AVerMedia D131L series

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

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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.

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 24, 2023	1st Released
Version 0.2	June 17, 2023	● Update product spec ● Add Dip swtich information
Version 0.3	July 11, 2023	Add OOB information into spec
Version 0.4	October 05, 2023	Revise 40-Pin GPIO expansion pinout
Version 0.5	October, 25, 2023	Update dip switch button instruction and 40-Pin GPIO expansion pinout
Version 0.6	January, 31, 2024	1. Update Ethernet LED indicator information & PCN number on DC power jack 2. Modified power requirement according to PCN20230901-2 (9V-24V / 5A-2.6A)
Version 0.7	Februrary, 15, 2024	Add accessory assmbly SOP for PSE board
Version 0.8	March, 22, 2024	Add Power Consumption .
Version 0.9	April, 24, 2024	Revise Fan Pinout
Version 1.0	May, 17, 2024	Update how to flash JetPack 6 to D131L
Version 1.1	Auguest, 12, 2024	Update 3.13 40-Pin GPIO expansion
Version 1.2	September, 04, 2024	1. M.2 E key 2230 / M.2 M key 2280 Remark Description 2. Product Specifications Dimensions Size 3. OOB Board Connector Remark Description 4. Power Control Button Remark Description 5. Force Recovery Button Remark Description
Version 1.3	Decembe,25,2024	USB3.2 GEN1 bandwidth description
Version 1.4	June,20,2025	1. Fan connector Description 2. MIPI CSI-2 DPHY Lanes Remark Description 3. 40-Pin GPIO expansion Remark Description 4 PSE Board Connector Remark Description 5 Debug Port Remark Description
Version 1.5	Sep. 15, 2025	Modify Product warranty

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Product Warranty

Please refer to Support | Warranty And Rma Services | AVerMedia

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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 AVerMedia D131L includes fully featured carrier board which is all developed for NVIDIA® Jetson Orin™ NX / Orin™ Nano modules. AVerMedia D131L 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.

D131L provides one HDMI video output, four USB 3.2 ports, one GbE RJ-45 port (Option POE), 40-pin expansion header , and one Micro-B USB 2.0 port for recovery.

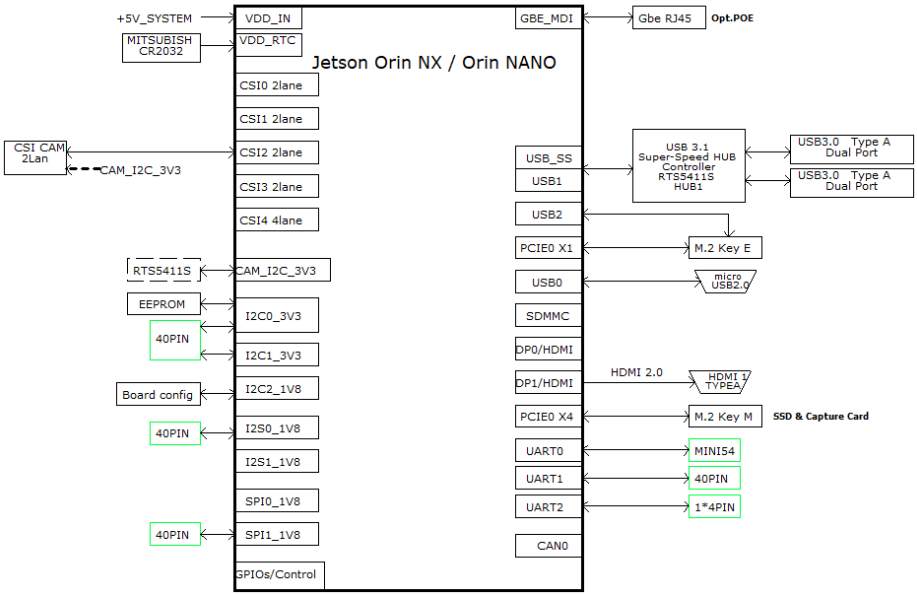
Operating with NVIDIA® BSP and the rich I/O functions, AVerMedia D131L is the perfect choice in building a compact, high performance AI edge computing platform for the intelligent video analytics applications.

1.1 Product Specifications

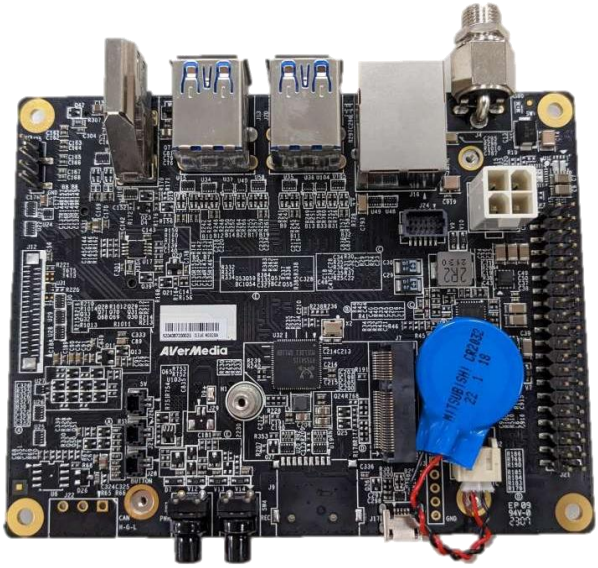
Model	D131L	
Type	Carrier board	
BSP	Applied to NVIDIA BSP directly	
NVIDIA GPU SoC Module Compatibility	NVIDIA® Jetson Orin™ NX/ Orin™ NANO module	
Networking	1x GbE RJ-45 (PoE option) 1xM.2. key E 2230 for Wi-Fi (AC9260)	
Display Output	1x HDMI 3840 x 2160 at 60Hz for Orin NX, 3840 x 2160 at 30Hz for Orin Nano	
Temperature	Operating temperature 0°C~70°C Option 0°C~60°C (PSE 802.3 AF) Storage temperature -40°C ~ 85°C Relative humidity 40 °C @ 95%, Non-Condensing	
MIPI Camera Inputs	1x 2 lane MIPI CSI-2, 15 pin FPC 1mm Pitch Connector	
USB	1x USB 2.0 Micro-B for recovery 4x USB3.2 Gen1 (5G) type A (Total Bandwidth: 5Gbps)	
Storage	1x M.2 key M 2280 for SSD	
Expansion Header	40-pin: 1x UART, 2x SPI, 2x 12C, 1x I2S, 6x GPIOs, 1xDip Switch button 1x OOB supported by Allxon	
Power requirement (PCN20230901-2)	Voltage	DC 9~24V
	Current	DC IN Jack on board: 5A~2.6A
		ATX 4pin: 5A~2.6A
Power adapter/Power Cord	12V/5A 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	• D131L: 113mm x87mm(4.45” x 3.43”), weight : 95g • D131LOX/D131LON: 113mm x 105mm x 50mm(4.45” x 4.13” x 1.97”), weight : 220g	
Certifications	CE, FCC,KC	
Remark	**MIPI Camera Inputs :** In the default support for D131L is raspberry v2(imx219), and about the MIPI Camera supported for Orin NX/ Orin Nano, please refer to https://developer.nvidia.com/embedded /jetson-partner-supported-cameras?t1_supported-jetson-products=Orin+nx	

2.0 Product Overview

2.1 Block Diagram



2.2 Front View and Back View of Carrier board



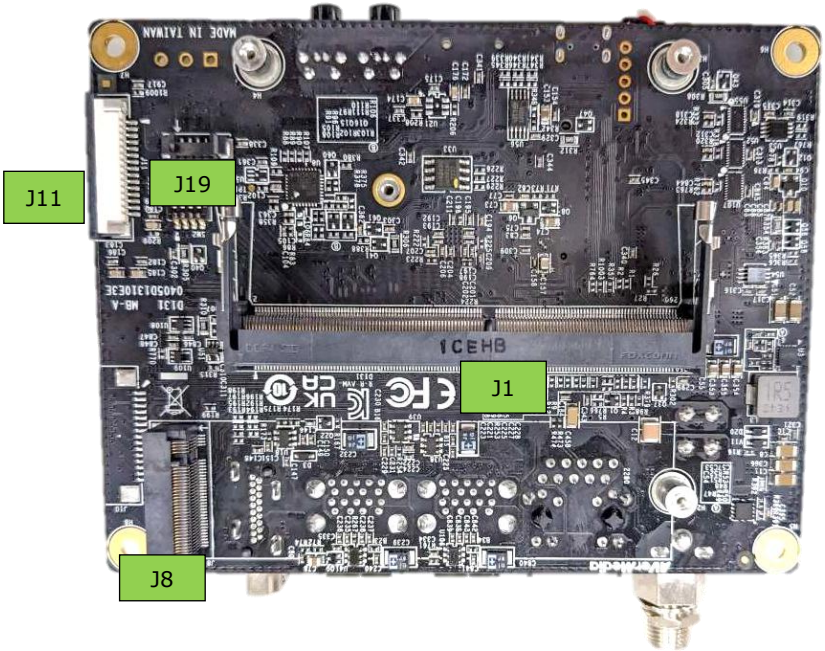
2.3 Connector Summary

J1	SO-DIMM 260-pin 90° SMD Socket(H-9.2mm) for Jetson Orin™ NX/ Orin™ Nano SOM
J2	External RTC Battery wafer
J4	DC power Jack with Lock
J6	HDMI output Type-A Vertical Side Connector (Female)
J7	M.2 E-Key Socket
J8	M.2 M-Key Socket
J11	FPC connector for 2-lane MIPI CSI-2
J13	USB 3.2 Gen1 Dual Port Type A Connector
J20	USB 3.2 Gen1 Dual Port Type A Connector
J16	RJ45 1Gb Ethernet connector (POE support optional)
J17	USB 2.0 Micro B Connector
J19	Fan Wafer
J21	40-pin Expansion
J23	Input Power – 4.2mm Pitch 90° ATX Power 4P
J24	PSE Board Connector (Maximum 15W)
J25	Debug Port
J26	OOB Board Connector (5V)
J27	OOB Board Connector (Reset)
J28	OOB Board Connector (Power)
SW2	Dip Switch Button
SW3	Power Button w/LEDs
SW4	Recovery Button w/LEDs

2.4 Carrier Board Interface

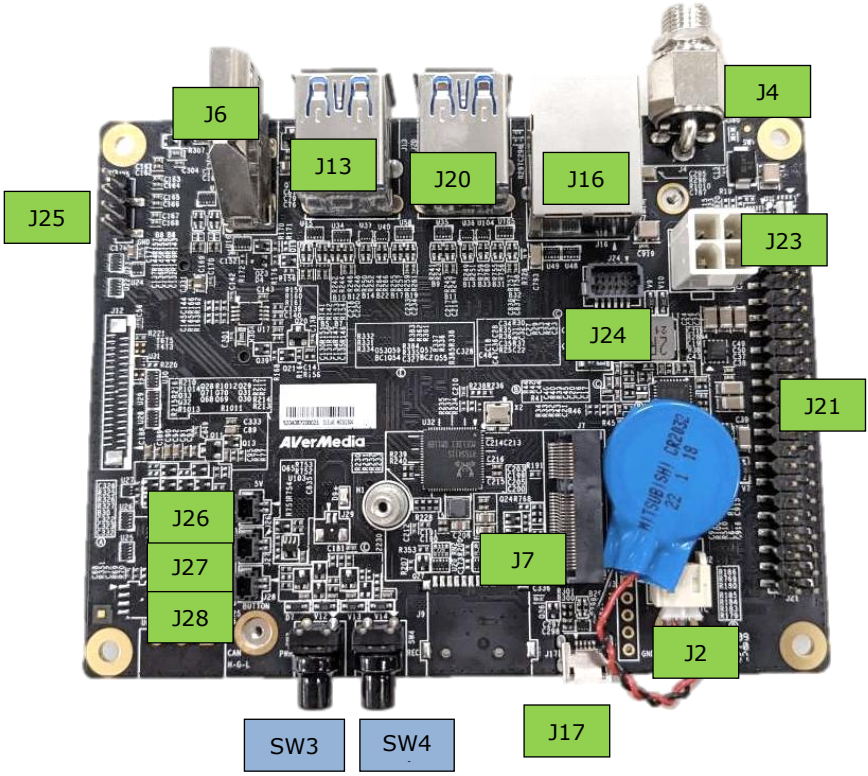
Top View Interface

J1	SO-DIMM 260-pin 90° SMD Socket(H-9.2mm) for Jetson Orin™ NX/ Orin™ Nano SOM
J8	M.2 M-Key Socket
J11	FPC connector for 2-lane MIPI CSI-2
J19	Fan Wafer



Bottom View Interface

J2	External RTC Battery wafer
J4	DC power Jack with Lock
J6	HDMI output Type-A Vertical Side Connector (Female)
J7	M.2 E-Key Socket
J13	USB 3.2 Gen1 Dual Port Type A Connector
J16	RJ45 1Gb Ethernet connector (POE support optional)
J17	USB 2.0 Micro B Connector
J20	USB 3.2 Gen1 Dual Port Type A Connector
J21	40-pin Expansion
J23	Input Power – 4.2mm Pitch 90° ATX Power 4P
J24	PSE Board Connector (Maximum 15W)
J25	Debug Port
J26	OOB Board Connector (5V)
J27	OOB Board Connector (Reset)
J28	OOB Board Connector (Power)
SW3	Power Button w/LEDs
SW4	Recovery Button w/LEDs

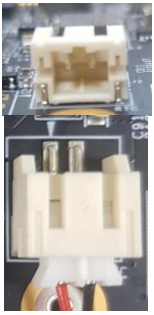


3.0 Feature Description

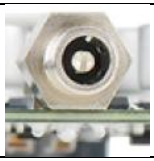
3.1 Jetson module Connector

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

3.2 RTC Battery Connector

Function	RTC battery for module	
Location	J2	
Type Description	2.0mm wire-to-board header 02P type	
Manufacturer and Part Number	Pinrex, 721-94-02TWR9	
Mating Connector	Tyu, TU2001HNO-02	
Pinout	Pin # / Description PIN1 / 3V Power PIN2 / GND	
Remarks	RTC Battery: MITSUBISHI, CR2032 3V	

3.3 DC POWER JACK

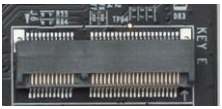
Function	DC Power input with lock	
Location	J4	
Type Description	JACK_DC POWER_D2.5 ㎜_90°_DIP include nut and washer	

Manufacturer and Part Number	京政 JKCR DCD-020-105B	
Mating Connector	伸銘 SMCTS OD 5.5*2.5 mm DC 10mm (655-236)	
Pinout	<table><tr><th>Pin Number</th><th>Description</th></tr><tr><td>Center</td><td>Power</td></tr><tr><td>Outer ring</td><td>GND</td></tr></table>	
Remarks	NA	

3.4 HDMI OUTPUT

Function	HDMI output connector	
Location	J6	
Type Description	HDMI Type-A female connector	
Manufacturer and Part Number	捷湧 EDL TECHNOLOGY CO. HM-FVD480B	
Mating Connector	Any HDMI standard Type-A interface cable or device.	
Pinout	Please refer to HDMI standard.	
Remarks	NA	

3.5 M.2 E key 2230

Function	M.2 E key	
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	Support PCIe Gen4 x1 & USB 2.0 for Orin NX Support PCIe Gen3 x1 & USB 2.0 for Orin Nano	

3.6 M.2 M key 2280

Function	M.2 M key
Location	J8
Type Description	SOCKET_M.2-KEY M_75PIN_90°_SMD
Manufacturer and 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	Support PCIe Gen4 x4 for Orin NX Support PCIe Gen3 x4 for Orin Nano

3.7 MIPI CSI-2 DPHY Lanes

Function	MIPI camera module connector
Location	J11
Type Description	WAFER_15PIN_1 ㎜_90°
Manufacturer and Part Number	CHAMPWAY AFA07-S15FCA-HF_FPC ZIF-LOWER
Mating Connector	2 Lane MIPI CSI-2 camera connector (15Pin)

Pinout

J11

PIN#	Description	Module Pin#	Type/ Dir
1	GND	-	Ground
2	CSI2_D0_N	22	Input, MIPI
3	CSI2_D0_P	24	Input, MIPI
4	GND	-	Ground
5	CSI2_D1_N	34	Input, MIPI
6	CSI2_D1_P	36	Input, MIPI
7	GND	-	Ground
8	CSI2_CLK_N	28	Input, MIPI
9	CSI2_CLK_P	30	Input, MIPI

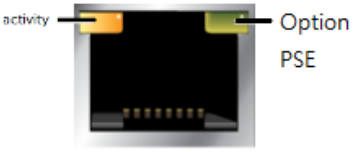
	10	GND	-	Ground
	11	CAM1_PWDN	120	Output, 1.8V
	12	CAM1_MCLK	122	Output, 1.8V
	13	I2C_CAM1_SCL	213	Output, 3.3V
	14	I2C_CAM1_SDA	215	Bidir, 3.3V
	15	+3V3_SYSTEM	-	Power, 3.3V
Remarks	In the default support for D131L is raspberry v2(imx219), and about the MIPI Camera supported for Orin NX/ Orin Nano, please refer to https://developer.nvidia.com/embedded/jetson-partner-supported-cameras?t1_supported-jetson-products=Orin+nx			

3.8 USB 3.2 Gen 1 Type-A Connector #1 , #2, #3

Function	USB 3.2 Gen 1 Type-A connector #1 #2 #3	
Location	J13, J20	
Type Description	Dual-port USB 3.2 Gen 1 Type-A female connector	
Manufacturer and Part Number	Champway, CU3B-AFR15U-096H	
Mating Connector	Any USB 3.2 standard Type-A interface cable or device.	
Pinout	Please refer to USB 3.2 Gen 1 standard.	
Remarks	None	

3.9 Gigabit Ethernet Connector

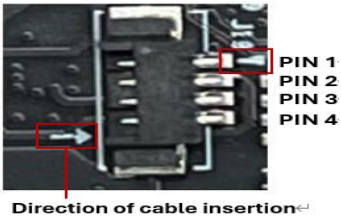
Function	1Gb single-port Ethernet connector, used to connect to the host system.	
Location	J16	
Type Description	RJ45 with integrated magnetics	
Manufacturer and Part	MJ45-111QC4A-GY-S307	

<table>
<tr><td>Number</td><td></td><td rowspan="3">  </td></tr>
<tr><td>Mating Connector</td><td>Any standard 1Gb Ethernet mating connector can be applicable.</td></tr>
<tr><td>Pinout</td><td>Comply with Ethernet standards.</td></tr>
<tr><td>LED indicator</td><td colspan="2"><table>
<tr><th colspan="2">Activity LED (left)</th><th colspan="2">Link/Speed LED (right)</th></tr>
<tr><th>Status</th><th>Description</th><th>Status</th><th>Description</th></tr>
<tr><td>Yellow Blinking</td><td>Data transmission or receiving is occurring</td><td>Green</td><td>PSE Ready</td></tr>
<tr><td>Off</td><td>No data transmission or receiving is occurring</td><td>Off</td><td>W/O PSE</td></tr>
</table> 
</td></tr>
<tr><td>Remarks</td><td colspan="2">PSE Option.</td></tr>
</table>

3.10 Jetson platform/ USB 2.0 Micro B Connector

<table>
<tr><td>Function</td><td>BSP Installation as recovery mode</td><td rowspan="6">  </td></tr>
<tr><td>Location</td><td>J17</td></tr>
<tr><td>Type Description</td><td>USB micro-type B female connector</td></tr>
<tr><td>Manufacturer and Part Number</td><td>Fullglory, FG-MCB-111440</td></tr>
<tr><td>Mating Connector</td><td>Any USB standard Micro-type interface cable or device.</td></tr>
<tr><td>Pinout</td><td>Please refer to USB Micro-type standard.</td></tr>
</table>

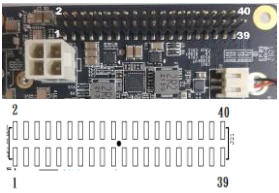
3.11 Fan connector

Function	Fan Power Connector	
Location	J19	
Type Description	WAFER_1*4PIN_1.25 ㎜_90°	
Manufacturer and Part Number	ACES 50271-0040N-001_BLACK	
Mating Connector	ACES 50276-004H0H0-001	
Pinout		

Pin #	Description	Module Pin#	Type/ Dir
1	GND	-	Ground
2	+5V Power	-	Power, 5V
3	FAN_TACH	127	Input, 5V
4	FAN_PWM	230	Output, 5V

Remarks	None

3.12 40-Pin GPIO expansion

Function	General-purpose input/output	
Location	J21	
Type Description	Expansion I/O Connector	
Manufacturer and Part Number	212-92-20GBEL	
Mating Connector	40-Pin GPIO expansion	
Pinout	D131L+Orin NX /Orin Nano	

Address	Pin Name	40-pin Index		Pin Name	Address
	3V3 VDC	1	2	5V VDC	
/dev/i2c-7	I2C1_SDA	3	4	5V VDC	
	I2C1_SCL	5	6	GND	
gpio492	GPIO09_LS	7	8	UART1_TXD_LS	JetPack5: / dev/ttyTHS0
	GND	9	10	UART1_RXD_LS	JetPack6: / dev/ttyTHS3
gpio460 Only Ouput	UART1_RTS_LS	11	12	I2S0_SCLK_LS	gpio398
gpio470	SPI1_SCK_LS	13	14	GND	
gpio433	GPIO12_LS	15	16	SPI1_CS1_LS	gpio474
	3V3 VDC	17	18	SPI1_CS0_LS	gpio473
gpio483	SPI0_MOSI_LS	19	20	GND	
gpio482	SPI0_MISO_LS	21	22	SPI1_MISO_LS	gpio471
gpio481	SPI0_SCK_LS	23	24	SPI0_CS0_LS	gpio484
	GND	25	26	SPI0_CS1_LS	gpio485
/dev/i2c-1	I2C0_ID_SDA	27	28	I2C0_ID_SCL	/dev/i2c-1
gpio453	GPIO01_LS	29	30	GND	
gpio454	GPIO11_LS	31	32	GPIO07_LS	gpio389
gpio391	GPIO13_LS	33	34	GND	
gpio401	I2S0_LRCK_LS	35	36	UART1_CTS_LS	gpio461 Only Input
gpio472	SPI1_MOSI_LS	37	38	I2S0_SDIN_LS	gpio400
	GND	39	40	I2S0_SDOUT_LS	gpio399

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:

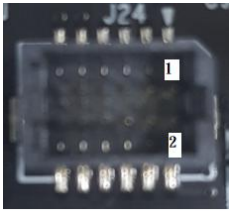
1. **This is current capability per power pin.**
2. **These pins are connected to the SoC directly. They are open-drain (either pulled up or driven low by the SoC when configured as outputs). The max drive that meets the data sheet VOL is ±2 mA.**
3. **These pins connect to TI TXB0108 level translators. 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**.

3.13 ATX 4P

Function	ATX 4P
Location	J23
Type Description	WAFER_2*2PIN_4.2 ㎜_90°_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 / 9-24V Power 4 / 9-24V Power
Remarks	None

3.14 PSE Board Connector.

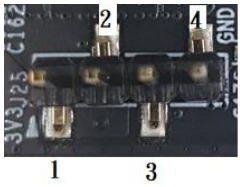
Function	PSE Board Connector.
Location	J24
Type Description	WAFER_2*6PIN_1 ㎜_180°_SMD
Manufacturer and Part Number	ACES 50238-01241-001



<table>
<tr><td>Pinout</td><td>
<table>
<tr><th>PIN#</th><th>Description</th><th>Module Pin#</th><th>Type/ Dir</th></tr>
<tr><td>1</td><td>VDD</td><td>-</td><td>Power Out, 12-24V</td></tr>
<tr><td>2</td><td>GND</td><td>-</td><td>Ground</td></tr>
<tr><td>3</td><td>VDD</td><td>-</td><td>Power Out, 12-24V</td></tr>
<tr><td>4</td><td>GND</td><td>-</td><td>Ground</td></tr>
<tr><td>5</td><td>54V</td><td>-</td><td>Power In, 54V+</td></tr>
<tr><td>6</td><td>SYS_RST</td><td>239</td><td>Bidir, 3.3V</td></tr>
<tr><td>7</td><td>54V</td><td>-</td><td>Power In, 54V+</td></tr>
<tr><td>8</td><td>I2C1_SCL</td><td>189</td><td>Output, 3.3V</td></tr>
<tr><td>9</td><td>54_N</td><td>-</td><td>Power In, 54V-</td></tr>
<tr><td>10</td><td>I2C1_SDA</td><td>191</td><td>Bidir, 3.3V</td></tr>
<tr><td>11</td><td>LED_PSE</td><td>-</td><td>Input, 3.3V</td></tr>
<tr><td>12</td><td>+3V3_STANDBY</td><td>-</td><td>Power Out, 3.3V</td></tr>
</table>
</td></tr>
<tr><td>Remarks</td><td>VDD is following DC_IN voltage
LED_PSE low active, indicate PSE link is ready</td></tr>
</table>

3.15 Debug Port

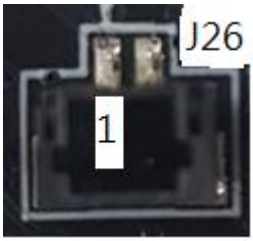
Function	Debug
Location	J25
Type Description	1*4PIN_2.54 ㎜_180°_SMD
Manufacturer and Part Number	ACES 60240-00471-001



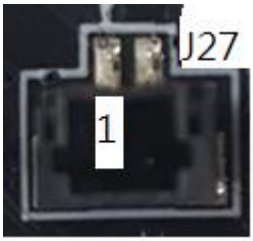
Pinout	<table><tr><th>Pin #</th><th>Description</th><th>Module Pin#</th><th>Type/ Dir</th></tr><tr><td>1</td><td>+3V3 Power</td><td>-</td><td>Power, 3.3V</td></tr><tr><td>2</td><td>UART2_DEBUG_TXD</td><td>238</td><td>Input, 3.3V</td></tr><tr><td>3</td><td>UART2_DEBUG_RXD</td><td>236</td><td>Output, 3.3V</td></tr><tr><td>4</td><td>GND</td><td>-</td><td>Ground</td></tr></table>
Remarks	N.A

3.16 OOB Board Connector.

Function	OOB Board Connector (5V)
Location	J26
Type Description	WAFER_1*2PIN_1 ㎜_180°_SMD
Manufacturer and Part Number	ACES 50228-00271-001
Pinout	<table><tr><th>Pin #</th><th>Description</th></tr><tr><td>PIN1</td><td>5V</td></tr><tr><td>PIN2</td><td>GND</td></tr></table>
Remarks	5V ouput for OOB daughter board



Function	OOB Board Connector (Reset)
Location	J27
Type Description	WAFER_1*2PIN_1 ㎜_180°_SMD
Manufacturer and Part Number	ACES 50228-00271-001
Pinout	<table><tr><th>Pin #</th><th>Description</th></tr><tr><td>PIN1</td><td>SYS_RST*_AI</td></tr><tr><td>PIN2</td><td>GND</td></tr></table>
Remarks	Low active



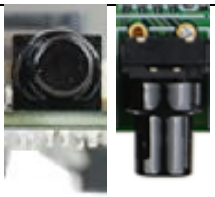
Function	OOB Board Connector (Power)
Location	J28
Type Description	WAFER_1*2PIN_1 ㎜_180°_SMD

<table>
<tr><td>Manufacturer and Part Number</td><td>ACES
50228-00271-001</td><td></td></tr>
<tr><td>Pinout</td><td><table><tr><td>Pin #</td><td>Description</td></tr><tr><td>PIN1</td><td>BUTTON_ON</td></tr><tr><td>PIN2</td><td>GND</td></tr></table></td><td></td></tr>
<tr><td>Remarks</td><td colspan="2">Low active, function is same as SW3</td></tr>
</table>

3.17 Dip Switch button

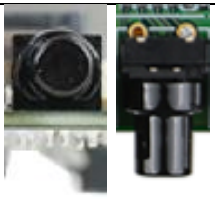
<table>
<tr><td>Function</td><td colspan="2">Fan PWM controller/Auto Power on</td><td rowspan="4"> 
</td></tr>
<tr><td>Location</td><td colspan="2">SW2</td></tr>
<tr><td>Type Description</td><td colspan="2">4 SPST DIP switch</td></tr>
<tr><td>Manufacturer and Part Number</td><td colspan="2">DIPTRONICS IN OFF-SWITCHING
0.025A/24VDC</td></tr>
<tr><td>Pinout</td><td colspan="3"><table><tr><th>Location</th><th>Description</th><th>Switch ON</th><th>Switch Off</th></tr><tr><td>1</td><td>Power On Mode Automatically restart after shutdown</td><td>Always Power On</td><td>X</td></tr><tr><td>2</td><td>CAN0_Terminal</td><td>With 120 ohm Terminal</td><td>W/O 120 ohm Terminal</td></tr><tr><td>3</td><td>Power-Up / Start-up Control When DC Plug In</td><td>ATX Mode (Power Button Press Required)</td><td>AT Mode (Automatic Start up En)</td></tr><tr><td>4</td><td>PWM Fan Control</td><td>FAN Always ON</td><td>SW Controlled</td></tr></table></td></tr>
<tr><td>Remark</td><td colspan="3"></td></tr>
</table>

3.18 Power control button

<table>
<tr><td>Function</td><td>Power control button</td><td rowspan="4">  </td></tr>
<tr><td>Location</td><td>SW3</td></tr>
<tr><td>Type Description</td><td>Button</td></tr>
<tr><td>Manufacturer and Part Number</td><td>Champway
LS67AK-NBR-A-R2KA9</td></tr>
<tr><td>Pinout</td><td colspan="2">N/A</td></tr>
<tr><td>Remark</td><td colspan="2">• When D131L is in "Button Power Mode," pressing the button will initiate the boot-up sequence.</td></tr>
</table>

	• When D131L 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 D131L is ON, holding the button for more than 5 seconds will force a full system power down.

3.19 Force recovery Button

Function	Force recovery	
Location	SW4	
Type Description	Button	
Manufacturer and 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.	

4.0 Installation

Please refer to Nvidia official website to download the BSP and flash to Target.

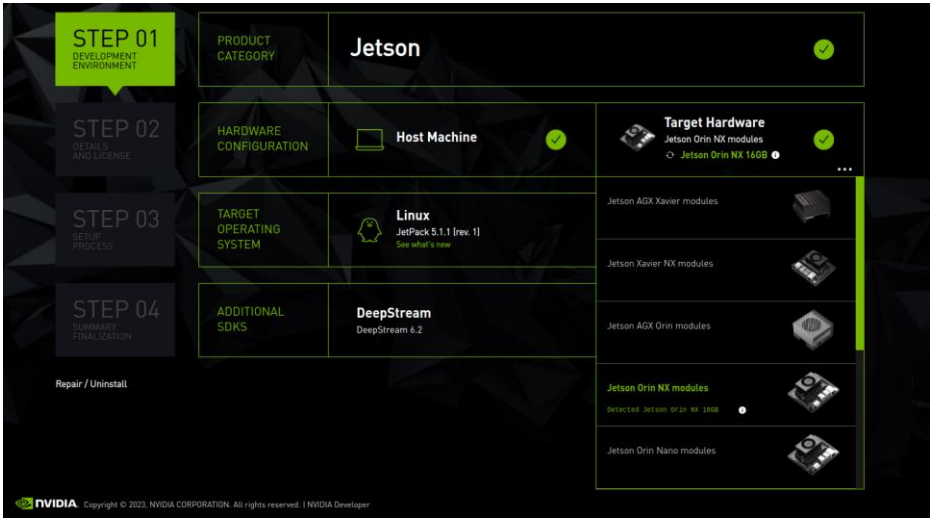
There are 2 ways to download& flash.

1. **SDK Manager**
2. **Visit and download BSP/ROOTFS from Nvidia official website**

SDK Manager

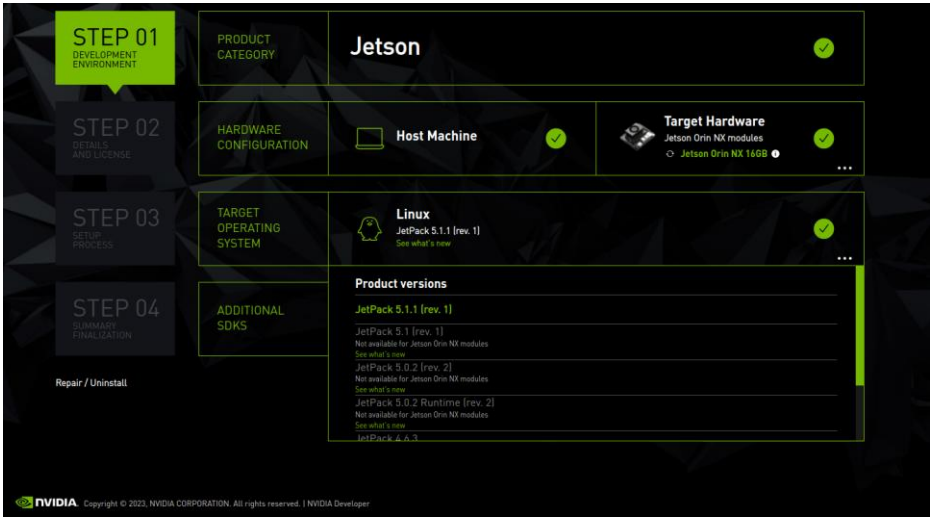
Please refer to the NVIDIA DEVELOPER to download https://docs.nvidia.com/sdk-manager/download-run-sdkm/index.html and SDK Manager install ready.

After prepare SDK Manager, please follow up to install Jetson Software with SDK Manager
https://docs.nvidia.com/sdk-manager/install-with-sdkm-jetson/index.html

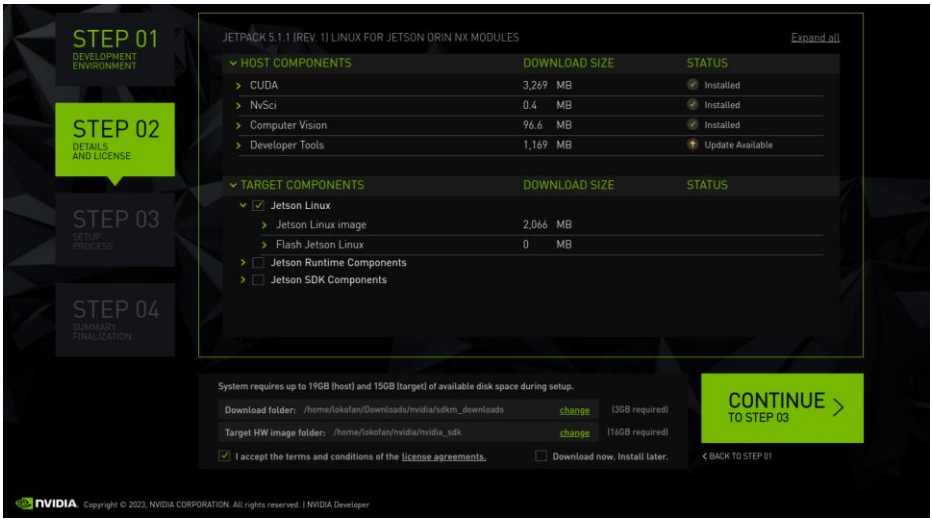


If a Jetson device is connected SDK Manager will auto-select it in the **Target Hardware** drop-down list. If your device is not automatically detected, click **Refresh**. You can hover over the message to display the detailed information of the detected hardware.

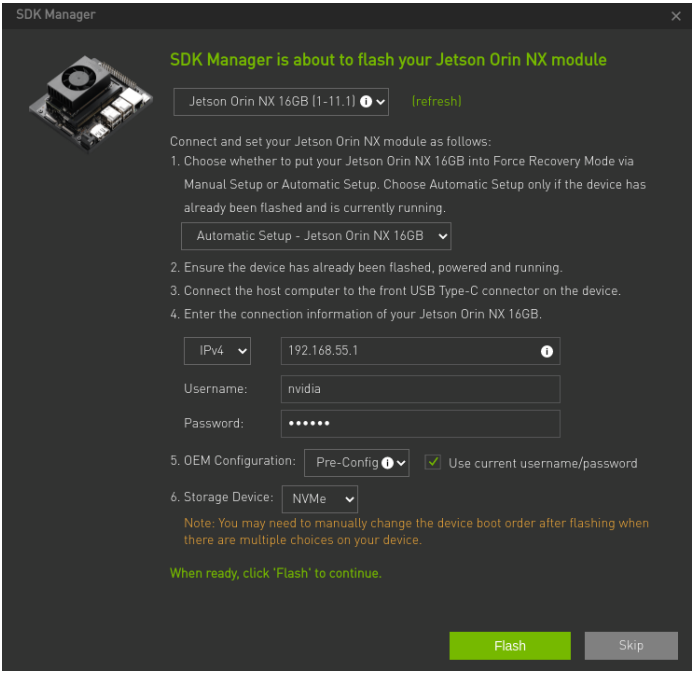
From the Target Operating System panel, select the operating system and JetPack version.

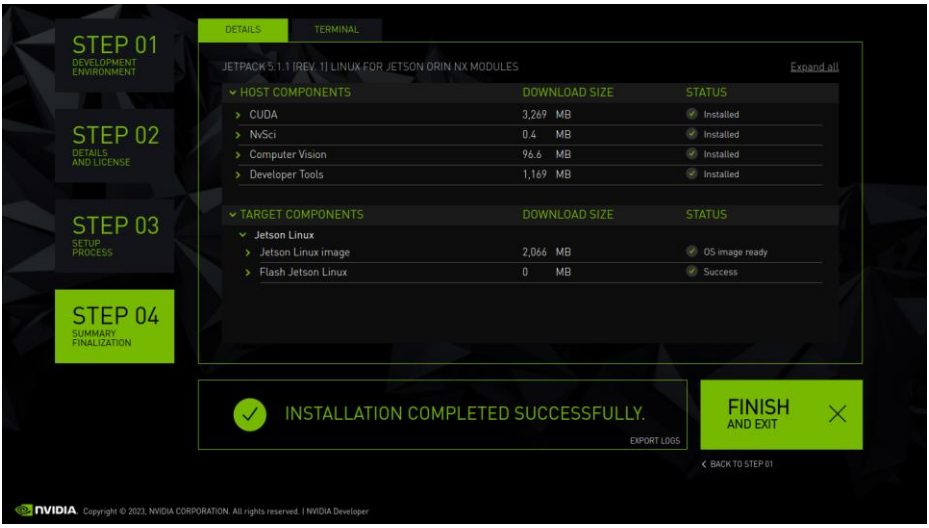


Select Target Components




STEP 01
DEVELOPMENT ENVIRONMENT
STEP 02
DETAILS AND LICENSE
STEP 03
SETUP PROCESS
STEP 04
SUMMARY FINALIZATION
DETAILS
TERMINAL
JETPACK 5.1.1 (REV. 1) LINUX FOR JETSON ORIN NX MODULES
Expand all
HOST COMPONENTS
DOWNLOAD SIZE
STATUS
CUDA 3,269 MB Installed
NvSci 0.4 MB Installed
Computer Vision 96.6 MB Installed
Developer Tools 1,169 MB Downloading - 85%
TARGET COMPONENTS
DOWNLOAD SIZE
STATUS
Jetson Linux
Jetson Linux image 2,066 MB Downloading - 14%
Flash Jetson Linux 0 MB Flash Pending
Downloading: 70.68% (11.12MB/s)
Installing: 63.33%
Download folder: /home/lokofan/Downloads/nvidia/sdkm_downloads
PAUSE FOR A BIT
NVIDIA. Copyright © 2023, NVIDIA CORPORATION. All rights reserved. | NVIDIA Developer


SDK Manager
SDK Manager is about to flash your Jetson Orin NX module
Jetson Orin NX 16GB [1-11.1]
[refresh]
Connect and set your Jetson Orin NX module as follows:
1. Choose whether to put your Jetson Orin NX 16GB into Force Recovery Mode via Manual Setup or Automatic Setup. Choose Automatic Setup only if the device has already been flashed and is currently running.
Automatic Setup - Jetson Orin NX 16GB
2. Ensure the device has already been flashed, powered and running.
3. Connect the host computer to the front USB Type-C connector on the device.
4. Enter the connection information of your Jetson Orin NX 16GB.
IPv4
192.168.55.1
Username: nvidia
Password: ••••••
5. OEM Configuration: Pre-Config
Use current username/password
6. Storage Device: NVMe
Note: You may need to manually change the device boot order after flashing when there are multiple choices on your device.
When ready, click 'Flash' to continue.
Flash
Skip



Flashing complete, the Target will boot up and set up to new automatically.

Visit and Download BSP/ROOTFS from Nvidia official Website

https://developer.nvidia.com/embedded-computing

So far, the latest version is **JetPack 5.1.1 (rev.1)**, NVIDIA Jetson Linux **35.3.1**

Downloads and Links

	Jetson Orin modules and developer kit	Jetson Xavier modules and developer kits
DRIVERS	Driver Package (BSP)	
	Sample Root Filesystem	

https://developer.nvidia.com/embedded/jetson-linux-r3531

DRIVERS	
Driver Package (BSP)	https://developer.nvidia.com/downloads/embedded/l4t/r35_release_v3.1/release/jetson_linux_r35.3.1_aarch64.tbz2/
Sample Root Filesystem	https://developer.nvidia.com/downloads/embedded/l4t/r35_release_v3.1/release/tegra_linux_sample-root-filesystem_r35.3.1_aarch64.tbz2/

Ex my side download to ~/Downloads/nvidia/sdkm_downloads/, please check your own side.

After Download **Driver Package (BSP)** and **Sample Root Filesystem**, follow below Steps to prepare the BSP and reflash:

1.Create a folder "NV_sources_JP5.1.1", move the downloaded sources under there

```
$ mkdir NV_sources_JP5.1.1
$ cd NV_sources_JP5.1.1
$ mv ~/Downloads/nvidia/sdkm_downloads/Jetson_Linux_R35.3.1_aarch64.tbz2 .
$ mv ~/Downloads/nvidia/sdkm_downloads/Tegra_Linux_Sample-Root-Filesystem_R35.3.1_aarch64.tbz2 .
```

2.Unzip the sources,

```
$ sudo tar xjvf Jetson_Linux_R35.3.1_aarch64.tbz2
```

```
$ cd Linux_for_Tegra/rootfs/
$ sudo tar xjvf ../../ Tegra_Linux_Sample-Root-Filesystem_R35.3.1_aarch64.tbz2
$ cd ..
$ sudo ./apply_binaries.sh
```

3.BSP reflash procedure

*EX. device is **Jetson Orin NX + D131L(NVMe)***

Let the JETSON Orin NX 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 MicroUSB to USB cable, you can check **lsusb** status, that should has this item ensure in the recovery mode.

$ lsusb

Bus 001 Device 039: ID 0955:7323 NVIDIA Corp. APX

At first time, create default login username/password of the BSP is **nvidia/nvidia**

```
$ sudo ./tools/l4t_create_default_user.sh -u nvidia -p nvidia -a -n tegra-ubuntu
--accept-license


#flash command

$ sudo ./tools/kernel_flash/l4t_initrd_flash.sh --external-device nvme0n1p1 -c
tools/kernel_flash/flash_l4t_external.xml -p "-c
bootloader/t186ref/cfg/flash_t234_qspi.xml" --showlogs --network usb0
p3509-a02+p3767-0000 internal
```

5.0 Software

This section describes BSP's features for D131L

1. 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/r35.2.1/DeveloperGuide/index.html#page/Tegra%20Linux%20Driver%20Package%20Development%20Guide/clock_power_setup.html# for more information
$ sudo nvpmodel -m <x>
```

   * Current default power mode: D131L: MODE 15W DESKTOP (2)

2. MIPI CSI Camera

   There is 1x 2-lane MIPI CSI camera supported on D131L, for current supported products type is

   * Raspberry pi v2 IMX219 (2-lane)

   About the MIPI Camera supported for Orin NX/ Orin Nano, please refer to https://developer.nvidia.com/embedded/jetson-partner-supported-cameras?t1_supported-jetson-products=Orin+nx

   Test Command:

> Raspberry pi v2 (imx219) :

No	width	height	framerate
0	3264	2464	21
1	3264	1848	28
2	1920	1080	30
3	1640	1232	30
4	1280	720	60

```
$ gst-launch-1.0 nvarguscamerasrc sensor-id=0 sensor-mode=0 !
'video/x-raw(memory:NVMM), width=(int)3280, height=(int)2464,
format=(string)NV12, framerate=(fraction)21/1' ! nvvidconv ! xvimagesink sync=false
-e

        $ gst-launch-1.0 nvarguscamerasrc sensor-id=0 sensor-mode=1 !
'video/x-raw(memory:NVMM), width=(int)3280, height=(int)1848,
format=(string)NV12, framerate=(fraction)28/1' ! nvvidconv ! xvimagesink sync=false
-e

        $ gst-launch-1.0 nvarguscamerasrc sensor-id=0 sensor-mode=2 !
```

```
'video/x-raw(memory:NVMM), width=(int)1920, height=(int)1080,
format=(string)NV12, framerate=(fraction)30/1' ! nvvidconv ! xvimagesink sync=false
-e

        $ gst-launch-1.0 nvarguscamerasrc sensor-id=0 sensor-mode=3 !
'video/x-raw(memory:NVMM), width=(int)1640, height=(int)1232,
format=(string)NV12, framerate=(fraction)30/1' ! nvvidconv ! xvimagesink sync=false
-e

        $ gst-launch-1.0 nvarguscamerasrc sensor-id=0 sensor-mode=4 !
'video/x-raw(memory:NVMM), width=(int)1280, height=(int)720,
format=(string)NV12, framerate=(fraction)60/1' ! nvvidconv ! xvimagesink sync=false
-e
```

3. GPIO usage EX: gpio**492** (**PAC.06**)

(1) check status to know the gpio index

```
$ sudo su

$ cat /sys/kernel/debug/gpio | grep 492

gpio-492 (PAC.06                )
```

(2) Export

```
$ echo 492 > /sys/class/gpio/export

#check status

$ cat /sys/kernel/debug/gpio | grep 492

gpio-492 (PAC.06                |sysfs                ) in    lo
```

(3) direction: Output

```
$ sudo su

# INPUT: in, OUTPUT:out
$ echo out > /sys/class/gpio/PAC.06/direction
#check status

$cat /sys/kernel/debug/gpio | grep 492

gpio-492 (PAC.06                |sysfs                ) out lo
```

(4) Value: low -> high

```
# HIGH:1 LOW:0
```

```
$echo 1 > /sys/class/gpio/PAC.06/value

#check status

$cat /sys/kernel/debug/gpio | grep 492

gpio-492 (PAC.06                |sysfs                ) out hi
```

(5) Disable

```
$ echo 492 >/sys/class/gpio/unexport

$ cat /sys/kernel/debug/gpio | grep 492

gpio-492 (PAC.06                )
```

4. **Force Recovery Mode**

USB 3.l/ Jetson platform port of D131L can be used to re-program NVIDIA® Jetson Orin NX by using the other host system running NVIDIA Jetpack, as the procedure described below.

1. Power off the system. Ensure the system power must be completely OFF, instead of staying in the suspend mode or the sleep mode.
2. Connect a USB cable from Jetson platform USB port to the other host system which will be used to re-program the new system file into NVIDIA® Jetson Orin NX.
3. Press and hold down Force Recovery Button and then power on the carrier board.
4. After three seconds, release Force Recovery Button.
5. NVIDIA® Orin NX will show up on the USB list of the host system as a new NVIDIA target device.

After the system software is updated successfully, please ensure to power off the system. A clean power-on will then revert Jetson platform port back to the host mode.

5.1 Software

This section describes how to flash JetPack 6 to D131L.

1. Prerequisites

   (1) X86 host running Ubuntu 20.04 LTS

   (2)Download the BSP and Sample Root Filesystem

   (Example: Jetson Linux R36.3.0)

   (Example Download Path: ~/Downloads)

2. Process

   (1) Extract BSP and Filesystem

```
$ mkdir NV_JP6.0GA
$ cd NV_JP6.0GA
$ mv ~/Downloads/Jetson_Linux_R36.3.0_aarch64.tbz2 .
$ mv~/Downloads/Tegra_Linux_Sample-Root-Filesystem_R36.3.0_aarch64.tbz2 .
$ sudo tar jxvf Jetson_Linux_R36.3.0_aarch64.tbz2
$ cd Linux_for_Tegra/rootfs/
$ sudo tar jxvf ../../Tegra_Linux_Sample-Root-Filesystem_R36.3.0_aarch64.tbz2
```

   (2) Apply Binaries to Setup Packages

```
$ cd ..
$ sudo ./apply_binaries.sh
```

3. **(Optional)** Apply NV patch for the Carrier Board with HDMI for the Orin NX/Nano Modules **If you encounter a blank screen after flashing, please apply the patch and re-flash the device.**
   File Location: ./bootloader/generic/BCT/tegra234-mb2-bct-scr-p3767-0000.dts

```
reg@322 { /* GPIO_M_SCR_00_0 */
        exclusion-info = <2>;
        value = <0x38009696>;
            };
```

4. Flash the Device

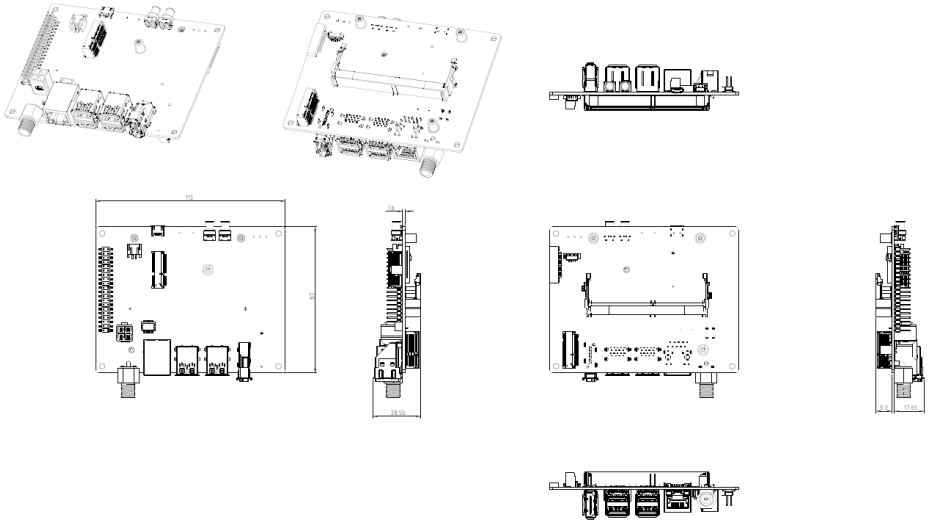
```
# Create default user nvidia/ nvidia
$ sudo ./tools/l4t_create_default_user.sh -u nvidia -p nvidia \
-a -n tegra-ubuntu --accept-license
# Flash to D131L
$ sudo ./tools/kernel_flash/l4t_initrd_flash.sh --external-device nvme0n1p1 \
-c tools/kernel_flash/flash_l4t_external.xml \
-p "-c bootloader/generic/cfg/flash_t234_qspi.xml" \
--showlogs --network usb0 p3509-a02-p3767-0000 internal
```

6.0 Power Consumption

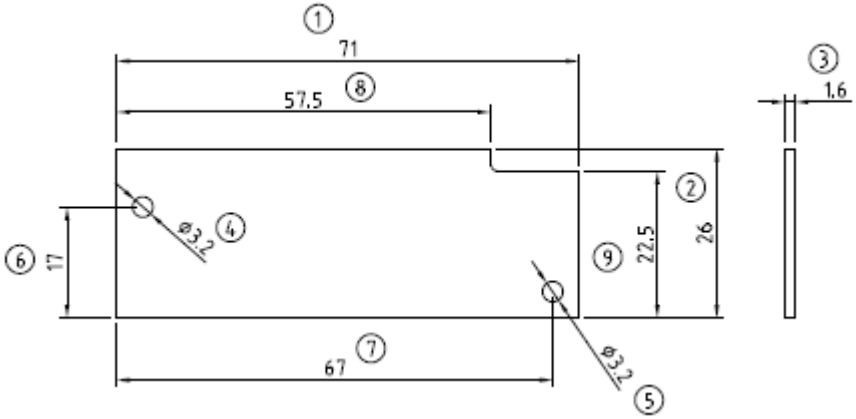
Item Description	Power Consumption
Theoretical Maximum System Power Consumption	D131LOX-16G Power Consumption: 8.47W to 33W (NVIDIA BSP) D131LOX-8G Power Consumption: 8.47W to 28W (NVIDIA BSP) D131LON-8G Power Consumption: 8.47W to 23W (NVIDIA BSP) D131LON-4G Power Consumption: 8.47W to 18W (NVIDIA BSP) The condition is connected to USB3.2*4,USB*1,MIPI 2 lane*1, SSD 256G*1,Wifi 9260*1, HDMI*1, with CPU/ GPU full loading. (maximum power consumption up to 60W 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/Orin Nano

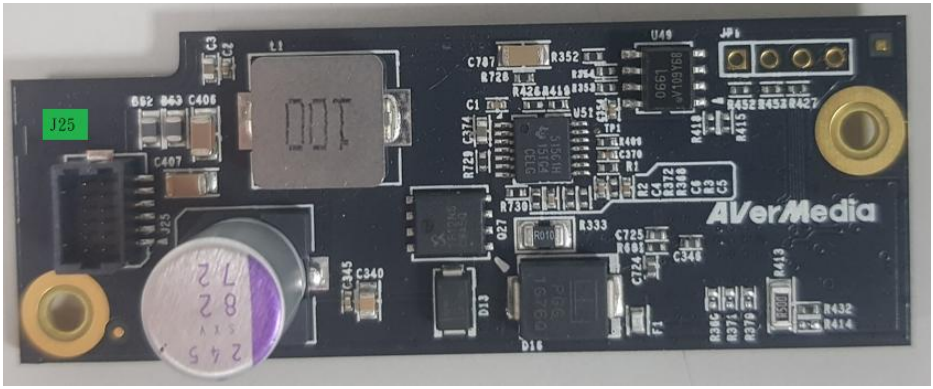
6.0 Dimension Drawings

6.1Dimension Drawings of carrier board



6.2 Dimension Drawing of PSE Board



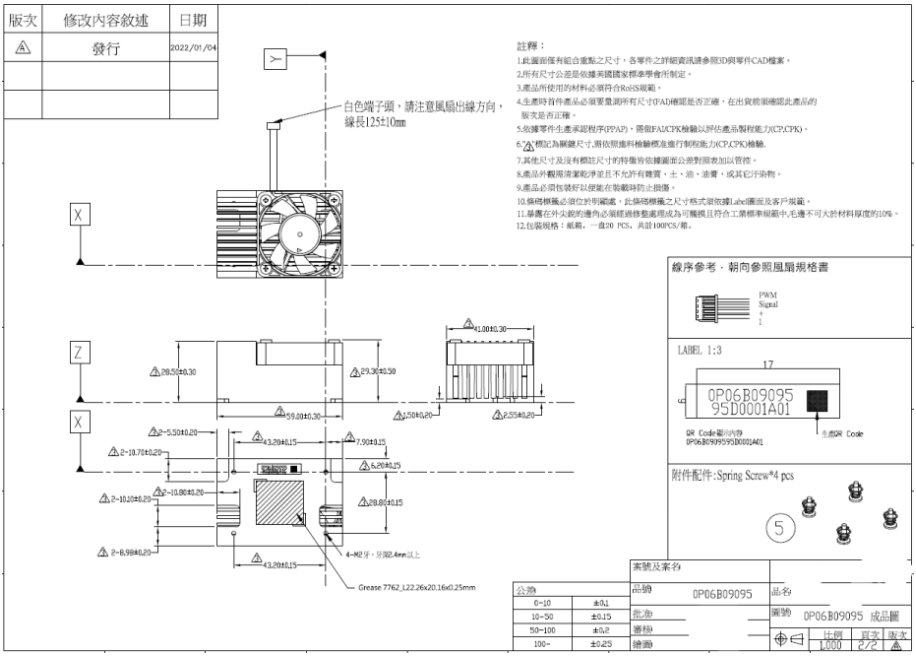


7.0 Accessory Drawings

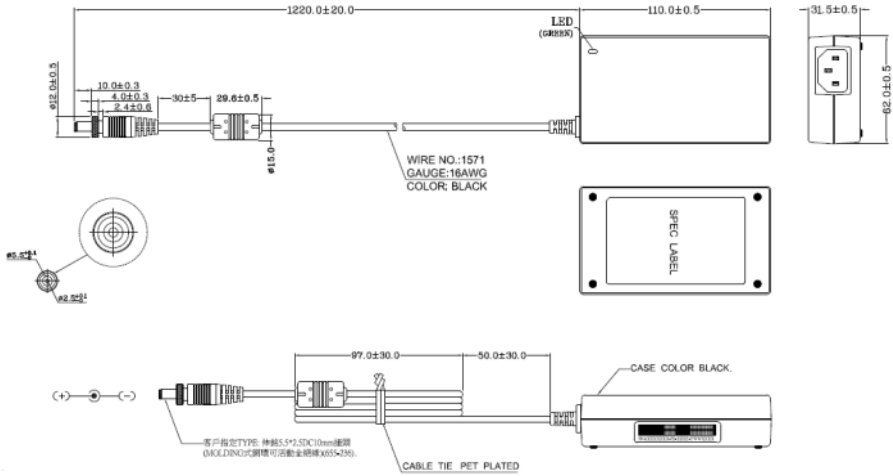
7.1 Fan Module/ Adapter/ Power Cord

Fan Module for Orin NX/Orin Nano

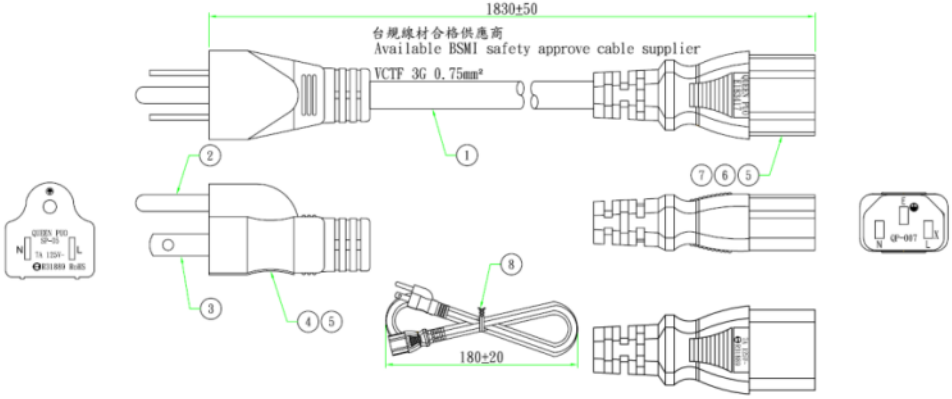
- Rated Voltage: 5V
- Operating Voltage Range: 3.5V~5.5V
- Rated Speed: 7000RPM±10%
  (Testing Speed After Continuous 3 Minute Operation At Ambient Temperature Of 25℃)
- Life Expectancy: 70,000hours at 40℃ (WITH 15~65% RH)
- Bearing Type: Two Ball



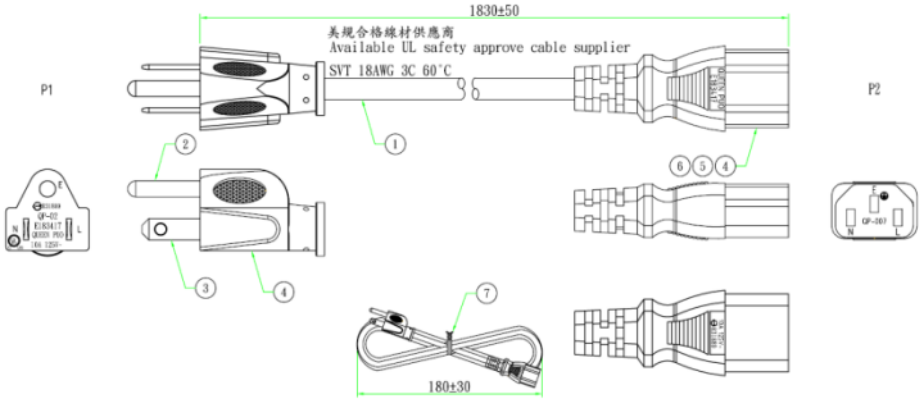
Power Adapter 04131HGOUANK



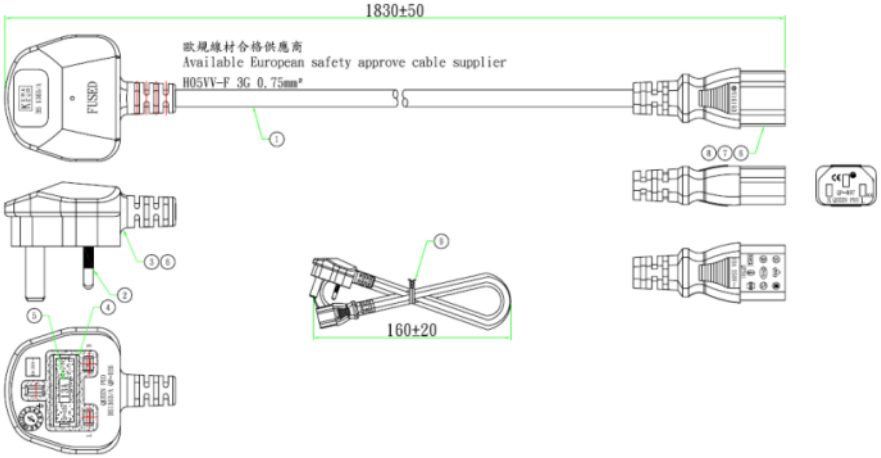
064APOWERBRX-IPD (TW version)



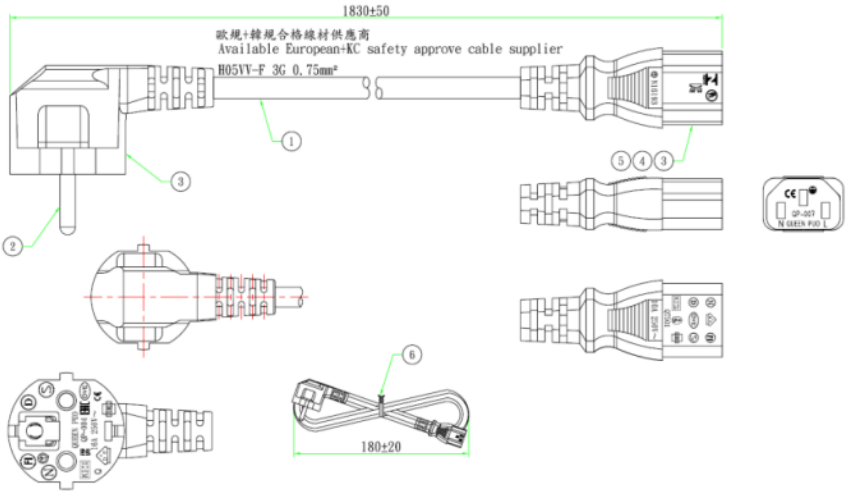
064APOWERBR2-IPD (US version)



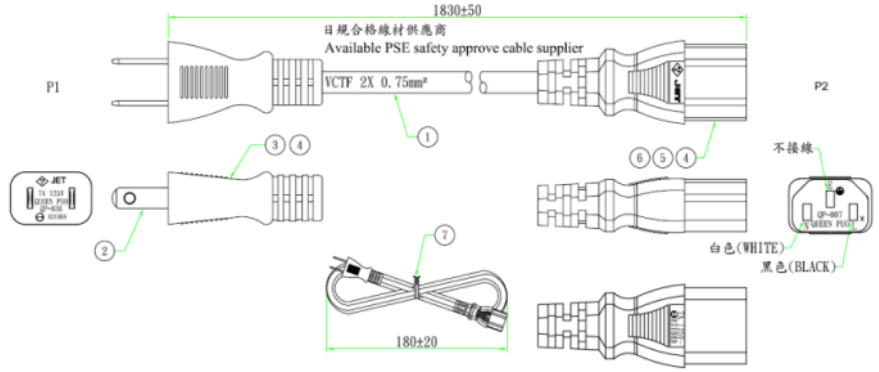
064APOWERBRW-IPD (UK version)



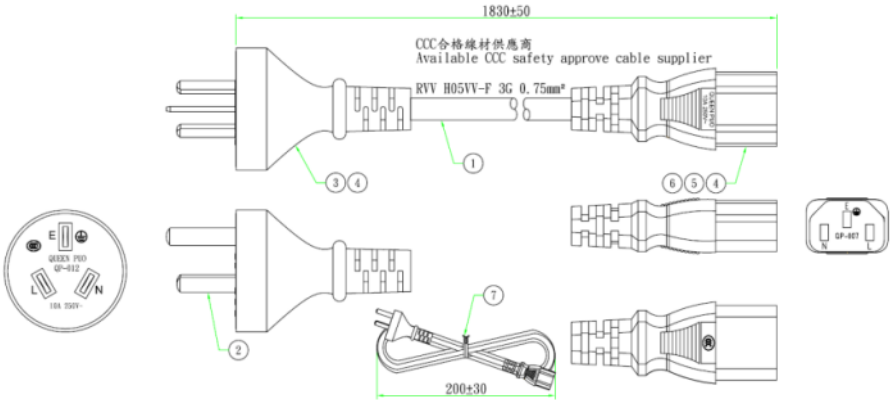
064APOWERBR5-IPD (EU version)



064APOWERBSL (JP version)

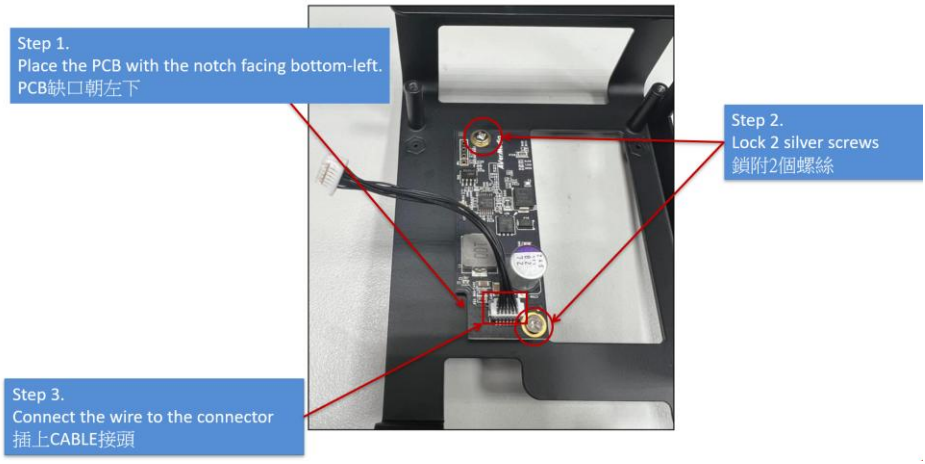


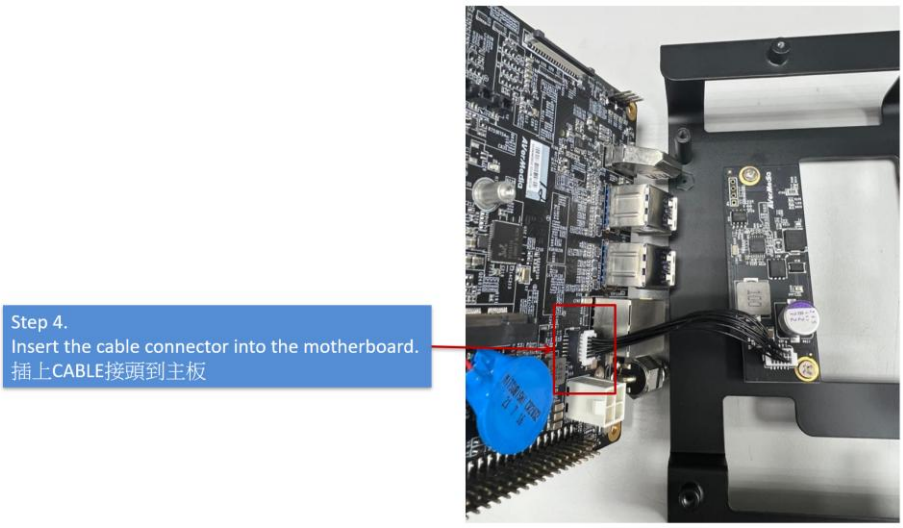
064APOWERBR4-IPD (CN version)



8.0 Accessory Assembly SOP

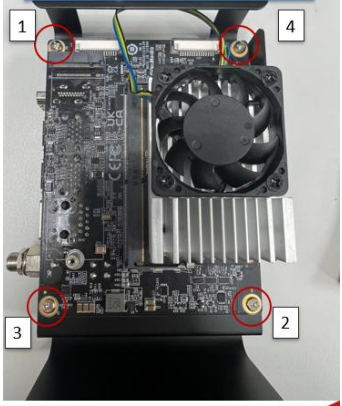
8.1 PSE board





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