

AVerMedia Carrier Board AG411 and Box PC AG411B

Designed for NVIDIA® Jetson™ AGX Xavier™ Modules



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Preface

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Revision History

Revision	Date	Updates
1.0	2021/7/9	First release.
2.0	2022/2/7	Detail Revised
2.1	2022/3/24	Update weight/dimension Update SATA function as optional
2.2	2022/11/09	Update Safety Precaution/Product Specifications /Connector Summary
2.3	2022/12/12	Update block diagram
2.4	2022/12/27	Update Fan information

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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 staff.
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. Introduction

AVerMedia AVerMedia AG411B includes one fully featured carrier board and one associated Box PC's which is all developed for NVIDIA® Jetson™ AGX Xavier™ modules. AVerMedia AG411_AG411B provides not only the access to a great list of latest interfaces on AGX Xavier™ modules but also one RS-485 interface, one CAN bus with transceiver, and one RTC battery as the function enrichment.

AG411B provides two M.2 Key M 2280 and three mPCIe slots alternatively for Xavier to receive various video inputs by using AVerMedia's capture cards. These two M.2 Key M 2280 and four mPCIe slots share four PCIe Gen2 lanes, so AG411_AG411B Box PC can provide three different combinations for developers to install video capture cards alternatively, such as two M.2 Key M 2280 slots, three mPCIe slots, or two mPCIe slots with one M.2 Key M 2280 slot.

By using AVerMedia's extended video capture cards, Xavier is able to receive HDMI, VGA, SDI, composite video inputs, and even dual 4Kp30 HDMI video inputs for different application scenarios.

Operating with NVIDIA® Jetson™ AGX Xavier™ module and the rich I/O functions, AVerMedia AG411_AG411B is the perfect choice in building the high performance AI edge computing platform for the intelligent video analytics

1.1 Product Specifications

Model	AG411	AG411B
Type	Carrier Board	Box PC with Fanless
NVIDIA GPU SoC Module Compatibility	NVIDIA® Jetson AGX Xavier™	NVIDIA® Jetson AGX Xavier™ 32GB or 64GB
Networking	2x GbE (RJ-45)	2x GbE (RJ-45)
Display Output	2x HDMI 2.0 Maximum resolution: 3840 x 2160 at 60Hz	2x HDMI 2.0 Maximum resolution: 3840 x 2160 at 60Hz
Temperature	Operating Temperature -20°C ~ 85°C Storage Temperature -40°C ~ 85°C Relative Humidity 40 °C @ 95%, Non-Condensing	Operating Temperature -10°C ~ 60°C Storage Temperature -40°C ~ 85°C Relative Humidity 40 °C @ 95%, Non-Condensing
USB	1x USB 2.0 Micro-B for RNDIS & BSP installation 2x USB 3.0 Type-A (USB3.1 x2) 3x USB 2.0	1x USB 2.0 Micro-B for RNDIS & BSP installation 2x USB 3.0 Type-A (USB3.1 x2) 3x USB 2.0
Storage	1x micro-SD card slot	32GB eMMC 5.1 & 1x micro-SD card slot
RS-485	1x RS-485	1x RS-485
CAN bus	1x CAN bus with transceiver	1x CAN bus with transceiver
Expansion Header	40 pins: 1x UART, 2x I2C, 1x I2S, 1x SPI 1x CAN (W/O transceiver), 5x GPIO *debug UART*1	40 pins: 1x UART, 2x I2C, 1x I2S, 1x SPI 1x CAN (W/O transceiver), 5x GPIO *debug UART*1 (Box internal)
User Expansion	1 x M.2 Key E 2230 for Wi-Fi module (PCIe Gen4x 1) 1 x M.2 Key M 2280 for NVMe (PCIe Gen4x 4) 2 x M.2 Key M 2280 (PCIe Gen2x 4) or 4x mPCIe Gen2 x1 1 x SATA(optional)	1 x M.2 Key E 2230 for Wi-Fi module (PCIe Gen4x 1) 1 x M.2 Key M 2280 for NVMe (PCIe Gen4x 4) 2 x M.2 Key M 2280 (PCIe Gen2x 4) or 3x mPCIe Gen2 x1 1 x SATA(optional)
DIP Switch Expansion	1. Auto power on enable/Disable 2. FAN PWM on enable/Disable 3. RS485 Terminal ON/OFF 4. CAN Bus Terminal ON/OFF	1. Auto power on enable/Disable (External) 2. FAN PWM on enable/Disable (External) 3. RS485 Terminal ON/OFF (External) 4. CAN Bus Terminal ON/OFF (External)
Input Power	12-54V	12-54V
Buttons	Power and Recovery (Power button with green LED)	Power and Recovery (Power button with green LED)
RTC Battery	Support RTC battery and Battery Life Monitoring by MCU	Support RTC battery and Battery Life Monitoring by MCU

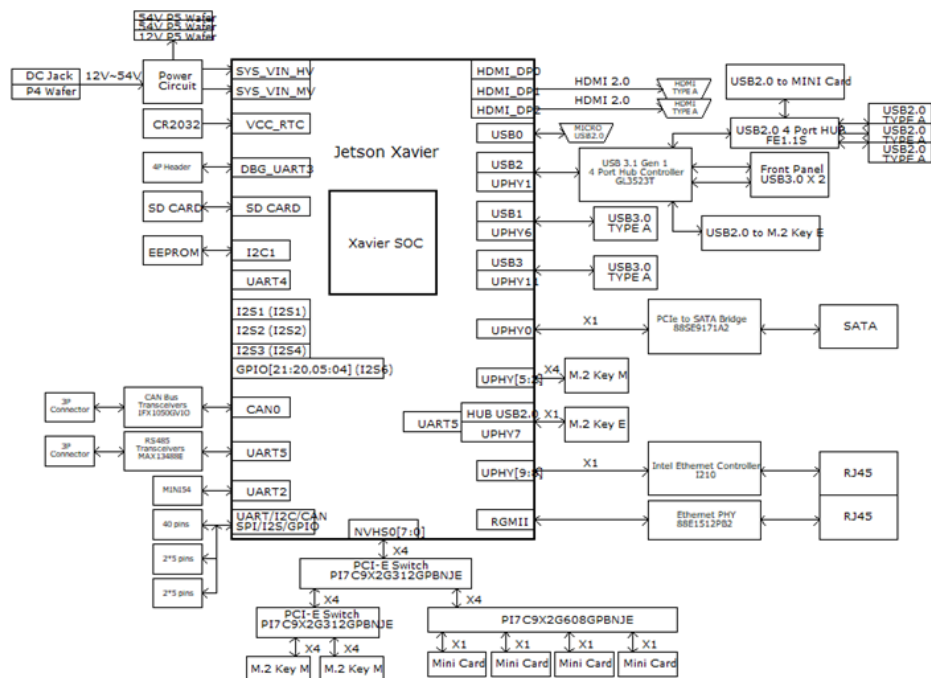
Carrier board/ Chassis Dimension	W: 170mm x L: 220 mm x H: 53 mm	W: 190mm x L: 240mm x H: 88.5mm W: 214mm x L: 240mm x H: 88.5mm(include wallmount)
Carrier board/ Chassis Weight	300g	4000g
Certifications	CE, FCC,KC	CE, FCC,KC

2. Product Overview

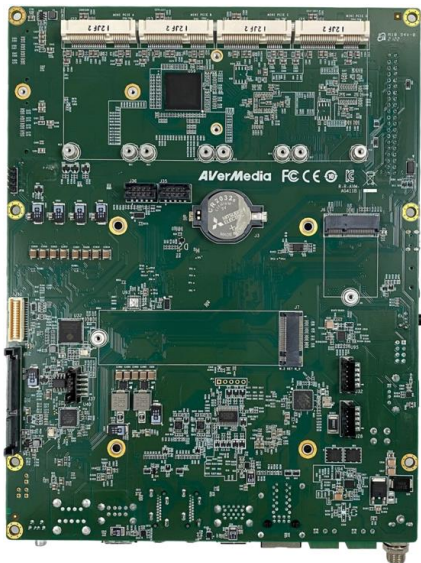
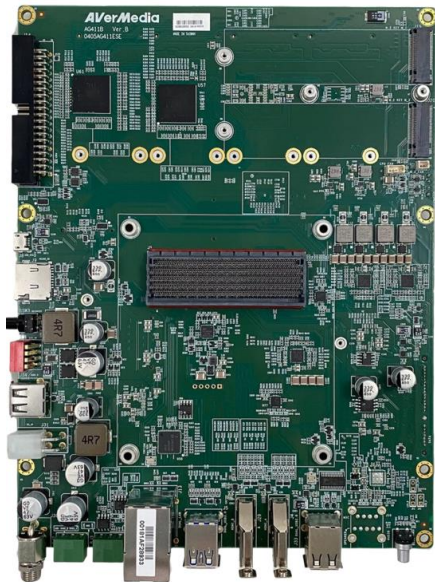
2.1 AG411_AG411B Compatible Cards

Model Name	CN311-H	CN312SW	CN312MW
Host Interface	PCIe Gen2 x2	PCIe Gen2 x4	PCIe Gen2 x4
Max Input Resolution	4096x2160 30fps	2048x1080 60fps	● 2Kp60 in (SDI) ● 1920 x 1200p60 in (HDMI)
Max Record Resolution	4096x2160 30fps	1920x1080 60fps	1920x1080 60fps
Channel No.	1	2	2
Audio Interface	HDMI embedded	SDI embedded	SDI embedded HDMI embedded
Video Interface	HDMI	SDI	HDMI SDI
Color Depth/Precision	8/10 bit	8 bit	8 bit
Color Format	YUY2, YUYV	YUY2, YUYV	YUY2, YUYV
Operating Temperature	0°~40℃	-20°~70℃	-20°~70℃
Dimensions (LxW) mm	22x80	22x80	22x80

2.2 Block Diagram



2.3 Top View and Bottom View of AG411 carrier board



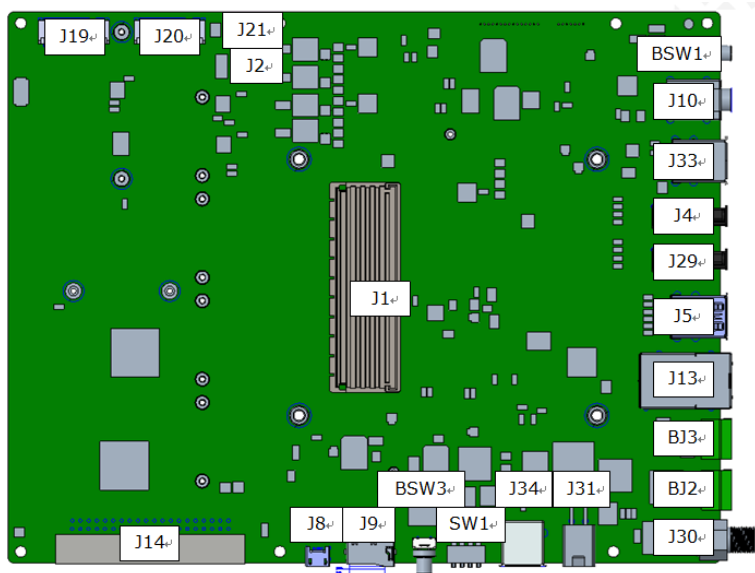


2.5 Connector Summary

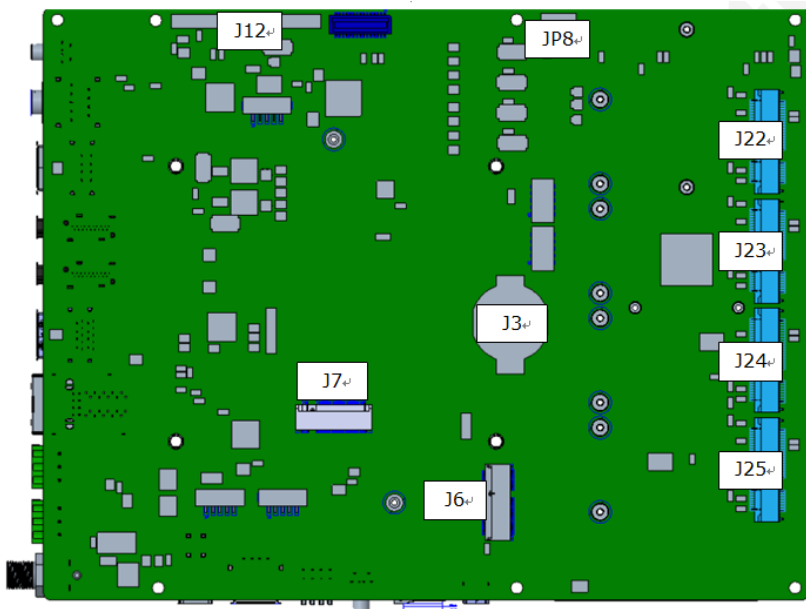
PCB Code	Designation	Description
AG411 (Carrier Board)	J1	699 pin high-speed/high-density connector (for NVIDIA® Jetson™ AGX Xavier™ module)
	J2	Fan Power Connector
	J3	RTC battery connector
	J4	HDMI output connector #A
	J5	USB 3.1 Gen 1 Type-A connector #1 and #2
	J6	M.2 E Key Connector for WIFI
	J7	M.2 M Key Connector for SSD
	J8	Micro USB connector
	J9	Micro SD card reader connector
	J12	SATA connector (optional)
	J13	Gigabit Ethernet connector #1 and #2
	J14	40 pin expansion header
	J19	M.2 M Key Connector
	J20	M.2 M Key Connector
	J22	Mini Card (PCIe)
	J23	Mini Card (PCIe)
	J24	Mini Card (PCIe)
	J25	Mini Card (PCIe)
	J29	HDMI output connector #B
	J30	DC IN 12~54V power jack
	J31	DC IN ATX 4P
	J33	USB 2.0 Type-A connector #1 and #2
	J34	USB 2.0 Type-A connector
	JP8	Debug UART
	BSW1	POWER button

	BSW3	RECOVERY button
	SW1	DIP Switch Expansion
	BJ2	RS485
	BJ3	CAN bus

AG411B Carrier Board Top View.




AG411B Carrier Board Bottom View.




3. Feature Description


3.1 699pin High-Speed/High-Density Connector (for NVIDIA® Jetson™ AGX Xavier™ Module)

Function	Provide connection with NVIDIA® Jetson™ AGX Xavier™ module	
Location	J1	
Type Description	MOLEX 699pin socket	
Manufacturer and Part Number	MOLEX,203456-0003	
Mating Connector	MOLEX,203456-0003	
Pinout	Please refer to NVIDIA Jetson™ AGX Xavier™ and AGX Xavier™ System-on-Module datasheet for pinout details.	
Remarks	None	


3.2 RTC Battery Connector

Function	RTC battery for module							
Location	J3							
Type Description	BATTERY HOLDER CR2032							
Manufacturer and Part Number	LOTES, AAA-BAT-054-P06							
Mating Connector	CR2032							
Pinout	<table><tr><th>Pin #</th><th>Description</th></tr><tr><td>1</td><td>3V Power</td></tr><tr><td>2</td><td>GND</td></tr></table>			Pin #	Description	1	3V Power	2
Pin #	Description							
1	3V Power							
2	GND							
Remarks	RTC Battery: MITSUBISHI, CR2032 3V							


3.3 HDMI Output #A and #B

Function	HDMI output connector	
Location	J4,J29	
Type Description	HDMI Type-A female connector	
Manufacturer and Part Number	Compupack, ACNHM210021-001	
Mating Connector	Any HDMI standard Type-A interface cable or device.	
Pinout	Please refer to HDMI standard.	
Remarks	None	


3.4 USB 3.1 Gen 1 Type-A Connector #1 and #2

Function	USB 3.1 Gen 1 Type-A connector #1 & #2	
Location	J5	
Type Description	Dual-port USB 3.1 Gen 1 Type-A female connector	
Manufacturer and Part Number	Champway, CU3B-AFR15U-096H	
Mating Connector	Any USB 3.1 standard Type-A interface cable or device.	
Pinout	Please refer to USB 3.1 Gen 1 standard.	
Remarks	None	

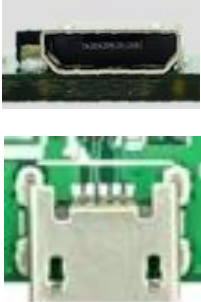
3.5 M.2 E Key Connector

Function	Provide M.2 interface to connect other 2230 M.2 E key devices.	
Location	J6	
Type Description	SOCKET_M.2-TYPE E_75PIN	
Manufacturer and Part Number	Aces, 51750-0750P-005	
Mating Connector	Any M.2 E key 2230 card standard interface device.	
Pinout	Please refer to M.2 E key card standard for the pinout details.	
Remarks	None	


3.6 M.2 M Key Connector

Function	Provide M.2 interface to connect other 2280 M.2 M key devices.	
Location	J7	
Type Description	SOCKET_M.2-M KEY_75PIN	
Manufacturer and Part Number	Aces, 51733-06702-012	
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	None	

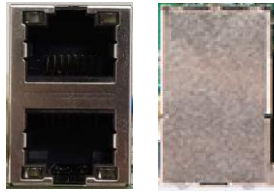
3.7 OTG/USB Micro-Type Connector

Function	OTG programming recovery	
Location	J8	
Type Description	USB micro-type B female connector	
Manufacturer and Part Number	Fullglory, FG-MCB-111440	
Mating Connector	Any USB standard Micro-type interface cable or device.	
Pinout	Please refer to USB Micro-type standard.	
Remarks	None	

3.8 Micro SD Card Reader Connector

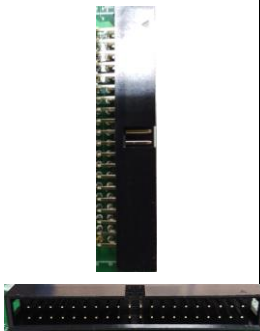
Function	Micro-SD card reader	
Location	J9	
Type Description	Micro-SD memory card connector	
Manufacturer and Part Number	Champway, MSPP-1014090RG-MN4	
Pinout	Comply with Micro-SD card standards.	
Remarks	None	

3.9 Gigabit Ethernet Connector

Function	1Gb dual-port Ethernet connector, used to connect to the host system.	
Location	J13	
Type Description	JACK_RJ45*2_TRANSFOMER +LED	
Manufacturer and	Aquatech,	

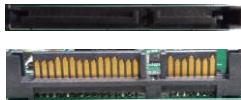
Part Number	JDKA1S826-G/D1_1G-LED L(G)+R(G/Y)	
Mating Connector	Any RJ45 plug with Cat5, Cat5e, Cat6 type cabling.	
Pinout	Comply with Ethernet standards.	
Remarks	None	

3.10 40-Pin Expansion I/O Connector


Function	System expansion IO connector				
Location	J14				
Type Description	HEADER_BOX_2*20PIN_2.54mm				
Manufacturer and Part Number	Chant Sincere, 302AE40PGAR003				
Mating Connector	Any 2.54mm pitch standard interface female				
Pinout	Pin#	Description	Pin#	Description	
	2	+5V_SYSTE M	1	+3V3_SYSTE M	
	4	+5V_SYSTE M	3	I2C_GP5_DAT A_3V3	
	6	GND	5	I2C_GP5_CLK _3V3	
	8	UART1_TX_ 3V3	7	MCLK05_3V3	
	10	UART1_RX_ 3V3	9	GND	
	12	I2S2_3V3_C LK	11	UART1_RTS_3 V3	
	14	GND	13	PWM01_3V3	
	16	GPIO8_AO_ DMIC_DAT	15	GPIO27_PWM 2_3V3	
	18	GPIO35_PW M3_3V3	17	+3V3_SYSTE M	
	20	GND	19	SPI1_3V3_MO SI	
	22	GPIO17_40H EADER_3V3	21	SPI1_3V3_MIS O	

	24	SPI1_3V3_CS0	23	SPI1_3V3_CLK	
	26	SPI1_3V3_CS1	25	GND	
	28	I2C_GP2_CLK_3V3	27	I2C_GP2_DATA_3V3	
	30	GND	29	CAN0_DIN	
	32	GPIO9_CAN1_GPIO0_D	31	CAN0_DOUT	
	34	GND	33	CAN1_DOUT	
	36	UART1_CTS_3V3	35	I2S2_3V3_FS	
	38	I2S2_3V3_DIN	37	CAN1_DIN	
	40	I2S2_3V3_DOUT	39	GND	
Remarks	None				


3.11 50 SATA Connector (Optional)

Function	7+15PIN SATA Connector	
Location	J12	
Type Description	SOCKET_SATA+POWER_7+15PIN_180°	
Manufacturer and Part Number	Light Jie, SAMSF005-220BTRH	
Mating Connector	Any SATA standard interface cable.	
Pinout	Please refer to SATA standard.	
Remarks	None	

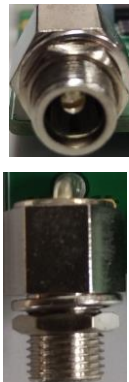
3.12 M.2 M Key Connectors

Function	Provide M.2 interface to connect other 2280 M.2 M key devices.	
Location	J19: M.2 M key connector #1 J20: M.2 M key connector #2	
Type Description	SOCKET_M.2-M KEY_75PIN	
Manufacturer and Part Number	Aces, 51733-06702-012	
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	None	

3.13 Connectors

Function	Provide MiniCard (PCIe) interface to connect other MiniCard (PCIe) devices	
Location	J22, J23, J24, J25 connectors	
Type Description	SOCKET_MINI PCIE_52PIN	
Manufacturer and Part Number	FOXCONN, AS0B221-S68Q-7H_H=6.8MM-062AL6	
Mating Connector	Any MiniCard standard interface device.	
Pinout	Please refer to MiniCard standard for the pinout details.	
Remarks	None	

3.14 DC IN Power Jack

Function	Power input with lock		
Location	J30		
Type Description	D2.5 mm_90° power jack		
Manufacturer and Part Number	JKCR, DCD-020-105B		
Mating Connector	Any OD 5.5/2.5 mm & 12mm length plug		
Pinout			
	Pin Number	Description	
	3	GND	
	1	Power	
	2	GND	
Remarks	None		

3.15 4-Pin Female Power Connector


Function	ATX Power 4P	
Location	J31	
Type Description	WAFER_2*2PIN_4.2mm	
Manufacturer and Part Number	Fullglory FPWD-42R2-04NAT	
Mating Connector	Any ATX Power standard interface female	
Pinout	Please refer to ATX Power standard for the pinout details.	
Remarks	None	



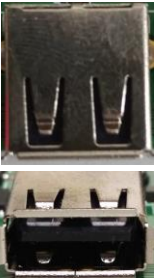
3.16 USB 2.0 Type-A Connector #1 and #2

Function	USB 2.0 Type-A connector #1 & #2	
Location	J33	
Type Description	Dual-port USB 2.0 Type-A female connector	
Manufacturer and	EDL, UAF208D010B	





Part Number		
Mating Connector	Any USB 2.0 standard Type-A interface cable or device.	
Pinout	Please refer to USB 2.0 standard.	
Remarks	None	

3.17 USB 2.0 Type-A Connector

Function	USB 2.0 Type-A connector	
Location	J34	
Type Description	USB 2.0 Type-A female connector	
Manufacturer and Part Number	HORNG TONG, US04N11BFL160	
Mating Connector	Any USB 2.0 standard Type-A interface cable or device.	
Pinout	Please refer to USB 2.0 standard.	
Remarks	None	

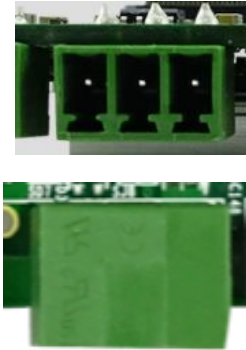
3.18 DIP Switch

Function	DIP Switch											
Location	SW1											
Type Description	SW_DIP_DAAH-04RR-T_DIP-90°											
Manufacturer and Part Number	CHAMPWAY, DAAH-04RR-T											
Mating Connector	None											
Pinout	<table><tr><th>Pin Number</th><th>Description</th></tr><tr><td>1</td><td>Power Mode</td></tr><tr><td>2</td><td>FAN Mode</td></tr><tr><td>3</td><td>RS485 Terminal</td></tr><tr><td>4</td><td>CAN Terminal</td></tr></table>		Pin Number	Description	1	Power Mode	2	FAN Mode	3	RS485 Terminal	4	CAN Terminal
	Pin Number	Description										
	1	Power Mode										
	2	FAN Mode										
	3	RS485 Terminal										
	4	CAN Terminal										

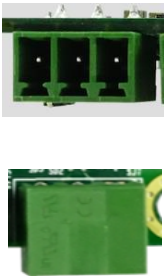


Remarks	SW1 => OFF->Auto Power / ON->Button Power SW2 => OFF->FAN PWM / ON->FAN Always SW3 => OFF->485 W/O Terminal / ON->485 W/ Terminal SW4 => OFF->CAN W/O Terminal / ON->CAN W/ Terminal
---------	---

3.19 RS485 Connector


Function	Provide RS485 connection.										
Location	BJ2										
Type Description	TERMINAL BLOCK_1*3PIN										
Manufacturer and Part Number	DECA, ME030-38103T										
Mating Connector	DECA, MC420-38103Z										
Pinout	<table><tr><th>Pin #</th><th>Description</th></tr><tr><td>1</td><td>GND</td></tr><tr><td>2</td><td>B</td></tr><tr><td>3</td><td>A</td></tr></table>				Pin #	Description	1	GND	2	B	3
Pin #	Description										
1	GND										
2	B										
3	A										
Remarks	None										

3.20 CAN Bus Connector

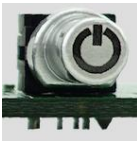

Function	Provide CAN bus connection.		
Location	BJ3		
Type Description	TERMINAL BLOCK_1*3PIN		
Manufacturer and Part Number	DECA, ME030-38103T		
Mating Connector	DECA, MC420-38103Z		
Pinout			
	Pin #	Description	
	1	CANL	
	2	GND	
	3	CANH	

Remarks	None
---------	------

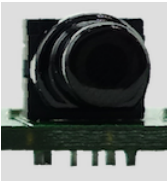

3.21 Fan Power connector

Function	Fan Power Connector			
Location	J2			
Type Description	WAFER_1*4PIN_1.25 mm_180°_DIP			
Manufacturer and Part Number	JOINT A1250WV-04PNLNT1N00B			
Mating Connector	ACES 50276-004H0H0-001			
Pinout	Pin #	Description		
	PIN 1	GND		
	PIN 2	+12V Power		
	PIN 3	FAN_TACH		
	PIN 4	FAN_PWM		
Remarks	None			

3.22 POWER on Button

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

3.23 RECOVERY Button

Function	Recovery button	
Location	BSW3	
Type Description	Button with R, G, B LED	
Manufacturer and Part Number	N/A	
Mating Connector	N/A	
Pinout	N/A	
Remarks	None	

3.24 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. Installation

1. Check and ensure all the external system power supplies are turned off.
2. Install NVIDIA® Jetson™ AGX Xavier™ module onto 699 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.
 - Power cable to the input power connector (J30) on the carrier board.
 - HDMI video display cable to HDMI video output connector (J4/J29).
 - Mouse and keyboard cables to USB connectors .
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.)

4.1 BSP Installation

< AG411_AG411B BSP download link...>

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

BSP Installation steps for NVIDIA Jetson board:

* Important Note: Please backup your personal files before re-flashing BSP

Prepare a Linux Host PC with Ubuntu 18.04 and download the BSP file to the Linux Host PC, and then refer to the following steps for flashing BSP.

1. Let the JETSON AGX Xavier initiate recovery mode.

Connecting a NVIDIA Jetson board to a Linux PC via a MicroUSB to USB cable, and initiate recovery mode with the following steps:

- (1) power off device
- (2) press recovery button
- (3) power on device
- (4) wait 2 seconds
- (5) release recovery button

2. Using the commands below on Linux Host PC to flash BSP.

(1) Extract BSP

```
$ sudo tar zxvf <bsp-filename>.tar.gz  
  
$ cd JetPack_*/Linux_for_Tegra
```

Where:

<bsp-filename> is the filename of BSP tarball file as the following format:

* AG411B-R*.*.*.*

(2) Flash BSP

```
# Use default user account. ( user_name/password: nvidia )  
  
$ ./install.sh  
  
# Create other user name and password as default user  
  
$ ./install.sh --create_default_account  
  
# Flash more modules (speed up)  
  
$ ./install.sh -r
```


5. Software

This section describes BSP's features for AG411_AG411B

1. Support optional M.2 WI-FI/Bluetooth modules (Intel® Wireless-AC 9260/AC 8265), the manager UI of AC9260/AC8265 WiFi/Bluetooth is located on the upper-right corner of Ubuntu desktop. It can be also controlled by nmcli/hcitol in command line.
2. Power Mode

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

```
# get current power mode

$ sudo nvpmode -q

# setup power mode

$ sudo nvpmode -m <x># where <x> is power mode number, please refer to
https://docs.nvidia.com/jetson/44t/#page/Tegra%20Linux%20Driver%20Package%20Development%20Guide/clock\_power\_setup.html# for more information
```

* Current default power mode: MAXN (0)

3. Watchdog

If the system crashes, it should be rebooted by the watchdog.

```
# Kernel crash: (detect in 5 seconds)

$ sudo su

$ echo 1 > /proc/sys/kernel/sysrq

$ echo c > /proc/sysrq-trigger

# Application crash: (detect in 30 seconds)

$ sudo avt_tool --watchdog 30 &

$ sleep 1
```

```
$ sudo killall avt_tool
```

4. RS485

On AG411B, the RS485 communication port is /dev/ttyTHS4.

5. CANBUS

```
# register CANBUS controller's pin
```

```
$ sudo busybox devmem 0x0c303000 32 0x0000C400
```

```
$ sudo busybox devmem 0x0c303008 32 0x0000C458
```

```
$ sudo busybox devmem 0x0c303010 32 0x0000C400
```

```
$ sudo busybox devmem 0x0c303018 32 0x0000C458
```

```
# enable canbus
```

```
$ sudo modprobe can;
```

```
$ sudo modprobe can_raw;
```

```
$ sudo modprobe mttcan;
```

```
$ sudo ip link set can0 type can bitrate 500000 dbitrates 2000000 berr-reporting on fd on  
restart-ms 100
```

```
$ sudo ip link set can0 up
```

```
# send
```

```
$ cansend can0 "<message>"
```

```
#receive
```

```
$ candump can0
```

```
# disable canbus

$ sudo ip link set can0 down

$ sudo modprobe -r mttcan

$ sudo modprobe -r can_raw

$ sudo modprobe -r can
```

6. RTC battery

The following command can get RTC battery voltage.

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

7. Fan Speed

The following commands can get PWM fan information.

```
# get current speed setting of PWM Fan (0 ~ 255)

$ cat /sys/devices/pwm-fan/cur_pwm

# get Fan RPM value

$ sudo bash -c "echo 1 > /sys/devices/pwm-fan/tach_enable"

$ cat /sys/devices/pwm-fan/rpm_measured
```

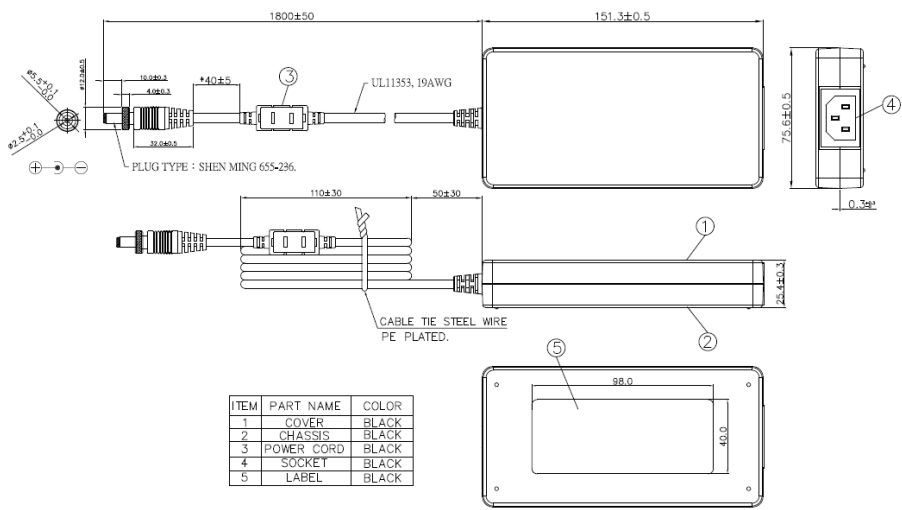
For L4T (Linux for Tegra) BSP support and the other software support associated with NVIDIA® Jetson AGX Xavier™ module, please click the link [here](#) to contact our technical support function.

6. Power Consumption

Item Description	Power Consumption
Theoretical Maximum System Power Consumption	50W
Typical System Power Consumption	The power consumption under the normal operating mode is depending on the application software running with NVIDIA® Jetson™ AGX Xavier™ module on the carrier board or in the box PC's.

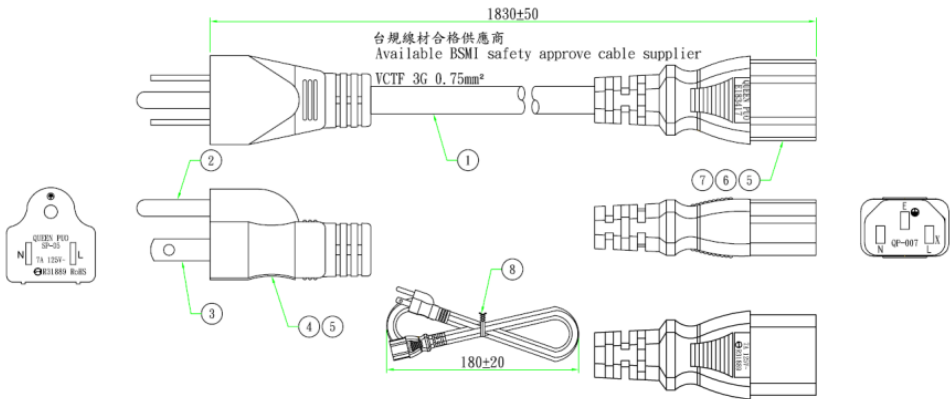
7. Accessory Drawings

7.1 Power Adapter

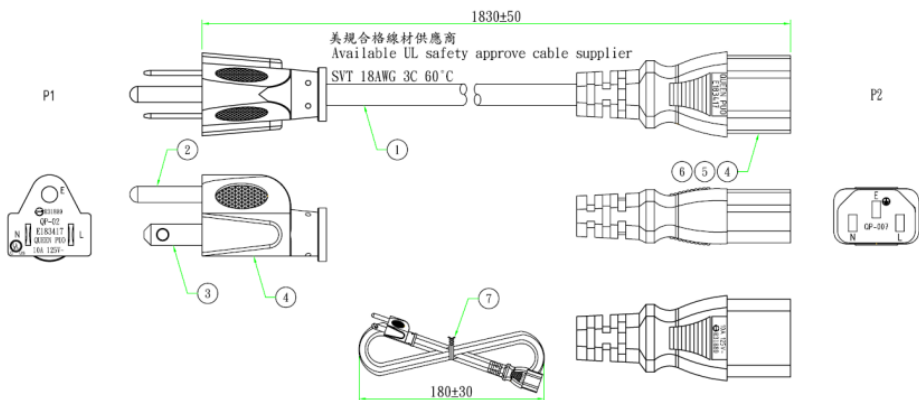


7.2 Power Cord

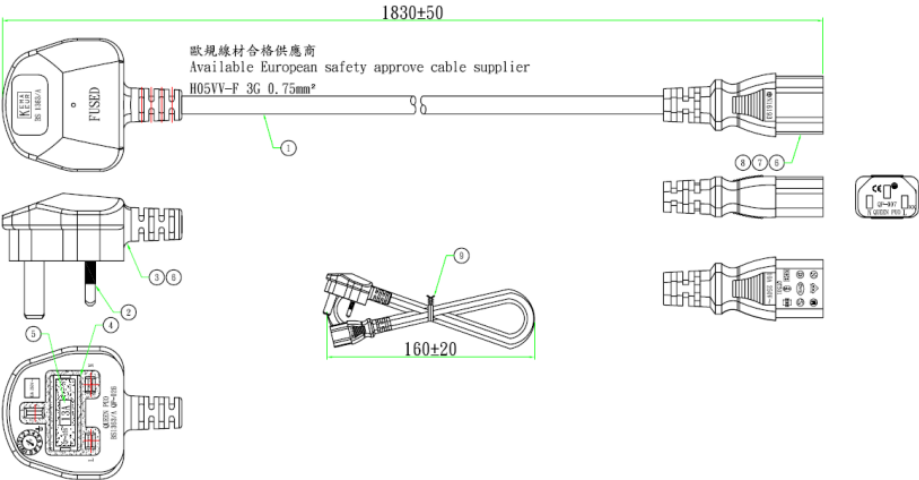
TW version



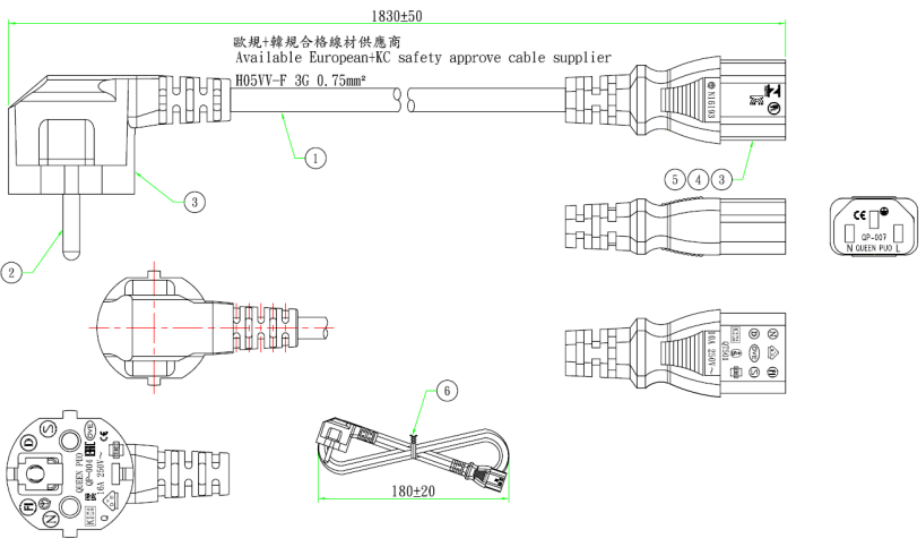
US version



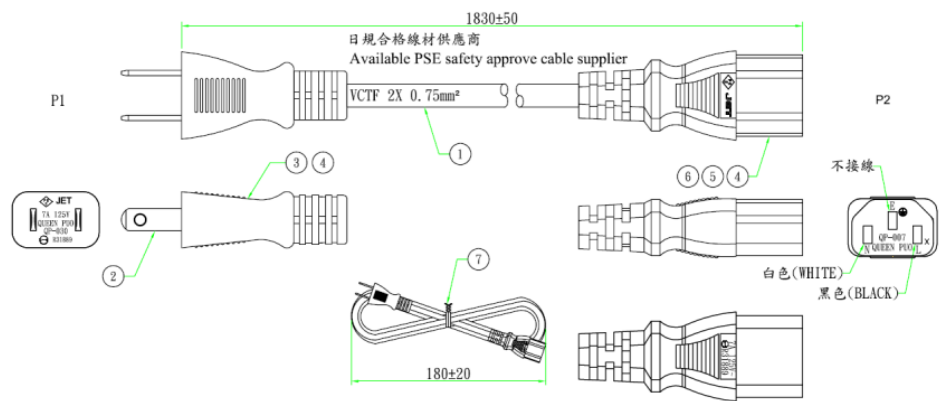
UK version



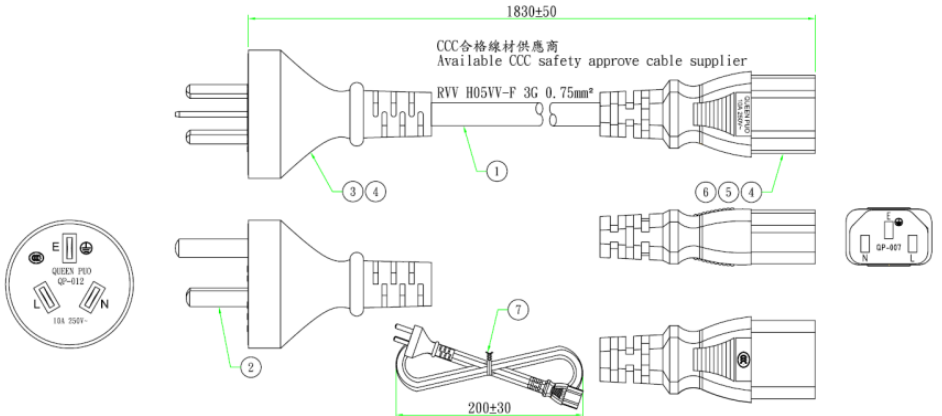
EU version



JP version



CN version



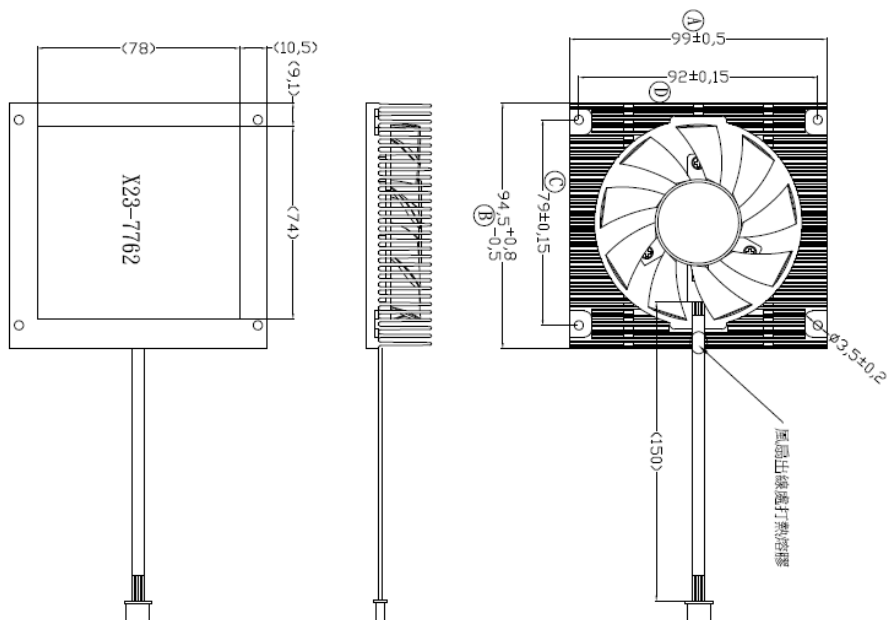
7.3 FAN

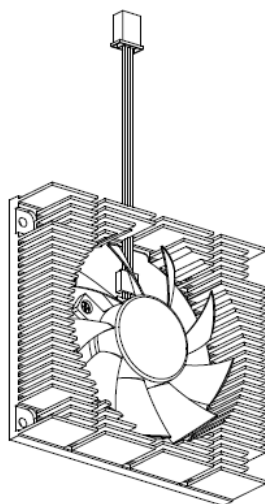
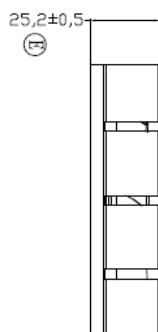
- Rated Voltage: 12V
- Operating Voltage Range: 11.4V~12.6V
- Rated Speed: 4200RPM \pm 10%

(Testing Speed After Continuous 3 Minute Operation At Ambient

Temperature Of 25°C)

- Life Expectancy: 50,000hours at 40°C (WITH 5~90% RH)
- Bearing Type: Two Ball





8. Dimension Drawings and Assembly Drawings

