

## AVerAI for AI at the Edge

### AVerAI Carrier Board and Box PC EX731

Designed for NVIDIA® Jetson™ TX1/TX2 Modules



AVerMedia Technologies, Inc.

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

Tel: 886-2-2226-3630

Fax: 886-2-3234-4842

Sales and Marketing: Russia: IDSolution LLC, +74955453283, [www.idsolution.ru](http://www.idsolution.ru)

Technical Support: [Professional User](#)

# Table of Contents

<b>Table of Contents</b> .....	2
<b>Preface</b> .....	5
<b>Disclaimer</b> .....	5
<b>Technical Support</b> .....	5
<b>Contact Enquiry</b> .....	5
<b>Download User Manual</b> .....	5
<b>Revision History</b> .....	5
<b>AVerMedia Global Offices</b> .....	6
<b>Limited Product Warranty</b> .....	7
<b>Copyright Notice</b> .....	7
<b>Trademark Acknowledgement</b> .....	8
<b>ESD Warning</b> .....	8
.....	9
<b>1.0 Introduction</b> .....	10
<b>1.1 Product Specifications</b> .....	12
<b>1.2 SKU (Part) Numbers and Ordering Information</b> .....	12
<b>2.0 Product Overview</b> .....	12
<b>2.1 Product Configurations by PCB Assembly and CN311-H</b> .....	13
<b>2.2 Block Diagram</b> .....	14
<b>2.3 Top View and Bottom View of EX731AA</b> .....	15
<b>2.4 Top View and Bottom View of EX731B1</b> .....	16
<b>2.5 Top View and Bottom View of EX731N1, with CN311-H</b> .....	17
<b>2.6 Front View and Rear View of EX731-AA00-1AC</b> .....	

2.7 Front View and Rear View of EX731-AAH2-2AC .....	18
2.8 Connector Summary.....	19
2.9 Switch Summary .....	19
<b>3.0 Feature Description</b> .....	<b>20</b>
3.1 Connector and Switch Locations.....	20
3.2 50x8 Pin High-Speed/High-Density Connector (for NVIDIA® Jetson™ TX1/TX2 Module).....	23
3.3 MICRO SD Card Reader Connector .....	23
3.4 DC IN 12VDC Power Jack .....	23
3.5 RTC Battery Connector .....	24
3.6 USB 3.1 Gen 1 Type-A Connector .....	24
3.7 Gigabit Ethernet Connector .....	24
3.8 HDMI OUTPUT 1 and 2 Connectors .....	25
3.9 2x60 Pin High-Speed Board-to-Board Connector (to EX731N1) .....	25
3.10 2x40 Pin Board-to-Board Connector (to EX731B1) .....	26
3.11 OTG/USB Micro-Type Connector .....	26
3.12 2x40 Pin Board-to-Board Connector (to EX731AA) .....	27
3.13 40-Pin Expansion I/O Connector .....	28
3.14 Fan Wafer for Active Heat Sink (NVIDIA® Jetson™ TX1/TX2 Fan) .....	28
3.15 2x60 Pin High-Speed Board-to-Board Connector (to EX731AA) .....	29
3.16 M.2 M Key Connectors .....	29
3.17 Fan Wafer for M.2 Device .....	29
3.18 SATA Connector .....	30
3.19 CAN Bus Connector.....	30
3.20 RS485 Connector	

3.21 MIC IN Connector .....	31
3.22 POWER on Button.....	31
3.23 RESET Button .....	31
3.24 RECOVERY Button.....	32
3.25 Mic Input Gain Adjustment Jumper.....	32
3.26 Other Switches and Jumpers.....	32
4.0 Installation .....	32
5.0 Software .....	33
6.0 Force Recovery Mode .....	33
7.0 Power Consumption .....	34
8.0 Accessory Drawings .....	34
8.1 Active Heat Sink .....	34
8.2 Passive Heat Sink .....	35
8.3 Power Adapter and Power Cord .....	35
9.0 Dimension Drawings and Assembly Drawings .....	38
9.1 Dimension Drawings of EX731AA, EX731B1, and EX731N1 .....	38
9.2 Assembly Drawing Active Heat Sink, NVIDIA® Jetson™ TX1/TX2 Module, EX731AA, EX731B1, and EX731N1 .....	40
9.3 Dimension Drawing of EX731 Box PC EX731-AA00-1AC .....	41
9.4 Dimension Drawing of EX731 Box PC EX731-AAH2-2AC .....	42

## 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
0.01	08/08/2019	Initial release.

# AVerMedia Global Offices

## Headquarters

### Taiwan Office

No. 135, Jian 1st Rd., Zhonghe Dist., New Taipei City  
23585, Taiwan  
Tel: +886-2-2226-3630  
Fax: +886-2-3234-4842  
Sales & Marketing: Contact  
Technical Support: Home users / Professional users

---

## The Americas

### USA Office

4038 Clipper Ct. Fremont, CA 94538  
Tel: (510) 403-0006  
Fax: (510) 403-0022  
Sales & Marketing: Contact  
Technical Support: Home users / Professional users

### Brazil Office

Sales & Marketing: Contact  
Technical Support: Home users / Professional users

### Latin America Office

Sales & Marketing: Contact  
Technical Support: Home users / Professional users

---

## Europe

### Head Office EU

AVT Solutions GmbH  
Hanauer Landstrasse 291 B 60314 Frankfurt Hessen  
Germany  
: technicalsupport\_120  
Technical Support: Home users / Professional users

### Russia Office

Sales & Marketing: Contact  
Technical Support: Home users / Professional users  
Professional Solutions Support Tel:  
+7 (925) 834-0310

### Spain Office

AVerMedia Europe Group  
Ronda de Poniente no. 4 segundo H  
28760 Tres cantos, Madrid  
Spain:  
: technicalsupport\_120  
Sales & Marketing: Contact  
Technical Support: Home users / Professional users

---

## Asia-Pacific

### China Office

Room 1510, No.488, Hitech Plaza, South Wuning Rd.,  
Jingan District, Shanghai, China  
Tel: +86-021-5298 7985  
Fax: +86-021-5298 7981  
Sales & Marketing: Contact  
Technical Support: Home users / Professional users

### India Office

Sales & Marketing: Contact  
Technical Support: Home users / Professional users

### Japan Office

6F, Kojimachi Syuei Bldg, 4-3-13 Kudan-minami,  
Chiyoda-ku, Tokyo, 102-0074, Japan  
Sales & Marketing: Contact  
Technical Support: Home users / Professional users

### Thailand Office

Sales & Marketing: Contact  
Technical Support: Home users / Professional users

### Korea Office

Sales & Marketing: Contact  
Technical Support: Home users / Professional users

### Vietnam Office

5F, No. 596 Nguyen Dinh Chieu St., Ward 3, District 3,  
HCM City, Vietnam  
Tel: +84-28-22 539 211  
Fax: +84-28-22 539 210  
Sales & Marketing: Contact  
Technical Support: Home users / Professional users

### **Limited Product Warranty**

AVerMedia provides the one-year 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.

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.

### **Copyright Notice**

The information contained in this document is subject to change without notice. AVerMedia shall not be liable for errors contained herein or for incidental consequential damages in connection with the furnishing, performance, or use of this material. This document contains proprietary information that is protected by copyright. All rights are reserved. No part of this document may be photocopied, reproduced, or translated to another language without the prior written consent by AVerMedia.

## **Trademark Acknowledgement**

AVerMedia acknowledges all the trademarks, registered trademarks, and/or copyrights referred to in this document as the property of their respective owners. Not listing all possible trademarks or copyright acknowledgments does not constitute the lack of acknowledgment to the rightful owners of the trademarks and copyrights mentioned in this document.

## **ESD Warning**

Electronic components and circuits are sensitive to Electrostatic Discharge (ESD). When handling any circuit board assemblies including AVerMedia AVerAI 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.



## 1.0 Introduction

AVerMedia AVerAI EX731 includes one fully featured mini-sized carrier board and two associated Box PC's which are all developed for NVIDIA® Jetson™ TX1/TX2 modules. AVerAI EX731 provides not only the access to a great list of latest interfaces on TX1/TX2 modules but also 1x RS-485 interface, 1x micro controller unit (MCU), and 1x RTC battery as the function enrichment.

EX731 carrier board is specifically designed to comply with Pico-ITX standard, which is adopted by the various industry applications in the environment with the physical space concern. It is equipped by a board-to-board connector, which can be used to connect to the other daughter board (51EX731AA2AX or 51EX731EM1A4), to get more I/O support, such as 2x M.2, 2x Mini PCIe, and 4x Ethernet. EX731 carrier board has a footprint of 100mm (L) x 72mm (W) x 4.5mm (H), which can fit in the very compact system for the commercial and industrial application. And it can operate in the temperature range from -20°C to 85°C.

There are two standard models of EX731 Box PC. The 1<sup>st</sup> model is a very slim design with EX731 carrier board and NVIDIA® Jetson™ TX1 module. And the 2<sup>nd</sup> one is a little bit taller design with EX731 carrier board, the daughter board 51EX731AA2AX, which is equipped by two AVerMedia CN311-H 4Kp30 HDMI M.2 video capture cards, and NVIDIA® Jetson™ TX2 module. Both models come with the active heat sink and the very compact chassis. And they can operate in the temperature range from -20°C to 85°C.

Operating with NVIDIA® Jetson™ TX1/TX2 module and the rich I/O functions, AVerAI EX731 is the perfect choice in building the high performance AI edge computing platform for the intelligent video analytics applications.

## 1.1 Product Specifications

Product Name	Major-Name	EX731-AAH2	EX731-AA00	
	Sub-Name	-2AC	-1AC	-000
Product Type	Fanless/Fan/Carrier Board	Fan Box PC	Fan Box PC	Carrier Board
Core	System on Module (SoM)	Fully support NVIDIA® Jetson™ TX2 module	Fully support NVIDIA® Jetson™ TX1 module	Fully support NVIDIA® Jetson™ TX1/TX2 module
Front I/O	Display Output	TX2: 2x HDMI Type A, 3840 x 2160 at 60Hz	TX1: 1x HDMI Type A, 4096 x 2160 at 60Hz	TX1: 1x HDMI Type A, 4096 x 2160 at 60Hz TX2: 2x HDMI Type A, 3840 x 2160 at 60Hz
	Ethernet	1x GbE RJ-45		
	USB 3.0	1x USB 3.0 Type-A (USB 3.2 Gen1x 1)		
	USB 2.0	1x USB 2.0 Micro-B for recovery		
	CAN Bus	1x CAN bus with transceiver	N/A	N/A
	RS-485	1x RS-485 Euroblock (3 pins)	N/A	N/A
	GPIO Expansion	1x 3.3V UART, 1x I2C, 1x I2S, 1x SPI, 7x GPIOs		
	Micro SD	1x micro-SD card reader		
	SATA	1x 3Gb/s	N/A	N/A
	Power Button	1x with a RGB tri-color LED		
	Recovery Button	1x with a RGB tri-color LED		
	Audio	1x Mic-in		
	Back I/O	Wi-Fi	IEEE 802.11a/b/g/n/ac dual-band 2x2 MIMO	IEEE 802.11ac 2x2
Antenna		2x SMA female connector (Optional)	2x SMA female connector (Optional)	
Internal PCIe Sockets	M.2	2x M.2 M Key 2280 slots	N/A	N/A
MCU	MCU Power Function	Automatically turn on system when the power input is connected		
	RTC Battery	1x for battery life monitoring by MCU		
Power	Power Input	12V/5A		
Environment	Operating Temperature	-20°C ~ 85°C	-20°C ~ 85°C	-20°C ~ 85°C
	Storage Temperature	-40°C ~ 85°C		
	Relative Humidity	40 °C @ 95%, Non-Condensing		

	Vibration during Operation	With Desk/Wall/Din Rail Mount: 3 Grms, IEC 60068-2-64, random vibration, 5 ~ 500 Hz, 1 hr/axis		
	Shock during Operation	30G, IEC60068-2-27, half sine, 11m duration		
<b>Physical Characteristics</b>	Dimension	Chassis w/ active heat sink L:117.2mm x W:76.8mm x H:94.1mm (W:144.8 mm with mounting ears)	Chassis w/ active heat sink L:117.2mm x W:76.8mm x H:61.0mm (W:144.8 mm with mounting ears)	Pico-ITX L:100mm x W:72mm x H:17.0mm
	Weight	874g	485g	75g
	Thermal Solution	Active heat sink	Active heat sink	Optional active heat sink
	Mounting	Desk/Wall/Din Rail	Desk/Wall/Din Rail	N/A
<b>System</b>	Operating System	Linux for Tegra (L4T) File system: Ubuntu 16.04, kernel version 4.9		
	System on Module (SoM)	Fully support NVIDIA® Jetson™ TX2	Fully support NVIDIA® Jetson™ TX1	<p>1 Fully support NVIDIA® Jetson™ TX1 and TX2.</p> <p>1 Please refer to NVIDIA Jetson TX1 and TX2 datasheets for the associated module specifications.</p>
	SoM Power Consumption	7.5W ~ 15W	6.5W ~ 15 W	
	Temperature Range	-25°C ~ 80°C	-25°C ~ 80°C	
	Memory	8GB 4ch x 32-bit LPDDR4   1866MHz	4GB 4ch x 16-bit LPDDR4   1600MHz	
	GPU	Pascal 256-core	Maxwell 256-core	
	FLOPS (fp16)	<b>1500 GFLOPS</b>	1024 GFLOPS	
	CPU Complex	NVIDIA Denver 2 (Dual-Core) Processor ARM® Cortex® A57 MPCore (Quad-Core) Processor	ARM® Cortex® A57 MPCore (Quad-Core) Processor with NEON Technology.	
	Maximum Operating Frequency	NVIDIA Denver 2: 2.0GHz ARM® Cortex® A57: 2.0GHz	1.73GHz	
	Storage	32GB eMMC v5.1	16GB eMMC v5.1	
	Video Encode	Maximum throughput: 2160p60 (H.265)   2160p60 (H.264)   2160p30 (WEBM VP8)	Maximum throughput: 2160p30 (H.265)   2160p30 (H.264)   2160p30 (WEBM VP8)	
	Video Decode	Maximum throughput: 2160p60 (H.265)   2160p60 (H.264)   2160p60 (WEBM VP9)	Maximum throughput: 2160p60 (H.265)   2160p60 (H.264)   2160p60 (WEBM VP9)	
<b>Regulation</b>	EMC	CE, FCC		
	Safety	CE		

## 1.2 SKU (Part) Numbers and Ordering Information

SKU Number	TX1 Module	TX2 Module	Active Heat Sink and Cable	731AS Chassis	731AT Chassis	Power Adapter	Power Cord
EX731-AA00-000	N/A	N/A	N/A	N/A	N/A	N/A	N/A
EX731-AA00-1AC	Installed	N/A	Installed	Installed	N/A	N/A	N/A
EX731-AAH2-2AC	N/A	Installed	Installed	N/A	Installed	N/A	N/A
04131HGOUANK	N/A	N/A	N/A	N/A	N/A	Provided by order	N/A
064APOWBRX-IPD (TW version)	N/A	N/A	N/A	N/A	N/A	N/A	Provided by order
064APOWBR2-IPD (US version)	N/A	N/A	N/A	N/A	N/A	N/A	Provided by order
064APOWBRW-IPD (UK version)	N/A	N/A	N/A	N/A	N/A	N/A	Provided by order
064APOWBR5-IPD (EU version)	N/A	N/A	N/A	N/A	N/A	N/A	Provided by order
064APOWBSL (JP version)	N/A	N/A	N/A	N/A	N/A	N/A	Provided by order
064APOWBR4-IPD (CN version)	N/A	N/A	N/A	N/A	N/A	N/A	Provided by order

## 2.0 Product Overview

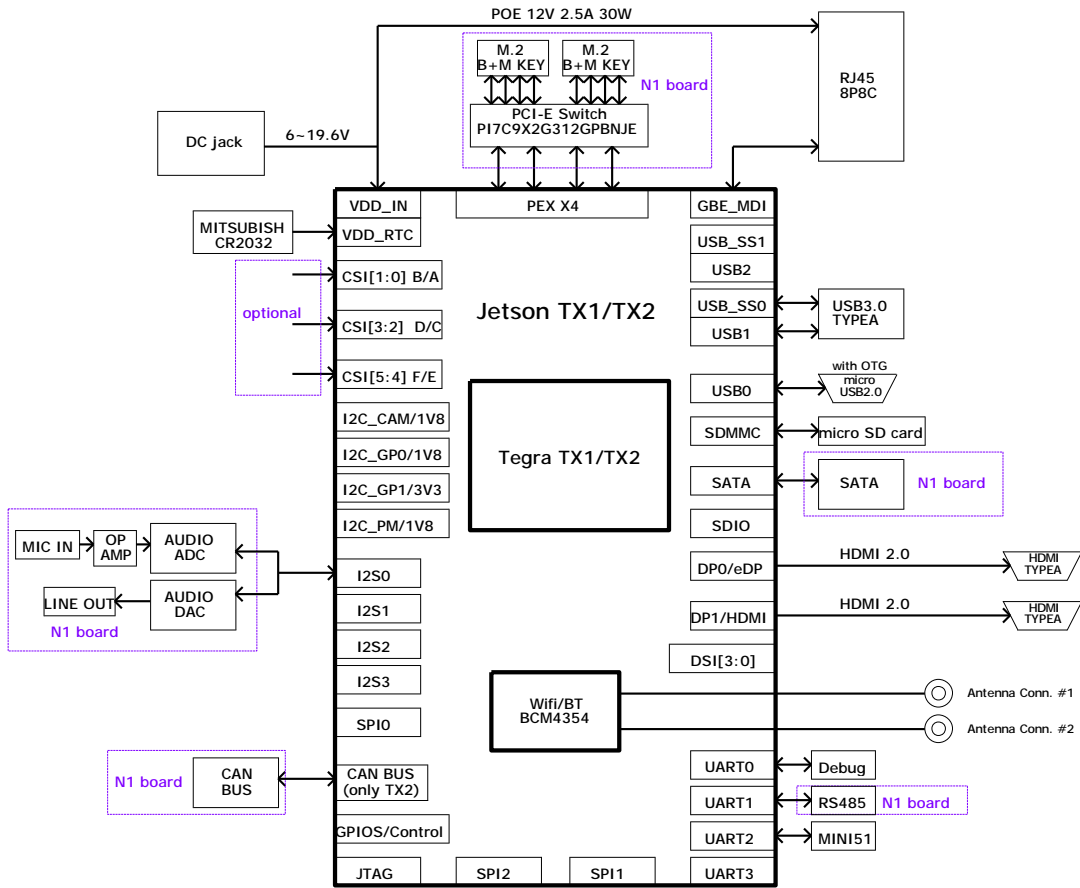
### 2.1 Product Configurations by PCB Assembly and CN311-H

SKU Number	Description	PCB Assembly Description			CN311-H
		EX731AA	EX731B1	EX731N1	
EX731-AA00-000	EX731 Carrier Board	Installed	Installed	N/A	N/A
EX731-AA00-1AC	EX731 Box PC w/ TX1	Installed	Installed	N/A	N/A
EX731-AAH2-2AC	EX731 Box PC w/ TX2	Installed	Installed	Installed	2x

For the composition related to the active heat sink, chassis, power adapter, and power cord, please refer to 1.2 SKU (Part) Numbers and Ordering Information.

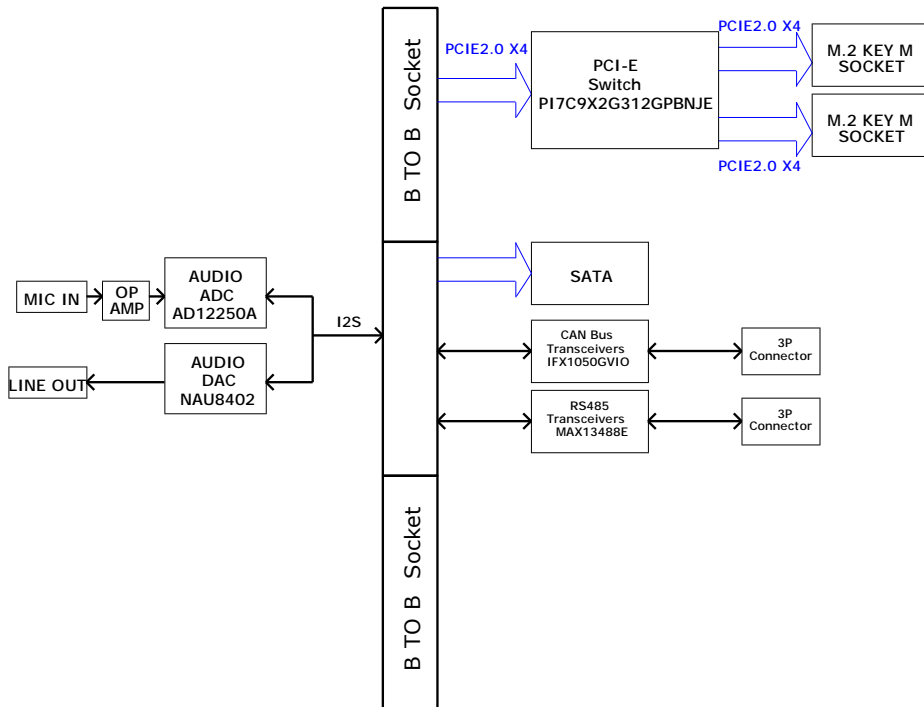
## 2.2 Block Diagram

EX731AA + EX731B1 + EX731N1

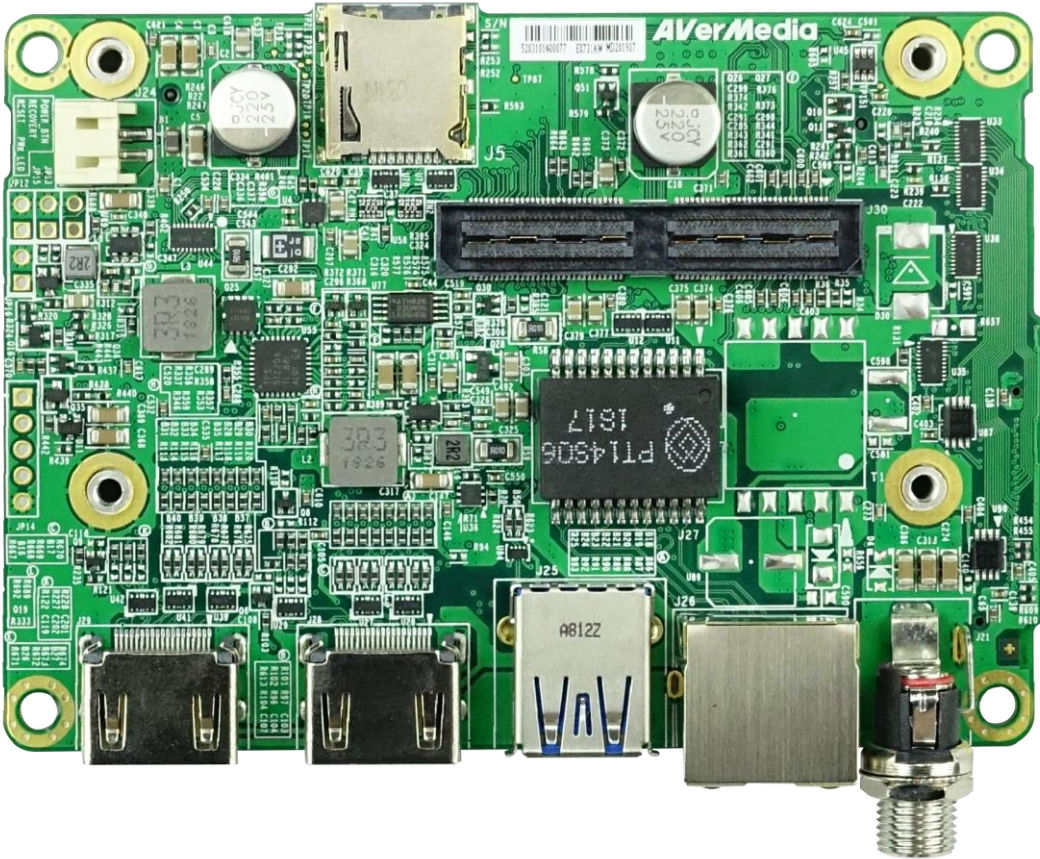
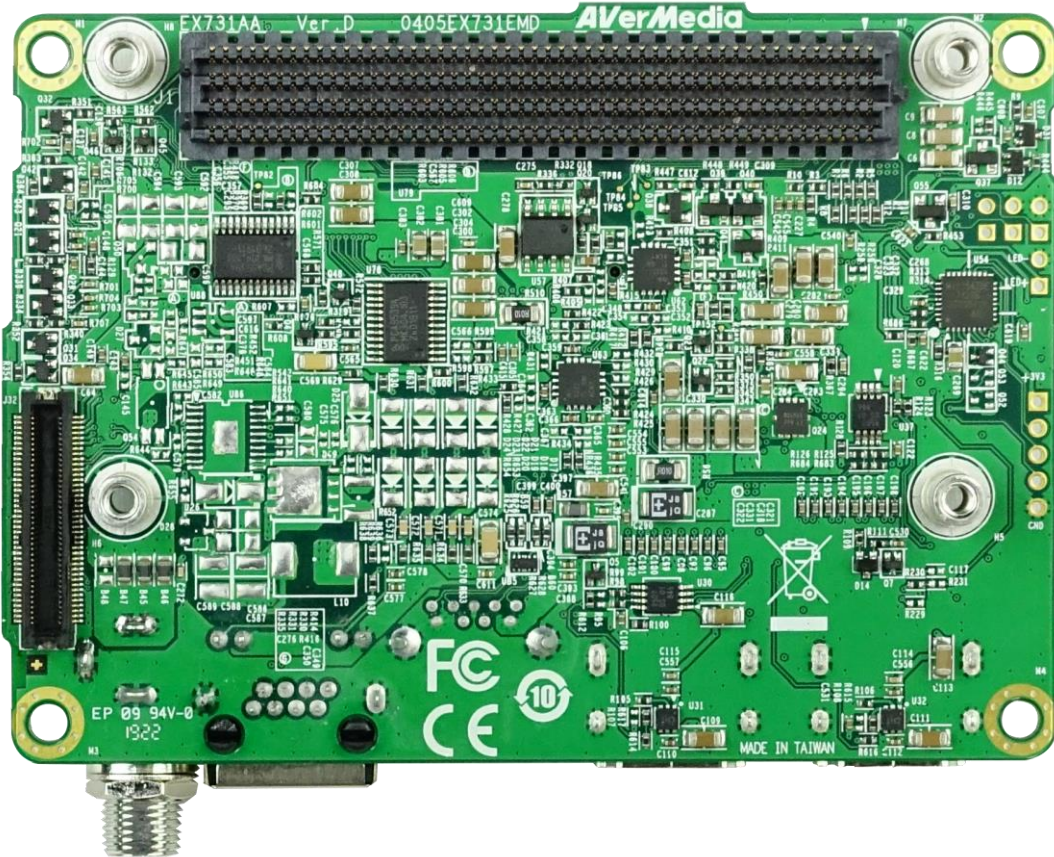


(N1 board mentioned in the above diagram is EX731N1.)

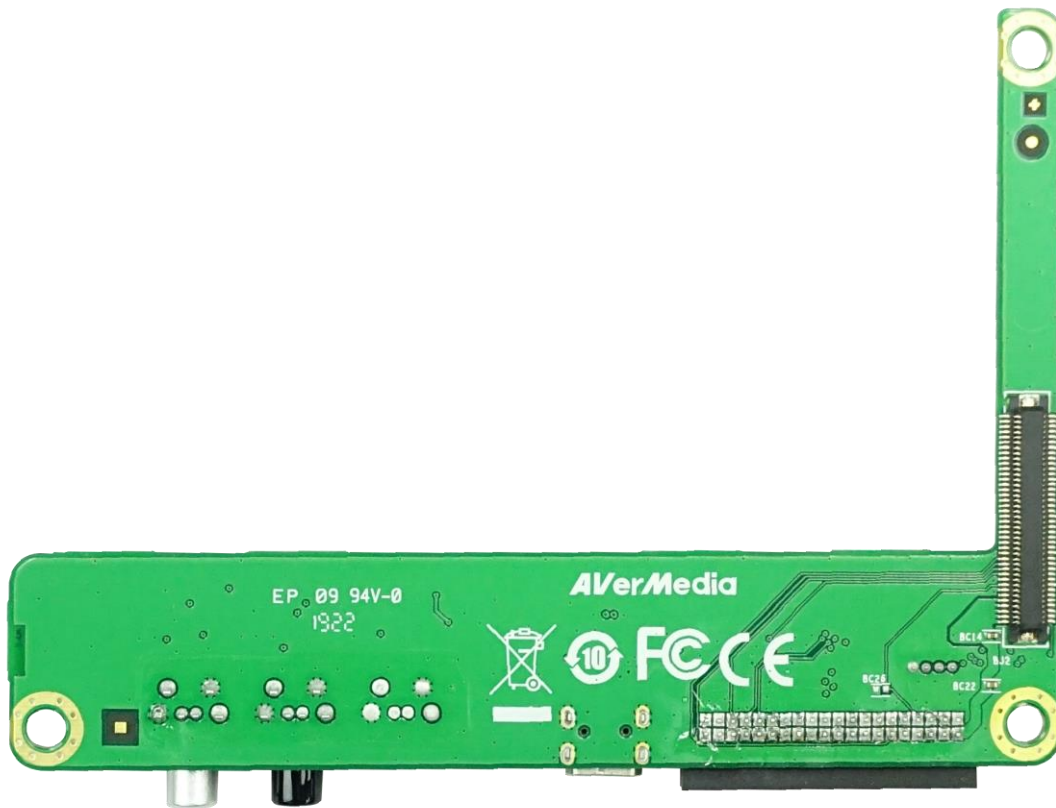
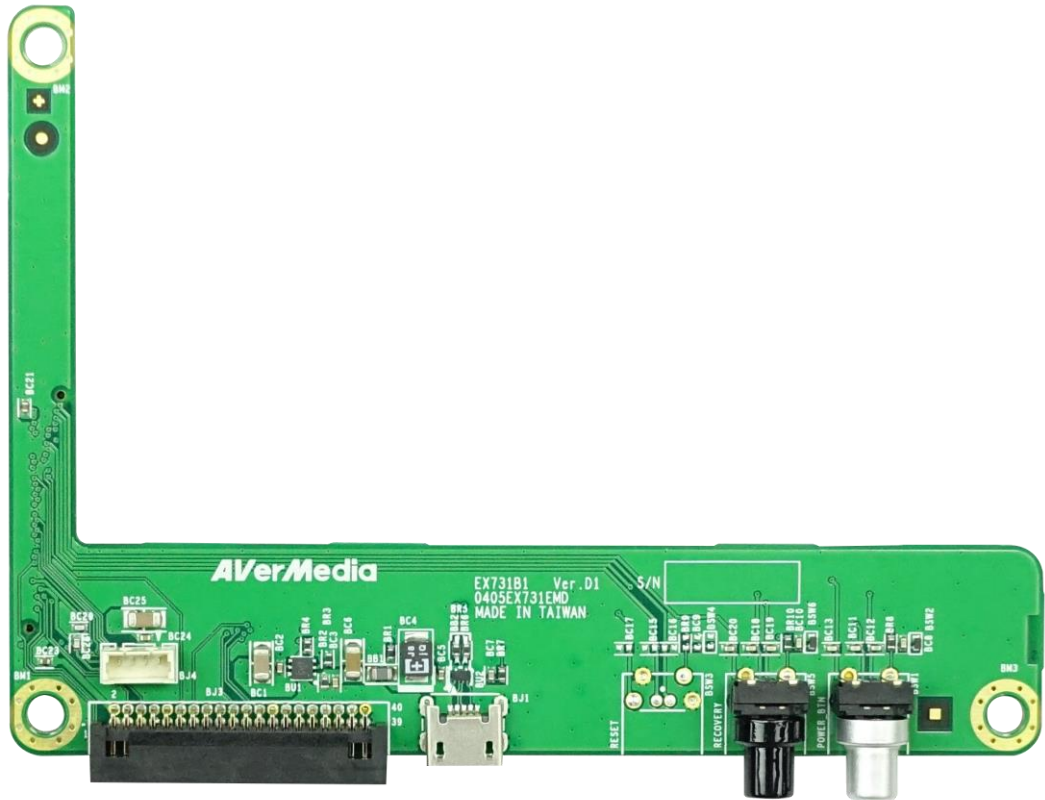
EX731N1



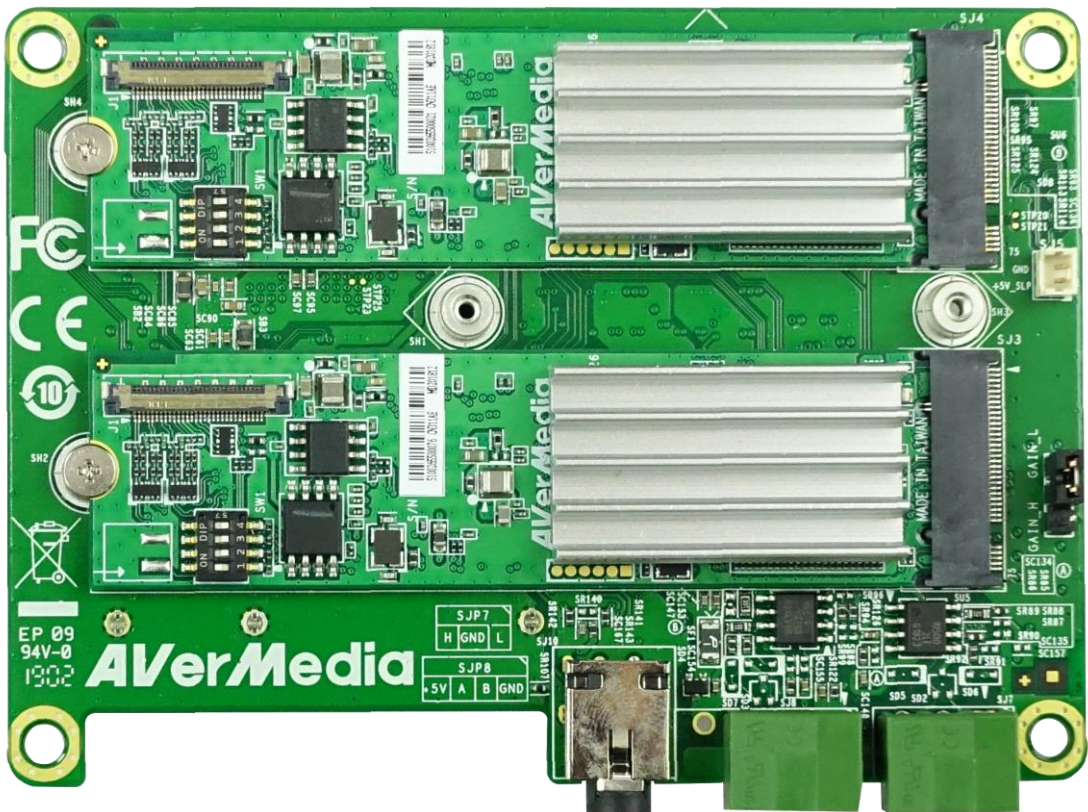
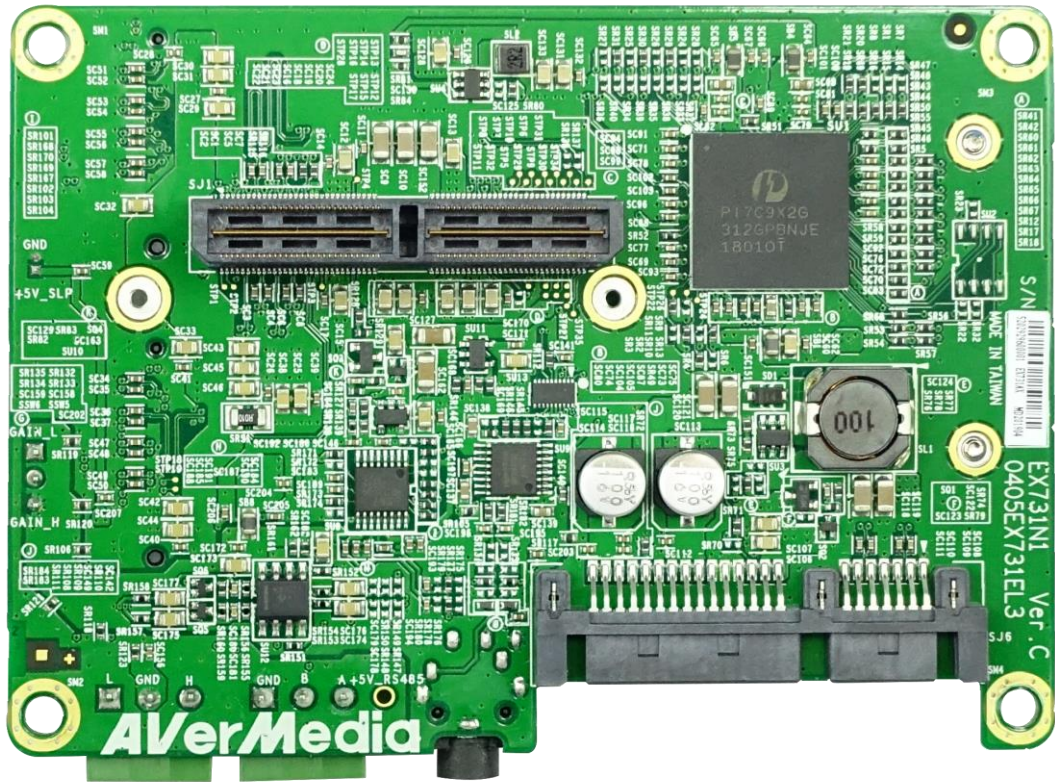
2.3 Top View and Bottom View of EX731AA



## 2.4 Top View and Bottom View of EX731B1



2.5 Top View and Bottom View of EX731N1, with CN311-H





2.6 Front View and Rear View of EX731-AA00-1AC



## 2.7 Front View and Rear View of EX731-AAH2-2AC



## 2.8 Connector Summary

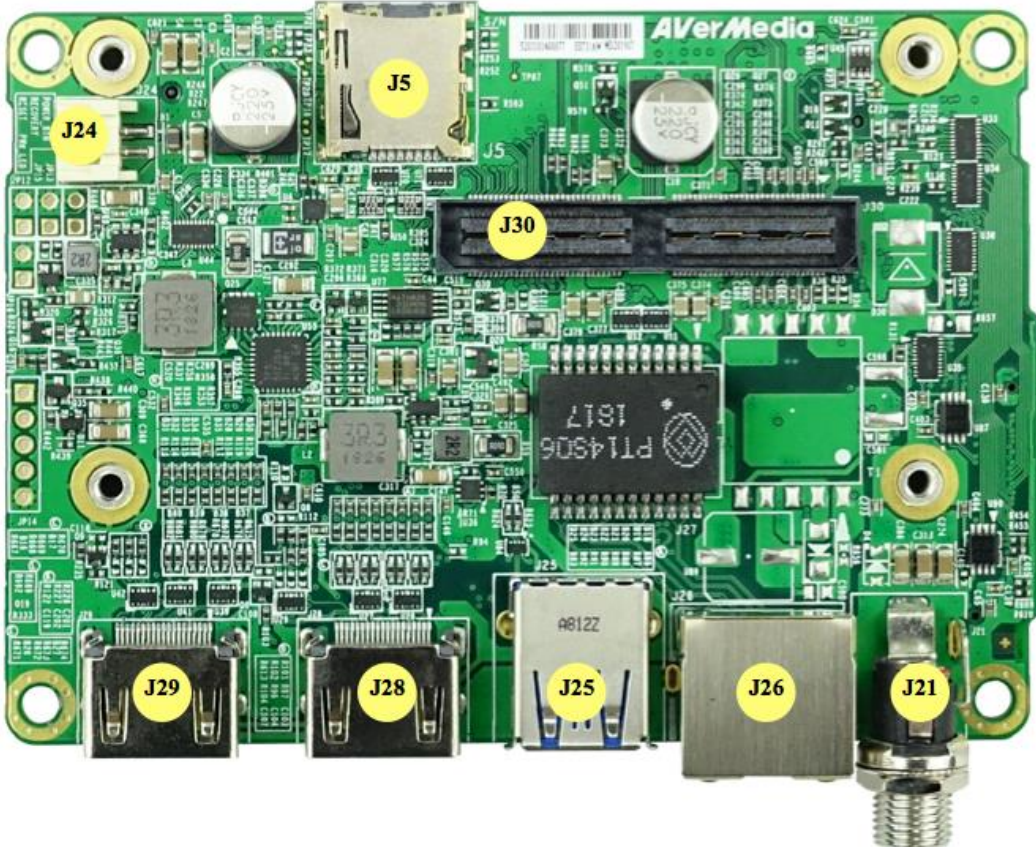
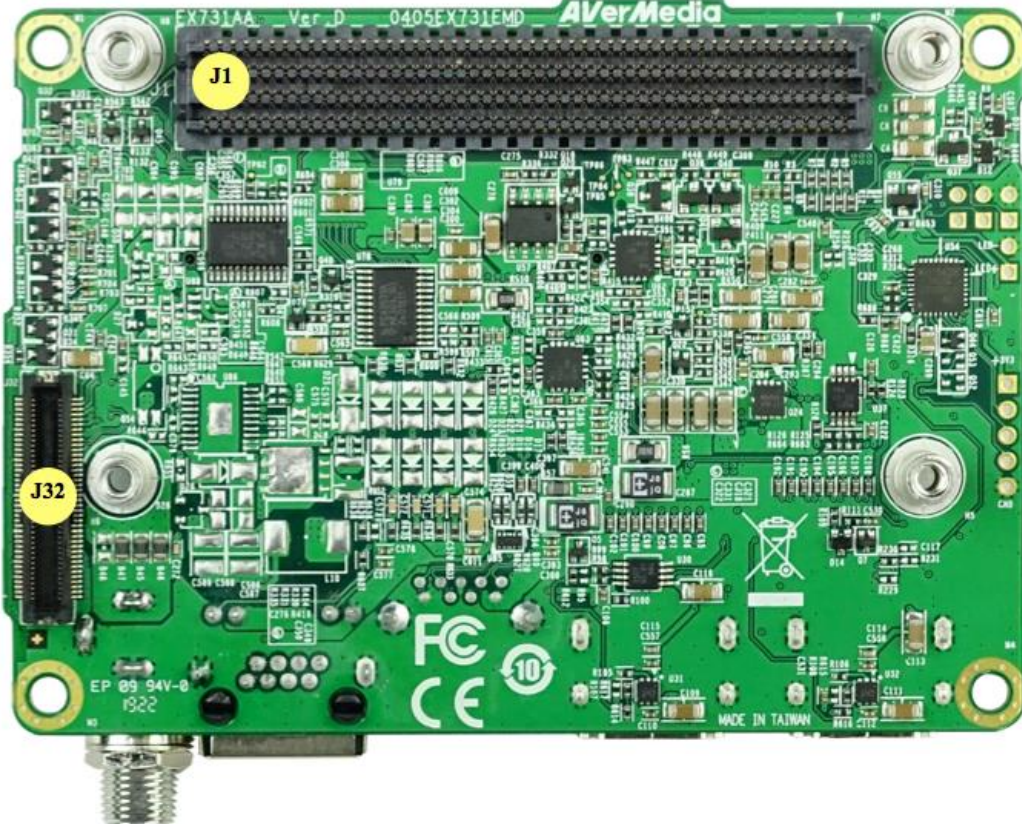
PCB Code	Designation	Description
EX731AA (Carrier Board)	J1	50x8 pin high-speed/high-density connector (for NVIDIA® Jetson™ TX1/TX2 module)
	J5	MICRO SD card reader connector
	J21	DC IN 12VDC power jack
	J24	RTC battery connector
	J25	USB 3.1 Gen 1 type-A connector
	J26	Gigabit Ethernet connector
	J28	HDMI output 1 connector
	J29	HDMI output 2 connector (Not supported when working with TX1)
	J30	2x60 pin high-speed board-to-board connector (to EX731N1)
	J32	2x40 pin board-to-board connector (to EX731B1)
EX731B1 (Carrier Board)	BJ1	OTG/USB micro-type connector
	BJ2	2x40 pin board-to-board connector (to EX731AA)
	BJ3	40-pin expansion I/O connector
	BJ4	Fan wafer for active heat sink (NVIDIA® Jetson™ TX1/TX2 fan)
EX731N1 (Daughter Board)	SJ1	2x60 pin high-speed board-to-board connector (to EX731AA)
	SJ3	M.2 M key connector
	SJ4	M.2 M key connector
	SJ5	Fan wafer for M.2 device
	SJ6	SATA connector
	SJ7	CAN bus connector
	SJ8	RS485 connector
	SJ10	MIC IN connector

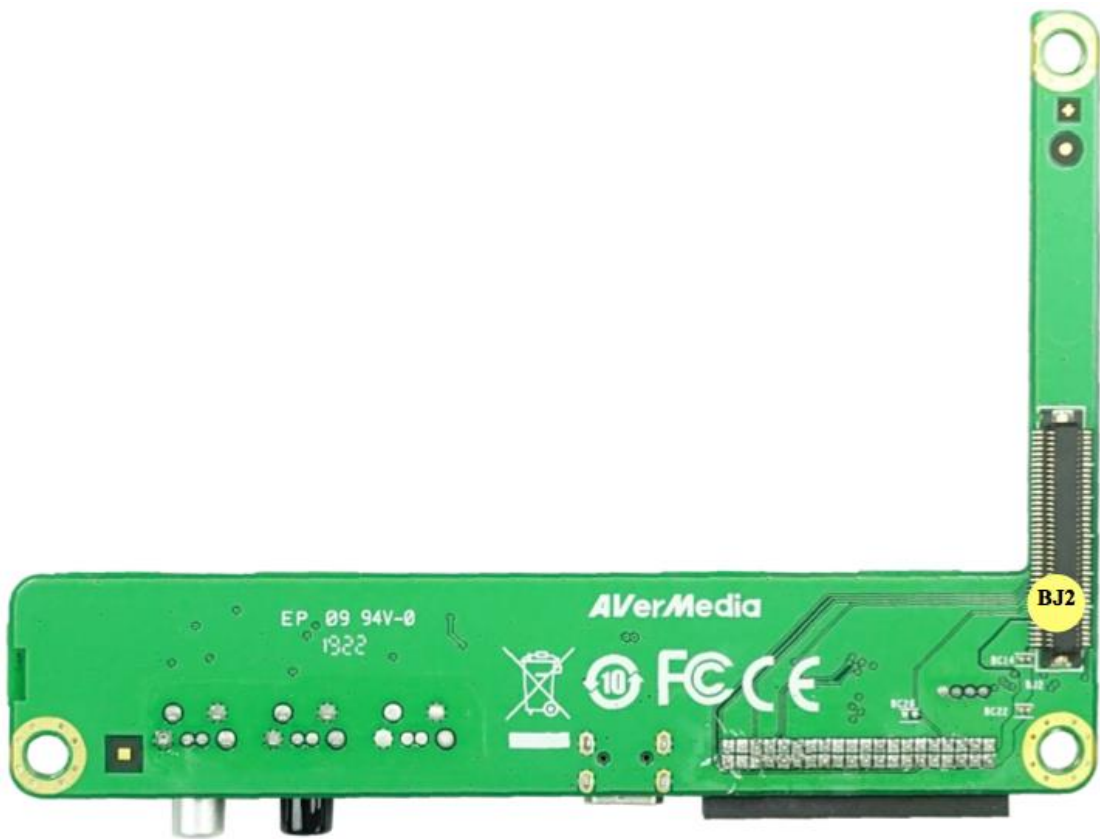
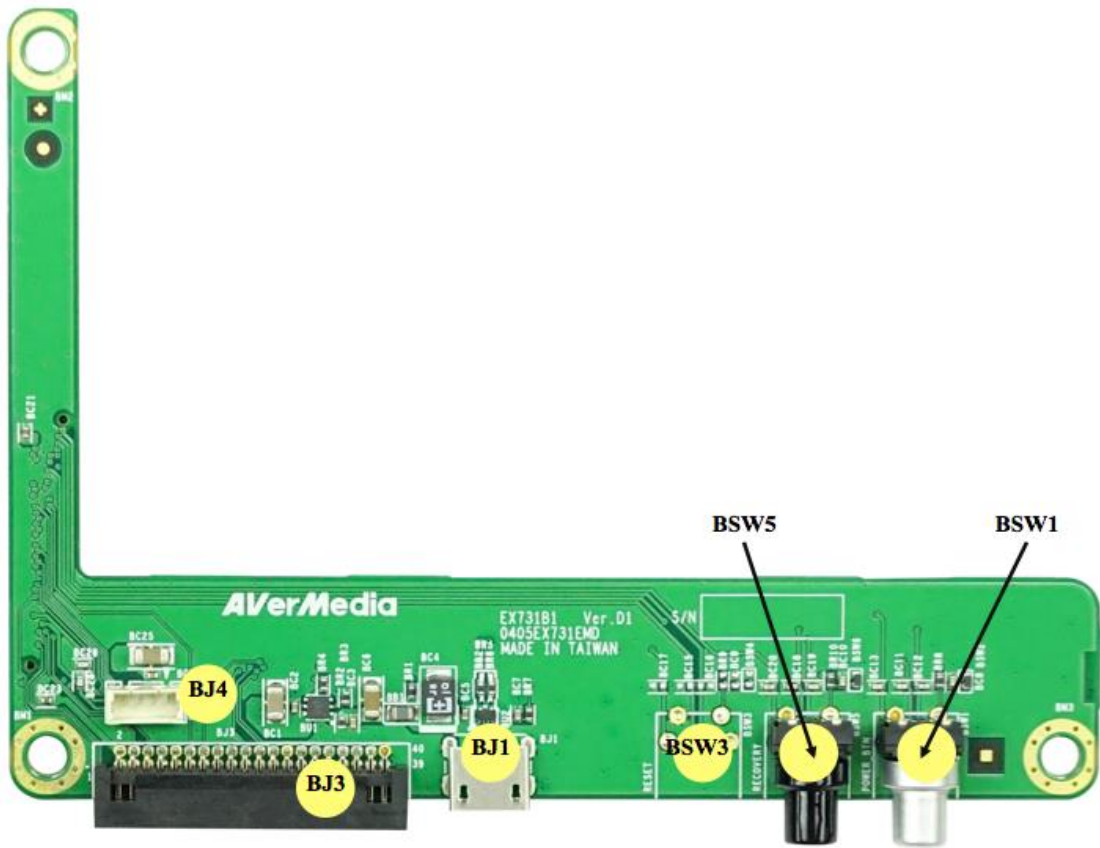
## 2.9 Switch Summary

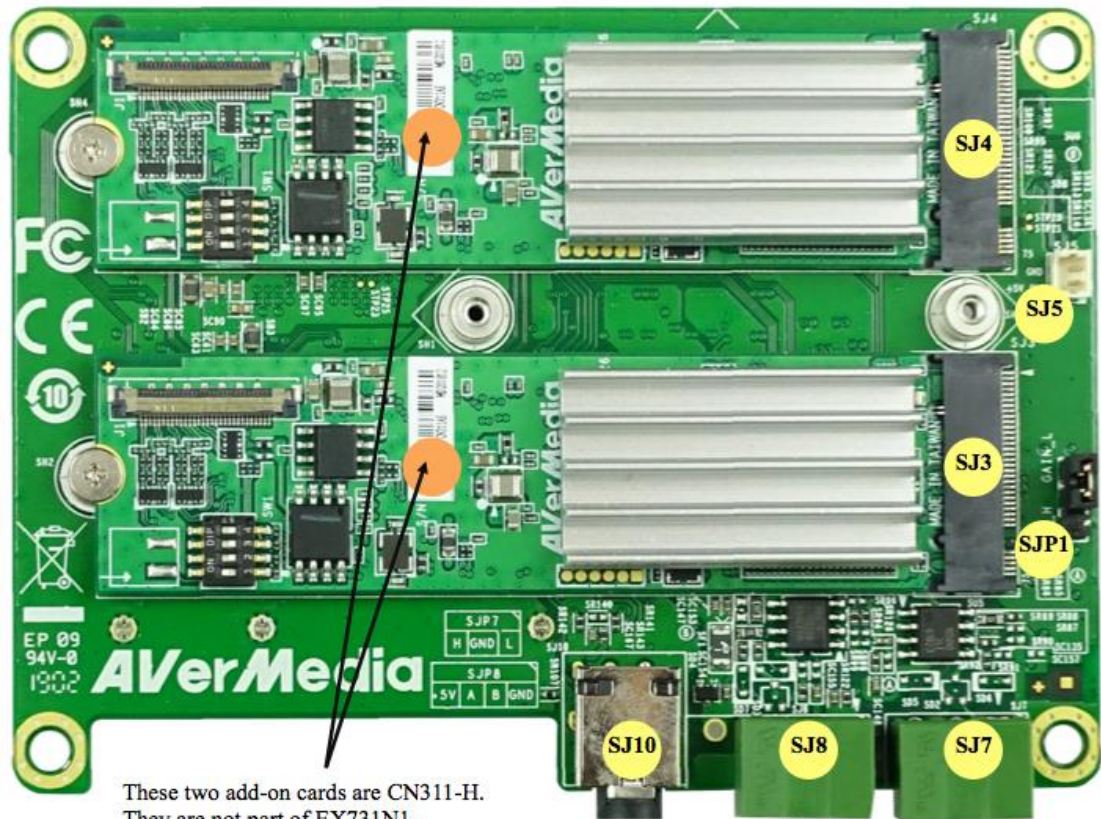
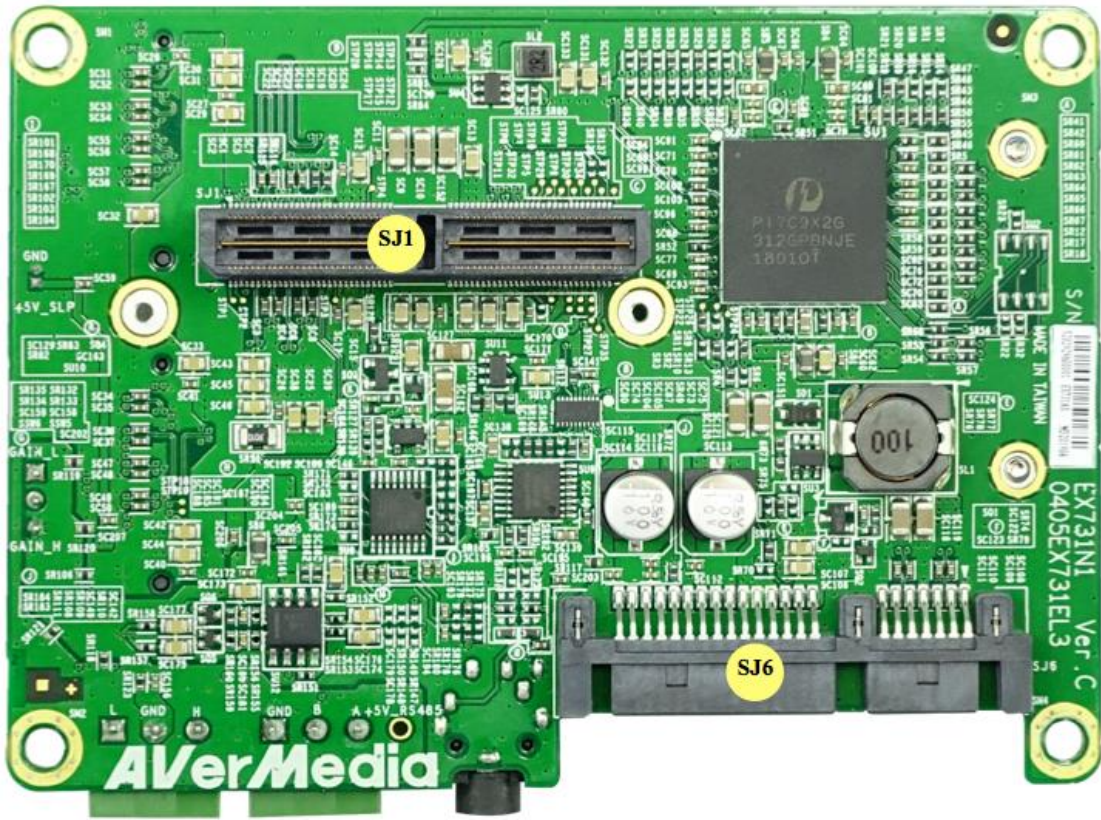
PCB Code	Designation	Description
EX731B1	BSW1	POWER on button
	BSW3	RESET button (reserved and not mounted)
	BSW5	RECOVERY button
EX731N1	SJP1	Mic input gain adjustment jumper

### 3.0 Feature Description

#### 3.1 Connector and Switch Locations

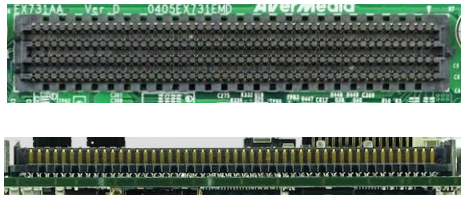




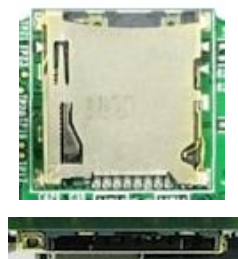


These two add-on cards are CN311-H. They are not part of EX731N1.


### 3.2 50x8 Pin High-Speed/High-Density Connector (for NVIDIA® Jetson™ TX1/TX2 Module)

<b>Function</b>	Provide connection with NVIDIA® Jetson™ TX1/TX2 module	
<b>Location</b>	J1	
<b>Type Description</b>	Samtec SEARAY™ Connector	
<b>Manufacturer and Part Number</b>	Samtec, SEAM-50-02.0-L-08-2-A-K-TR (7.0mm stacking height)	
<b>Mating Connector</b>	Samtec, SEAF-50-05-S-08-02-A-K (on Jetson™ TX1/TX2)	
<b>Pinout</b>	Please refer to NVIDIA Jetson™ TX1 and TX2 System-on-Module datasheet for pinout details.	
<b>Remarks</b>	None	

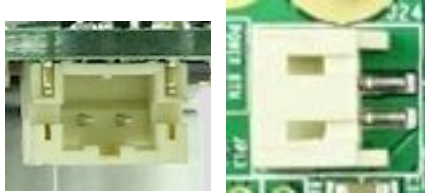
### 3.3 MICRO SD Card Reader Connector

<b>Function</b>	Micro-SD card reader	
<b>Location</b>	J5	
<b>Type Description</b>	Micro-SD memory card connector	
<b>Manufacturer and Part Number</b>	Champway, MSPP-1014090RG-MN4	
<b>Pinout</b>	Comply with Micro-SD card standards.	
<b>Remarks</b>	None	

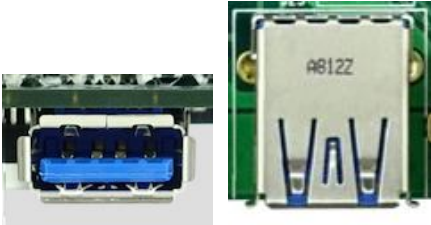
### 3.4 DC IN 12VDC Power Jack

<b>Function</b>	Power input with lock		
<b>Location</b>	J21		
<b>Type Description</b>	5.5/2.5 mm power jack		
<b>Manufacturer and Part Number</b>	JKCR, DCD-020-66LMB		
<b>Mating Connector</b>	Any OD 5.5/2.5 mm & 12mm length plug		
<b>Pinout</b>	Pin Number	Description	
	3	GND	
	1	Power	
	2	GND	
<b>Remarks</b>	None		

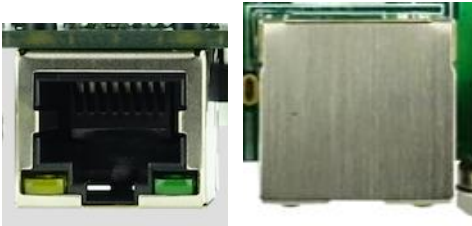
### 3.5 RTC Battery Connector

<b>Function</b>	RTC battery for module		
<b>Location</b>	J24		
<b>Type Description</b>	2.0mm wire-to-board header 02P type		
<b>Manufacturer and Part Number</b>	Pinrex, 721-94-02TWR9		
<b>Mating Connector</b>	Tyu, TU2001HNO-02		
<b>Pinout</b>	Pin Number	Description	
	1	3V Power	
	2	GND	
<b>Remarks</b>	RTC Battery: MITSUBISHI, CR2032 3V		

### 3.6 USB 3.1 Gen 1 Type-A Connector



<b>Function</b>	USB 3.1 Gen 1 Type-A connector		
<b>Location</b>	J25		
<b>Type Description</b>	Single-port USB 3.1 Gen 1 Type-A female connector		
<b>Manufacturer and Part Number</b>	Foxconn, UEA1112C-4HK1-4H		
<b>Mating Connector</b>	Any USB 3.1 standard Type-A interface cable or device.		
<b>Pinout</b>	Please refer to USB 3.1 Gen 1 standard.		
<b>Remarks</b>			

### 3.7 Gigabit Ethernet Connector


<b>Function</b>	1Gb single-port Ethernet connector, used to connect to the host system.		
<b>Location</b>	J26		
<b>Type Description</b>	RJ45 8P8C single-port with LED		
<b>Manufacturer and Part Number</b>	Champway, 8188D-B514-00200		
<b>Mating Connector</b>	Any RJ45 plug with Cat5, Cat5e, Cat6 type cabling.		
<b>Pinout</b>	Comply with Ethernet standards.		
<b>Remarks</b>	None		



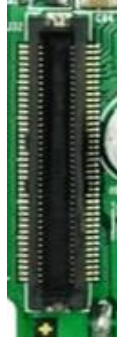
### 3.8 HDMI OUTPUT 1 and 2 Connectors

<b>Function</b>	HDMI output connector #1 and HDMI output connector #2	 <p>J28 on the left and J29 on the right</p> 
<b>Location</b>	J28: HDMI #1 (CEC pass-through, optional) J29: HDMI #2	
<b>Type Description</b>	HDMI Type-A female connector	
<b>Manufacturer and Part Number</b>	Compupack, ACNHM220028-001	
<b>Mating Connector</b>	Any HDMI standard Type-A interface cable or device.	
<b>Pinout</b>	Please refer to HDMI standard.	
<b>Remarks</b>	HDMI video output connector #2 is not supported when working with TX1.	

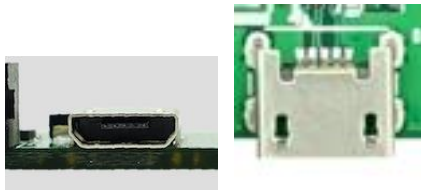
### 3.9 2x60 Pin High-Speed Board-to-Board Connector (to EX731N1)

<b>Function</b>	Provide connection between EX731AA and EX731N1	
<b>Location</b>	J30	
<b>Type Description</b>	Samtec Q STRIP™ connector	
<b>Manufacturer and Part Number</b>	Samtec, QSH-060-01-L-D-A-K-TR	
<b>Mating Connector</b>	Samtec, QTH-060-04-L-D-A-K-TR (16.0mm stacking height)	
<b>Pinout</b>	For PCI-E/SATA/UART/CAN bus expansion	
<b>Remarks</b>	None	


### 3.10 2x40 Pin Board-to-Board Connector (to EX731B1)

<b>Function</b>	Provide connection between EX731AA and EX731B1	
<b>Location</b>	J32	
<b>Type Description</b>	0.5mm BTB plug conn. SMT D/R S/T type 80P	
<b>Manufacturer and Part Number</b>	Aces, 50019-08071-001	
<b>Mating Connector</b>	Aces, 50150-08001-002	
<b>Pinout</b>	For 40-pin Expansion IO connector, OTG/USB, and buttons	
<b>Remarks</b>	None	

### 3.11 OTG/USB Micro-Type Connector

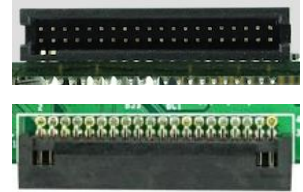
<b>Function</b>	OTG programming recovery	
<b>Location</b>	BJ1	
<b>Type Description</b>	USB micro-type B female connector	
<b>Manufacturer and Part Number</b>	Fullglory, FG-MCB-111440	
<b>Mating Connector</b>	Any USB standard Micro-type interface cable or device.	
<b>Pinout</b>	Please refer to USB Micro-type standard.	
<b>Remarks</b>	None	

### 3.12 2x40 Pin Board-to-Board Connector (to EX731AA)


<b>Function</b>	Provide connection between EX731B1 and EX731AA	
<b>Location</b>	BJ2	
<b>Type Description</b>	0.5mm BTB Rcpt. Conn. SMT D/R S/T Type 80P	
<b>Manufacturer and Part Number</b>	Aces, 50150-08001-002	
<b>Mating Connector</b>	Aces, 50019-08071-001	
<b>Pinout</b>	For 40-pin Expansion IO connector, OTG/USB, and buttons	
<b>Remarks</b>	None	

### 3.13 40-Pin Expansion I/O Connector


<b>Function</b>	System expansion IO connector			
<b>Location</b>	BJ3			
<b>Type Description</b>	HEADER_BOX_2*20PIN_1.27 mm			
<b>Manufacturer and Part Number</b>	Champway, CB25-G4024H010-03			
<b>Mating Connector</b>	Pinrex, 636-92-20GB00			
<b>Pinout</b>	Pin #	Description	Pin #	Description
	1	+5V_SYSTEM	2	+3V3_SYSTEM
	3	+5V_SYSTEM	4	I2C_GP0_DATA_3V3
	5	GND	6	I2C_GP0_CLK_3V3
	7	UART0_TX_3V3	8	I2S_3V3_MCK
	9	UART0_RX_3V3	10	GND
	11	I2S0_3V3_BCLK	12	UART0_RTS_3V3
	13	GND	14	AUDIO_CODEC_3V3_IRQ
	15	AO_DMIC_IN_3V3_DAT	16	GPIO_EXP_P17_3V3
	17	MDM_WAKE_3V3_AP	18	+3V3_SYSTEM
	19	GND	20	SPI1_3V3_MOSI
	21	GPIO_EXP_P16_3V3	22	SPI1_3V3_MISO
	23	SPI1_3V3_CS0	24	SPI1_3V3_CLK
	25	SPI1_3V3_CS1	26	GND
	27	I2C_GP1_CLK_3V3M	28	I2C_GP1_DATA_3V3M
	29	GND	30	AUDIO_CODEC_3V3_RST
	31	AO_DMIC_IN_3V3_CLK	32	MOTION_3V3_INT
	33	GND	34	AP_WAKE_3V3_BT
	35	UART0_CTS_3V3	36	I2S0_3V3_LRCK
	37	I2S0_3V3_DIN	38	ALS_PROX_3V3_INT
39	I2S0_3V3_DOUT	40	GND	
<b>Remarks</b>	None			




### 3.14 Fan Wafer for Active Heat Sink (NVIDIA® Jetson™ TX1/TX2 Fan)

<b>Function</b>	Fan power and control wafer		
<b>Location</b>	BJ4		
<b>Type Description</b>	1x4 pin 1.25mm pitch 180° wafer		
<b>Manufacturer and Part Number</b>	Joint Tech, A1250WV-04PNLNT1N00B		
<b>Mating Connector</b>	Molex, 51021-0400		
<b>Pinout</b>	Pin Number	Description	
	1	GND	
	2	5V Power	
	3	TACH from fan to module	
	4	PWM from module to fan	
<b>Remarks</b>	None		


### 3.15 2x60 Pin High-Speed Board-to-Board Connector (to EX731AA)

<b>Function</b>	Provide connection between EX731N1 and EX731AA	
<b>Location</b>	SJ1	
<b>Type Description</b>	Samtec Q STRIP™ connector	
<b>Manufacturer and Part Number</b>	Samtec, QTH-060-04-L-D-A-K-TR (16.0mm stacking height)	
<b>Mating Connector</b>	Samtec, QSH-060-01-L-D-A-K-TR	
<b>Pinout</b>	For PCI-E/SATA/UART/Can bus expansion	
<b>Remarks</b>	None	


### 3.16 M.2 M Key Connectors

<b>Function</b>	Provide M.2 interface to connect other 2280 M.2 M key devices.	
<b>Location</b>	SJ3: M.2 M key connector #1 SJ4: M.2 M key connector #2	
<b>Type Description</b>	0.5mm M.2 card conn. SMT D/R R/A type H=3.2mm 67P	
<b>Manufacturer and Part Number</b>	Aces, 51733-06702-012	
<b>Mating Connector</b>	Any M.2 M key 2280 card standard interface device.	
<b>Pinout</b>	Please refer to M.2 M key card standard for the pinout details.	
<b>Remarks</b>	None	

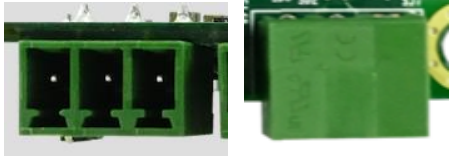
### 3.17 Fan Wafer for M.2 Device

<b>Function</b>	Fan wafer for M.2 devices							
<b>Location</b>	SJ5							
<b>Type Description</b>	WAFER_1*2PIN_1.25 mm							
<b>Manufacturer and Part Number</b>	Molex, 53047-0210							
<b>Mating Connector</b>	Molex, 51021-0200							
<b>Pinout</b>	<table border="1"> <thead> <tr> <th>Pin Number</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>+5V</td> </tr> <tr> <td>2</td> <td>GND</td> </tr> </tbody> </table>		Pin Number	Description	1	+5V	2	GND
Pin Number	Description							
1	+5V							
2	GND							
<b>Remarks</b>								

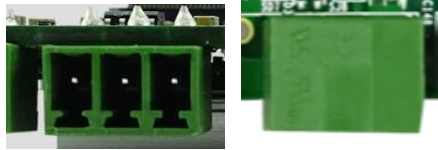
### 3.18 SATA Connector

<b>Function</b>	Provide connection to SATA HDD	
<b>Location</b>	SJ6	
<b>Type Description</b>	SATA 7+15P standard SMT type (male)	
<b>Manufacturer and Part Number</b>	Tact Precision, C37CH2-22021-R	
<b>Mating Connector</b>	Any SATA 7+15P standard type connector (female)	
<b>Pinout</b>	Please refer to SATA 7+15P standard for the pinout details	
<b>Remarks</b>	None	

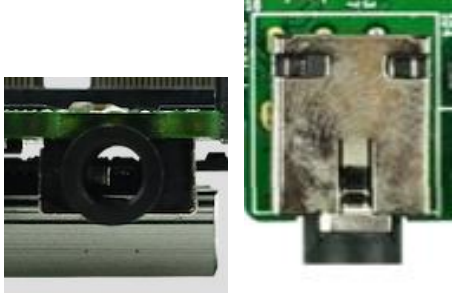
### 3.19 CAN Bus Connector

<b>Function</b>	Provide CAN bus connection.		
<b>Location</b>	SJ7		
<b>Type Description</b>	TERMINAL BLOCK_1*3PIN		
<b>Manufacturer and Part Number</b>	DECA, ME030-38103T		
<b>Mating Connector</b>	DECA, MC420-38103Z		
<b>Pinout</b>	Pin Number	Description	
	1	CANL	
	2	GND	
	3	CANH	
<b>Remarks</b>	None		


### 3.20 RS485 Connector

<b>Function</b>	RS485 interface from Jetson™ TX1/TX2 module UART control		
<b>Location</b>	SJ8		
<b>Type Description</b>	PLUG_TERMINAL BLOCK_1*3PIN		
<b>Manufacturer and Part Number</b>	DECA, ME030-38103T		
<b>Mating Connector</b>	DECA, MC420-38103Z		
<b>Pinout</b>	Pin Number	Description	
	1	GND	
	2	B	
	3	A	
<b>Remarks</b>	None		

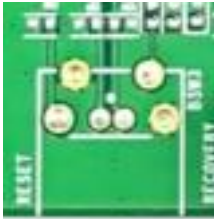
### 3.21 MIC IN Connector

<b>Function</b>	3.5mm phone jack for Mic input (optional Line in or Line out)	
<b>Location</b>	SJ10	
<b>Type Description</b>	Miniature Jack	
<b>Manufacturer and Part Number</b>	EDL Tech., PJ-LD07B7R	
<b>Mating Connector</b>	For any 3.5mm audio cable	
<b>Pinout</b>	Refer to 3.5mm 3P audio phone jack define	
<b>Remarks</b>	None	

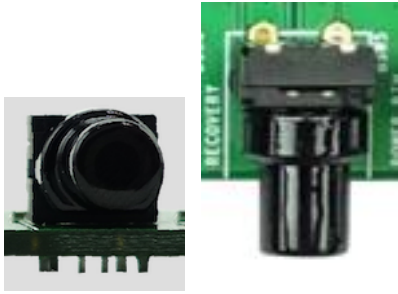
### 3.22 POWER on Button

<b>Function</b>	Power control button	
<b>Location</b>	BSW1	
<b>Type Description</b>	Button with R, G, B LED	
<b>Manufacturer and Part Number</b>	N/A	
<b>Mating Connector</b>	N/A	
<b>Pinout</b>	N/A	
<b>Remarks</b>	The green light on LED is activated when the board is powered on.	


### 3.23 RESET Button

<b>Function</b>	Reset	
<b>Location</b>	BSW3	
<b>Type Description</b>	N/A	
<b>Manufacturer and Part Number</b>	N/A	
<b>Mating Connector</b>	N/A	
<b>Pinout</b>	N/A	
<b>Remarks</b>	Reserved and not mounted.	

### 3.24 RECOVERY Button

<b>Function</b>	Force recovery (volume up) button and status LED indicator.	
<b>Location</b>	BSW5	
<b>Type Description</b>	Button with R, G, B LED	
<b>Manufacturer and Part Number</b>	N/A	
<b>Mating Connector</b>	N/A	
<b>Pinout</b>	N/A	
<b>Remarks</b>	None	

### 3.25 Mic Input Gain Adjustment Jumper

<b>Function</b>	Pre-amplifier gain adjustment jumper for Mic input.	
<b>Location</b>	SJP1	
<b>Type Description</b>	N/A	
<b>Manufacturer and Part Number</b>	N/A	
<b>Mating Connector</b>	N/A	
<b>Pinout</b>	N/A	
<b>Remarks</b>	N/A	

### 3.26 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

1. Check and ensure all the external system power supplies are turned off.
2. Install NVIDIA® Jetson™ TX1/TX2 module onto 50x8 pin high-speed/high-density connector (J1). Check and be sure to follow the manufacturer's instructions for the proper installation of the mounting hardware, heat sink or heat spreader, fan, and any other applicable requirements from the associated manufacturers.
3. Install the necessary cables for the application. The cables can include the following ones. For the additional information of these mentioned cables, please refer to 8.0



Cable Assembly in this manual.

- 1 Power cable to the input power connector (J21) on the carrier board.
  - 1 HDMI video display cable to HDMI video output connector (J28).
  - 1 Mouse and keyboard cables to USB connectors (J25).
4. Connect the power cable to the power adapter.
  5. Turn on the power adapter. (Please be reminded NOT to power on the system by plugging in the live power.)

## 5.0 Software

For L4T (Linux for Tegra) BSP support and the other software support associated with NVIDIA® Jetson Nano™ module, please click the link [here](#) to contact our technical support function.

## 6.0 Force Recovery Mode

USB 3.1/OTG port (BJ1) of EX731-AA00 can be used to re-program NVIDIA® Jetson™ TX1/TX2 module 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 OTG USB port to the other host system which will be used to re-program the new system file into NVIDIA® Jetson™ TX1/TX2 module.
3. Press and hold down Force Recovery Button (SW8) and then power on the carrier board.
4. After three seconds, release Force Recovery Button.
5. NVIDIA® Jetson™ TX1/TX2 module will show up on the USB list of the host system as a new NVIDIA target device.
6. After the system software is updated successfully, please ensure to power off the system. A clean power-on will then revert OTG port back to the host mode.

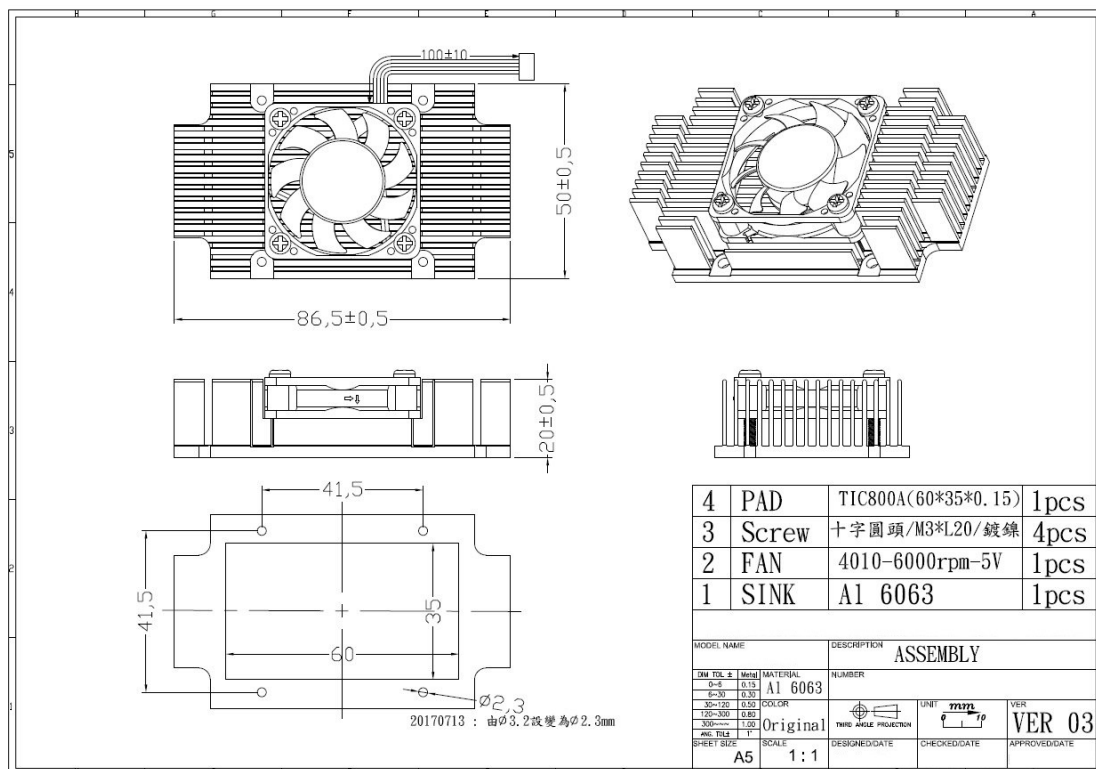
## 7.0 Power Consumption

Item Description	Power Consumption
Theoretical Maximum System Power Consumption	60W
Typical System Power Consumption	The power consumption under the normal operating mode is depending on the application software running with NVIDIA® Jetson™ TX1/TX2 module on the carrier board or in the box PC's.

## 8.0 Accessory Drawings

### 8.1 Active Heat Sink

The part number of the active heat sink is 113AAAAAABJ. The active heat sink is composed of the fan module, four mounting screws, and one power cable connecting from the fan module to the fan wafer (BJ4).

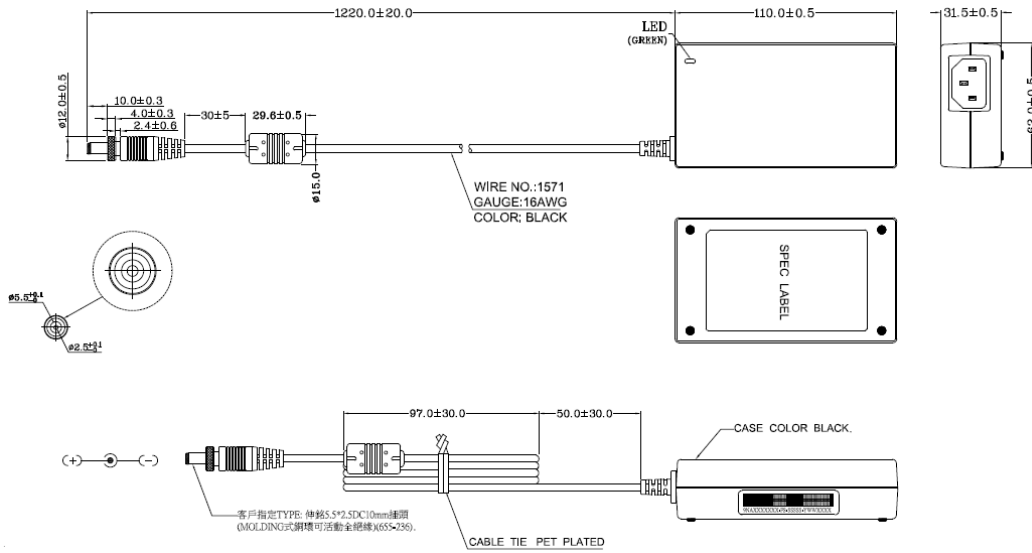


## 8.2 Passive Heat Sink

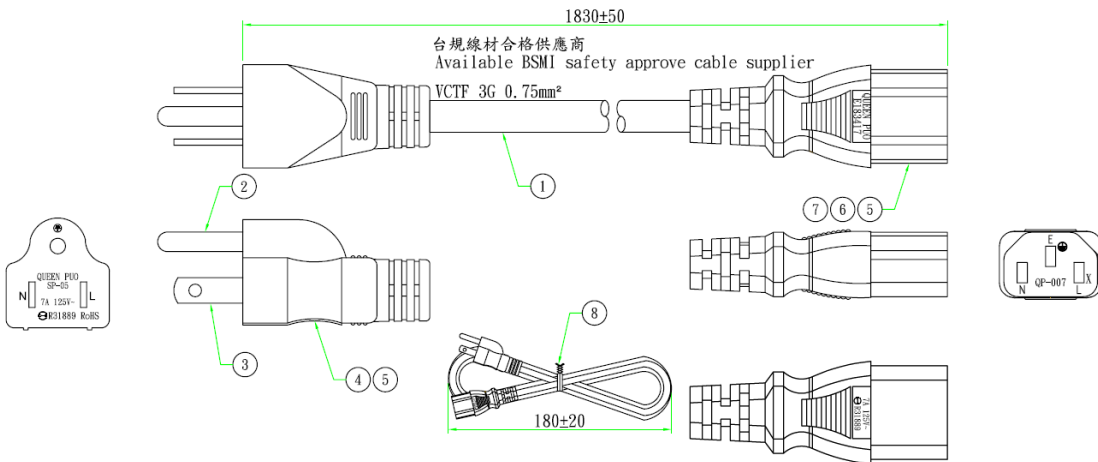
There is no passive heat sink available to work with EX731-AA00 carrier board.

## 8.3 Power Adapter and Power Cord

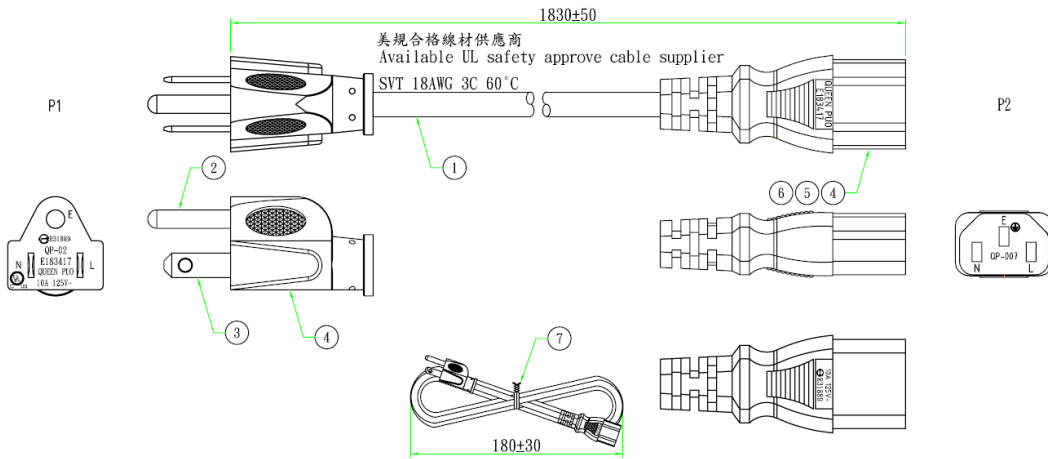
04131HGOUANK



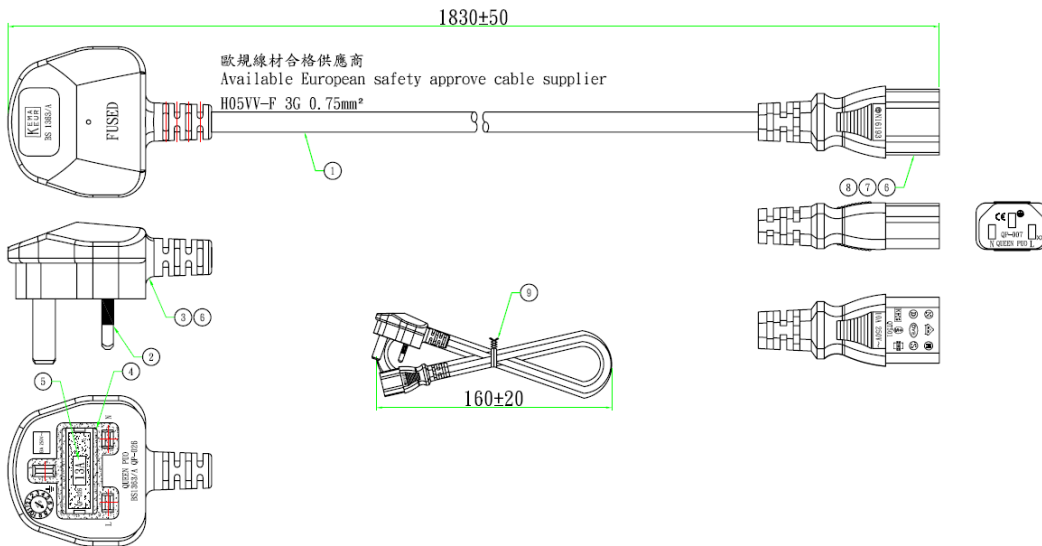
064APOWBRX-IPD (TW version)



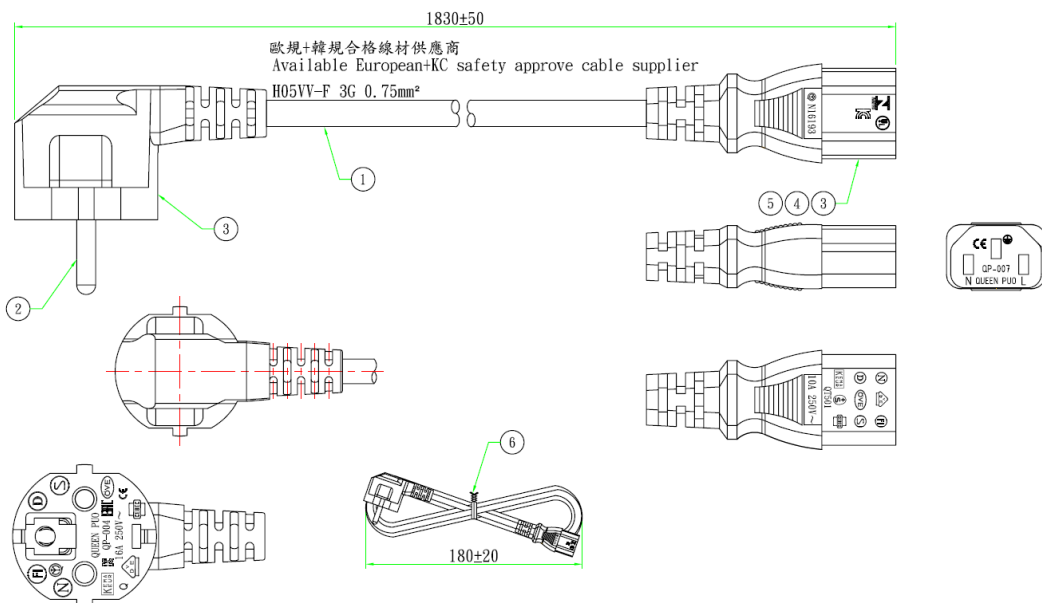
### 064APOWBR2-IPD (US version)



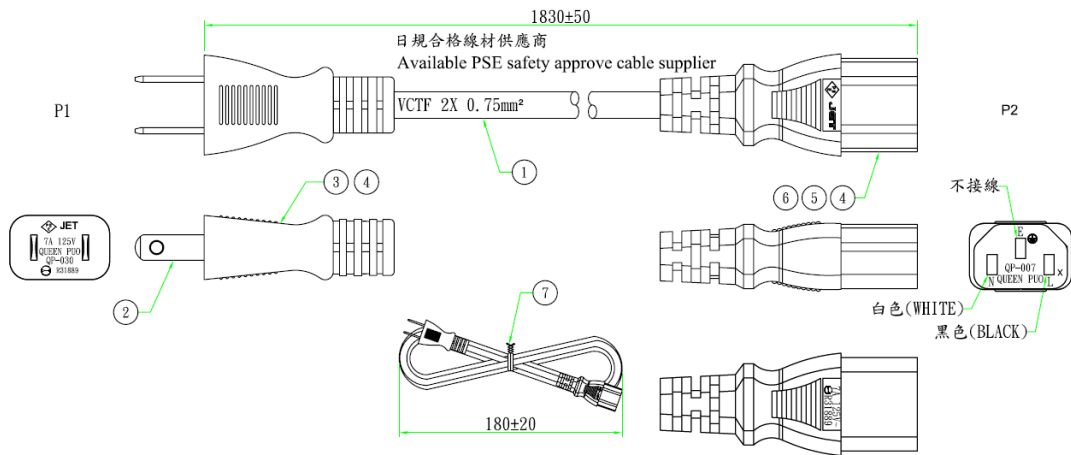
### 064APOWBRW-IPD (UK version)



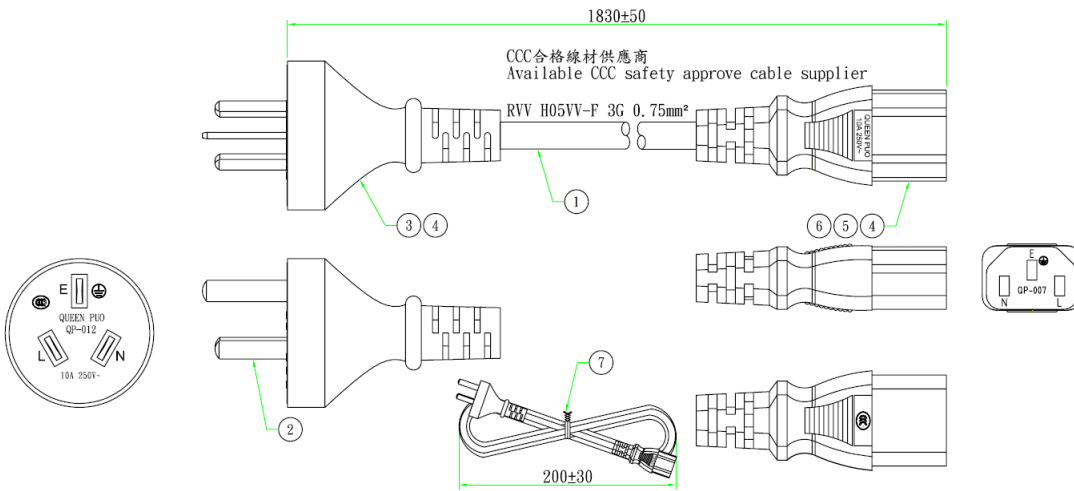
### 064APOWBR5-IPD (EU version)



### 064APOWERSL (JP version)



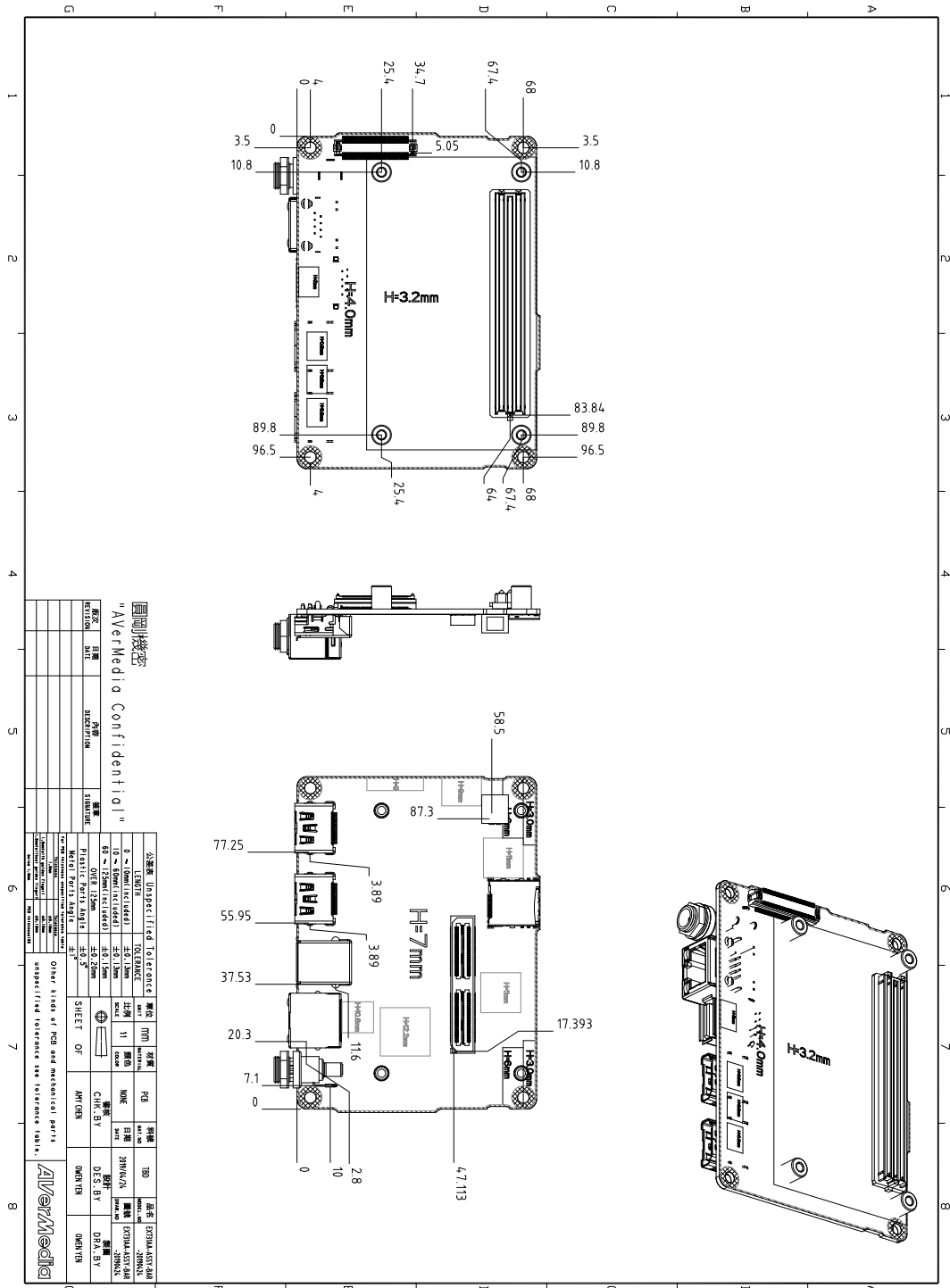
### 064APOWERSL4-IPD (CN version)



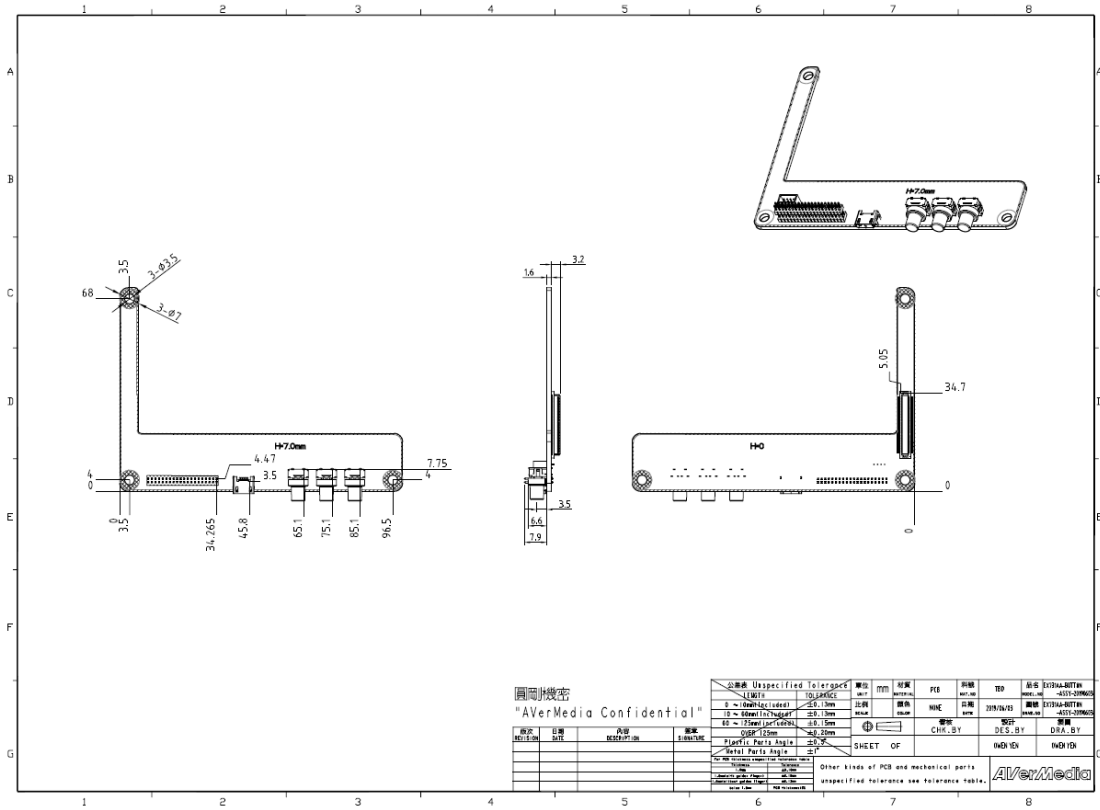
# 9.0 Dimension Drawings and Assembly Drawings

## 9.1 Dimension Drawings of EX731AA, EX731B1, and EX731N1

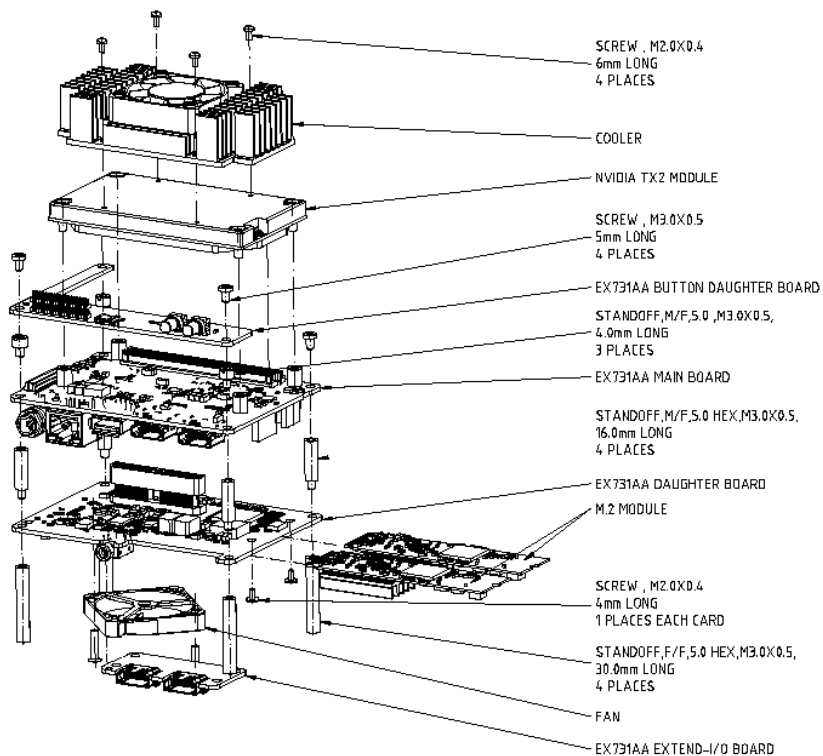
EX731AA



# EX731B1

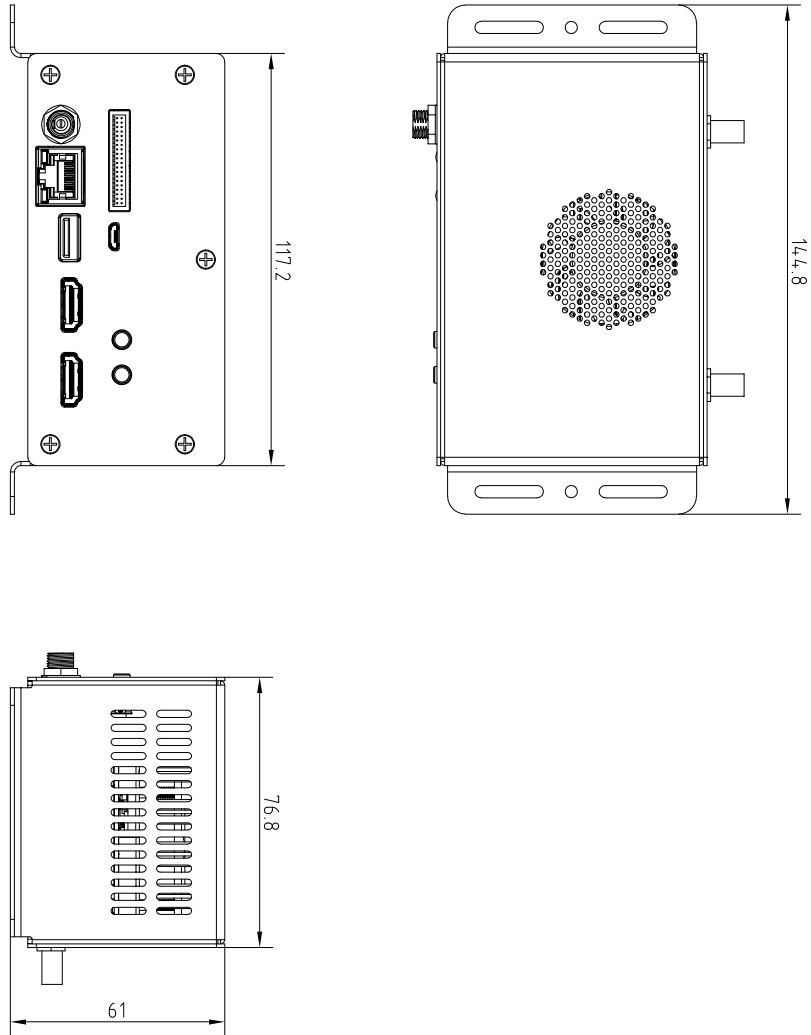


## 9.2 Assembly Drawing Active Heat Sink, NVIDIA® Jetson™ TX1/TX2 Module, EX731AA, EX731B1, and EX731N1





### 9.3 Dimension Drawing of EX731 Box PC EX731-AA00-1AC



### 9.4 Dimension Drawing of EX731 Box PC EX731-AAH2-2AC

