AVerMedia D131S

Applies to NVIDIA® Jetson Orin™ NX/ Orin™ NANO Module

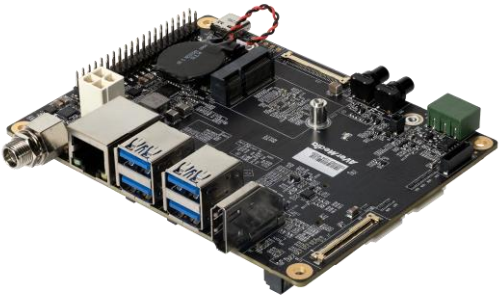

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Table of Contents

Preface

Disclaimer

The information contained in this user manual, including but not limited to any product specification is subject to change without notice. AVerMedia assumes no liability for any damages incurred directly or indirectly from any technical or typographical errors or omissions contained herein or for discrepancies between the product and the user manual.

Technical Support

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
Version 0.1	May 28, 2025	1st Released
Version 0.2	June 30, 2025	Update 3.2 & 3.11 & 3.12 & 3.14 & 3.15 & 3.19 & 3.22
Version 0.3	June 30, 2025	Update 3.2 & 3.11 & 3.12 & 3.14 & 3.15 & 3.19 & 3.22
Version 0.4	July 02, 2025	Change from raspberry pi camera v2 IMX 219/ raspberry pi camera v3 to raspberry pi imx219 & imx477 (V2)
Version 0.5	July 30, 2025	Update 3.22 Add 5.7

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Limited Product Warranty

AVerMedia provides product warranty. Should this product, in AVerMedia's opinion, fail to be in the good working order during the warranty period, AVerMedia will, at its option, repair or replace it at no charge, provided that the product has not been subjected to abuse, misuse, accident, disaster, or non-AVerMedia authorized modification or repair.

You may obtain the warranty service by delivering this product to an authorized AVerMedia business partner or to AVerMedia along with the proof of purchase. Product returned to AVerMedia must be pre-authorized by AVerMedia with an RMA (Return Material Authorization) number marked on the outside of the package and sent prepaid, insured, and packaged for the safe shipment. AVerMedia will return the product by prepaid shipment service.

It is not recommended to disassemble the box PC, which will impact the warranty. The limited product warranty is only valid over the serviceable life of the product. This is defined as the period during which all components are available. Should the product prove to be irreparable, AVerMedia reserves the right to substitute an equivalent product if available or to retract the product warranty if no replacement is available.

The above product warranty is the only warranty authorized by AVerMedia. Under no circumstances will AVerMedia be liable in any way for any damages, including any lost profits, lost savings, or other incidental or consequential damages arising out of the use of, or inability to use, such product.

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ESD Warning

Electronic components and circuits are sensitive to Electrostatic Discharge (ESD). When handling any circuit board assemblies including AVerMedia 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 the 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 usage or idle for a long time.
10. Disconnect the device from any AC supply before cleaning. While cleaning, use a damp cloth instead of liquid or spray detergents.

11. Make sure the device is installed near a power outlet and easy for accessible.
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 electric shock.
15. The static electricity should be noted while installing any internal components. Consider to use 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) Device is not working as expected or in a manner as described in this manual

1.0 Introduction

AVerMedia D131S includes fully featured carrier board which is all developed for NVIDIA® Jetson Orin™ NX / Orin™ Nano modules. AVerMedia D131S provides not only the access to a great list of latest interfaces on NVIDIA® Jetson Orin™ NX/ Orin™ Nano modules but also 1 x GbE RJ-45 (Option PoE) & 40-pin expansion header as the function enrichment.

D131S provides one HDMI video output, four USB 3.2 ports, one GbE RJ-45 port (Option POE), 40-pin expansion header , and one USB 2.0 type C port for recovery.

Operating with NVIDIA® Jetson Orin™ NX/ Orin™ Nano modules and the rich I/O functions, AVerMedia D131S is the perfect choice in building a compact, high performance AI edge computing platform for the intelligent video analytics applications.

1.1 Product Specifications

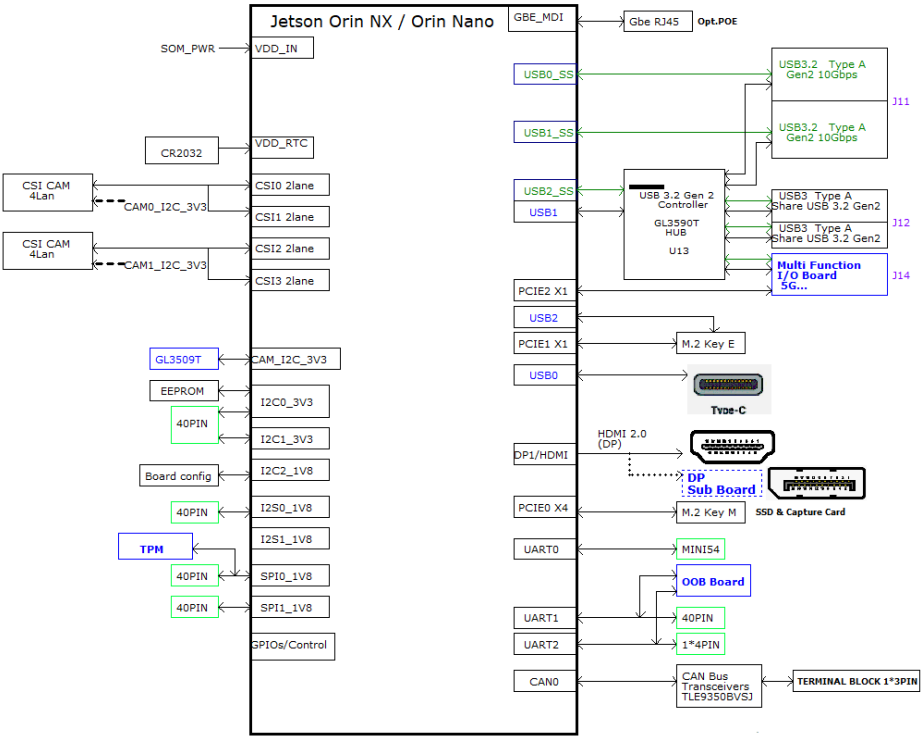
Model	D131S	
Type	Carrier board / Engineering Kit / BOX PC	
NVIDIA GPU SoC Module Compatibility	NVIDIA® Jetson Orin™ NX/ Orin™ NANO module	
Networking	1x GbE RJ-45 (PoE option) 1xM.2. key E 2230 for Wi-Fi	
Display Output	1x HDMI (3840 x 2160 at 60Hz) for Orin NX, (3840 x 2160 at 30Hz) for Orin Nano DP is optional through DP Daughter Board	
Temperature	Operating temperature: D131S(Carrier Board): -40°C~85°C Operating temperature: D131SOX/ON(Devkit): -25°C~65°C(TBD) Operating temperature: D131SOXB/ONB(BOX PC, super mode): -25°C~55°C (TBD) Operating temperature: D131SOXB/ONB(BOX PC, standard mode): -25°C~60°C (TBD) Option -40°C~60°C (PSE 802.3 AF)(TBD) Storage temperature -40°C ~ 85°C Relative humidity 40 °C @ 95%, Non-Condensing	
MIPI Camera Inputs	2x 4 lane MIPI CSI-2, 22 pin FPC 0.5mm Pitch Connector	
USB	4x USB 3.2 Type-A 1x USB 2.0 type C for recovery	
Storage	1x M.2 key M 2280 for SSD	
Misc	40-pin expansion Header: 1x UART, 2x SPI, 2x I2C, 1x I2S, 6x GPIOs 1x CAN 2.0 FD (3-pin terminal block) TPM2.0 (optional)	
Expansion	802.3AF PSE board(optional) OOB board(optional) 5G Daughter Board(optional) DP Daughter Board(optional)	
Power requirement	Voltage	DC 12~24V
	Current	DC IN Jack on board: 10A Max
		ATX 4pin: 10A Max
Power adapter/Power Cord	19V/4.73A adapter and US/JP/EU/UK/TW/AU/CN power cord (optional)	
Fan Module	Heat sink with fan (optional)	
Buttons	Power and Recovery	
RTC Battery	Support RTC battery and Battery Life Monitoring by MCU	
Dimensions	113mm x87mm(4.45” x 3.43”), weight : 97g (Carrier Board)	
Certifications	VCCI, CE, FCC, KC (TBA)	

1.2 Option Accessory

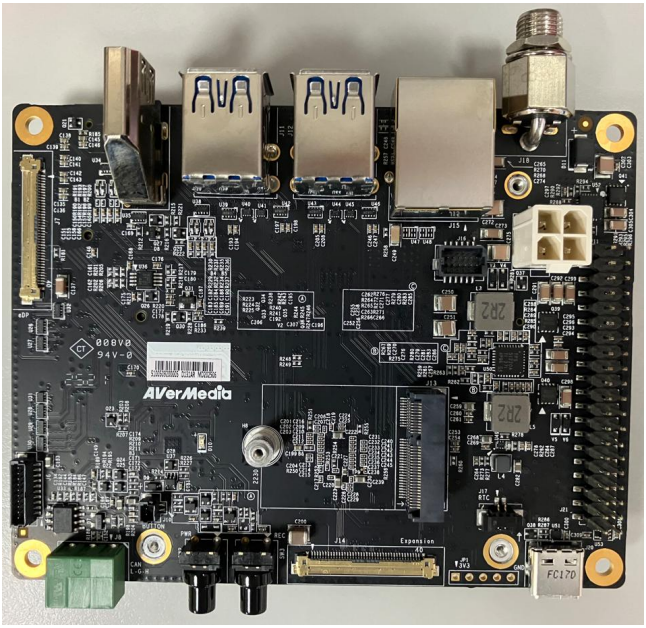
Item	D131S
NVIDIA® Jetson	NVIDIA® Jetson Orin NX/Orin Nano
Power Cord	EU/JP/TW/US/CN/UK/AU
MIPI Camera (internal I/O)	● For 22 pin MIPI connector 1. raspberry pi imx219 &imx477 (V2) 2. Manufacturer: APPRO.PHO ■ B-04: IMX179(8M)MIPI, 1080P(30fps) ■ C-04: IMX290(2M)MIPI, 1080P(30fps) ■ C-05: IMX290(2M)+ISP(YUV), 1080P(30fps)

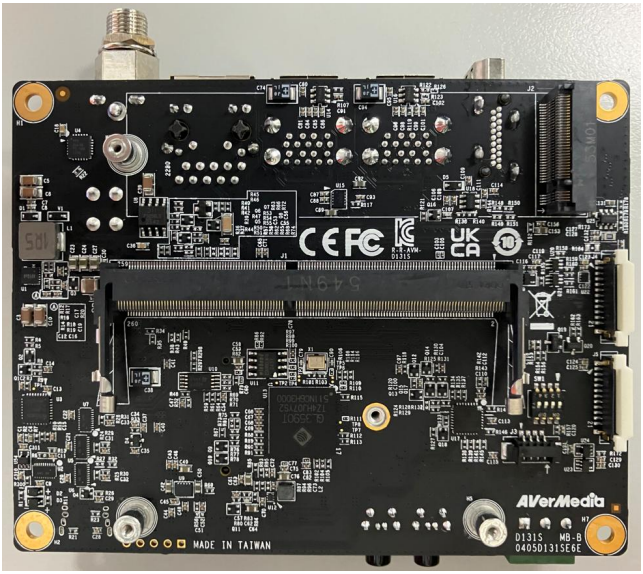
2.0 Product Overview

2.1 Block Diagram



2.2 Front View and Back View of Carrier board

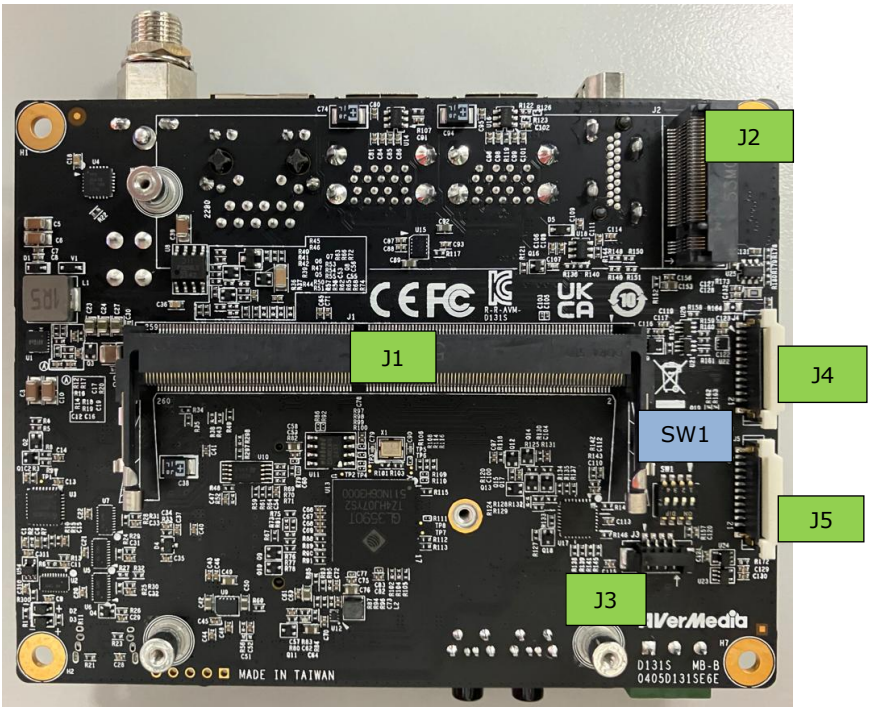




2.3 Connector Summary

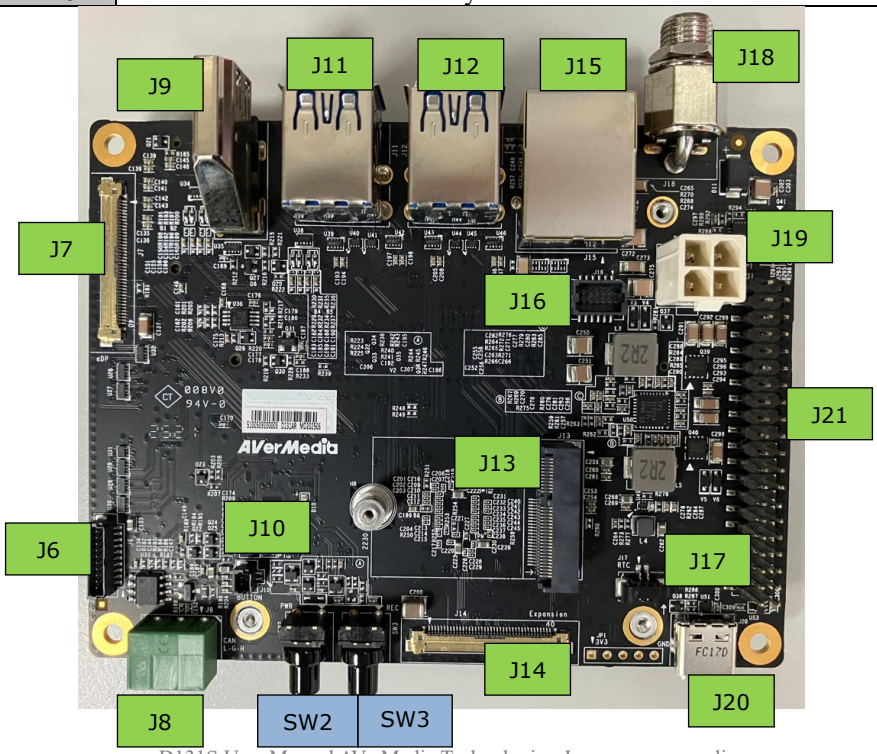
Top View Interface

J1	SO-DIMM 260-pin 90° SMD Socket(H-9.2mm)
J2	M.2 M-Key Socket
J3	Fan Wafer
J4	FPC connector for 4-lane MIPI CSI-2
J5	FPC connector for 4-lane MIPI CSI-2
SW1	DIP switch



Bottom View Interface

J6	OOB Board Connector
J7	0.5mm pitch I-PEX connector for optional DP board
J8	CAN bus 3-pin terminal block with transceiver
J9	HDMI output Type-A Vertical Side Connector (Female)
J10	Expansion connector for external power button
J11	USB 3.2 Dual Port Type A Connector
J12	USB 3.2 Dual Port Type A Connector
J13	M.2 E-Key Socket
J14	0.5mm pitch I-PEX connector for optional 5G Board
J15	Gigabit Ethernet Connector w/LEDs (PSE optional)
J16	PSE Board Connector (Maximum 15W)
J17	External RTC Battery wafer
J18	OD 5.5/2.5 DC Jack with Lock
J19	ATX 4pin (Molex Mini-Fit compatible)
J20	USB type C connector
J21	2.54mm pitch 40-pin Expansion
SW2	Power Button w/LEDs
SW3	Recovery Button w/LEDs



3.0 Feature Description

3.1 Jetson module Connector

Function	Provide connection with NVIDIA® Jetson Orin™ NX module	
Location	J1	
Description	SOCKET_DDR4 SO-DIMM_260PIN_90°	
Manufacturer Part number	Foxconn ASAA826-EASB0-7H	
Mating Connector	NVIDIA® Jetson Orin NX/Orin Nano	
Pinout	Please refer to NVIDIA Jetson System-on-Module datasheet for pinout details.	
Remarks	https://developer.nvidia.com/embedded/downloads	

3.2 M.2 M key 2280

Function	M.2 M key	
Location	J2	
Description	SOCKET_M.2-KEY M_75PIN_90°_SMD	
Manufacturer Part number	鴻海_FOXCONN 2E0BC21-S85BM-7H_P0.5 ㎜-H8.5 ㎜	
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	PCIe related signal supported only @PCIe0(PCIe C4@0x14160000) Support PCIe Gen4 x4 for Orin NX Support PCIe Gen3 x4 for Orin Nano	

3.3 Fan connector

Function	Fan Connector	
Location	J3	
Type Description	WAFER_1*4PIN_1.25 ㎜_90°	
Manufacturer Part number	ACES 50271-0040N-001	
Mating Connector	ACES ACES 50276-004H0H0-001	

Pinout

Pin #	Description	Module Pin#	Type/ Dir
1	GND	-	Ground
2	+5V Power	-	Power, 5V
3	FAN_TACH	208	Input, 5V
4	FAN_PWM	230	Output, 5V

Remarks: None

3.4 MIPI CSI-2 DPHY Lanes

Function	MIPI camera module connector	
Location	J4 , J5	
Description	ACES ZIF FPC Conn._22PIN_0.5 ㎜_90°	
Manufacturer Part number	ACES 50554-02241-003	
Mating Connector	FPC Cable(22Pin)	

Pinout

J4

PIN#	Description	Module Pin#	Type/ Dir
1	+3V3_SYSTEM	-	Power, 3.3V
2	I2C_CAM0_SDA	215	Bidir, 3.3V
3	I2C_CAM0_SCL	213	Output, 3.3V

4	GND	-	Ground
5	CAM0_MCLK	116	Output, 1.8V
6	CAM0_PWDN_LS	114	Output, 3.3V
7	GND	-	Ground
8	CSI1_D1_P	17	Input, MIPI
9	CSI1_D1_N	15	Input, MIPI
10	GND	-	Ground
11	CSI1_D0_P	5	Input, MIPI
12	CSI1_D0_N	3	Input, MIPI
13	GND	-	Ground
14	CSI0_CLK_P	12	Input, MIPI
15	CSI0_CLK_N	10	Input, MIPI
16	GND	-	Ground
17	CSI0_D1_P	18	Input, MIPI
18	CSI0_D1_N	16	Input, MIPI
19	GND	-	Ground
20	CSI0_D0_P	6	Input, MIPI
21	CSI0_D0_N	4	Input, MIPI
22	GND	-	Ground

J5

PIN#	Description	Module Pin#	Type/ Dir
1	+3V3_SYSTEM	-	Power, 3.3V
2	I2C_CAM1_SDA	215	Bidir, 3.3V
3	I2C_CAM1_SCL	213	Output, 3.3V
4	GND	-	Ground
5	CAM1_MCLK	122	Output, 1.8V
6	CAM1_PWDN_LS	120	Output, 3.3V
7	GND	-	Ground
8	CSI3_D1_P	35	Input, MIPI
9	CSI3_D1_N	33	Input, MIPI

	10	GND	-	Ground
	11	CSI3_D0_P	23	Input, MIPI
	12	CSI3_D0_N	21	Input, MIPI
	13	GND	-	Ground
	14	CSI2_CLK_P	30	Input, MIPI
	15	CSI2_CLK_N	28	Input, MIPI
	16	GND	-	Ground
	17	CSI2_D1_P	36	Input, MIPI
	18	CSI2_D1_N	34	Input, MIPI
	19	GND	-	Ground
	20	CSI2_D0_P	24	Input, MIPI
	21	CSI2_D0_N	22	Input, MIPI
	22	GND	-	Ground
Remarks	I2C_CAM0 & I2C_CAM1 connect to an I2C mux controlled by CAM_I2C of module			

3.5 OOB Board Connector (for optional OOB board)

Function	OOB Board Connector
Location	J6
Description	WAFER_1*10PIN_1㎜_180°_SMD
Manufacturer Part number	ACES 50228-01071-001
Mating Connector	ACES 50233-010H0H0-001

Pinout	PIN#	Description	Module Pin#	Type/ Dir
	1	GND	-	Ground
	2	NC	-	-

	3	UART2_RX (Debug UART)	238	Input, 3.3V
	4	UART2_TX (Debug UART)	236	Output, 3.3V
	5	UART1_RX (Auto-link)	205	Input, 3.3V
	6	UART1_TX (Auto-link)	203	Output, 3.3V
	7	SOM_PWR_GOOD	-	Output, 3.3V
	8	SYS_RST	239	Input, 3.3V
	9	BUTTON_PWR	240	Input, 3.3V
	10	+5V_STANDBY	-	Power, 5V
Remarks	For optional OOB board			

3.6 DP Board Connector (for optional DP Daughter Board)

Function	DP Board Connector
Location	J7
Description	WAFER_40PIN_0.5㎜_90°_SMD
Manufacturer Part number	I-PEX 20455-040E-12
Mating Connector	I-PEX 20453-240T-03

Pinout

PIN#	Description	Module Pin#	Type/ Dir
1	NC	-	-
2	GND		Ground
3	DP1_TXD3_N	81	Output
4	DP1_TXD3_P	83	Output
5	GND		Ground
6	DP1_TXD2_N	75	Output
7	DP1_TXD2_P	77	Output

8	GND	-	Ground
9	DP1_TXD1_N	69	Output
10	DP1_TXD1_P	71	Output
11	GND	-	Ground
12	DP1_TXD0_N	63	Output
13	DP1_TXD0_P	65	Output
14	GND	-	Ground
15	DP1_AUX_P	100	Bidir
16	DP1_AUX_N	98	Bidir
17	GND	-	Ground
18 19 20 21	LCD_VCC	-	Power, 3.3V
22	NC	-	-
23 24 25 26	GND	-	Ground
27	DP1_HPD	96	Input
28 29 30 31	BL_GND		Ground
32	BL_EN	222	Output, 3.3V
33	BL_PWM	228	Output, 3.3V
34	NC	-	-
35	NC	-	-
36 37	BL_PWR	-	Power, 12-24V

<table>
<tr><td></td><td>
<table>
<tr><td>38</td><td></td><td></td><td></td></tr>
<tr><td>39</td><td></td><td></td><td></td></tr>
<tr><td>40</td><td>NC</td><td>-</td><td>-</td></tr>
</table>
</td></tr>
<tr><td>Remarks</td><td>For optional DP board
LCD_VCC is 3.3V, can be set to 5V by H/W bom selecting
BL_PWR is following DC_IN voltage
BL_PWM & J21.33(GPIO13) recommend not to be used at same time</td></tr>
</table>

3.7 CAN Bus 3-pin terminal block with transceiver

<table>
<tr><td>Function</td><td>CAN Bus 3-pin terminal block with transceiver</td><td rowspan="5"> 
<table><tr><td>3</td><td>2</td><td>1</td></tr></table></td></tr>
<tr><td>Location</td><td>J8</td></tr>
<tr><td>Description</td><td>TERMINAL BLOCK_1*3PIN_90°_DIP</td></tr>
<tr><td>Manufacturer
Part number</td><td>DECA SwitchLab Inc.
ME030-38103T</td></tr>
<tr><td>Mating Connector</td><td>DECA SwitchLab Inc.
MC420-38103Z</td></tr>
<tr><td>Pinout</td><td colspan="2"><table><tr><td>Pin #</td><td>Description</td></tr><tr><td>1</td><td>CANH</td></tr><tr><td>2</td><td>GND</td></tr><tr><td>3</td><td>CANL</td></tr></table></td></tr>
<tr><td>Remarks</td><td colspan="2">None</td></tr>
</table>

3.8 HDMI OUTPUT

<table>
<tr><td>Function</td><td>HDMI output connector</td><td rowspan="5">  </td></tr>
<tr><td>Location</td><td>J9</td></tr>
<tr><td>Description</td><td>HDMI Type-A female connector</td></tr>
<tr><td>Manufacturer
Part number</td><td>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">None</td></tr>
</table>

3.9 Expansion connector for external button

Function	External Power button
Location	J10
Description	WAFER_1*2PIN_1 ㎜_180°_SMD
Manufacturer Part number	ACES 50228-00271-001
Mating Connector	ACES 50233-002H0H0-001

Pinout

PIN#	Description	Module Pin#	Type/ Dir
1	BUTTON_PWR	240	Input, 3.3V
2	GND	-	Ground

Remarks	For optional external power button

3.10 USB 3.2 Dual Port Type A Connector

Function	USB 3.2 Dual Port Type A Connector
Location	J11, J12
Description	Dual-port USB 3.2 Type-A female connector
Manufacturer Part number	Champway CU3B-AFR15U-096H
Mating Connector	Any Standard Type-A interface cable or device.
Pinout	Please refer to USB 3.2 standard.
Remarks	Dual port within same connector(J11 & J12) share currents up to 2A Each port of J11 has full 10Gpbs bandwidth available. Both ports within J12 are from HUB GL3590T, shares 10Gbps bandwidth wth J14

3.11 M.2 E key 2230

Function	M.2 E key	
Location	J13	
Type Description	SOCKET_M.2-KEY E_75PIN_90°_SMD	
Manufacturer Part number	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	PCIe related@PCIe1(PCIe C1@0x14100000) & USB signal supported only Support PCIe Gen4 x1 & USB 2.0 for Orin NX Support PCIe Gen3 x1 & USB 2.0 for Orin Nano	

3.12 Expansion 5G Board Connector (for optional 5G Daughter Board)

Function	5G Board Connector	
Location	J14	
Description	WAFER_40PIN_0.5 ㎜_90°_SMD	
Manufacturer Part number	I-PEX 20455-040E-12	
Mating Connector	I-PEX 20453-240T-03	

Pinout

PIN#	Description	Module Pin#	Type/ Dir
1	VDD	-	Power, 12-24V
2			
3			
4			
5			
6			
7	GND	-	Ground
8	GND	-	Ground
9	GNSS_CTRL	105	Output, 1.8V

	10	AIRPLANE_CTRL	103	Output, 1.8V
	11	LTE_PWR	223	Output, 3.3V
	12	PCIE_WAKEN	179	Input, 3.3V
	13	PCIE2_CLKREQ	221	Input, 3.3V
	14	PCIE2_RST	219	Output, 3.3V
	15	GND	-	Ground
	16	USB3_SSTX_P	59	Output, USB3.2
	17	USB3_SSTX_N	57	Output, USB3.2
	18	GND	-	Ground
	19	USB3_SSRX_P	53	Input, USB3.2
	20	USB3_SSRX_N	51	Input, USB3.2
	21	GND	-	Ground
	22	USB3_DP	117	Bidir, USB2.0
	23	USB3_DN	115	Bidir, USB2.0
	24	GND	-	Ground
	25	PCIE2_TX1_N	64	Output, PCIe
	26	PCIE2_TX1_P	66	Output, PCIe
	27	GND	-	Ground
	28	PCIE2_TX0_P	48	Output, PCIe
	29	PCIE2_TX0_N	46	Output, PCIe
	30	GND	-	Ground
	31	PCIE2_RX1_N	58	Input, PCIe
	32	PCIE2_RX1_P	60	Input, PCIe
	33	GND	-	Ground
	34	PCIE2_RX0_P	42	Input, PCIe
	35	PCIE2_RX0_N	40	Input, PCIe
	36	GND	-	Ground
	37	PCIE2_CLK_P	54	Output, PCIe
	38	PCIE2_CLK_N	52	Output, PCIe
	39	GND	-	Ground

	40	5G_RST	225	Output, 3.3V
Remarks	For 5G Board VDD is following DC_IN voltage USB signal is from HUB GL3590T, shares 10Gbps bandwidth wth J12 PCIe related signal @PCIe2 (PCIe C7@0x141e0000) Support PCIe Gen4 x2 for Orin NX & PCIe Gen3 x2 for Orin Nano			

3.13 Gigabit Ethernet Connector

Function	1Gb single-port Ethernet connector, used to connect to the host system.
Location	J15
Description	RJ45 with integrated magnetics (1G-LEFT(G)+RIGHT(Y)-DOWN)
Manufacturer Part number	Contact Technology MJ45-111QC4A-GY-S307
Mating Connector	Any standard 1Gb Ethernet mating connector can be applicable.
Pinout	Comply with Ethernet standards.

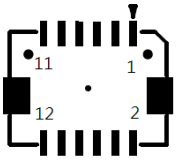
LED indicator

Activity LED (Yellow)		Link/Speed LED (Green)	
Status	**Description**	**Status**	**Description**
Yellow Blinking	Data transmission or receiving is occurring	Solid Green	PSE Ready
Off	No data transmission or receiving is occurring	Off	W/O PSE

Remarks	directly from NVIDIA Jetson SOM PSE(Maximum 15W) Option.

3.14 PSE Board Connector (for optional PSE board)

Function	PSE Board Connector.
Location	J16
Description	WAFER_2*6PIN_1㎜_180°_SMD
Manufacturer Part number	ACES 50238-01241-001
Mating Connector	ACES 50247-012H0H1-001



Pinout

PIN#	Description	Module Pin#	Type/ Dir
1	VDD	-	Power Out, 12-24V
2	GND	-	Ground
3	VDD	-	Power Out, 12-24V
4	GND	-	Ground
5	54V	-	Power In, 54V+
6	SYS_RST	239	Bidir, 3.3V
7	54V	-	Power In, 54V+
8	I2C1_SCL	189	Output, 3.3V
9	54_N	-	Power In, 54V-
10	I2C1_SDA	191	Bidir, 3.3V
11	LED_PSE	-	Input, 3.3V
12	+3V3_STANDBY	-	Power Out, 3.3V

Remarks	VDD is following DC_IN voltage LED_PSE low active, indicate PSE link is ready

3.15 RTC Battery Connector

Function	RTC battery for module	
Location	J17	
Description	WAFER_1*2PIN_1.25 ㎜_90°	
Manufacturer Part number	ACES 50271-00201-001	
Mating Connector	ACES 50276-002H0H0-001 Molex 51021-8602	
Pinout		
Remarks	RTC Battery: KTS, CR2032 3V	

PIN#	Description	Module Pin#	Type/ Dir
1	GND	-	Ground
2	RTC_BAT	235	Power, 3V

3.16 DC POWER JACK

Function	DC Power input with lock	
Location	J18	
Description	JACK_DC POWER_D2.5 ㎜_90°_DIP	
Manufacturer Part number	JKCR DCD-020-105B	
Mating Connector	Any OD 2.5mm power plug	
Pinout	N/A	
Remarks	NA	

3.17 ATX 4pin (Molex Mini-Fit compatible)

Function	DC Power input	
Location	J19	
Description	WAFER_2*2PIN_4.2 ㎜_180°_DIP	
Manufacturer Part number	PINREX 740-81-04TW00	
Mating Connector	Follow ATX 4pin plug or molex mini fit plug	
Pinout	PIN# / Description 1 / GND 2 / GND 3 / 9-24V Power 4 / 9-24V Power	
Remarks	None	

3.18 USB type C connector

Function	BSP Installation as recovery mode	
Location	J20	
Description	JACK_USB3.1_C TYPE(F)_90°_PIP-L1.45 ㎜	
Manufacturer Part number	ACES 57988-0240D-001	
Mating Connector	Any Standard Type-C interface cable or device.	
Pinout	Please refer to USB 3.2 type- C standard	
Remarks	USB2.0 Only(Device Mode)	

3.19 2.54mm pitch 40-pin Expansion

Function	General-purpose input/output
Location	J21
Description	HEADER_PIN_2*20PIN_2.54 ㎜ _180°_SMD
Manufacturer Part number	PINREX 212-92-20GBEL
Mating Connector	Any 2.54mm pitch housing
Remarks	Refer to follow tables

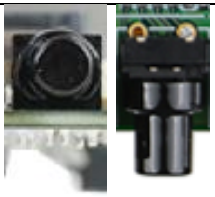
Pin#	Signal Name	Module Pin #	Type/ Direction (Note.5)	Pin Drive or Power Pin Max Current	Power-on Default	Notes
1	+3V3_SYSTEM	-	Power	1A	-	1
2	+5V_SYSTEM	-	Power	1A	-	1
3	I2C1_SDA	191	Bidir OD	±2mA	z	2
4	+5V_SYSTEM		Power	1A	-	1
5	I2C1_SCL	189	Bidir OD	±2mA	z	2
6	GND	-	Ground	-	-	-
7	GPIO09_LS	211	Bidir	±20uA	pd	3
8	UART1_TXD_LS	203	Output	±24mA	pd	4
9	GND	-	-	-	-	-
10	UART1_RXD_LS	205	Input	±24mA	pd	4
11	UART1_RTS_LS	207	Output	±24mA	pd	4
12	I2S0_SCLK_LS	199	Bidir	±20uA	pd	3
13	SPI1_SCK_LS	106	Bidir	±20uA	pd	3
14	GND	-	Ground	-	-	-
15	GPIO12_LS	218	Bidir	±20uA	z	3
16	SPI1_CS1_LS	112	Bidir	±20uA	z	3
17	+3V3_SYSTEM	-	Power	1A	-	1
18	SPI1_CS0_LS	110	Bidir	±20uA	z	3
19	SPI0_MOSI_LS	89	Bidir	±20uA	pd	3
20	GND	-	Ground	-	-	-
21	SPI0_MISO_LS	93	Bidir	±20uA	pd	3
22	SPI1_MISO_LS	108	Bidir	±20uA	pd	3
23	SPI0_SCK_LS	91	Bidir	±20uA	pd	3
24	SPI0_CS0_LS	95	Bidir	±20uA	z	3

25	GND	-	Ground	-	-	-
26	SPI0_CS1_LS	97	Bidir	±20uA	z	3
27	I2C0_ID_SDA	187	Bidir OD	±2mA	z	2
28	I2C0_ID_SCL	185	Bidir OD	±2mA	z	2
29	GPIO01_LS	118	Bidir	±20uA	pd	3
30	GND	-	Ground	-	-	-
31	GPIO11_LS	216	Bidir	±20uA	pd	3
32	GPIO07_LS	206	Bidir	±20uA	z	3
33	GPIO13_LS	228	Bidir	±20uA	z	3
34	GND	-	Ground	-	-	-
35	I2S0_LRCK_LS	197	Bidir	±20uA	pd	3
36	UART1_CTS_LS	209	Input	±24mA	pd	4
37	SPI1_MOSI_LS	104	Bidir	±20uA	pd	3
38	I2S0_SDIN_LS	195	Bidir	±20uA	pd	3
39	GND	-	Ground	-	-	-
40	I2S0_SDOUT_LS	193	Bidir	±20uA	pd	3

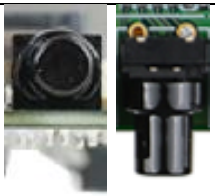
Notes:

1. **This is current capability per power pin.**
2. **These pins are connected to the SoC directly. They are open-drain (either pulled up or driven low by the SoC when configured as outputs). The max drive that meets the data sheet VOL is ±2 mA.**
3. **These pins connect to TI TXB0108 level translators. Due to the design of these devices, the output drivers are very weak, so they can be overdriven by another connected device output for bidirectional support.**
4. **These pins connect to TI SN74LVC2T45 with H/W direction-control. The direction is unidirectional if these are configured as GPIOs.**
5. **In the Type/Dir column, directions indicate H/W ability, Birdir mean direction is controlled by S/W setting signal function.**
6. **All signals on the 40-pin header are 3.3V levels.**

3.20 Power Control Button

Function	Power control button	
Location	SW2	
Description	Button	
Manufacturer Part number	Champway LS67AK-NBR-A-R2KA9	
Pinout	N/A	
Remark	• When D131S is in "PWB Mode," pressing the button will initiate the boot-up sequence. • When D131S is ON, pressing the button will display the Power Off GUI. If no operation is performed, the system will automatically power off in 60 seconds. • When D131S is ON, holding the button for more than 5 seconds will force a full system power down.	

3.21 Force Recovery Button

Function	Force recovery	
Location	SW3	
Type Description	Button	
Manufacturer Part number	Champway LS67AK-NBR-A-R2KA9	
Pinout	N/A	
Remark	• No function during normal operation. • The SOM will enter recovery mode when held down during power ON	

3.22 Dip Switch button

Function	Fan PWM controller/Auto Power on
Location	SW1
Description	4 SPST DIP switch
Manufacturer Part number	DIPTRONICS DHN-04F-T-Q-T/R IN OFF-SWITCHING 0.025A/24VDC

Pos. No	Description	Switch ON	Switch Off
1	Power ON mode	Always Power Enable	Always Power Disable
2	CAN0_Terminal	W/ 120ΩTerminal	W/O 120ΩTerminal
3	Power-Up / Start-up Control	"PWB Mode" - Power Button Press Required	"AT Mode" - Automatic Start-up Enabled
4	Fan Control	FAN Always ON (full speed running)	FAN PWM Enabled (SW Controlled)

Remark	• Blue font is default setting • When D131S is ON, if Power ON mode setting is "Always Power Enable", the system will restart automatically after shutdown. • Power-Up / Start-up Control setting is for DC Plug In

Other Switches and Jumpers

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

4.0 Installation

4.1 BSP Setup Instructions

The AVerMedia JetPack 6.2 BSP, named AVERMEDIA_JETPACK-Rx.x.x.6.2.0, is available for download at https://www.avermedia.com/en/professional/support/download?model_number=D131S. If you experience issues accessing the download, contact technical support at https://www.avermedia.com/en/professional/support/technical or eusupport@avermedia.com.

Before re-flashing the BSP on your NVIDIA Jetson board, back up your personal files. Refer to the following steps after downloading the BSP tarball on your Linux PC.

4.2 To initiate recovery mode on the JETSON Orin NX

Press and hold the "Recovery" button while powering on the device. Connect the Jetson board to a Linux PC using a Type-C to USB cable.

Verify the connection by running $ lsusb
and confirming the device is recognized as
0955:7423 NVIDIA Corp. APX
or
0955:7423 NVIDIA Corp. USB Receiver

4.3 How to flash BSP

After downloading the BSP from AVerMedia (e.g., AVERMEDIA_JETPACK-R1.1.x.6.2.0_desktop.tar.gz), flash the D131S as follows:

$ sudo tar zxvf AVERMEDIA_JETPACK-R1.1.x.6.2.0_desktop.tar.gz
$ cd cd JetPack_6.2_Linux_JETSON_desktop/Linux_for_Tegra/
$ sudo ./setup.sh
Select the appropriate options for D131S (3), including Normal Mode (0) or Super Mode (1), and any specific camera.

```
Please select AVerMedia carrier board:
-----------------------------------------
   0) D115
   1) D115W
   2) D131
   3) D131S
   4) D133
   5) D133S
   6) D135
   7) D315
   8) D317
-----------------------------------------
Enter your choice (0 - 8): 3
You selected: D131S
```

```
Please select Mode:
-------------------------------------------
   0) Normal Mode
   1) Super Mode
-------------------------------------------
Enter your choice (0-1): 1
Selected  mode
```

```
Run addition_setup.sh
-------------------------------------------
   0) no camera
   1) ap_ar0234
   2) ap_imx179
   3) ap_imx290
   4) ap_imx290_isp
   5) raspberry_pi_v2
   6) raspberry_pi_v3
-------------------------------------------
Please select a profile for MIPI CSI camera (0 - 6):
```

Create the default user (nvidia/ nvidia):

$ sudo ./create_user.sh

Install with flash storage: (select "0" for SSD, "1" for USB Disk)

$ sudo ./install.sh

```
Jetson Orin NX/Nano does not have any built-in eMMC to run the kernel and file system.
You need to use an NVMe or a USB (at least 64GB) flash device as a storage device.
-----------------------------------------
   0) nvme0n1p1
   1) sda1
-----------------------------------------
Please select your storage: 0
```

5.0 Software

This section describes the D131S software features.

5.1 Power Mode

D131S BSP features power mode support, including a 'Super' mode for Orin NX (16GB,

8GB) and Orin Nano (8GB, 4GB).

After flashing or updating to JetPack 6.2, run the following command to start the newly available ‘Super’ power modes:

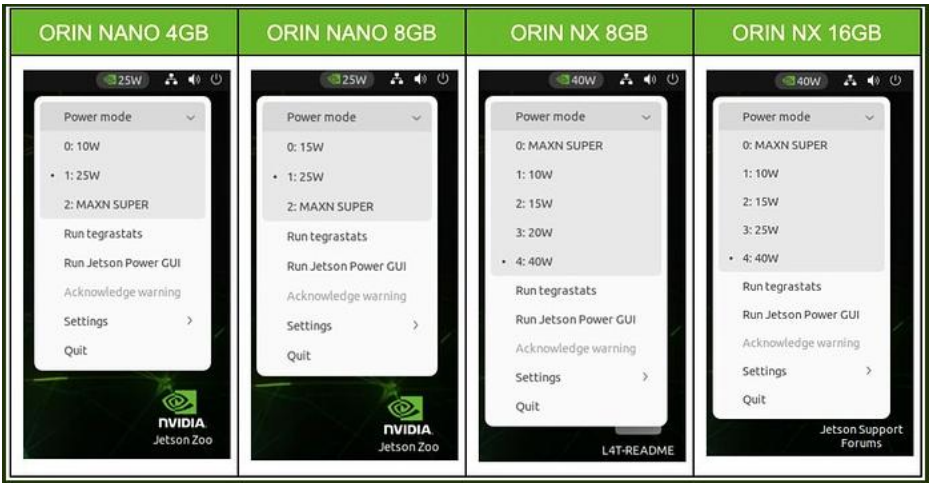
MAXN SUPER mode on Jetson Orin Nano Modules

$ sudo nvpmodel -m 2

MAXN SUPER mode on Jetson Orin NX Modules

$ sudo nvpmodel -m 0

Alternatively, select MAXN SUPER and other power modes from the power mode menu in the GUI.



About more information about Super Mode, please refer to the link:

https://docs.nvidia.com/jetson/archives/r36.4.3/DeveloperGuide/SD/PlatformPowerAndPerformance/JetsonOrinNanoSeriesJetsonOrinNxSeriesAndJetsonAgxOrinSeries.html#supported-modes-and-power-efficiency

5.2 RTC Battery

The following command can get RTC battery voltage.

```
$ sudo avt_tool -a | grep -oP "AIN5.*\[\K[^\]]*"
nvidia@tegra-ubuntu:~$ sudo avt_tool -a | grep -oP "AIN5.*\[\K[^\]]*"
3.087305
```

5.3 Fan Control

To obtain FAN PWM and RPM:

```
# Check the which hwmon to identify FAN PWN, RPM
$ cd /sys/class/hwmon
$ ll
```

```
nvidia@tegra-ubuntu:/sys/class/hwmon$ ll
total 0
drwxr-xr-x   2 root root 0 May 31 04:54 ./
drwxr-xr-x 100 root root 0 May 31 04:53 ../
lrwxrwxrwx   1 root root 0 Jun  2 16:26 hwmon0 -> '../../devices/platform/bus@0/3520000.padctl/usb2-0/3520000.padctl:ports:usb2-0:connector/power_supply/usb-charger/hwmon0'/
lrwxrwxrwx   1 root root 0 Jun  2 16:26 hwmon1 -> ../../devices/platform/pwm-fan/hwmon/hwmon1/
lrwxrwxrwx   1 root root 0 May 31 04:54 hwmon2 -> '../../devices/platform/bus@0/c240000.i2c/i2c-1/1-0040/hwmon/hwmon2'/
lrwxrwxrwx   1 root root 0 Jun  2 16:26 hwmon3 -> '../../devices/platform/bus@0/39c0000.tachometer/hwmon/hwmon3'/
lrwxrwxrwx   1 root root 0 May 31 04:54 hwmon4 -> ../../devices/platform/socthern-oc-event/hwmon/hwmon4/
```

```
hwmon1 -> ../../devices/platform/pwm-fan/hwmon/hwmon1
hwmon3 -> ../../devices/platform/bus@0/39c0000.tachometer/hwmon/hwmon3
# Get FAN PWM
$ cat hwmon1/pwm1

# Get FAN RPM
$ cat hwmon3/rpm
```

5.4 CAN Bus

For D131S CAN Bus usage, ensure Dip Switch #2 is ON (see section 3.22).

(1) Enable and setup CAN Bus

```
# 1. Enable CAN Bus
$ sudo modprobe can
$ sudo modprobe can-raw
$ sudo modprobe mttcan

# 2. Setup CAN Bus
$ sudo ip link set can0 type can bitrate 500000 dbitrate 2000000 berr-reporting on fd
on restart-ms 100
$ sudo ip link set can0 up
```

```
nvidia@tegra-ubuntu:~$ ifconfig
can0: flags=193<UP,RUNNING,NOARP>  mtu 72
        unspec 00-00-00-00-00-00-00-00-00-00-00-00-00-00-00-00  txqueuelen 10  (UNSPEC)
        RX packets 0  bytes 0 (0.0 B)
        RX errors 0  dropped 0  overruns 0  frame 0
        TX packets 0  bytes 0 (0.0 B)
        TX errors 0  dropped 0 overruns 0  carrier 0  collisions 0
        device interrupt 203
```

(2) Receive and Send

```
# Receive
$ candump can0

# Send
$ cansend can0 <can_frame>
```

* where:

<can_frame> is CAN Bus frame message, see `cansend --help` for more detail.

5.5 MIPI CSI Camera

The D131S supports two 4-lane MIPI CSI cameras. Currently supported models include:

* Raspberry Pi V2 IMX219
* Raspberry Pi V2 IMX477
* IMX179
* IMX290
* IMX290ISP

Refer to the BSP Release Note for camera testing commands.

5.6 GPIO usage

JetPack 6.2 uses the built-in "gpiod" for GPIO access, as documented at https://kernel.googlesource.com/pub/scm/libs/libgpiod/libgpiod/+/v0.2.x/README.md

The following command-line tools are available:

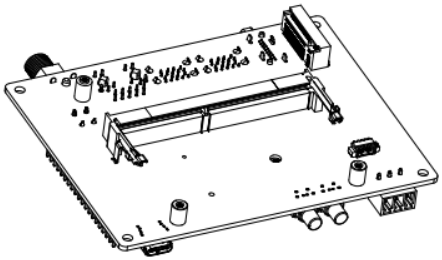
- **gpiodetect**: Lists all gpiochips, their names, labels, and the number of GPIO lines.
- **gpioinfo**: Lists all lines of specified gpiochips, including their names, consumers, direction, active state, and flags.
- **gpioget**: Reads values of specified GPIO lines.
- **gpioset**: Sets values of specified GPIO lines and can keep the lines exported, waiting until a timeout, user input, or signal.
- **gpiofind**: Finds the gpiochip name and line offset given the line name.
- **gpiomon**: Monitors a GPIO line for specified events, allowing configuration of the number of events to process or whether to report events to the console.

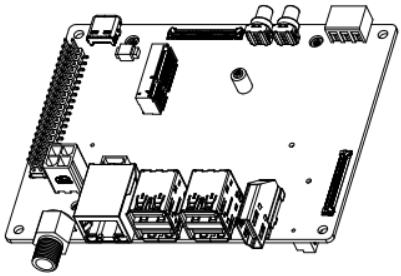
5.7 Power Consumption

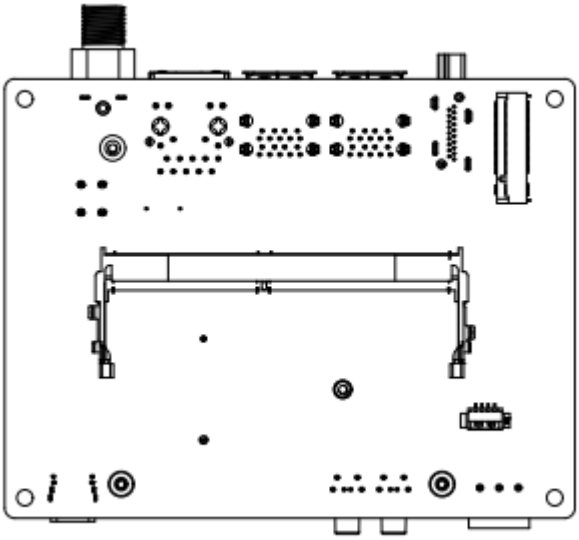
Item Description	Power Consumption
Theoretical Maximum System Power Consumption	D131SOXB Power Consumption: 6.48W(standby) to 48W (full loading). The condition is connected to USB3.2 device*4, MIPI 4 lane*2, SSD 256G*1, WIFI AX210*1, HDMI*1, with CPU/ GPU super mode full loading. (maximum power consumption up to 90W based on adapter)
Typical System Power Consumption	The power consumption under the normal operating mode is depending on the application software running with NVIDIA® Orin™ NX

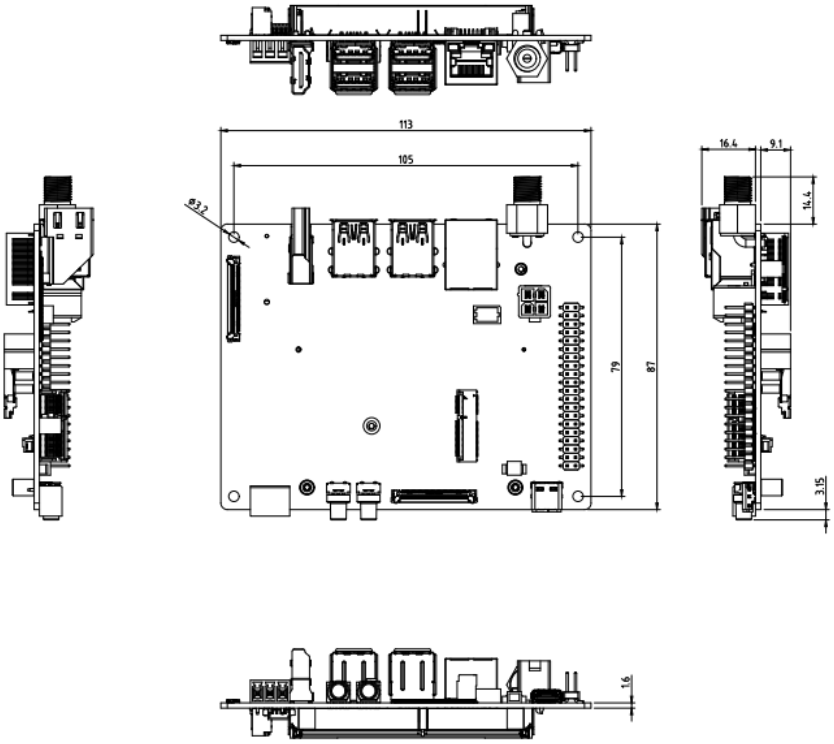
6.0 Dimension Drawings

6.1Dimension Drawings of D131S carrier board

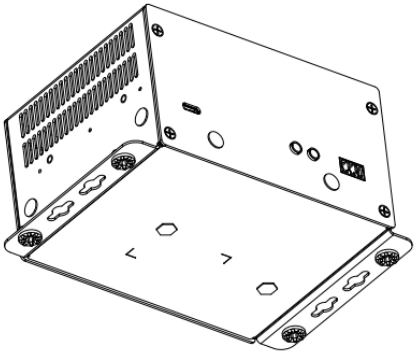


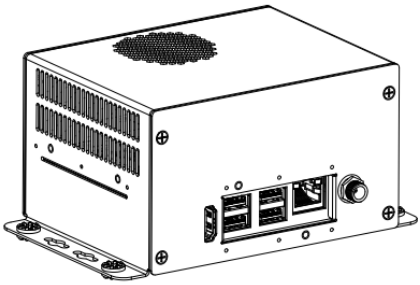


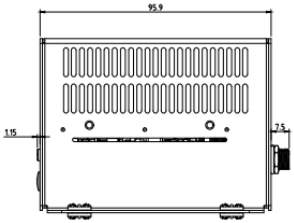


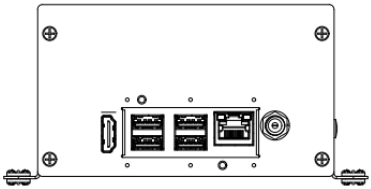


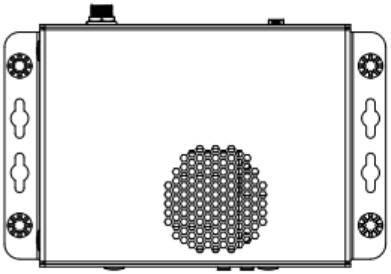
6.2 Dimension Drawing of D131S BOX PC

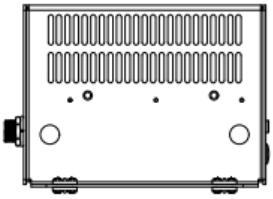


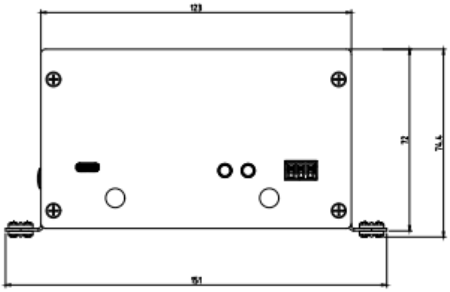


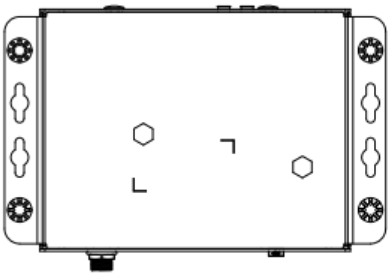

95.9
1.15
7.5



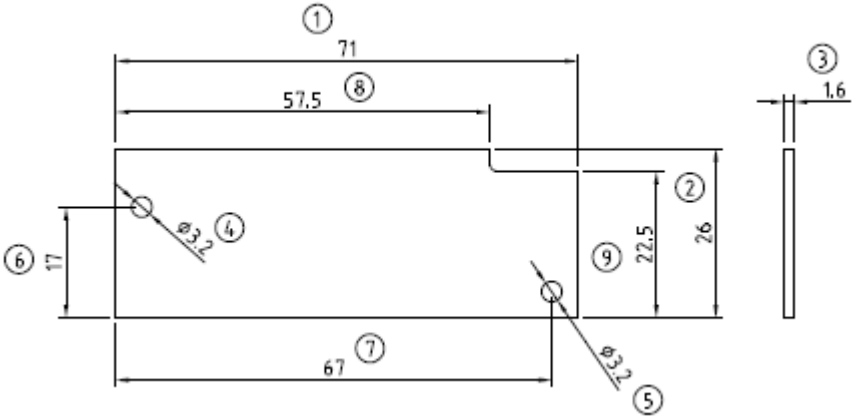


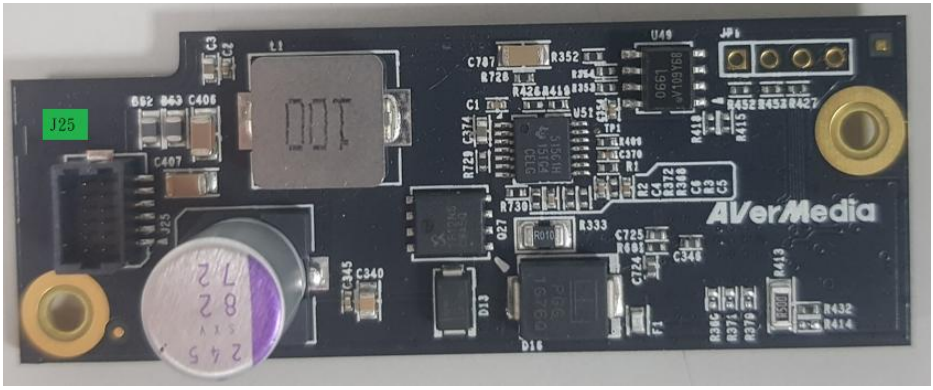



123
72
76.6
151



6.3 Dimension Drawing of PSE Board



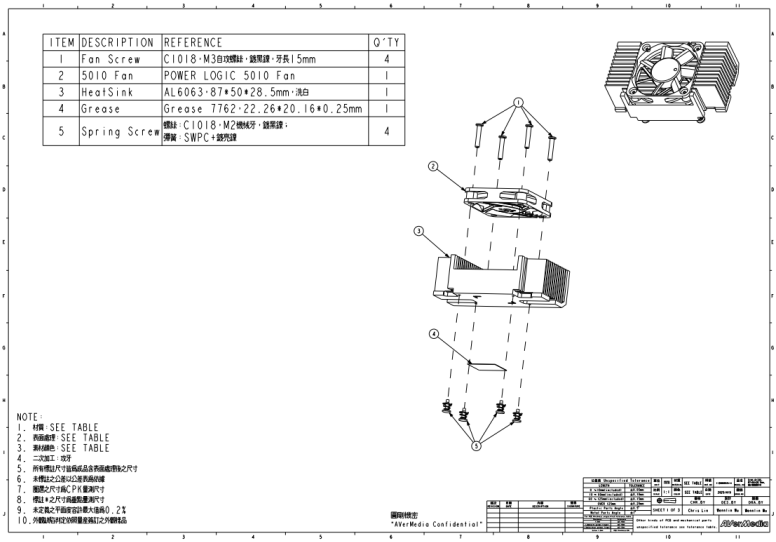


7.0 Accessory Drawings

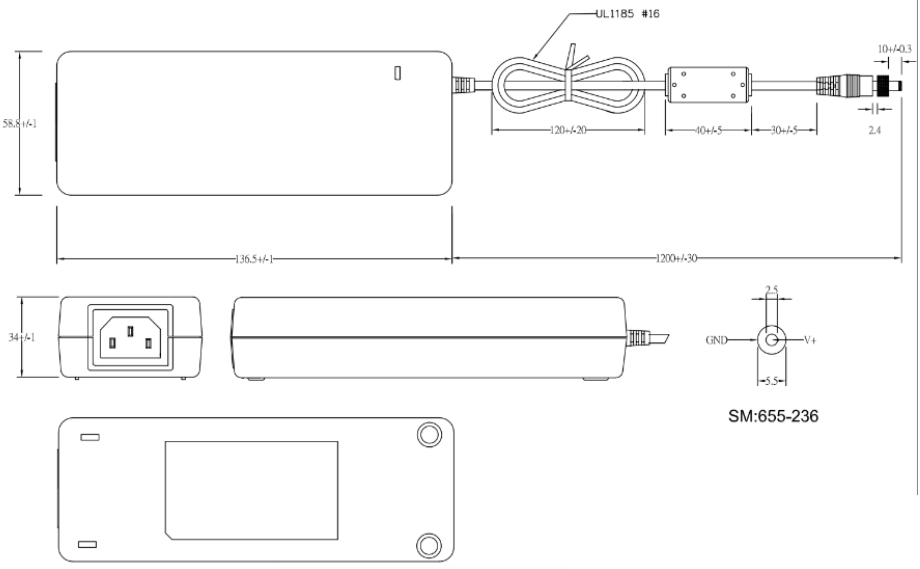
7.1 Fan Module / Adapter/ Power Cord

Fan Module for Orin NX/Orin Nano

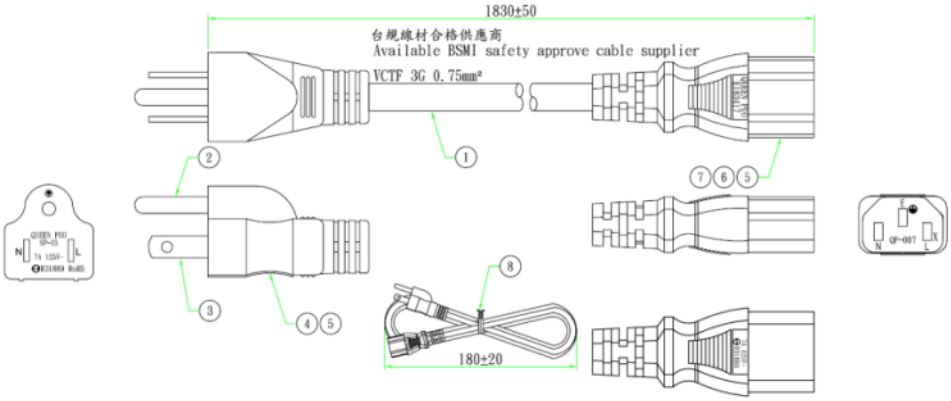
- Rated Voltage: 5V
- Operating Voltage Range: 3.5V~5.5V
- Rated Speed: 6000RPM±10%
  (Testing Speed After Continuous 3 Minute Operation At Ambient Temperature Of 25℃)
- Life Expectancy: 70,000hours at 40°C (WITH 15~65% RH)
- Bearing Type: Two Ball



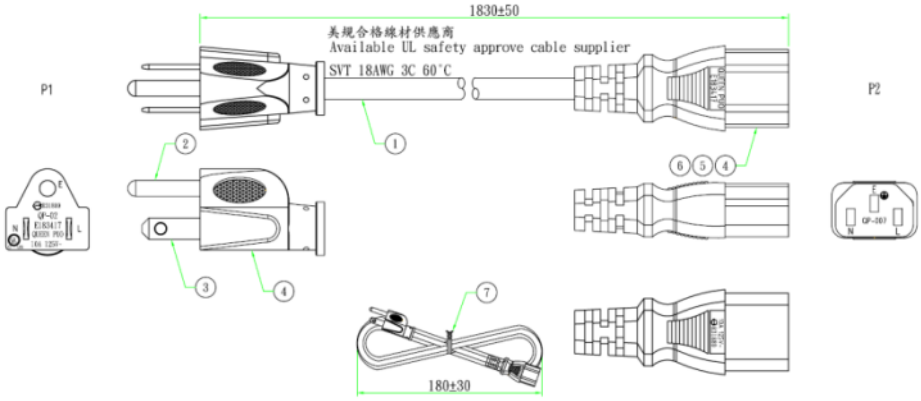
Power Adapter 041312GOYANW (for Super Mode)



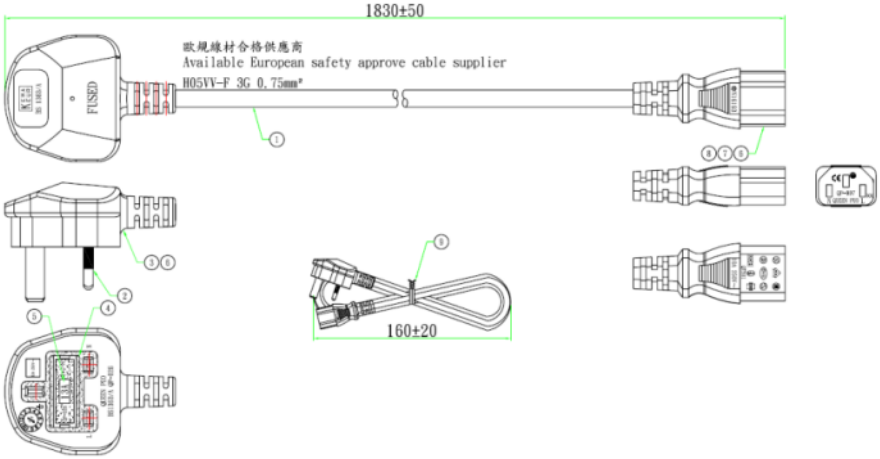
064APOWERBRX-IPD (TW version)



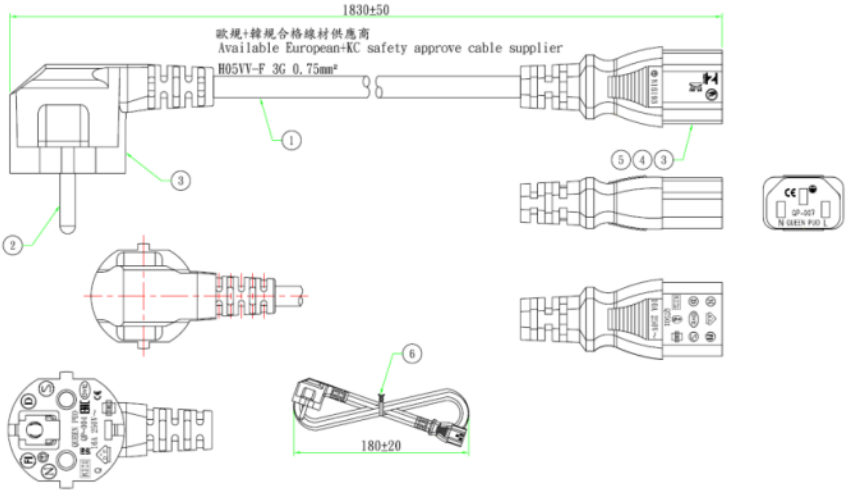
064APOWERBR2-IPD (US version)



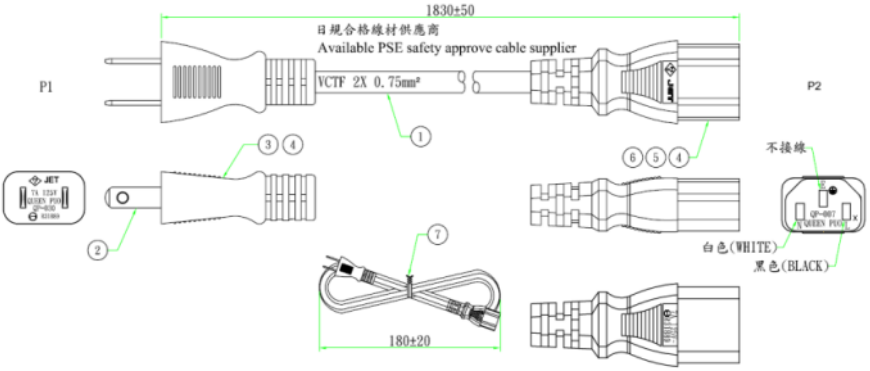
064APOWERBRW-IPD (UK version)



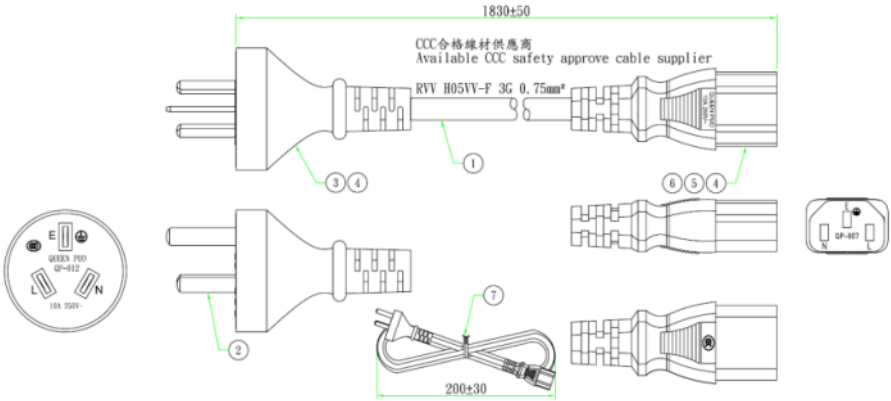
064APOWERBR5-IPD (EU version)



064APOWERBSL (JP version)

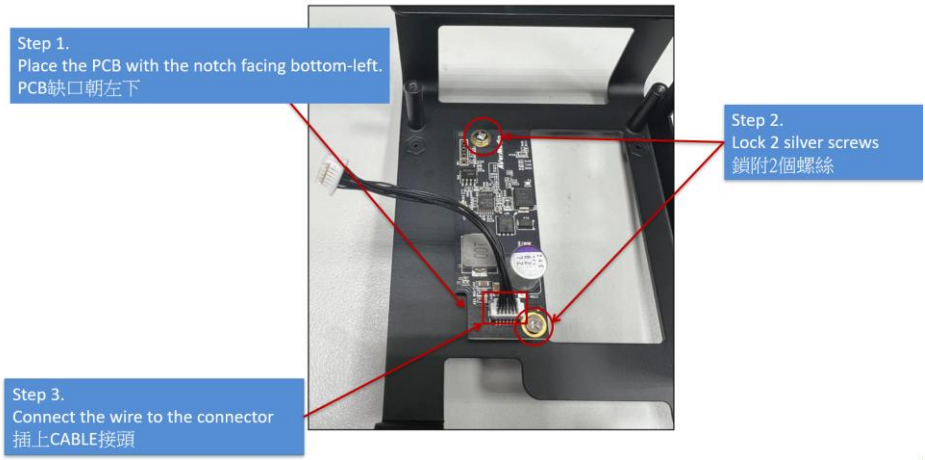


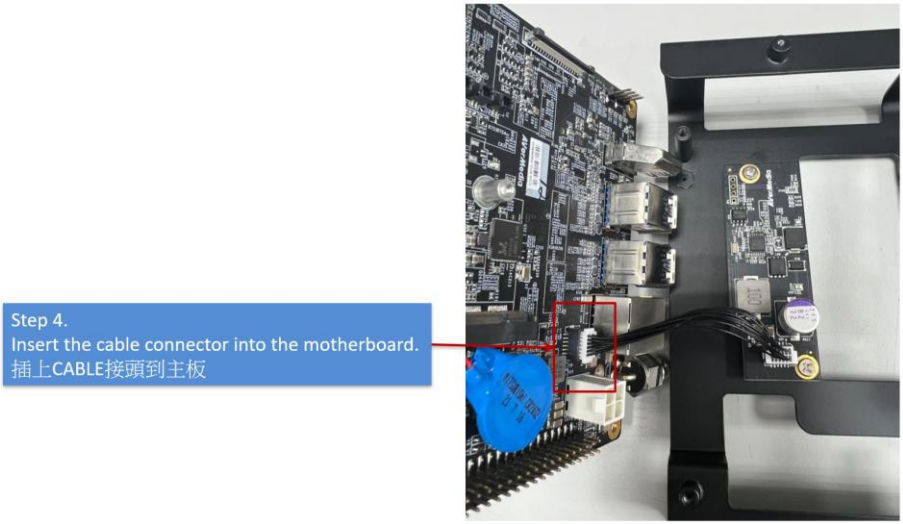
064APOWERBR4-IPD (CN version)



8.0 Accessory Assembly SOP

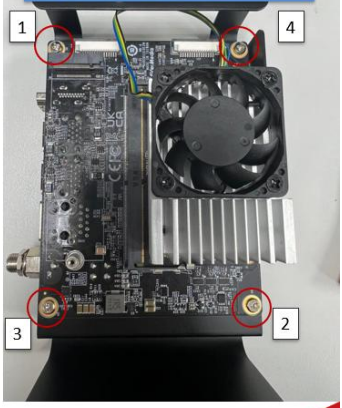
8.1 PSE board





Step 5.
Store the wires within the space between the large capacitor and the external connectors, ensuring they do not extend beyond the red box to avoid damaging the wires.
將線材收納在大電容與外部連接器間的空間，勿超出紅框範圍以免壓傷線材

Step 6.
Lock the four silver screws in order.
依序鎖附4個螺絲



Step 7.
Assembly complete. PoE functionality can be used directly after installing the BSP.
組裝完成，安裝完BSP後可直接使用PoE功能