

AVerAI NX215 Carrier board and NX215B/ TN115B / NO115B Box PC

Applies to NVIDIA® Jetson Xavier NX/ TX2 NX/ Nano(Version B01) module



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Preface

Disclaimer

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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 1.0	17 Nov, 2021	1 st Released
Version 1.1	24 Nov, 2021	Update 8.0 power consumption
Version 1.2	12 Jan, 2022	Update DC power jack
Version 1.3	24 Jan, 2022	Update P9/P10 DC input range and Can bus
Version 1.4	18 Apr, 2022	Update P24 Gigabit Ethernet Connector
Version 1.5	17 May, 2022	Update P9/10/12/27/28/29/30/31/36 CAN bus spec update

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Limited Product Warranty

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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.

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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 NX215/NO115B/ TN115B/ NX215B includes fully featured carrier board which is all developed for NVIDIA® Jetson Nano(Version B01)/ /TX2 NX/ Xavier NX modules. AVerAI NX215/NO115B/ TN115B/ NX215B provides not only the access to a great list of latest interfaces on NVIDIA® Jetson (Version B01)/ TX2 NX/ Xavier NX modules but also two RJ-45 interface and one RTC battery as the function enrichment.

NX215/NO115B/ TN115B/ NX215B provides two 4Kp60 HDMI video output (NO115B only supports one HDMI output), two USB 3.0 ports, two GbE RJ-45 port, 20-pin GPIO expansion, and one Micro-B USB 2.0 port for recovery.

Operating with NVIDIA® Jetson Nano(Version B01)/TX2 NX/ Xavier NX modules and the rich I/O functions, AVerAI NX215/ NO115B/ TN115B/ NX215B 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	NX215		
Type	Carrier board		
NVIDIA GPU SoC Module Compatibility	NVIDIA® Jetson Xavier™ NX module	NVIDIA® Jetson TX2 NX module	NVIDIA® Jetson NANO (B01) module
Networking	2x GbE RJ-45 1xM.2. key E 2230 for wifi		2x GbE RJ-45
Display Output	2x HDMI 2.0 (3840 x 2160 at 60Hz)		1x HDMI 2.0 (3840 x 2160 at 60Hz)
Temperature	Operating temperature 0°C~70°C Storage temperature -40°C ~ 85°C Relative humidity 40 °C @ 95%, Non-Condensing		
MIPI Camera Inputs	2x 2 lane MIPI CSI-2, 15 pin FPC 1mm Pitch Connector 1x 4 lane MIPI CSI-2, 36 pin FPC 0.5mm Pitch Connector		
USB	1x USB 2.0 Micro-B for recovery 3x USB 3.0 Type-A (1xinternal)		
Storage	1x micro-SD card slot 1xM.2. key M 2280 for SSD		
Expansion Header (PCN20220406-2)	20 pins: 2x I2C, 1x UART, 4x GPIOs, 1xCAN (EU terminal block)		20 pins: 2x I2C, 1x UART, 4x GPIOs (EU terminal block)
Expansion Header (original)	20 pins: 2x I2C, 1x UART, 4x GPIOs, 2xCAN (EU terminal block)		20 pins: 2x I2C, 1x UART, 4x GPIOs, 1xCAN (EU terminal block)
Input Power	DCINJACK on board & ATX 4pin 12V/5A, 12~24V is recommended.		
Power Cord	US/JP/EU/UK/TW		
Fan Module	Heat sink with fan (optional)		
Buttons	Power and Recovery		
RTC Battery	Support RTC battery and Battery Life Monitoring by MCU		
PCB/Electronics Mechanical Info	120mm (W) x 90mm (L) Weight: 125 g		
Certifications	CE, FCC,		

Model	NX215B	TN115B	NO115B
Type	Box PC		
NVIDIA GPU SoC Module Compatibility	NVIDIA® Jetson Xavier™ NX module	NVIDIA® Jetson TX2 NX module	NVIDIA® Jetson NANO (B01) module
Networking	2x GbE RJ-45 1xM.2. key E 2230 for wifi		2x GbE RJ-45
Display Output	2x HDMI 2.0 (3840 x 2160 at 60Hz)		1x HDMI 2.0 (3840 x 2160 at 60Hz)
Temperature	Operating temperature 0°C~60°C for NX215B, 0°C~50°C for TN115B, 0°C~60°C for NO115B (based on module and usage) Storage temperature -40°C ~ 85°C Relative humidity 40 °C @ 95%, Non-Condensing		
MIPI Camera Inputs (Internal)	2x 2 lane MIPI CSI-2, 15 pin FPC 1mm Pitch Connector 1x 4 lane MIPI CSI-2, 36 pin FPC 0.5mm Pitch Connector		
USB	1x USB 2.0 Micro-B for recovery 3x USB 3.0 Type-A (1x internal)		
Storage	1x micro-SD card slot 1xM.2. key M 2280 for SSD		
Expansion Header (PCN20220406-2)	20 pins: 2x I2C, 1x UART, 4x GPIOs, 1xCAN (EU terminal block)		20 pins: 2x I2C, 1x UART, 4x GPIOs (EU terminal block)
Expansion Header (original)	20 pins: 2x I2C, 1x UART, 4x GPIOs, 2xCAN (EU terminal block)		20 pins: 2x I2C, 1x UART, 4x GPIOs, 1xCAN (EU terminal block)
Input Power	DCINJACK on board & ATX 4pin 12V/5A, 12V~24V is recommended.		
Power Cord	US/JP/EU/UK/TW		
Fan Type	Fanless solution		
Buttons	Power and Recovery		
RTC Battery	Support RTC battery and Battery Life Monitoring by MCU		
PCB/Electronics Mechanical Info	W: 126mm (W) x 96mm (L) x 74mm (H) Weight: 1kg		
Certifications	CE, FCC		

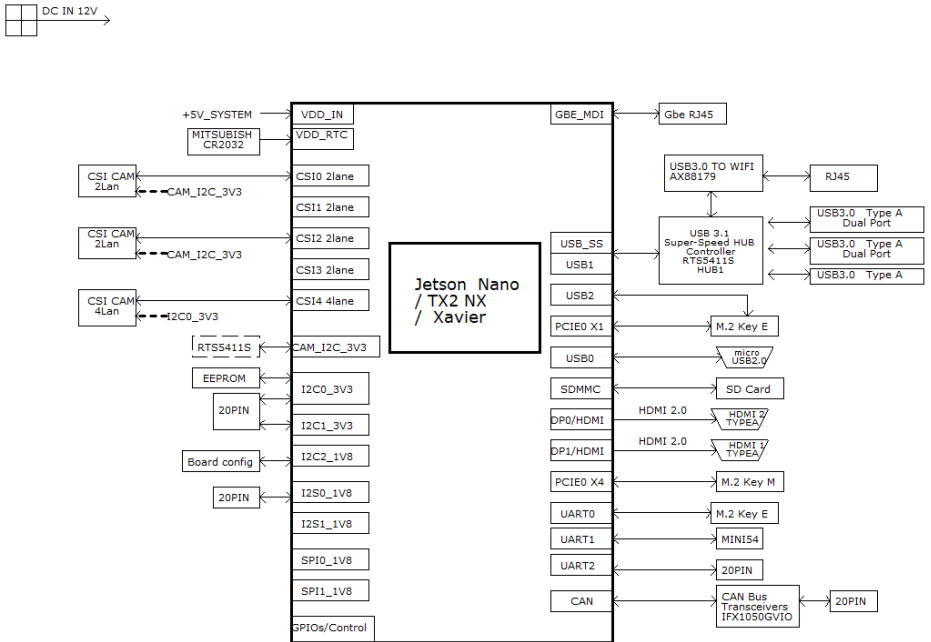
1.2 OPTION ACCESSORY

Item	NX215/ NX215B/ TN115B/ NO115B
NVIDIA® Jetson	NVIDIA® Jetson Xavier NX for NX215B NVIDIA® Jetson TX2 NX for TN115B NVIDIA® Jetson Nano(Version B01) for NO115B
Power cord	EU/JP/TW/US/CN/UK
MIPI Camera (internal I/O)	<ul style="list-style-type: none"> ● For 15 pin MIPI connector <ol style="list-style-type: none"> 1. raspberry pi camera v2 2. Manufacturer: APPRO.PHO <ul style="list-style-type: none"> ■ B-04: IMX179(8M)MIPI, 1080P(30fps) ■ C-04: IMX290(2M)MIPI, 1080P(30fps) ■ C-05: IMX290(2M)+ISP(YUV), 1080P(30fps) ● For 36 pin MIPI connector <ol style="list-style-type: none"> 1. Manufacturer: APPRO.PHO <ul style="list-style-type: none"> ■ B-03: IMX334(4K) MIPI, 4K(30fps) ■ A-06: IMX334(4K) V-by-One® HS x1, 4K(30fps)

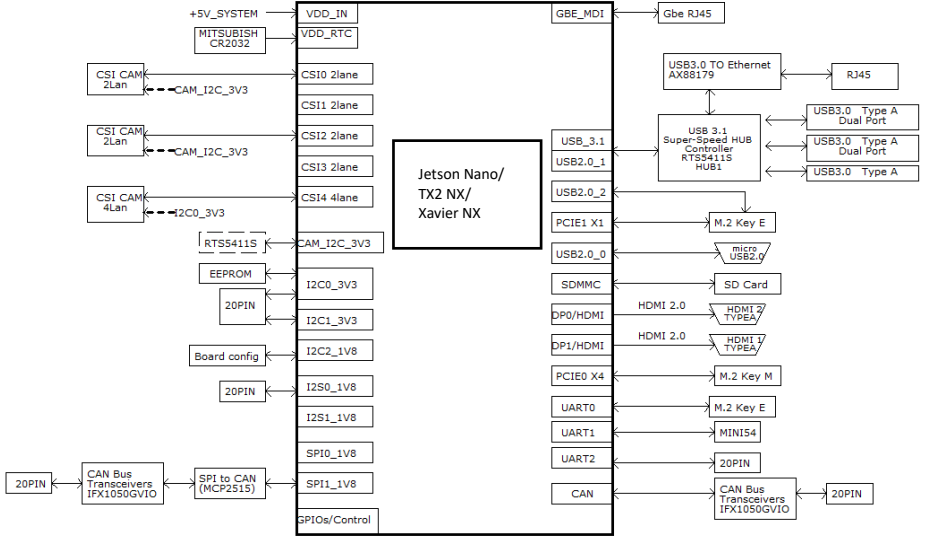
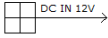
2.0 Product Overview

2.1 Block Diagram

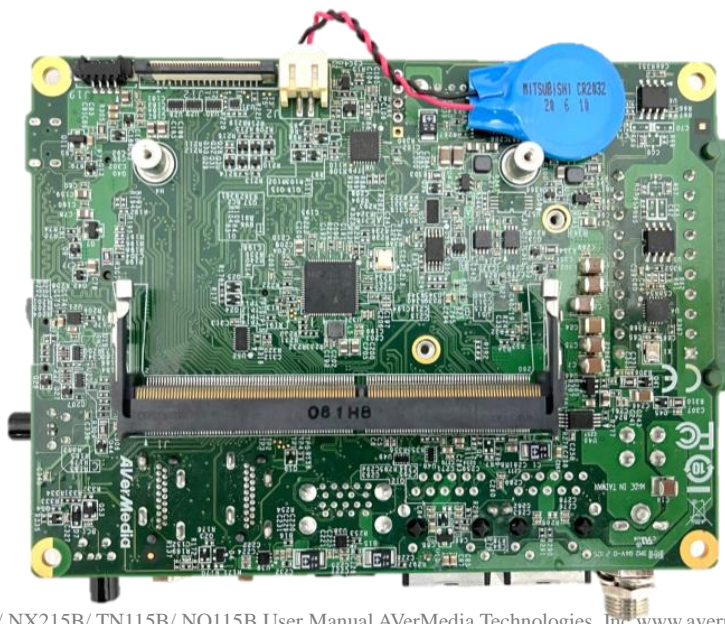
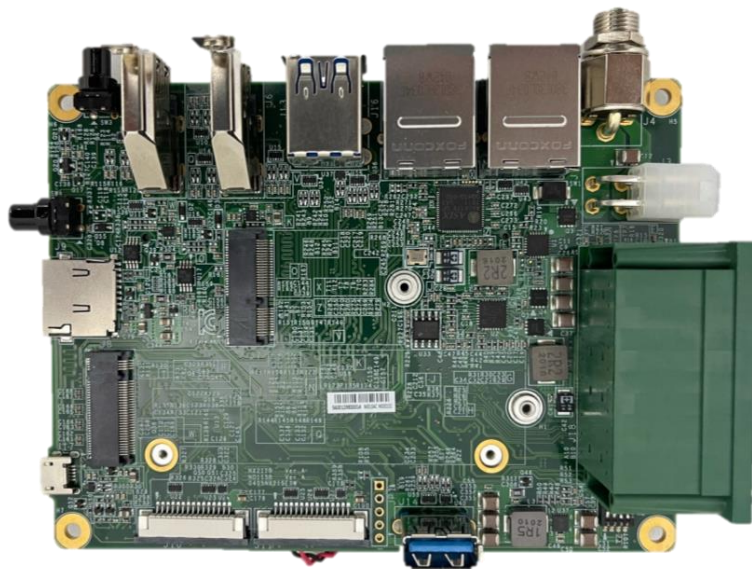
(PCN20220406-2)



(Original)



Front View and Back View of Carrier board



2.2 Front View and Three-Quarter View of BoxPC

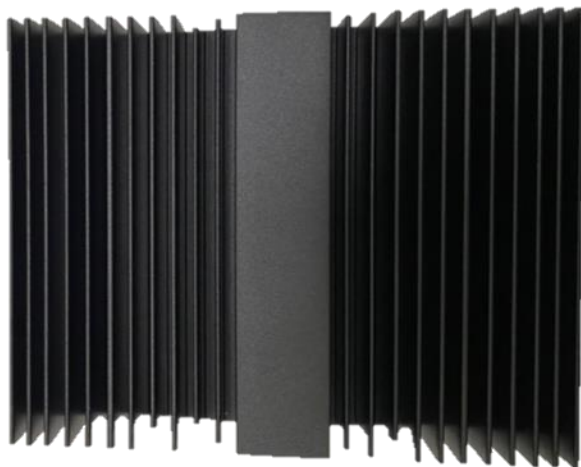
Left view



Right view



Top view



Front view



Rear view



Bottom view

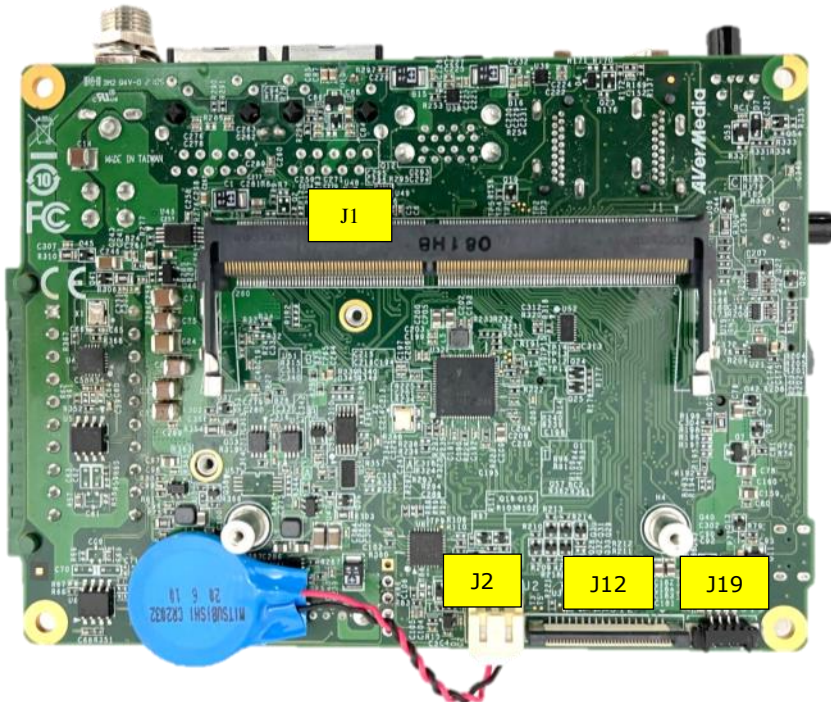


2.3 Connector Summary

3.0 NX215B/NO115B/TN115B Carrier Board Interface

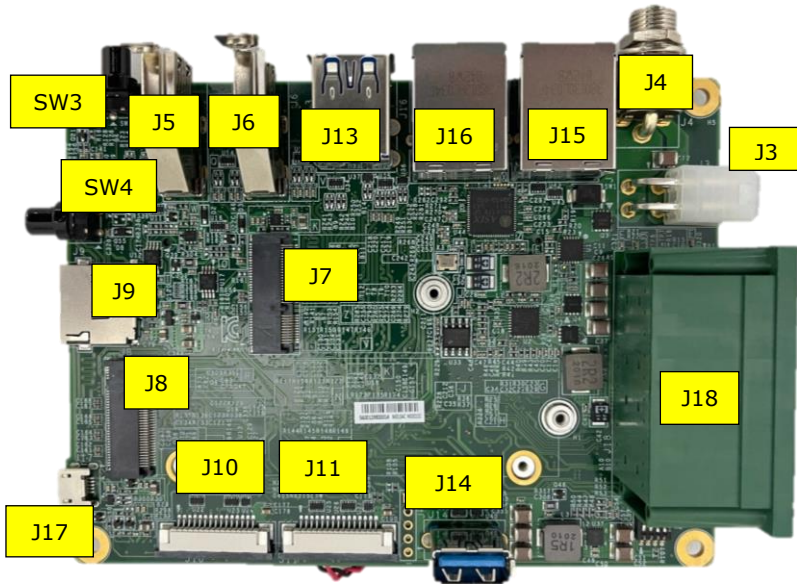
Top View Interface

J1	SO-DIMM 260-pin 90° SMD Socket(H-9.2mm) for Jetson Xavier NX / Jetson Nano / Jetson TX2 NX SOM
J2	External RTC Battery wafer
J12	FPC connector for 4-lane MIPI CSI-2
J19	Fan Wafer



Bottom View Interface

J3	Input Power – 4.2mm Pitch 90° ATX Power 4P
J4	OD 5.5/2.5 DC Jack with Lock
J5	HDMI Type-A Vertical Side Connector with lock (Female)
J6	HDMI Type-A Vertical Side Connector with lock (Female)
J7	M.2 E-Key Socket
J8	M.2 M-Key Socket
J9	Micro SD Card Socket
J10	FPC connector for 2-lane MIPI CSI-2
J11	FPC connector for 2-lane MIPI CSI-2
J13	USB 3.1 Gen1 Dual Port Type A Connector
J14	USB 3.1 Gen1 Type A Connector
J15	Gigabit Ethernet Connector w/LEDs
J16	Gigabit Ethernet Connector w/LEDs
J17	USB 2.0 Micro B Connector
J18	20-pin Expansion Terminal Blocks
SW3	Power Button w/LEDs
SW4	Recovery Button w/LEDs



4.0 Feature Description


4.1 Jetson module Connector

Function	Provide connection with NVIDIA® Jetson NANO /TX2 NX/ Xavier NX modules	
Location	J1	
Type Description	SOCKET_DDR4 SO-DIMM_260PIN_90°	
Manufacturer and Part Number	Foxconn ASAA826-EASB0-7H	
Mating Connector	NVIDIA® Jetson Nano(Version B01) / TX2 NX/ Xavier NX	
Pinout	Please refer to NVIDIA Jetson System-on-Module datasheet for pinout details.	
Remarks	https://developer.nvidia.com/embedded/downloads	

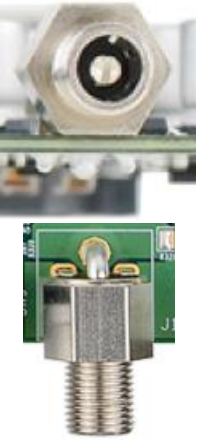
4.2 RTC Battery Connector

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			

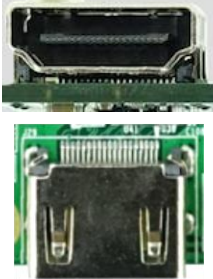
4.3 ATX 4P

Function	ATX 4P		
Location	J3		
Type Description	WAFER_2*2PIN		
Manufacturer and Part Number	FPWD-42R2-04NAT		
Mating Connector	power plug cable		
Pinout	Pin Number	Description	
	1	GND	
	2	GND	
	3	9-24V Power	
	4	9-24V Power	
Remarks	None		


4.4 DC POWER JACK

Function	DC power input		
Location	J4		
Type Description	2.5 mm power jack		
Manufacturer and Part Number	JKCR, DCD 020 105B		
Mating Connector	Any 2.5mm power plug cable		
Pinout	Pin Number	Description	
	1	12-24V Power	
	2	GND	
	3	GND	
Remarks			


4.5 HDMI OUTPUT

Function	HDMI output connector	
Location	J5,J6	
Type Description	HDMI Type-A female connector	
Manufacturer and Part Number	Compupack, ACNHM220028-001	
Mating Connector	Any HDMI standard Type-A interface cable or device.	
Pinout	Please refer to HDMI standard.	
Remarks	None	

4.6 Micro SD Card Slot

Function	Micro SD Card	
Location	J9	
Type Description	SOCKET_MICRO SD CARD_9PIN_90°_SMD	
Manufacturer and Part Number	Fullglory, FG-0011BAAS09A	
Pinout	Refer to MicroSD card standard	
Remark	None	

4.7 MIPI CSI-2 DPHY Lanes

Function	MIPI camera module connector	
Location	J10 , J11	
Type Description	WAFER_15PIN_1mm_90°	
Manufacturer and Part Number	CHAMPWAY AFA07-S15FCA-HF_FPC ZIF-LOWER	
Mating Connector	2 Lane MIPI CSI-2 camera connector (15Pin)	

Pinout


J10

PIN#	Description	PIN#	Description
Pin1	GND	Pin9	CSI0_CLK_P
Pin2	CSI0_D0_N	Pin10	GND
Pin3	CSI0_D0_P	Pin11	MIPI2_PWDN
Pin4	GND	Pin12	CAM2_MCLK
Pin5	CSI0_D1_N	Pin13	CSI0_I2C_SCL
Pin6	CSI0_D1_P	Pin14	CSI0_I2C_SDA
Pin7	GND	Pin15	+3V3_MIPI
Pin8	CSI0_CLK_N		


J11

PIN#	Description	PIN#	Description
Pin1	GND	Pin9	CSI2_CLK_P
Pin2	CSI2_D0_N	Pin10	GND
Pin3	CSI2_D0_P	Pin11	MIPI2_PWDN
Pin4	GND	Pin12	CAM2_MCLK
Pin5	CSI2_D1_N	Pin13	CSI2_I2C_SCL
Pin6	CSI2_D1_P	Pin14	CSI2_I2C_SDA
Pin7	GND	Pin15	+3V3_MIPI
Pin8	CSI2_CLK_N		


4.8 SerDes (V-by-One® HS)

Function	MIPI camera module connector			
Location	J12			
Type Description	WAFER_1*36PIN_0.5mm_180°			
Manufacturer and Part Number	PINREX 979-44-93610A_ZIF FPC			
Mating Connector	4 Lane MIPI CSI-2 camera connector (36PIN)			
PIN OUT	Pin Number	Signal	Pin Number	Signal
	1	5V	19	GND
	2	5V	20	CSI4_D3_P
	3	1.8V	21	CSI4_D3_N
	4	3.3V	22	GND
	5	3.3V	23	N/A
	6	3.3V	24	N/A
	7	GND	25	N/A
	8	CSI4_D0_P	26	MIPI4_PWDN
	9	CSI4_D0_N	27	CSI4_I2C_SDA
	10	GND	28	CSI4_I2C_SCL
	11	CSI4_CLK_P	29	GND
	12	CSI4_CLK_N	30	N/A
	13	GND	31	N/A
	14	CSI4_D1_P	32	N/A
	15	CSI4_D1_N	33	N/A
	16	GND	34	GND
	17	CSI4_D2_P	35	CAM4_MCLK
18	CSI4_D2_N	36	GND	

4.9 USB 3.1 Gen 1 Type-A Connector #1, #2, #3

Function	USB 3.1 Gen 1 Type-A connector #1 #2 #3	
Location	J13, J14	
Type Description	Dual-port USB 3.1 Gen 1 Type-A female connector	
Manufacturer and Part Number	Foxconn, UEA1112C-4HK1-4H	
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	

4.10 Gigabit Ethernet Connector

Function	1Gb single-port Ethernet connector, used to connect to the host system.	
Location	J15, J16	
Type Description	RJ45 with integrated magnetics	
Manufacturer and Part Number	FOXCONN, JFM38013-0L03-4F-BX3	
Mating Connector	Any standard 1Gb Ethernet mating connector can be applicable.	
Pinout	Comply with Ethernet standards.	
Remarks	J15 is via USB3.0 Ethernet controller and J16 is directly from NVIDIA Jetson SOM.	

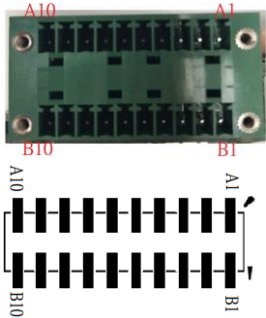
4.11 Jetson platform/ USB 2.0 Micro B Connector

Function	BSP Installation as recovery mode	
Location	J7	
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	

4.12 RTC Battery Connector

Function	RTC battery for module			
Location	J6			
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			

4.13 20-Pin GPIO expansion

Function	General-purpose input/output	
Location	J18	
Type Description	Expansion I/O Connector	
Manufacturer and Part Number	ME252-35020-1	
Mating Connector	20-Pin GPIO expansion	

Pinout

NX215+NX/NX215B (PCN20220406-2)

Address	Pin Name	20-Pin Index		Pin Name	Address
	+3V3	B1	A1	+5V	
	GND	B 2	A2	GND	
/dev/i2c-8	I2C1_SDA	B3	A3	UART2_TXD_3V3	/dev/ttyTCU0
	I2C1_SCL	B4	A4	UART2_RXD_3V3	
/dev/i2c-1	I2C0_ID_SDA	B5	A5	GND	
	I2C0_ID_SCL	B6	A6	N/A	
gpio445 Bidirectional	I2S0_SCLK_LS	B7	A7	N/A	Can0 (Native CAN)
gpio446 Bidirectional	I2S0_SDOUT_LS	B8	A8	CANL0	
gpio447 Bidirectional	I2S0_SDIN_LS	B9	A9	CANH0	
gpio448 Bidirectional	I2S0_LRCK_LS	B10	A10	N/A	

NX215+NX/NX215B (Original)

Address	Pin Name	40-pin Index		Pin Name	Address
	3V3	B1	A1	5V	
	GND	B2	A2	GND	
/dev/i2c-8	I2C1_SDA	B3	A3	UART2_TXD_3V3	/dev/ttyTCU0
	I2C1_SCL	B4	A4	UART2_RXD_3V3	
/dev/i2c-1	I2C0_ID_SDA	B5	A5	GND	
	I2C0_ID_SCL	B6	A6	CANL1	
gpio445 Bidirection	I2S0_SCLK_LS	B7	A7	CANH1	can1 (SPI to CAN)
gpio446 Bidirection	I2S0_SDOUT_LS	B8	A8	CANL0	can0 (Native CAN)
gpio447 Bidirection	I2S0_SDIN_LS	B9	A9	CANH0	
gpio448 Bidirection	I2S0_LRCK_LS	B10	A10	N/A	

NX215+TX2 NX/TN115B (PCN20220406-2)

Address	Pin Name	20-Pin Index		Pin Name	Address
		B	A		
	+3V3	B1	A1	+5V	
	GND	B2	A2	GND	
/dev/i2c-8	I2C1_SDA	B3	A3	UART2_TXD_3V3	/dev/ttyTCU0
	I2C1_SCL	B4	A4	UART2_RXD_3V3	
/dev/i2c-1	I2C0_ID_SDA	B5	A5	GND	
	I2C0_ID_SCL	B6	A6	N/A	
gpio445 Bidirectional	I2S0_SCLK_LS	B7	A7	N/A	Can0 (Native CAN)
gpio446 Bidirectional	I2S0_SDOOUT_LS	B8	A8	CANL0	
gpio447 Bidirectional	I2S0_SDIN_LS	B9	A9	CANH0	
gpio448 Bidirectional	I2S0_LRCK_LS	B10	A10	N/A	

NX215+TX2 NX/TN115B (Original)

Address	Pin Name	40-pin Index		Pin Name	Address
		B	A		
	3V3	B1	A1	5V	
	GND	B2	A2	GND	
/dev/i2c-1	I2C1_SDA	B3	A3	UART2_TXD_3V3	/dev/tty50
	I2C1_SCL	B4	A4	UART2_RXD_3V3	
/dev/i2c-0	I2C0_ID_SDA	B5	A5	GND	can1 (SPI to CAN)
	I2C0_ID_SCL	B6	A6	CANL1	
gpio392 Bidirection	I2S0_SCLK_LS	B7	A7	CANH1	can0 (Native CAN)
gpio393 Bidirection	I2S0_SDOOUT_LS	B8	A8	CANL0	
gpio394 Bidirection	I2S0_SDIN_LS	B9	A9	CANH0	
gpio395 Bidirection	I2S0_LRCK_LS	B10	A10	N/A	

NX215+NANO/ NO115B (PCN20220406-2)

Address	Pin Name	20-Pin Index		Pin Name	Address
	+3V3	B1	A1	+5V	
	GND	B2	A2	GND	
/dev/i2c-8	I2C1_SDA	B3	A3	UART2_TXD_3V3	/dev/ttyTCU0
	I2C1_SCL	B4	A4	UART2_RXD_3V3	
/dev/i2c-1	I2C0_ID_SDA	B5	A5	GND	
	I2C0_ID_SCL	B6	A6	N/A	
gpio445 Bidirectional	I2S0_SCLK_LS	B7	A7	N/A	
gpio446 Bidirectional	I2S0_SDOOUT_LS	B8	A8	N/A	
gpio447 Bidirectional	I2S0_SDIN_LS	B9	A9	N/A	
gpio448 Bidirectional	I2S0_LRCK_LS	B10	A10	N/A	


NX215+NANO/ NO115B (Original)

Address	Pin Name	40-pin Index		Pin Name	Address
	3V3	B1	A1	5V	
	GND	B2	A2	GND	
/dev/i2c-1	I2C1_SDA	B3	A3	UART2_TXD_3V3	/dev/ttyS0
	I2C1_SCL	B4	A4	UART2_RXD_3V3	
/dev/i2c-0	I2C0_ID_SDA	B5	A5	GND	
	I2C0_ID_SCL	B6	A6	CANL1	
gpio79 Bidirection	I2S0_SCLK_LS	B7	A7	CANH1	(SPI to CAN)
gpio78 Bidirection	I2S0_SDOOUT_LS	B8	A8	N/A	
gpio77 Bidirection	I2S0_SDIN_LS	B9	A9	N/A	
gpio76 Bidirection	I2S0_LRCK_LS	B10	A10	N/A	


Remarks

GPIO uses 3.3V


4.14 Optional Function Selection

Function	Fan PWM controller/Auto Power on			
Location	SW2			
Type Description	4 SPST DIP switch			
Manufacturer and Part Number	DIPTRONICS IN OFF-SWITCHING 0.025A/24VDC			
Pinout	(PCN20220406-2)			
	Position No.	Position Description	Switch ON	Switch OFF
	1-	N/A-	N/A-	N/A-
	2-	CAN0_Terminal-	With 120 ohm terminal-	w/o 120 ohm terminal-
	3-	Power-Up / Start-up Control-	"ATX Mode"- Power Button Press Required-	"AT Mode"- Automatic Start-up Enabled-
	4-	PWM Fan Control-	FAN Always ON-	FAN PWM Enabled-
Pinout	(original)			
	Position No.	Position Description	Switch ON	Switch OFF
	1-	CAN1_Terminal-	With 120 ohm terminal-	w/o 120 ohm terminal-
	2-	CAN0_Terminal-	With 120 ohm terminal-	w/o 120 ohm terminal-
	3-	Power-Up / Start-up Control-	"ATX Mode"- Power Button Press Required-	"AT Mode"- Automatic Start-up Enabled-
	4-	PWM Fan Control-	FAN Always ON-	FAN PWM Enabled-
Remark	Default SW2 OFF			

4.15 Force Recovery Button

Function	Force recovery	
Location	SW3	
Type Description	Button	
Manufacturer and Part Number	N/A	
Pinout	N/A	
Remark	None	

4.16 Power on Button

Function	Power control button	
Location	SW4	
Type Description	Button	
Manufacturer and Part Number	N/A	
Pinout	N/A	
Remark	None	

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.

Installation

1. Check and ensure all the external system power supplies are turned off.
2. Install the Micro USB2.0 cable to Jetson platform connector.
3. Press and hold on the Recover button.
4. Connect the power cord to the box PC.

4.17BSP Setup Instructions

BSP (board support package) file: NO115B-R1.0.*.tar.gz for NO115B

BSP (board support package) file: TN115B-R1.0.*.tar.gz for TN115B

BSP (board support package) file: NX215B-R1.0.*.tar.gz for NX215B

If you want to get the BSP download link, Please contact with AVerMedia FAE.

Default login username/password of the BSP is nvidia/nvidia

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

BSP Installation steps for NVIDIA Jetson board: (Important Note: Please backup your personal files before re-flashing BSP)

After you download the BSP file and put the file in a Linux PC, please refer to the steps below to re-flash BSP.

1. Let the JETSON Nano/TX2 NX/Xavier 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 kernel messages with `dmesg` command in the Linux PC.

Once you see these messages in the kernel messages, this means that the NVIDIA Jetson board is in the recovery mode.

```
[24685.229129] usb 1-7: Product: APX
```

```
[24685.229132] usb 1-7: Manufacturer: NVIDIA Corp
```

2. Using the commands below in the Linux PC to start re-flashing BSP.

```
$ sudo tar zxvf NX215-R1.0.*.tar.gz
```

```
(file: NO115B-R1.0.*.tar.gz for NO115B/ file: TN115-R1.0.*.tar.gz for TN115B/ file:  
NX215B-R1.0.*.tar.gz for NX215B)
```

```
$ cd JetPack_*.*/Linux_for_Tegra
```

```
$ sudo ./install.sh
```

Note: sudo is required to re-flash the BSP..

5.0 Software

This section describes BSP's features for NX215B/TN115B/NO115B

1. Support optional M.2 WI-FI/Bluetooth modules (Intel® Wireless-AC 9260), the manager UI of AC9260 WiFi/Bluetooth is located on the upper-right corner of Ubuntu desktop. It can be also controlled by nmcli/hcitol in command line.
* This feature is not supported on NO115B
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
# where <x> is power mode number, please refer to
https://docs.nvidia.com/jetson/14t/#page/Tegra%20Linux%20Driver%20Package%20Development%20Guide/clock\_power\_setup.html# for more information
$ sudo nvpmode -m <x>
```

* Current default power mode:

NX215B: MODE 10W DESKTOP (5)

TN115B: MAXP CORE AEM (3)

NO115B: MAXN (0)

3. RTC Battery
The following command can get RTC battery voltage.

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

4. 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
```

5. CAN Bus

(PCN20220406-2)

There are one CAN Bus for NX215B and TN115B, see the following command for usage.

(1) Enable and setup CAN Bus

```
# 1. Enable CAN Bus
$ sudo modprobe can
$ sudo modprobe can-raw
$ sudo modprobe mttcan
# 2. Setup CAN Bus
$ sudo ip link set can0 type can bitrate 500000 dbitrte 2000000 berr-reporting on fd
on restart-ms 100
$ sudo ip link set can0 up
```

(2) Receive and Send

```
# Receive
$ candump can0

# Send
$ cansend can0 <can_frame>
```

* where:

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

(Original)

There are two CAN Bus available for NX215B and TN115B (CAN0/CAN1), and only one CAN Bus available on NO115B (CAN1), see the following command for usage.

(1) Enable and setup CAN0

```
# 1. Enable CAN0
$ sudo modprobe can
$ sudo modprobe can-raw
$ sudo modprobe mttcan
# 2. Setup CAN0
$ sudo ip link set can0 type can bitrate 500000 dbitrate 2000000 berr-reporting on fd
on restart-ms 100
$ sudo ip link set can0 up
```

(2) Setup CAN1 (CAN1 is enabled by default)

```
# CAN1 (interface name: can1)
# 1. Setup CAN1
$ sudo ip link set can1 type can bitrate 500000 restart-ms 100
$ sudo ip link set can1 up
```

(3) Receive and Send

```
# Receive
$ candump <interface>

# Send
$ cansend <interface> <can_frame>
```

* where:

<interface> is the interface name of CAN Bus, e.g. can0 or can1

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

6. MIPI CSI Camera

There are 2x 2-lane and 1x 4-lane MIPI CSI camera supported on NX215B/TN115B/NO115B, for current supported products type are listing as below:

- * IMX219 (2-lane)
- * IMX477 (2-lane) - only supported on NX215B for now
- * IMX179 (2-lane)
- * IMX290 (2-lane)
- * IMX290ISP (2-lane)
- * IMX334 (4-lane)
- * IMX334THCV (4-lane)

Test Command:

```
> Raspberry pi v2 :
  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)3264, height=(int)2464,
format=(string)NV12, framerate=(fraction)21/1 ! nvvidconv ! xvimagesink -e
  $ gst-launch-1.0 nvarguscamerasrc sensor-id=0 sensor-mode=1 !
'video/x-raw(memory:NVMM), width=(int)3264, height=(int)1848,
format=(string)NV12, framerate=(fraction)28/1 ! nvvidconv ! xvimagesink -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 -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 -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 -e

  Multiple:
  $ gst-launch-1.0 nvarguscamerasrc sensor-id=0 sensor-mode=0 !
'video/x-raw(memory:NVMM), width=(int)3264, height=(int)2464,
format=(string)NV12, framerate=(fraction)21/1 ! nvvidconv ! xvimagesink -e &
gst-launch-1.0 nvarguscamerasrc sensor-id=1 sensor-mode=0 !
'video/x-raw(memory:NVMM), width=(int)3264, height=(int)2464,
format=(string)NV12, framerate=(fraction)21/1 ! nvvidconv ! xvimagesink -e &

> Raspberry pi v3 (imx477):
  No width height framerate
```

```
0 4032 3040 30
1 1920 1080 60
```

```
$ gst-launch-1.0 nvarguscamerasrc sensor-id=0 !
"video/x-raw(memory:NVMM),width=4032,height=3040,framerate=30/1" !
nvvidconv ! xvimagesink -e
```

```
$ gst-launch-1.0 nvarguscamerasrc sensor-id=0 !
"video/x-raw(memory:NVMM),width=1920,height=1080,framerate=60/1" !
nvvidconv ! xvimagesink -e
```

Multiple:

```
$ gst-launch-1.0 nvarguscamerasrc sensor-id=0 !
"video/x-raw(memory:NVMM),width=1920,height=1080,framerate=60/1" !
nvvidconv ! xvimagesink -e & gst-launch-1.0 nvarguscamerasrc sensor-id=1 !
"video/x-raw(memory:NVMM),width=1920,height=1080,framerate=60/1" !
nvvidconv ! xvimagesink -e &
```

> IMX179 :

No	width	height	framerate
0	3280	2464	15
1	1920	1080	30
2	3280	1698	30
3	2096	1084	30
4	1640	1232	30
5	820	616	30
6	820	616	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)15/1' ! nvvidconv ! xvimagesink -e
```

```
$ gst-launch-1.0 nvarguscamerasrc sensor-id=0 sensor-mode=1 !
'video/x-raw(memory:NVMM), width=(int)1920, height=(int)1080,
format=(string)NV12, framerate=(fraction)30/1' ! nvvidconv ! xvimagesink -e
```

```
$ gst-launch-1.0 nvarguscamerasrc sensor-id=0 sensor-mode=2 !
'video/x-raw(memory:NVMM), width=(int)3280, height=(int)1698,
format=(string)NV12, framerate=(fraction)30/1' ! nvvidconv ! xvimagesink -e
```

```
$ gst-launch-1.0 nvarguscamerasrc sensor-id=0 sensor-mode=3 !
'video/x-raw(memory:NVMM), width=(int)2096, height=(int)1084,
format=(string)NV12, framerate=(fraction)30/1' ! nvvidconv ! xvimagesink -e
```

```
$ gst-launch-1.0 nvarguscamerasrc sensor-id=0 sensor-mode=4 !
'video/x-raw(memory:NVMM), width=(int)1640, height=(int)1232,
format=(string)NV12, framerate=(fraction)30/1' ! nvvidconv ! xvimagesink -e
```

```
$ gst-launch-1.0 nvarguscamerasrc sensor-id=0 sensor-mode=5 !
'video/x-raw(memory:NVMM), width=(int)820, height=(int)616,
format=(string)NV12, framerate=(fraction)30/1' ! nvvidconv ! xvimagesink -e
```

```
$ gst-launch-1.0 nvarguscamerasrc sensor-id=0 sensor-mode=6 !
'video/x-raw(memory:NVMM), width=(int)820, height=(int)616,
```



```

format=(string)NV12, framerate=(fraction)60/1' ! nvvidconv ! xvimagesink -e
Control Focus:
$ v4l2-ctl -d /dev/video2 --set-ctrl=focus_manual=1
$ v4l2-ctl -d /dev/video2 --set-ctrl=focus_manual=1024

> IMX290 :
No width height framerate
0 1948 1096 30
1 1948 1096 60

$ gst-launch-1.0 nvarguscamerasrc sensor-id=0 sensor-mode=0 !
'video/x-raw(memory:NVMM), width=(int)1948, height=(int)1096,
format=(string)NV12, framerate=(fraction)30/1' ! nvvidconv ! xvimagesink -e
$ gst-launch-1.0 nvarguscamerasrc sensor-id=0 sensor-mode=1 !
'video/x-raw(memory:NVMM), width=(int)1948, height=(int)1096,
format=(string)NV12, framerate=(fraction)60/1' ! nvvidconv ! xvimagesink -e

> IMX290ISP :
No width height framerate
0 1920 1080 25/30/50/60
1 1280 960 25/30/50/60
2 1280 720 25/30/50/60
0 800 600 25/30/50/60
1 640 480 25/30/50/60
2 640 360 25/30/50/60

$ gst-launch-1.0 v4l2src io-mode=4 device=/dev/video0 do-timestamp=true !
'video/x-raw, width=1920, height=1080, framerate=30/1, format=UYVY' !
xvimagesink sync=false
$ gst-launch-1.0 v4l2src io-mode=4 device=/dev/video0 do-timestamp=true !
'video/x-raw, width=1280, height=720, framerate=30/1, format=UYVY' ! xvimagesink
sync=false
$ gst-launch-1.0 v4l2src io-mode=4 device=/dev/video0 do-timestamp=true !
'video/x-raw, width=1280, height=960, framerate=30/1, format=UYVY' ! xvimagesink
sync=false
$ gst-launch-1.0 v4l2src io-mode=4 device=/dev/video0 do-timestamp=true !
'video/x-raw, width=1920, height=1080, framerate=60/1, format=UYVY' !
xvimagesink sync=false
$ gst-launch-1.0 v4l2src io-mode=4 device=/dev/video0 do-timestamp=true !
'video/x-raw, width=1280, height=720, framerate=60/1, format=UYVY' ! xvimagesink
sync=false
$ gst-launch-1.0 v4l2src io-mode=4 device=/dev/video0 do-timestamp=true !
'video/x-raw, width=1280, height=960, framerate=60/1, format=UYVY' ! xvimagesink
sync=false

> IMX334 :

```

```
No width height framerate
0 3864 2180 30
1 3864 2180 60
2 1944 1090 30
3 1944 1090 60
```

```
$ gst-launch-1.0 nvarguscamerasrc sensor-id=0 sensor-mode=0 !
'video/x-raw(memory:NVMM), width=(int)3864, height=(int)2180,
format=(string)NV12, framerate=(fraction)30/1' ! nvvidconv ! xvimagesink -e
$ gst-launch-1.0 nvarguscamerasrc sensor-id=0 sensor-mode=1 !
'video/x-raw(memory:NVMM), width=(int)3864, height=(int)2180,
format=(string)NV12, framerate=(fraction)60/1' ! nvvidconv ! xvimagesink -e
$ gst-launch-1.0 nvarguscamerasrc sensor-id=0 sensor-mode=2 !
'video/x-raw(memory:NVMM), width=(int)1944, height=(int)1090,
format=(string)NV12, framerate=(fraction)30/1' ! nvvidconv top=5 bottom=1085
left=12 right=1932 ! xvimagesink -e
$ gst-launch-1.0 nvarguscamerasrc sensor-id=0 sensor-mode=3 !
'video/x-raw(memory:NVMM), width=(int)1944, height=(int)1090,
format=(string)NV12, framerate=(fraction)60/1' ! nvvidconv top=5 bottom=1085
left=12 right=1932 ! xvimagesink -e
```

> IMX334 V-by-One (imx334thcv):

```
No width height framerate
0 3864 2180 30
1 1944 1090 30
2 1944 1090 60
```

```
$ gst-launch-1.0 nvarguscamerasrc sensor-id=0 sensor-mode=0 !
'video/x-raw(memory:NVMM), width=(int)3864, height=(int)2180,
format=(string)NV12, framerate=(fraction)30/1' ! nvvidconv ! xvimagesink -e
$ gst-launch-1.0 nvarguscamerasrc sensor-id=0 sensor-mode=1 !
'video/x-raw(memory:NVMM), width=(int)1944, height=(int)1090,
format=(string)NV12, framerate=(fraction)30/1' ! nvvidconv top=5 bottom=1085
left=12 right=1932 ! xvimagesink -e
$ gst-launch-1.0 nvarguscamerasrc sensor-id=0 sensor-mode=2 !
'video/x-raw(memory:NVMM), width=(int)1944, height=(int)1090,
format=(string)NV12, framerate=(fraction)60/1' ! nvvidconv top=5 bottom=1085
left=12 right=1932 ! xvimagesink -e
```

7. GPIO usage

(1) Output: (e.g. gpio232)

```
$ sudo su
$ gpio_id=232
$ echo $gpio_id > /sys/class/gpio/export
$ echo out > /sys/class/gpio/gpio$gpio_id/direction
```

```
$ echo 1 > /sys/class/gpio/gpio$gpio_id/value # HIGH
$ echo 0 > /sys/class/gpio/gpio$gpio_id/value # LOW
```

(2) Input

```
$ sudo su
$ gpio_id=232
$ echo $gpio_id > /sys/class/gpio/export
$ echo in > /sys/class/gpio/gpio$gpio_id/direction
$ cat /sys/class/gpio/gpio$gpio_id/value # 1: HIGH, 0: LOW
```

(3) Disable

```
$ sudo su
$ gpio_id=232
$ echo $gpio_id > /sys/class/gpio/unexport
```

For L4T (Linux for Tegra) BSP support and the other software support associated with NVIDIA® Jetson Nano / TX2 NX/ Xavier NX , please visit AVerMedia website to contact our technical support function. (<https://www.avermedia.com/tw/support/contact>)

6.0 Force Recovery Mode

USB 3.1/ Jetson platform port of NX215/NO115B/TN115B/NX215B can be used to re-program NVIDIA® Jetson NANO/TX2 NX/Xavier 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 NANO/TX2 NX/Xavier 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® NANO/TX2 NX/Xavier NX 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 Jetson platform port back to the host mode.

7.0 Power Consumption

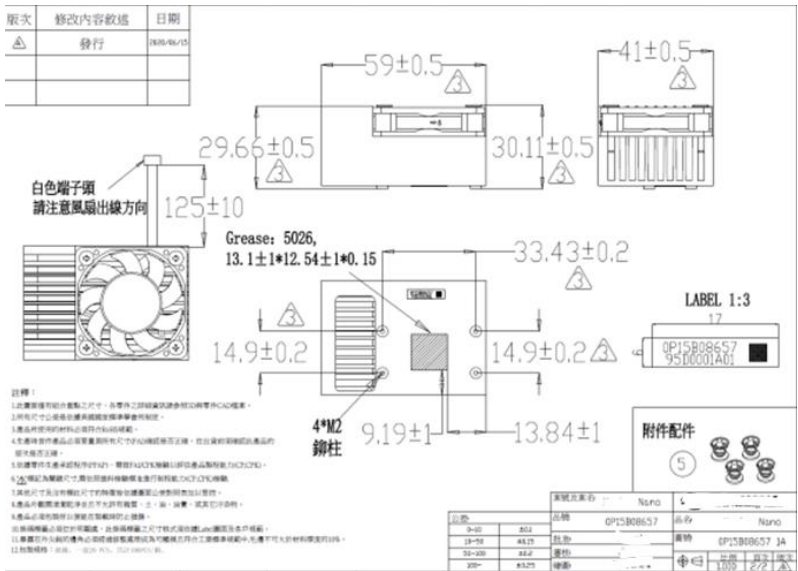
Item Description	Power Consumption
<p>Theoretical Maximum System Power Consumption</p>	<ul style="list-style-type: none"> ● NO115B Power Consumption: 3.5W to 18.5W ● TN115B Power Consumption: 3.5W to 23.5W ● NX215B Power Consumption: 3.5W to 28.5W <p>The condition is connected to USB3.0*2,USB*1,MIPI 2 lane*3, LAN *2, SSD 256G*1,Wifi 9260*1, HDMI*1,SD Card*1 with CPU/ GPU full loading. (maximum power consumption up to 60W based on adapter)</p>
<p>Typical System Power Consumption</p>	<p>The power consumption under the normal operating mode is depending on the application software running with NVIDIA® Jetson Nano/ TX2 NX/Xavier NX.</p>

8.0 Accessory Drawings

8.1 Fan Module/ Adapter/ Power Cord

Fan Module for NANO

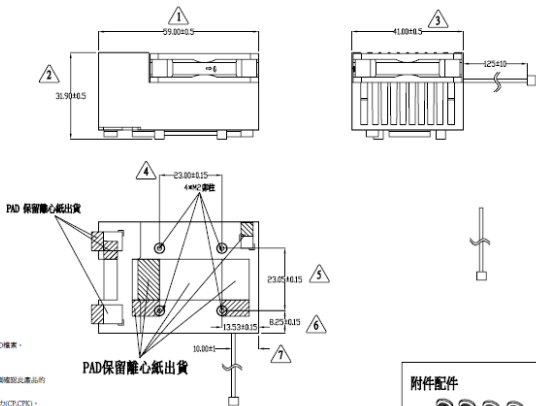
- Rated Voltage: 5V
- Operating Voltage Range: 4V~5.5V
- Rated Speed: 6000RPM±10%
(Testing Speed After Continuous 3 Minute Operation At Ambient Temperature Of 25 °C)
- Life Expectancy: 70,000hours at 40°C (WITH 15~65% RH)
- Bearing Type: Two Ball



Fan Module for TX2 NX

- Rated Voltage: 5V
- Operating Voltage Range: 4V~5.5V
- Rated Speed: 6000RPM±10%
(Testing Speed After Continuous 3 Minute Operation At Ambient Temperature Of 25 °C)
- Life Expectancy: 70,000hours at 40 °C (WITH 15~65% RH)
- Bearing Type: Two Ball

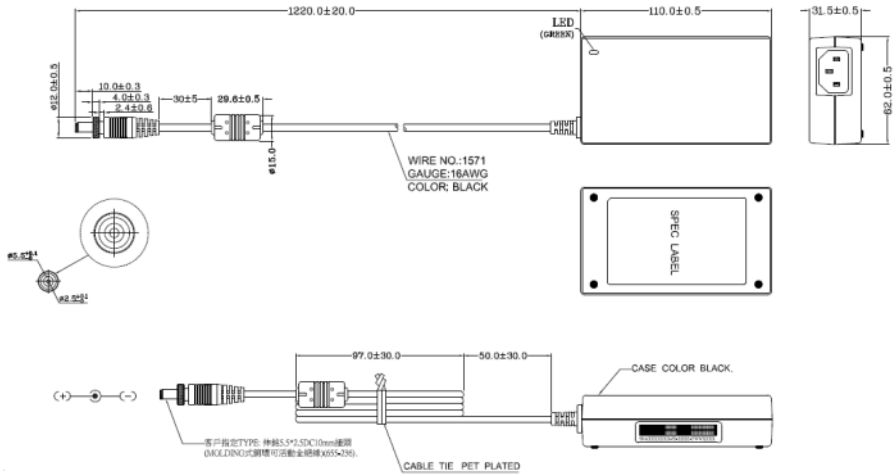
版次	修改內容敘述	日期
△	發行	2020/05/12



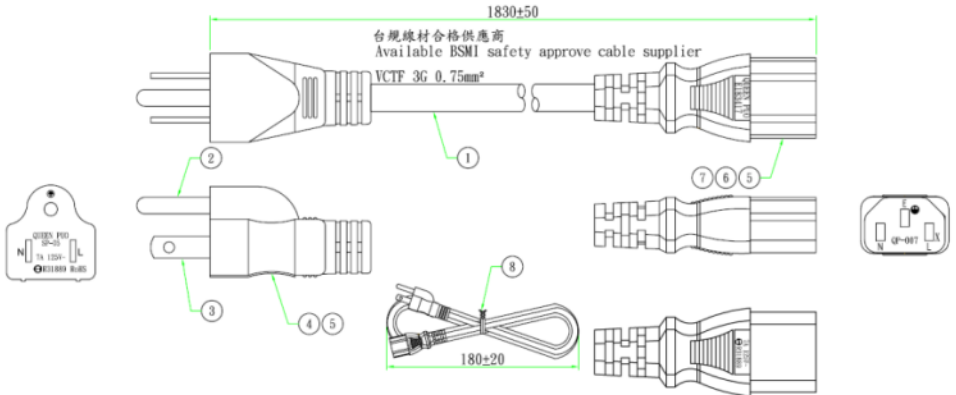
- 註釋：
- 1.此圖面僅有組合圖點之尺寸，各零件之詳細圖與尺寸與零件CAD檔案。
 - 2.所有尺寸公差係依據美國國家標準所制定。
 - 3.圖面所使用之材料必須符合RoHS規範。
 - 4.生產時所有產品必須量測所有尺寸以確認符合公差，在出貨前須確認此圖面之版本是否正確。
 - 5.包裝零件生產須按照IPC-AI-610，需經ICT檢驗以評估產品製造能力(CPI/CPII)。
 - 6.圖面之公差與尺寸，應依照零件檢驗標準進行判定(CPI/CPII檢驗)。
 - 7.圖面尺寸公差有圖面尺寸之公差者，應以圖面公差為準。
 - 8.產品外觀應清潔且無允許有銹蝕、土、油、漆、或任何其他污物。
 - 9.產品必須包裝好以便在包裝時防止損傷。
 - 10.無損壞產品應設計與製造，此類無損壞之尺寸係以保證產品質量及客戶利益。
 - 11.圖面中所有之顏色均須依照標準顏色卡之規定進行塗裝，所有零件應符合圖面中所有材料之公差。
 - 12.包裝規格：內裝一包，PCS一包裝，每包一PCS包裝。

名稱	規格	料號	圖號
名稱	規格	料號	圖號
規格	規格	規格	規格
規格	規格	規格	規格

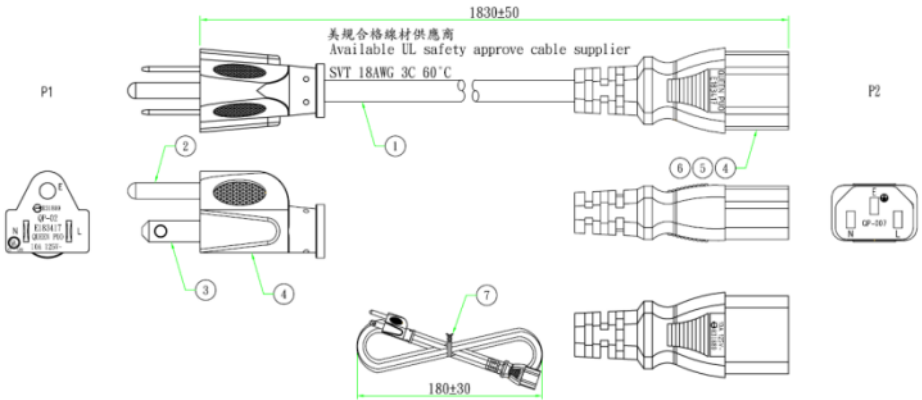
Power Adapter 04131HGOUANK



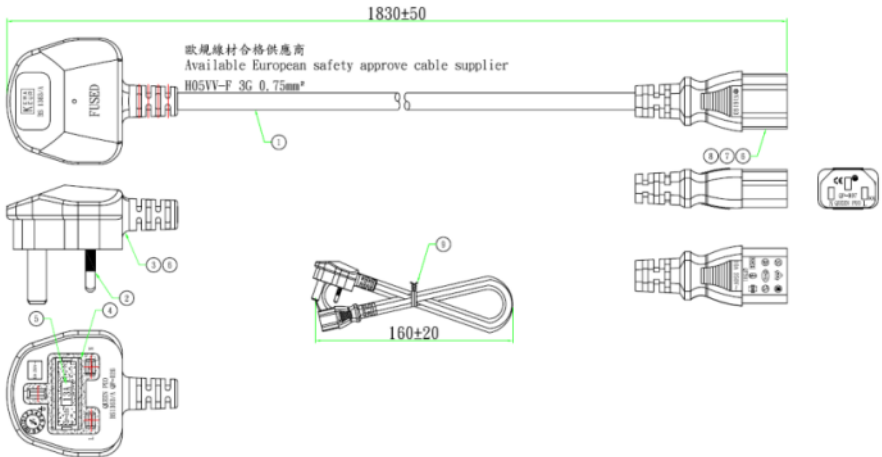
64APOWBRX-IPD (TW version)



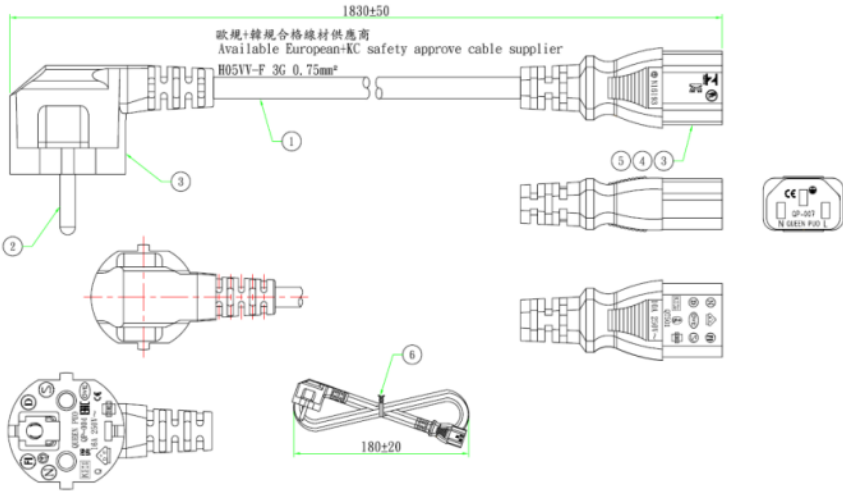
064APOWBR2-IPD (US version)



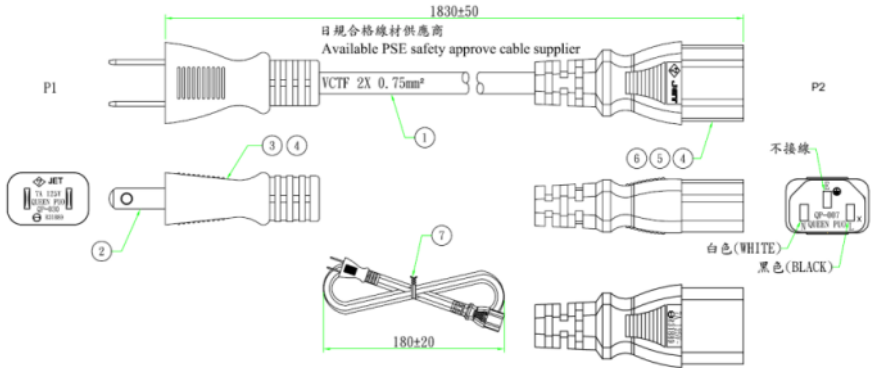
064APOWBRW-IPD (UK version)



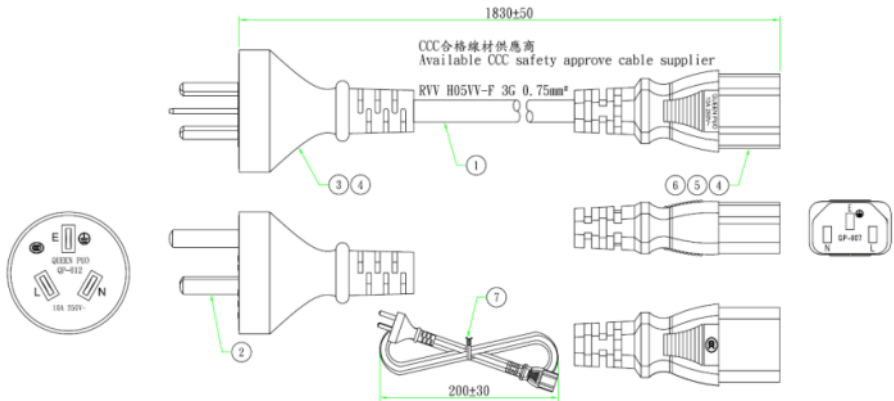
064APOWBR5-IPD (EU version)



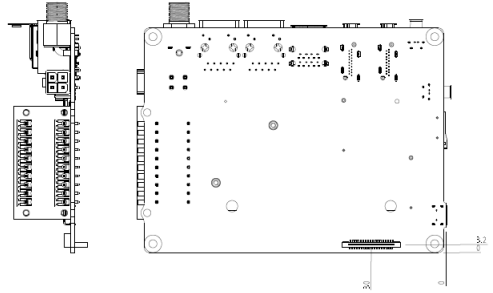
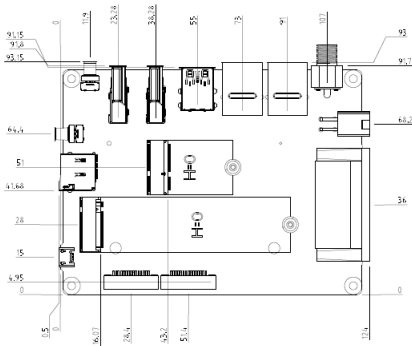
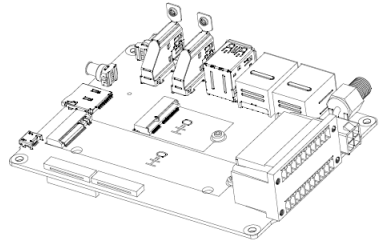
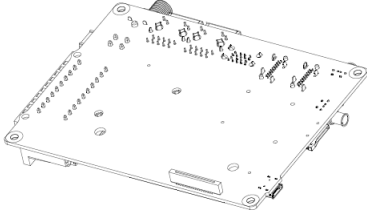
064APOWBRSL (JP version)



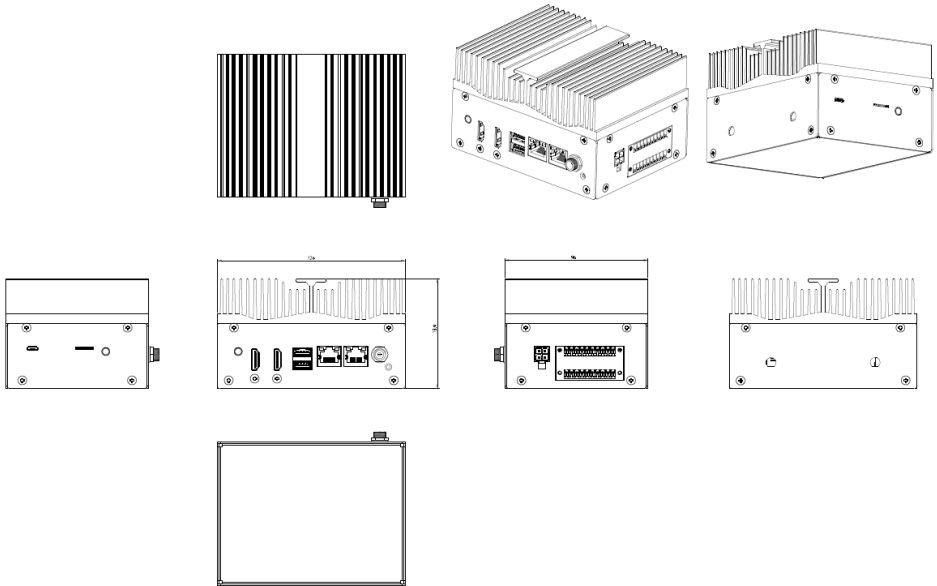
064APOWBR4-IPD (CN version)

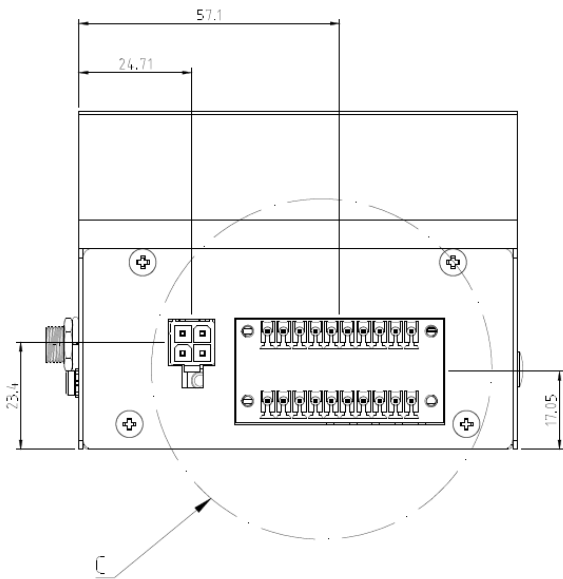
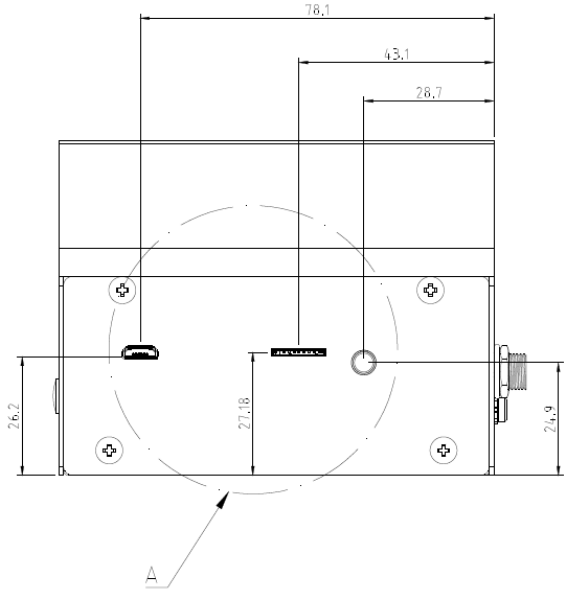


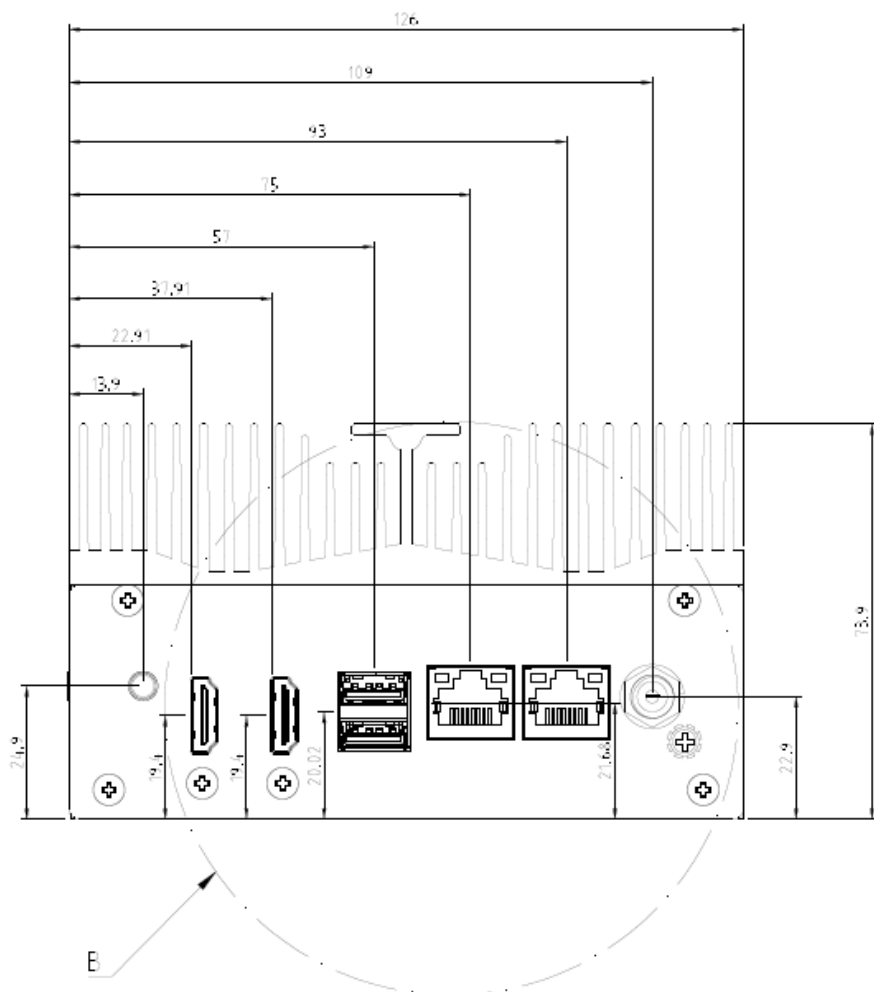
9.0 Dimension Drawings and Assembly Drawings
9.1 Dimension Drawings of carrier board

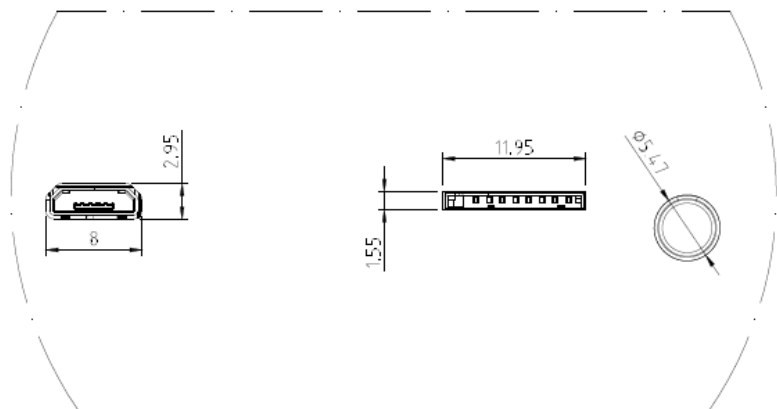
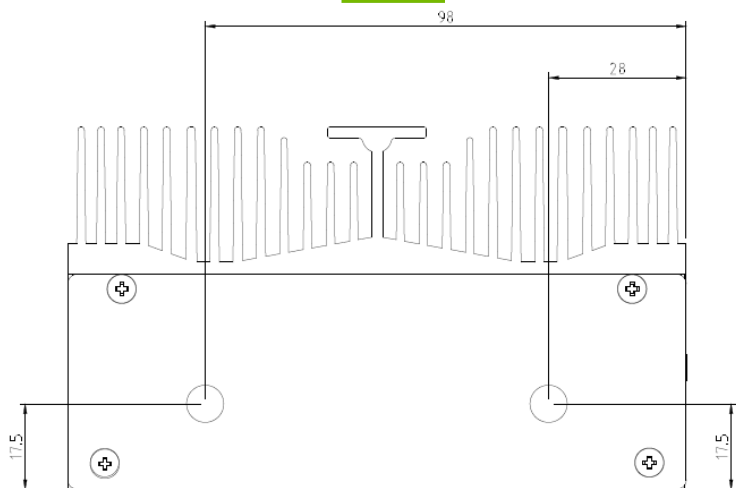


9.2 Dimension Drawing of NO115B/ TN115B/ NX215B Box PC

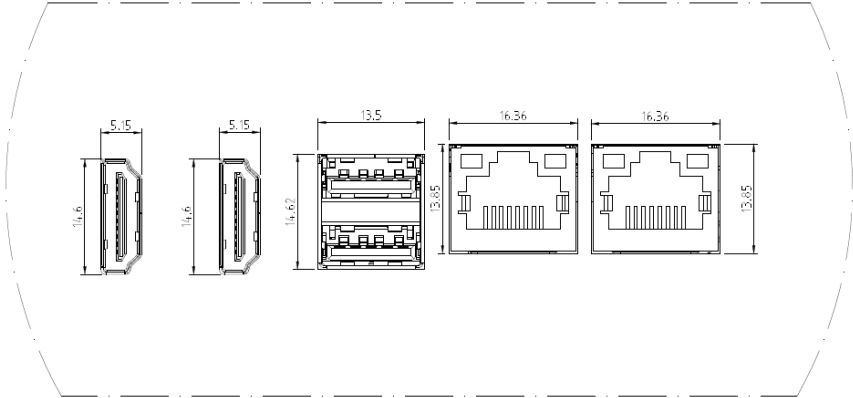




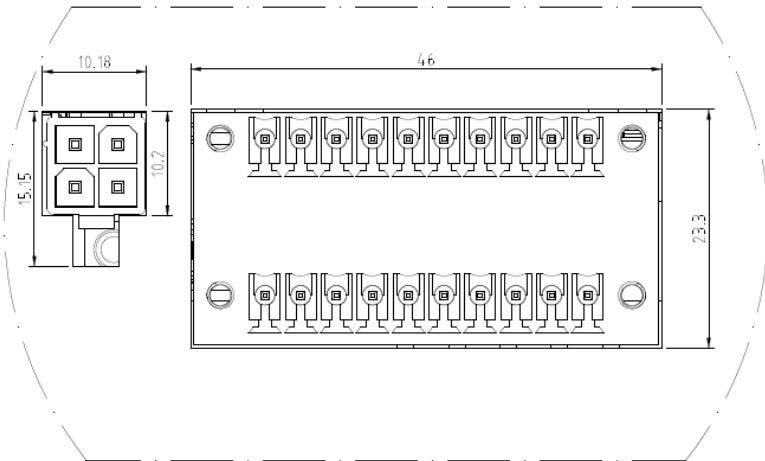




DETAIL A
2 : 1



DETAIL B
2 : 1



DETAIL C
2 : 1