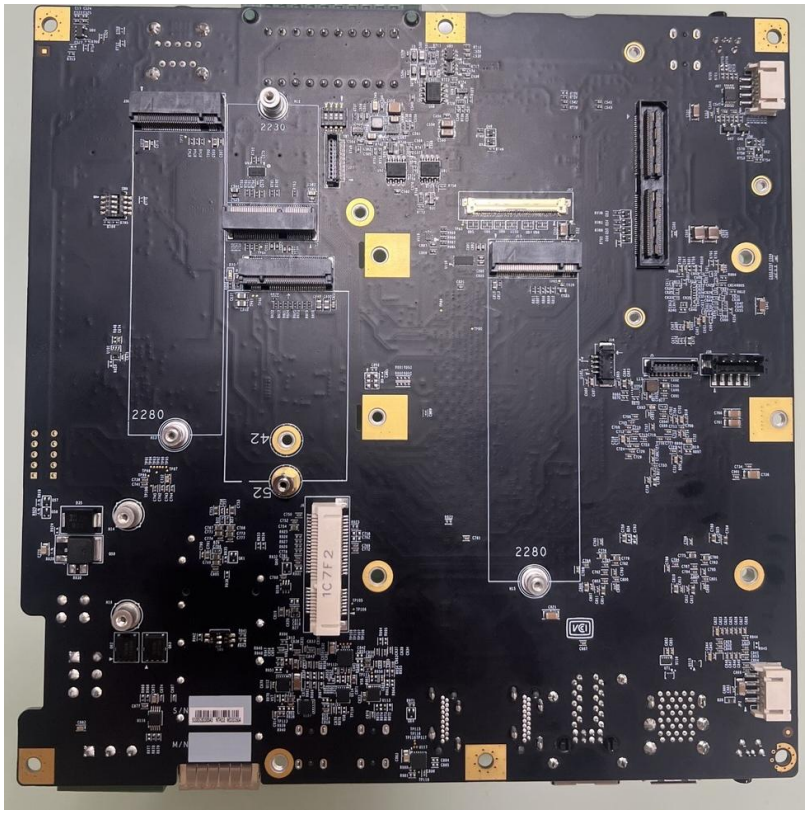
2.2 Block Diagram



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2.3 Front View and Back View of Carrier board



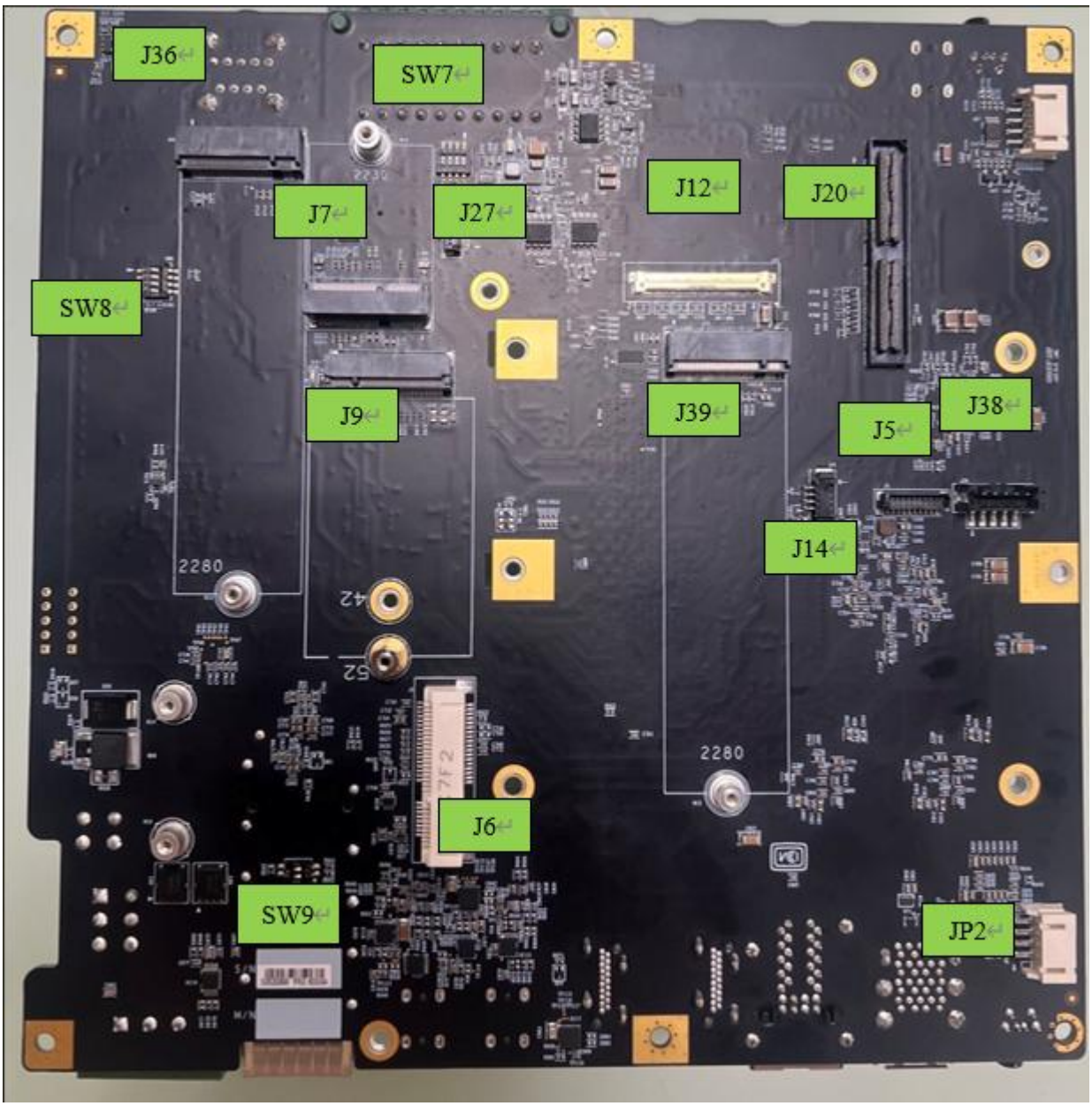


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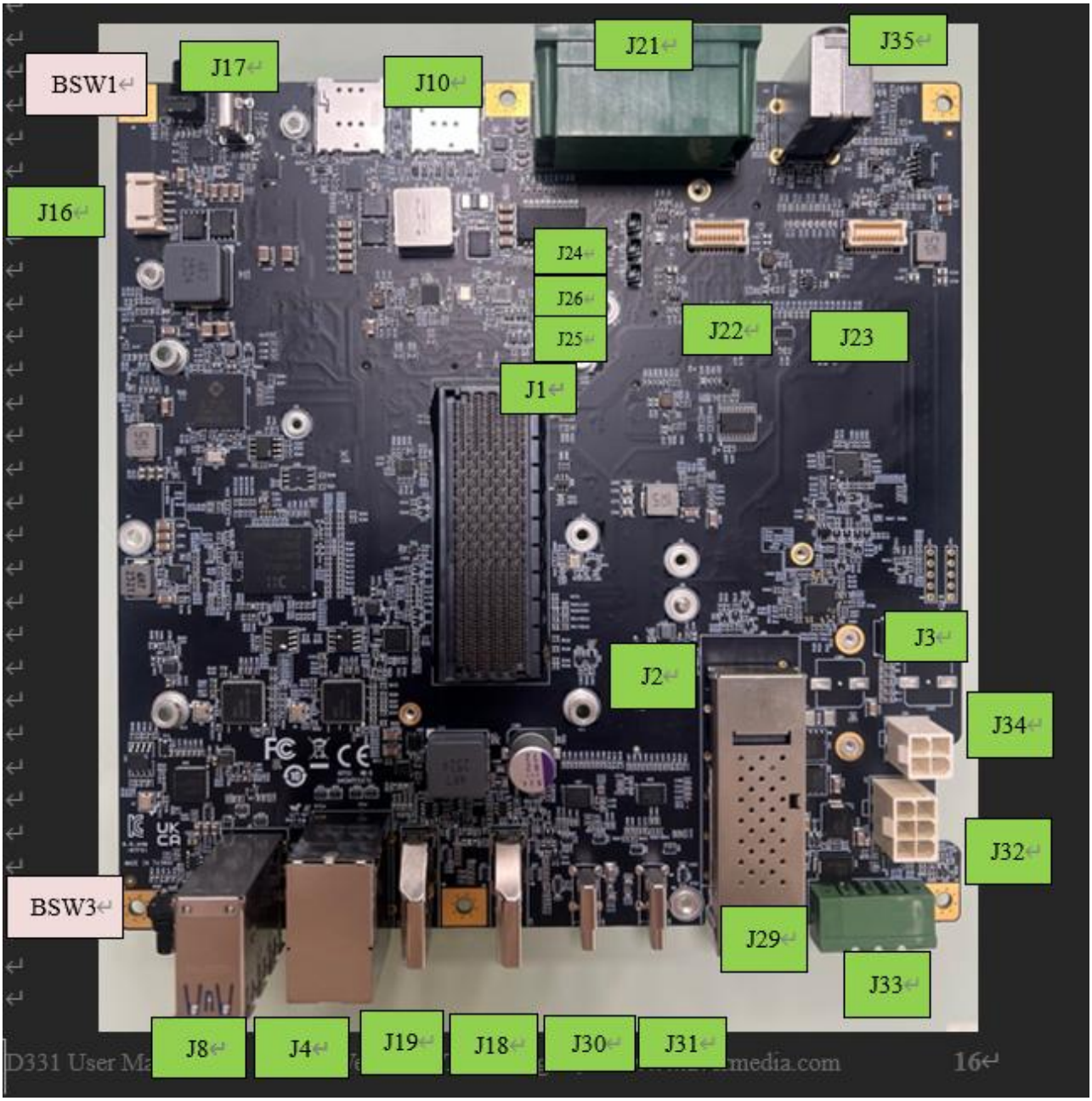
2.4 Carrier Board Interface

J1	699-pin high-speed/high-density connector
J16	Fan Wafer for SOM FAN
J3	External RTC Battery wafer
J18	HDMI-2 output Type-A Vertical Side Connector (Female)
J19	HDMI-1 output Type-A Vertical Side Connector (Female) **(It is suggest using it first, please see page.18 notes)**
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-1 card socket (Push-Push)
J40	Micro SIM-2 card socket (Push-Push)
J21	2x10 Euro Terminal Block 4x CAN-FD for T5000 SOM
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	Output 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 (Recovery)
J26	OOB board connector (Reset)
BSW1	Recovery Button w/LED
BSW5	Power Button w/LED
J36	M.2 M-Key Socket 4-Lane
J8	USB 3.2 Type A Connector
J7	M.2 E-Key Socket
J9	M.2 B-Key Socket
J6	Mini card socket
J27	ERMI Out-Of-Band (OOB) connector
J5	ERMI Out-Of-Band (OOB) NCSI connector
J14	4-pin USB 2.0 wafer
J38	5-pin 12V DC output wafer
J13	M.2 M-Key Socket 2-Lane
J20	120-pin high speed board to board connector (to Camera board)
J12	40-pin Micro coaxial connector
JP1	Fan Wafer for Chassis FAN
JP2	Fan Wafer for Chassis FAN
SW7	DIP Switch for CAN Terminal
SW8	DIP Switch for power mode
SW9	DIP Switch for mini card setting

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2.5 Feature Description

2.5.1 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	

2.5.2 Fan Wafer

Function	Fan Power Connector	
Location	J16 / JP1 / JP2	
Type Description	WAFER_1*4PIN_2 ㎜_90°_SMD	
Manufacturer and Part Number	JOINT TECH 燦達 A2001WR-S-04PNLNT1T00R	
Mating Connector	JOINT TECH 燦達 A2001 Series Housing	
Pinout	Pin # / Description PIN 1 / GND PIN 2 / +12V Power PIN 3 / FAN_TACH PIN 4 / FAN_PWM	
Remarks	None	

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RTC Battery Connector

<table>
<tr><td>Function</td><td>RTC battery for module</td><td rowspan="5"></td></tr>
<tr><td>Location</td><td>J3</td></tr>
<tr><td>Type Description</td><td>1.25mm wire-to-board header</td></tr>
<tr><td>Manufacturer and Part Number</td><td>宏致_ACES
50271-00201-001_BLACK</td></tr>
<tr><td>Mating Connector</td><td>Molex, 51021-8602</td></tr>
<tr><td>Pinout</td><td colspan="2"><table><tr><th>Pin #</th><th>Description</th></tr><tr><td>PIN1</td><td>GND</td></tr><tr><td>PIN2</td><td>3V Power</td></tr></table></td></tr>
<tr><td>Remarks</td><td colspan="2">RTC Battery: CR2450 3V
The CR2450 battery capacity varies from approximately 540 to 600 mAh depending on the brand. Estimated lifespan for each mode is as follows; actual lifespan may vary depending on environmental conditions.
Storage:16.61uA, 3.7 years
Standby: 1.54uA, 40.0 years
Operation:1.54uA, 40.0 years</td></tr>
</table>

2.5.3 HDMI OUTPUT

<table>
<tr><td>Function</td><td>HDMI output connector</td><td rowspan="5"></td></tr>
<tr><td>Location</td><td>J19/J18</td></tr>
<tr><td>Type Description</td><td>HDMI Type-A female connector</td></tr>
<tr><td>Manufacturer and Part Number</td><td>捷湧 EDL TECHNOLOGY CO.
HM-FVD480B</td></tr>
<tr><td>Mating Connector</td><td>Any HDMI standard Type-A interface cable or device.</td></tr>
<tr><td>Pinout</td><td>Please refer to HDMI standard.</td></tr>
<tr><td>Remarks</td><td colspan="2">1. The J18 HDMI-2, like the EVB kit, is a native HDMI port. The J19 HDMI-1 EVB is a DisplayPort; the BSP performs DP to HDMI setup.
2. Please use a standard 4KP60 monitor to avoid compatibility issues.</td></tr>
</table>

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Notes:

Comparison Item	JP 7.2 or before JP 7.2 (Without DCB Tool Update)	JP7.2.1 or later (With DCB Tool Update)
HDMI 0 (J19) during UEFI	Display output available	Display output available
HDMI 1 (J18) during UEFI	Display output available	No display output
HDMI 0 (J19) during Linux Kernel Operation	Display operates normally	Display operates normally
HDMI 1 (J18) during Linux Kernel Operation	Hot plug does not function properly; J18 display output is available under certain conditions.	Display operates normally
Main Advantage	Both HDMI ports support UEFI display output.	Both HDMI ports operate normally under Linux.
Main Limitation	After entering Linux, hot plug does not function properly on one HDMI port.	Only HDMI 0 (J19) provides display output during UEFI.

2.5.4 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	

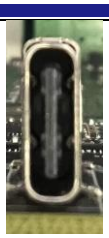
2.5.5 USB Type C Power Supply Connector

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	It is not recommended to use at present.	

2.5.6 USB 2.0 Type C Connector (Debug UART)

Function	For dumping debug UART	
Location	J17	

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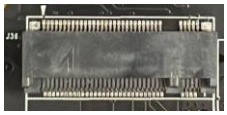
Type Description	USB2.0 Type-C female connector	
Manufacturer and Part Number	GM9-HF_JACK_建倚_SBC-240P-31HF-S277_-55+85℃	
Mating Connector	Any Standard Type-C interface cable or device.	
Pinout	Please refer to USB 2.0 standard.	
Remarks	None	

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2.5.7 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	

2.5.8 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	

2.5.9 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	Only officially verified 4G/5G modules are supported.	
Pinout	Please refer to M.2 B key card standard for the pinout details.	
Remarks	Support list 4G module: Quectel EM05-G 5G module: Quectel RM520-GL	

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2.5.10 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	

2.5.11 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	銨運_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	When EMRI (OOB) NCSI is selected, the upper RJ45 will support OOB-NCSI.	

2.5.12 QSFP 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	Only supports DAC (Direct Attach Copper) cable	

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	T5000: 4× 25 GbE, T4000: 3× 25 GbE

2.5.13 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	The top two ports support 10Gbps, and the bottom two ports support 5Gbps.	

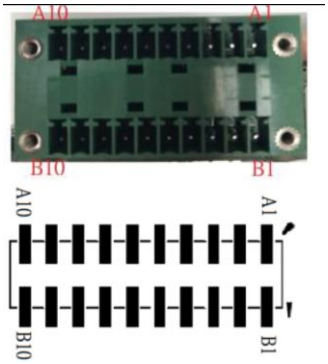
2.5.14 Micro SIM Card Slot

Function	Micro SIM Card	
Location	J10/J40	
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 *Inserting directing as below J10 SIM-1, J40 SIM-2 are used with the M.2 Key B cellular module.	

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2.5.15 2x10 Euro Terminal Block 4x 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



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	4 x CAN FD (1x Isolation), Support for T5000 only

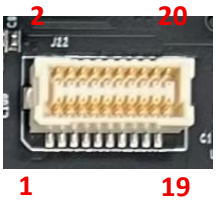
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2.5.16 2x10pin expansion header-1

Function	General-purpose input/output
Location	J22
Type Description	WAFER_2*10PIN_1 ㎜_180°_SMD
Manufacturer and Part Number	JST_BM20B-SHLDS-G-TFT(LF)(SN)
Mating Connector	JST SHLDS-G housing or compatible products

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	UARTH1_TX_3V3	GL3590 未動作
i2c-9	I2C_GP9_CLK_3V3 (A53)	7	8	UARTH1_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



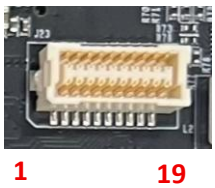
Remarks	Accessories: Carrier board with 2.54mm Box Header Adapter Board Box PC with F1R4D DI/DO/Serial Port Adapter Board

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2.5.17 2x10pin expansion header-2

Function	General-purpose input/output
Location	J23
Type Description	WAFER_2*10PIN_1 ㎜_180°_SMD
Manufacturer and Part Number	JST_BM20B-SHLDS-G-TFT(LF)(SN)
Mating Connector	JST SHLDS-G housing or compatible products
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

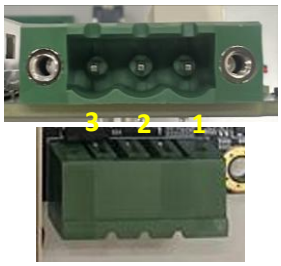


Remarks	Accessories: Carrier board with 2.54mm Box Header Adapter Board Box PC with F1R4D DI/DO/Serial Port Adapter Board

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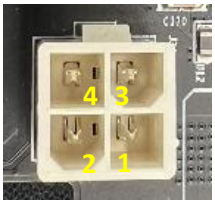
2.5.18 Terminal block 3Pin

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 / DC IN=>9-36V 2 / GND 3 / ACC=>9-36V
Remarks	ACC function needs to be enabled via SW8



2.5.19 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	This is a DC pass-through design; the output voltage follows the J32/J33 input voltage.

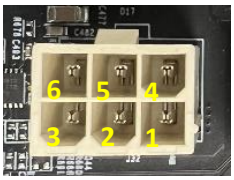


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2.5.20 Input Power – 4.2mm Pitch ATX Power 6P

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	
Remarks	ACC function needs to be enabled via SW8

Pin Number	Description
1	9-36V Power
2	9-36V Power
3	ACC=>9-36V
4	GND
5	GND
6	GND



2.5.21 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 QSH-060-01-L-D-A-K-TR BTB-RECEPTACLE
Mating Connector	SAMTEC QTH-060-03-H-A-D BTB-PLUG QTH-060-04-H-A-D BTB-PLUG
Pinout	Comply with NVIDIA Devkit pinout.
Remarks	None



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2.5.22 40pin Micro coaxial connector

Function	40pin Micro 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	

2.5.23 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

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2.5.24 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	X		X
3	UART3_RX (Debug)		Input, 3.3V
4	UART3_TX (Debug)		Output, 3.3V
5	UART1_RX (Auto Link)		Input, 3.3V
6	UART1_TX (Auto Link)		Output, 3.3V
7	+5V_SOM_PG		Output, 3.3V
8	RST_OOB		Input, 3.3V
9	POWER_BTN		Input, 3.3V
10	+5V_STANDBY		Power

Remark	For optional OOB with NCSI and RMII board

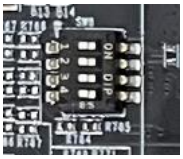
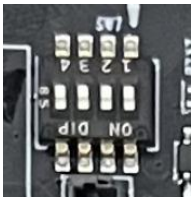
2.5.25 Board Connector (Power/Reset/Recovery)

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	

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Pinout	J24 / Description PIN 1 — Power PIN 2 — GND J26 / Description PIN 1 — Reset PIN 2 — GND J25 / Description PIN 1 — Recovery PIN 2 — GND
Remark	NA

2.5.26 DIP Switch

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

Pinout

SW7

Pin #	Description
1	OFF=>CAN0 W/O Terminal ON=> CAN0 W Terminal
2	OFF=>CAN1 W/O Terminal ON=> CAN1 W Terminal
3	OFF=>CAN2 W/O Terminal ON=> CAN2 W Terminal
4	OFF=>CAN3 W/O Terminal ON=> CAN3 W Terminal

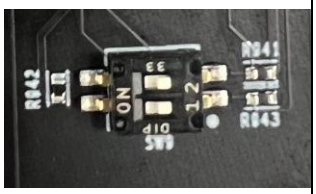
SW8

Pin #	Description
1	OFF=>Auto Power ON=>Button Power
2	OFF=>FAN PWM ON=>FAN Always
3	OFF=>Always Powser ON Disable ON=> Always Powser ON Enable
4	OFF=>Ignore ACC for Development ON=> ACC Enable

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Remark	NA

2.5.27 DIP Switch

Function	DIP Switch	
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 Pin # / Description 1 / OFF=>Mini Card set as PCIe Reset ON=> Mini Card set as GPS Reset 2 / OFF=>PCIe C3 2L for M.2 Key M 2L ON=> PCIe C3 2L for 40pin 2L	
Remark	None	

2.5.28 Power & Recovery Button

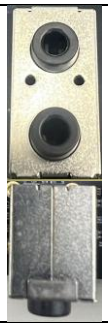
Function	Power & Recovery control button	
Location	BSW1, BSW3	
Type Description	Button	
Manufacturer and Part Number	冠泰 Champway 12VDC/0.05A-160G-H1.8 ㎜-BLACK	
Pinout	N/A	
Remark	Power Button: • When D331 is in "PWB Mode", pressing the button will initiate the boot-up sequence. • When D331 is ON, pressing the button will display the Power Off GUI. If no operation is performed, the system will	

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	automatically power off in 60 seconds. • When D331 is ON, holding the button for more than 5 seconds will force a full system power down. Recovery Button: • No function during normal operation. • The SOM will enter recovery mode when held down during power ON

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2.5.29 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 Buttom : Headphone out	Top : MIC in Button : Headphone out	
Remark	None	

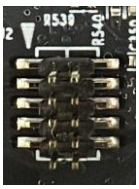
2.5.30 5-pin 12V DC wafer header

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

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2.5.31 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)

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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.

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```
# 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)

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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.

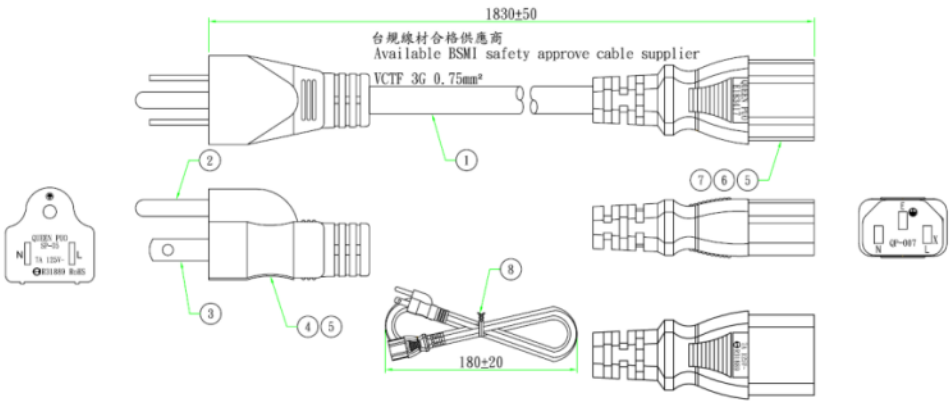
1. Before you start
   - Please make sure to use a Linux host PC with Ubuntu 22.04 or 20.04 operating system.
   - Please use a native setup (no virtual machine) installation file in the following steps.
   - You will also need a high-quality standard USB Type C connector.
   - Download installation 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.

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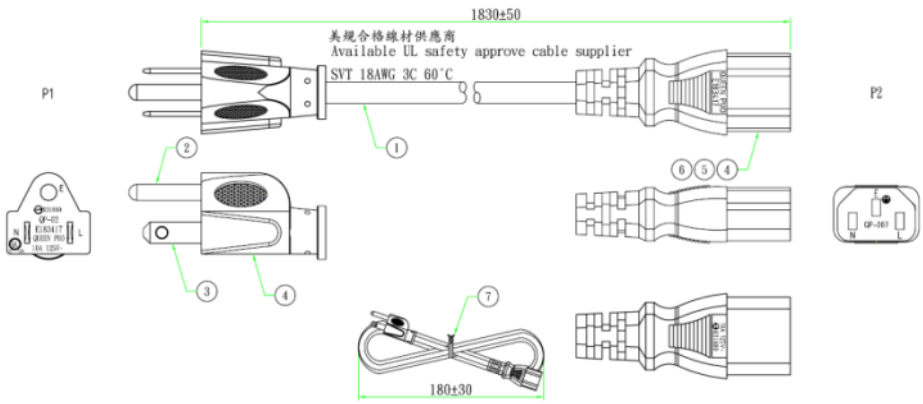
6.0 Accessory Drawings

6.1 Power Cord, Power Adapter & Converter Cable

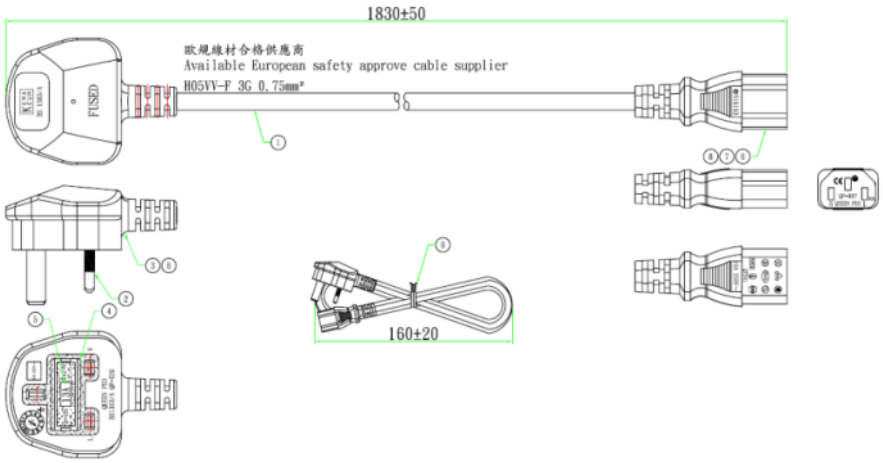
64APOWERBRX-IPD (TW version)



064APOWERBR2-IPD (US version)

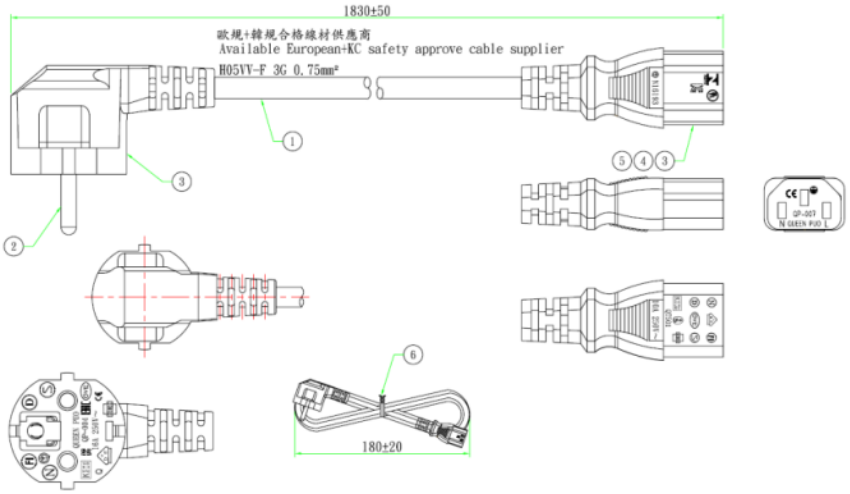


064APOWERBRW-IPD (UK version)

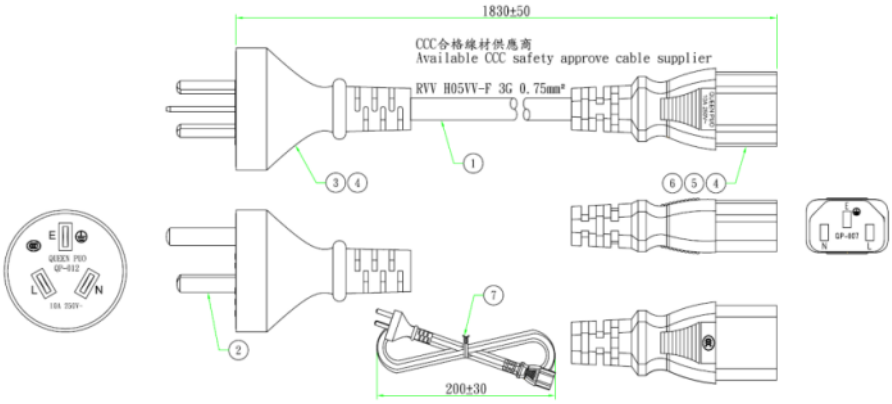


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064APOWERBR5-IPD (EU version)

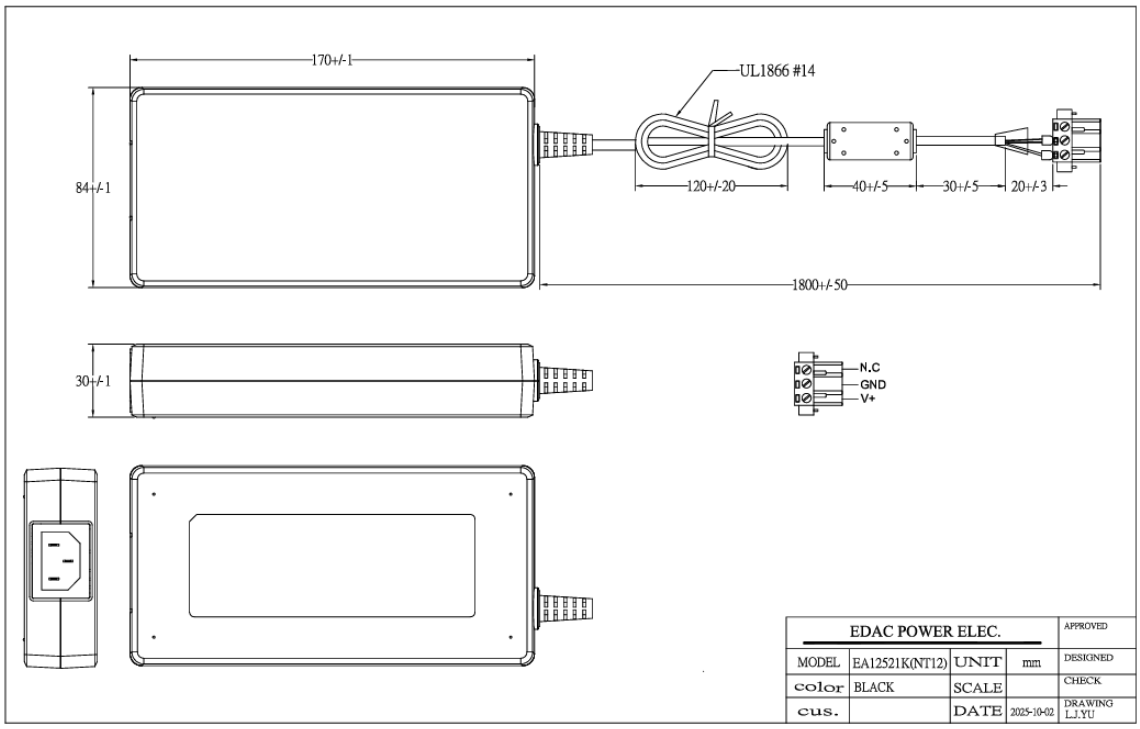


064APOWERBR4-IPD (CN version)

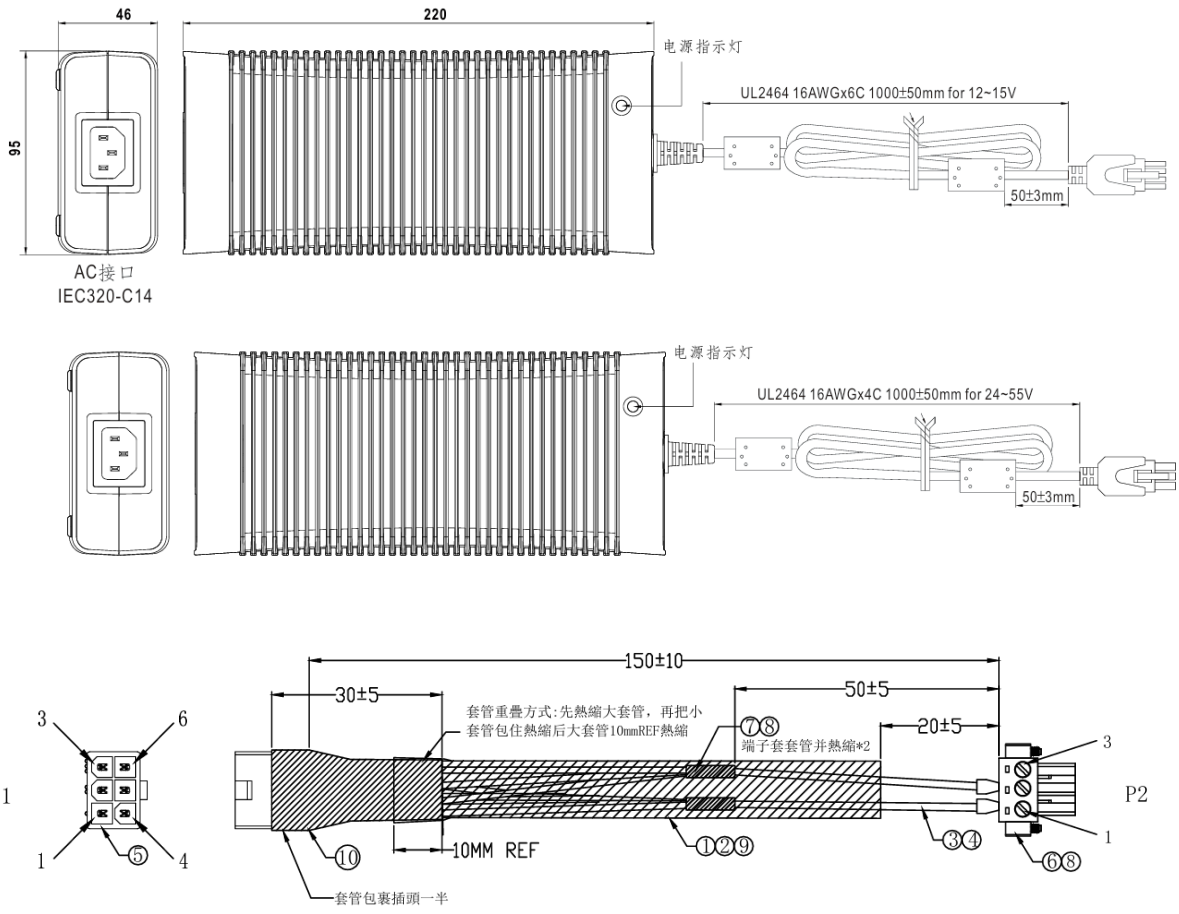


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240W Adapter



360W Adapter + converter cable



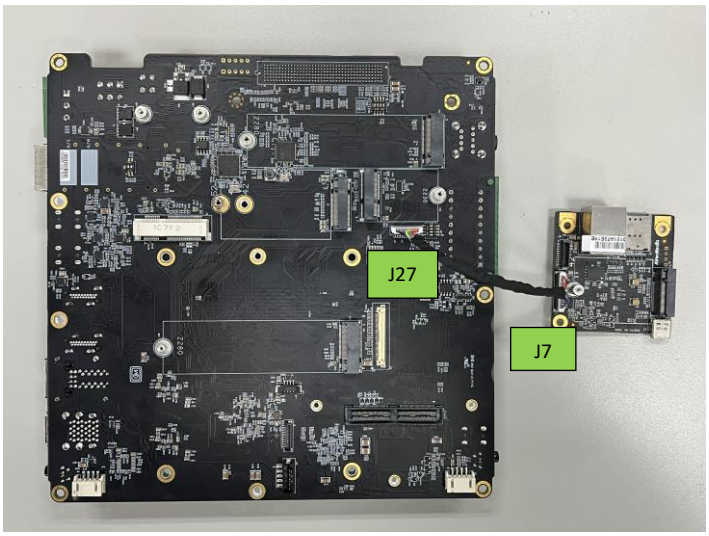
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7.0 Daughter board introduction

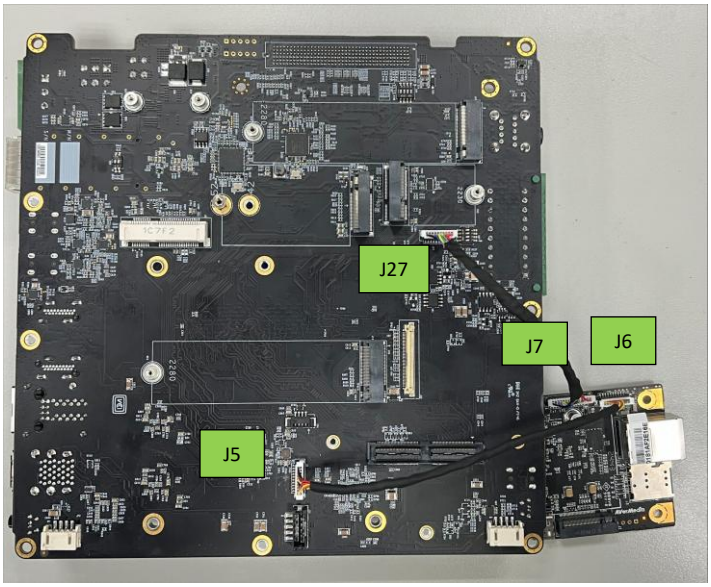
7.1 D331 + ERMI Module

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

OOB demo connection



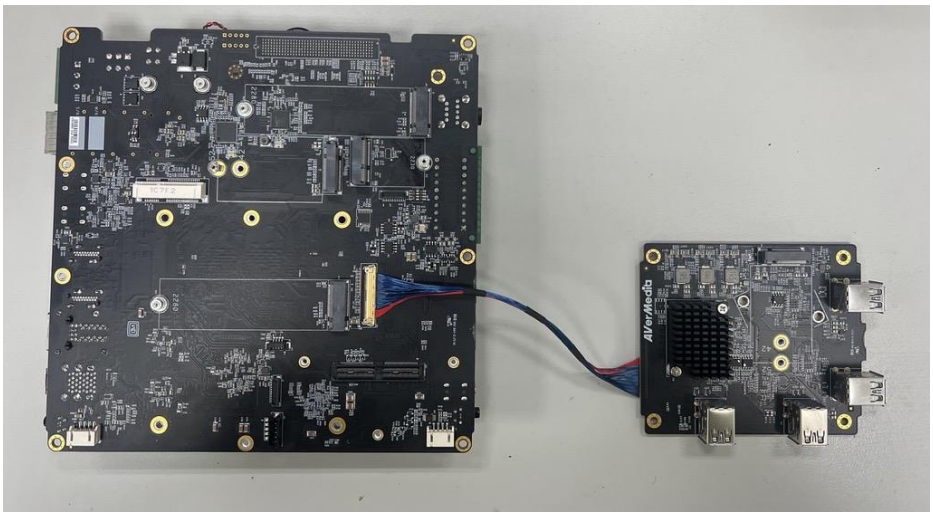
NCSI OOB demo connection



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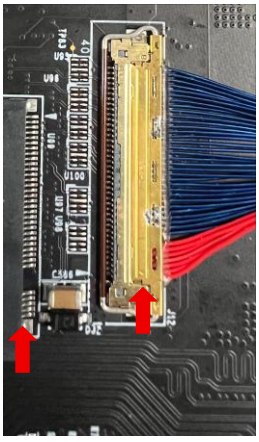
7.2 D331 + USB Daughter Board

Please refer to [USB-board | AVerMedia]

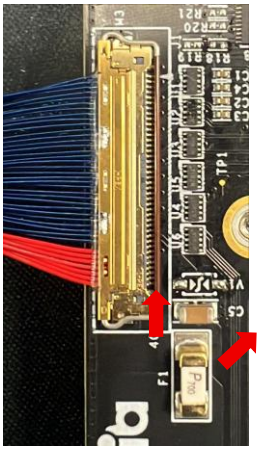


On D331, The red end of the cable must be aligned with the resistor indicated by the yellow arrow and properly connected.

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)



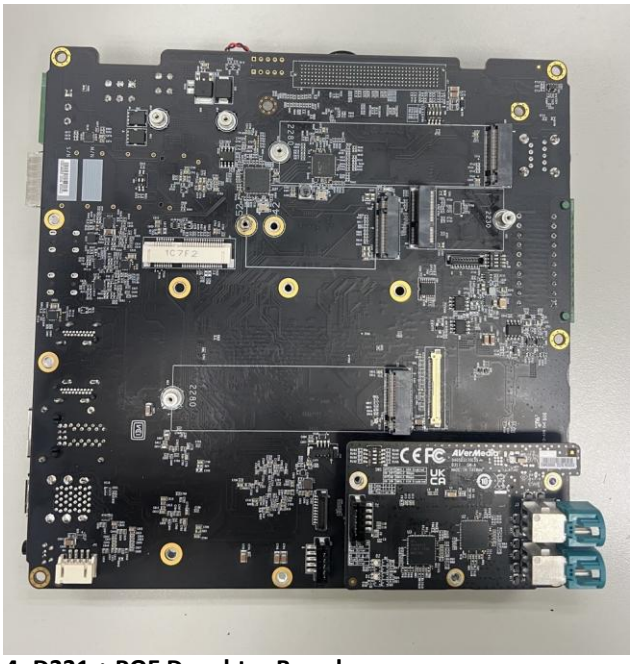
(On USB Daughter Board)

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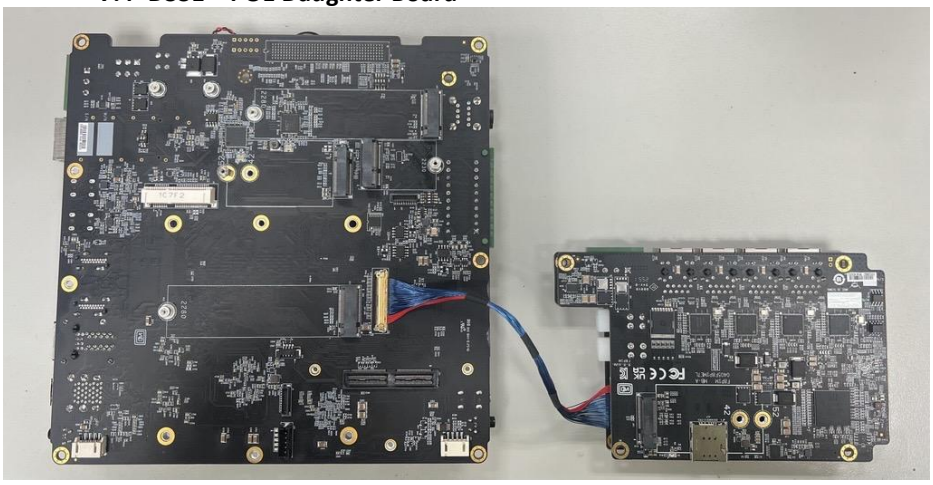
7.3 D331 + GMSL Daughter Board

Please refer to [GMSL Board | AVerMedia]

Connect GMSL Daughter Board with J20



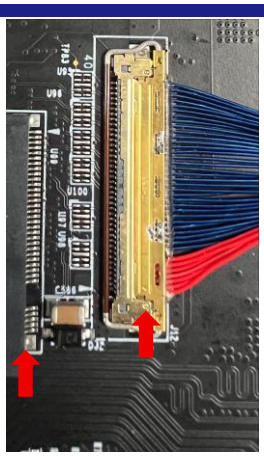
7.4 D331 + POE Daughter Board



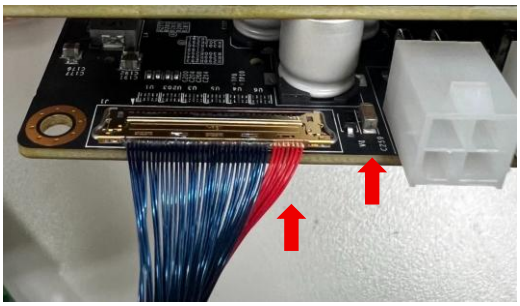
On D331, The red end of the cable must be aligned with the resistor indicated by the yellow arrow and properly connected.

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

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(On D331)



(On POE Daughter Board)

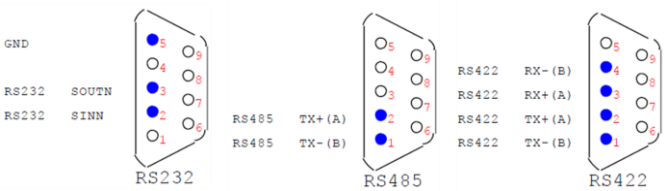
The cable terminals are fragile; please handle them with care.

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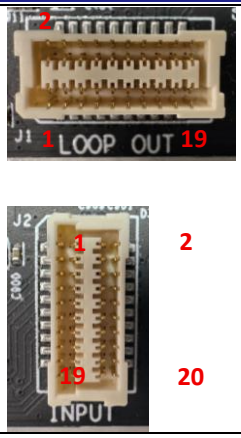
7.5 F1R4D Daughter Board (RS232/RS485/RS422)

<table>
<tr><td>Function</td><td>Serial Port</td><td rowspan="4">
</td></tr>
<tr><td>Location</td><td>CN1</td></tr>
<tr><td>Type Description</td><td>JACK_D-SUB_9PIN(M)-BLACK_90°_DIP-L3.2 ㎜</td></tr>
<tr><td>Manufacturer and Part Number</td><td>光榮 DBMRx002-09</td></tr>
<tr><td>Mating Connector</td><td>N/A</td><td></td></tr>
<tr><td>Pinout</td><td colspan="2"><table><tr><th>Pin #</th><th>Description</th></tr><tr><td>1</td><td>SPI1_CS1_GPI</td></tr><tr><td>2</td><td>SPI1_MOSI_GPI</td></tr><tr><td>3</td><td>I2S1_LRCK_GPO</td></tr><tr><td>4</td><td>I2S1_SDOUT_GPO</td></tr><tr><td>5</td><td>GND</td></tr><tr><td>6</td><td>SPI1_CS0_GPI</td></tr><tr><td>7</td><td>SPI1_MISO_GPI</td></tr><tr><td>8</td><td>I2S1_SDIN_GPO</td></tr><tr><td>9</td><td>I2S1_SCLK_GPO</td></tr></table></td></tr>
<tr><td>Note</td><td colspan="2"></td></tr>
</table>

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<table>
<tr><td>Function</td><td>DI/DO</td><td rowspan="3">
</td></tr>
<tr><td>Location</td><td>CN2</td></tr>
<tr><td>Type
Description</td><td>JACK_D-SUB_9PIN(M)-
BLACK_90°_DIP-L3.2 ㎜</td></tr>
<tr><td>Manufacturer and Part Number</td><td>光榮 DBMRx002-09</td><td></td></tr>
<tr><td>Mating Connector</td><td>N/A</td><td></td></tr>
<tr><td>Pinout</td><td colspan="2"><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>
</td></tr>
<tr><td>Note</td><td colspan="2"></td></tr>
</table>

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<table>
<tr><td>Function</td><td>Pass-Through 20Pin for GPIOs</td><td rowspan="4">
</td></tr>
<tr><td>Location</td><td>J1 & J2</td></tr>
<tr><td>Type Description</td><td>WAFER_2*10PIN_1 ㎜_180°_SMD</td></tr>
<tr><td>Manufacturer and Part Number</td><td>JST BM20B-SHLDS-G-TFT(LF)(SN)</td></tr>
<tr><td>Mating Connector</td><td>N/A</td><td></td></tr>
<tr><td>Pinout</td><td colspan="2"><table>
<tr><th>Pin#</th><th>Description</th><th>Pin#</th><th>Description</th></tr>
<tr><td>1</td><td>+3V3_EXP2</td><td>2</td><td>+5V_EXP2</td></tr>
<tr><td>3</td><td>GND</td><td>4</td><td>GND</td></tr>
<tr><td>5</td><td>I2C_GP9_DAT_3V3</td><td>6</td><td>UARTH1_TX_3V3</td></tr>
<tr><td>7</td><td>I2C_GP9_CLK_3V3</td><td>8</td><td>UARTH1_RX_3V3</td></tr>
<tr><td>9</td><td>GPIO27_PWM2_3V3</td><td>10</td><td>GND</td></tr>
<tr><td>11</td><td>I2S7_LRCK_PWM10_3V3</td><td>12</td><td>SPI1_SCK_3V3</td></tr>
<tr><td>13</td><td>I2S1_SCLK_3V3</td><td>14</td><td>SPI1_MISO_3V3</td></tr>
<tr><td>15</td><td>I2S1_SDOUT_3V3</td><td>16</td><td>SPI1_MOSI_3V3</td></tr>
<tr><td>17</td><td>I2S1_SDIN_3V3</td><td>18</td><td>SPI1_CS0_3V3</td></tr>
<tr><td>19</td><td>I2S1_LRCK_3V3</td><td>20</td><td>SPI1_CS1_3V3</td></tr>
</table></td></tr>
<tr><td>Note</td><td colspan="2"></td></tr>
</table>

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