BRAV-7123

User’s Manual

Ver.A0.1

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Product Warranty (2 years)

JHC warrants to you, the original purchaser, that each of its products will be free from defects in materials and workmanship for two years from the date of purchase.

This warranty does not apply to any products which have been repaired or altered by persons other than repair personnel authorized by JHC, or which have been subject to misuse, abuse, accident or improper installation.

JHC assumes no liability under the terms of this warranty as a consequence of such events.

Because of JHC.s high quality-control standards and rigorous testing, most of our customers never need to use our repair service. If an JHC product is defective, it will be repaired or replaced at no charge during the warranty period. For out-of-warranty repairs, you will be billed according to the cost of replacement materials, service time and freight. Please consult your dealer for more details.

If you think you have a defective product, follow these steps:

1. Collect all the information about the problem encountered. (For example, CPU speed, JHC products used, other hardware and software used, etc.) Note anything abnormal and list any onscreen messages you get when the problem occurs.
2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.
3. If your product is diagnosed as defective, obtain an RMA (return merchandise authorization) number from your dealer. This allows us to process your return more quickly.
4. Carefully pack the defective product, a fully-completed Repair and Replacement Order Card and a photocopy proof of purchase date (such as your sales receipt) in a shippable container. A product returned without proof of the purchase date is not eligible for warranty service.
5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

Declaration of Conformity

CE

This product has passed the CE test for environmental specifications when shielded cables are used for external wiring. We recommend the use of shielded cables. This kind of cable is available from JHC. Please contact your local supplier for ordering information. Test conditions for passing included the equipment being operated within an industrial enclosure. In order to protect the product from being damaged by ESD (Electrostatic Discharge) and EMI leakage, we strongly recommend the use of CE-compliant industrial enclosure products.

FCC Class A

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Technical Support and Assistance

Step 1. Visit the JHC web site at www.jhctech.com.cn where you can find the latest information about the product.

Step 2. Contact your distributor, sales representative, or JHC's customer service center for technical support if you need additional assistance. Please have the following information ready before you call:

- Product name and serial number
- Description of your peripheral attachments
- Description of your software (operating system, version,application software, etc.)
- A complete description of the problem
- The exact wording of any error messages

CONTENTS

CHAPTER 1

General Information

1.1 Introduction

BRAV-7123 is a product of NVIDIA Jetson Orin platform for MEC edge computing with high performance and high power. It is equipped with NVIDIA Jetson NX Orin 8/16GB module, 8/12 core ARM CPU and high-performance GPU, and the highest AI performance can reach 70~157TOPS.

BRAV-7123 offers rich I/O interfaces, including 1*HDMI, maximum resolution 4096x2304@60Hz, 2* Gigabit LAN, 6*USB3.0, 2*USB2.0, 2* Iso.CAN. It has multiple expansion options, 1*M.2 3052 B-Key with SIM card slot, PCIeX1+USB2.0 signal, support 4G LTE or 5G NR wireless function module; 1*M.2 2280 M-Key, PCIeX4 signal, support NVMe high-speed memory card or AI accelerated computing module; 1*M.2 2230 E-Key, PCIeX1+USB2.0 signal, supporting gigabit bandwidth WiFi6/ USB 5.0. It provides DC 9-36V wide voltage power , and it can be used as MEC edge computing for humanoid robot, machine vision and intelligent logistics industries.

1.2 Features

- NVIDIA Jetson Orin NX，8G/16G LPDDR5
- AI Performance 70~157 TOPS
- support 1*M.2 2280 M-Key NVMe
- 2*GBE, 6*USB3.0, 2*USB2.0, 2*CAN FD, 2*RS485
- 1*HDMI，1*MIC，2*Speaker
- 1*M.2 B-Key support 4G LTE or 5G NR，1*M.2 E-Key support Wifi_6
- DC9~36V wide power input，with OVP,OCP and SCP
- Aluminum extruded shell, cushioning structure, active and passive combined heat dissipation design

1.3 Specifications

1.3.1 General

CPU: 6*Cores Arm® Cortex®-A78AE v8.2 64-bit CPU 1.5MB L2+4MB L3(S001);
8*Cores Arm® Cortex®-A78AE v8.2 64-bit CPU 2MB L2+4MB L3(S002)

GPU: 1024*Cores NVIDIA Ampere Architecture GPU 765MHz, with 32*Tensor Cores(S001);
1024*Cores NVIDIA Ampere Architecture GPU 918MHz, with 32*Tensor Cores(S002)

DL Accelerator & VS Accelerator: 1*NVDLA v2(S001)/2*NVDLA v2(S002), PVA v2.0

Memory: Onboard 8GB(S001)/16GB(S002) 128-bit LPDDR5, the maximum bandwidth up to 102.4GB/s

USB: 6*USB3.0(Type A)，2*USB2.0(Type A)

Serial Ports： 2*2.5KV Iso. RS485

CAN： 2*Iso. CAN (DB9)

Expansion Interface:

1*M.2 3052 B-key, with SIM card slot, PCIe X1 + USB2.0 signal, support 4G LTE or 5G NR wireless function module;

1*M.2 2280 M-Key , PCIe X4 signal, support NVMe high-speed memory card or edge AI computing module;

1*M.2 2230 E-Key , PCIe X1 + USB2.0 signal, support gigabit bandwidth WiFi6/BT5.0.

Storage:

1*M.2 Type 2280 M-Key，PCIeX4 signal, support NVMe high-speed memory card.

1.3.2 Graphics

Video code : (H.265)1*4K60 | 3*4K30 | 6*1080p60 | 12*1080p30 (S001/S002).;

Video decode : (H.265)1*8K30 | 2*4K60 | 4*4K30 | 9*1080p60 | 18*1080p30(S001/S002);

Resolution: HDMI 2.0 up to 4096*2304@60Hz

1.3.3 Ethernet

Chipset: 2*Intel I210AT PCIe Gig. Ethernet

Speed: 10M / 100M / 1000Madaptive

Interface: 2*RJ45 w/LED

1.3.4 Audio

Chipset: Realtek ALC564, support stereo channel output

Interface: 1* Line out, 3.5mm audio interface

1.3.5 Power Consumption

Input Voltage: DC 9~36V wide power input, 3-pin 3.81mm terminal block， with short circuit, over voltage and over current protection

Power Consumption:

TDP: TBD

Power Adapter:

AC/DC power adapter · DC12V/5A,60W

AC/DC power adapter · DC19V/6.32A,120W

1.4 Environmental requirement

Operating temperature: -20 ~60° C ,airflow

Relative humidity:10%-90%@40°C (non-condensing)

Storage temperature: -40 ~ 85°C (-40 ~ 185°F)

Vibration loading during operation: With SSD: 5grms/random/5～500Hz；with HDD: 1grms/random/5～500Hz

Shock during operation: With SSD: 50g peak acceleration (continue 11ms)； with HDD: 20g peak acceleration (continue 11ms)

EMC: CE, FCC Class A

1.5 Ordering Information

Model No.	Module	Introduction
BRAV-7123-S001	Jetson Orin NX 8GB	1*HDMI，2*GBE RJ45，6*USB3.0，2*USB2.0，2*RS485，2*Iso. CAN FD，2*Speaker，1*Mic，1*M.2 B-Key w/SIM，1*M.2 E-key，DC-IN 9~36V,
BRAV-7123-S002	Jetson Orin NX16GB	
PA-120DC12	AC/DC power adapter，DC19V/5A,60W	
PA-220DC19	AC/DC power adapter，DC24V/6.32A, 120W	

1.6 I/O Interface

BRAV-7123 front view：

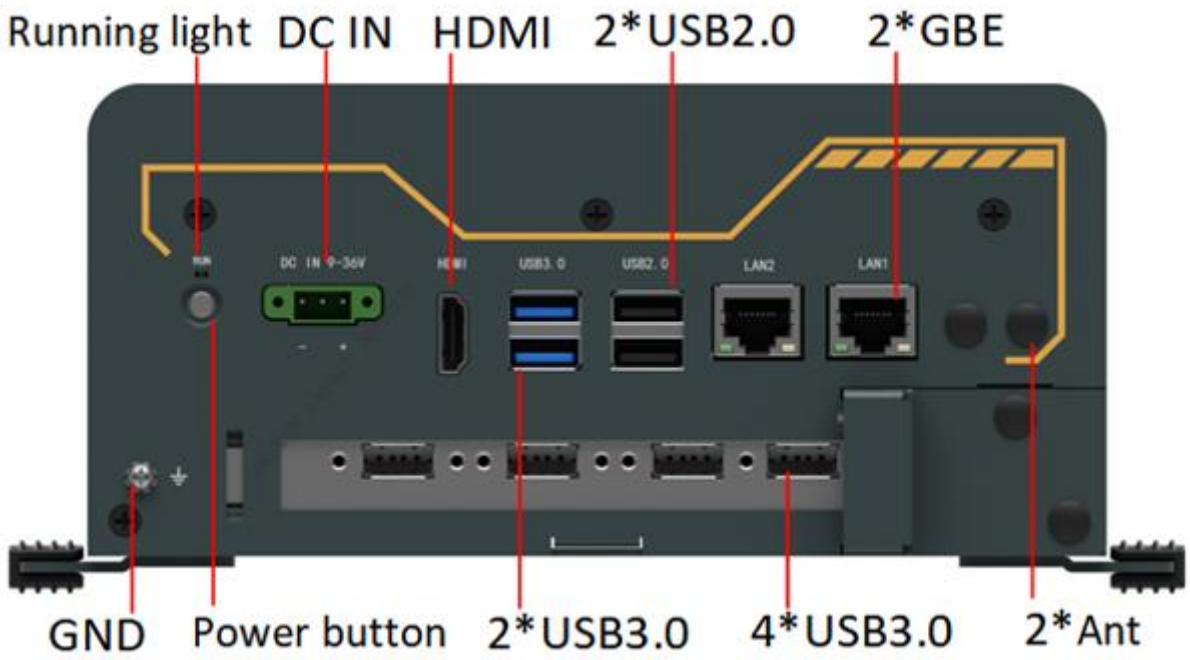

Figure 1. 1

I/O interface included on the front panel：

- DC IN 9-36V
- 1*HDMI
- 2*Gig-LAN
- 6*USB3.0
- 2*USB 2.0
- 2*ANT
- 1*Power button

BRAV-7123 rear view：

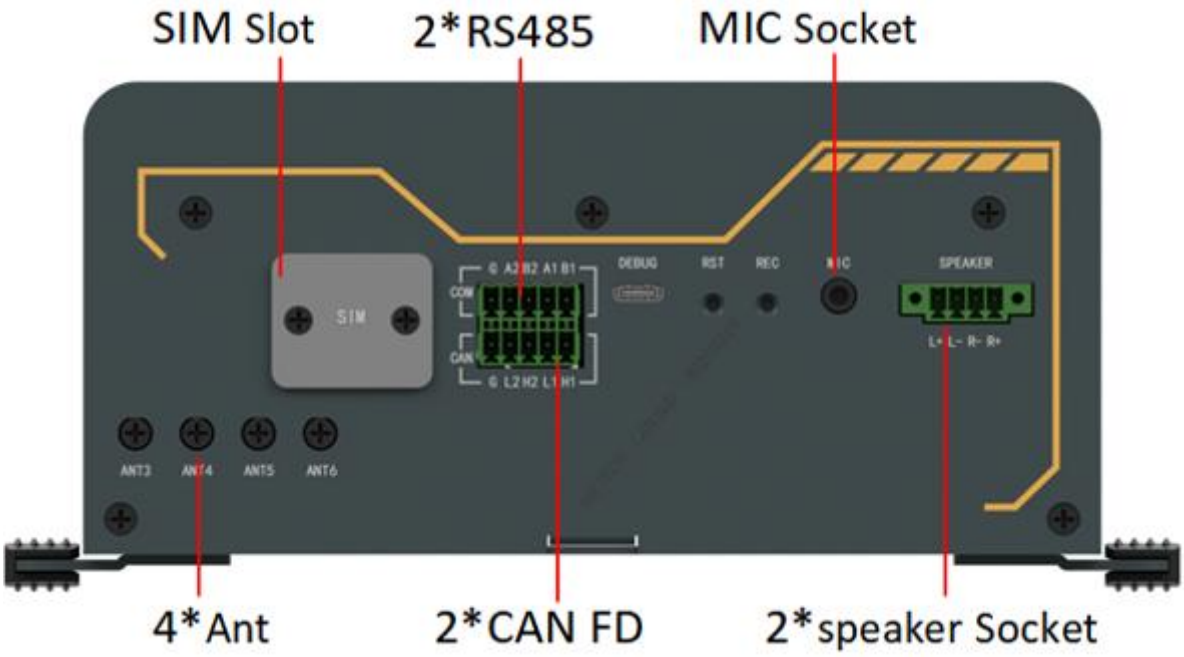

Figure 1. 2

I/O interface included on the rear panel：

- 1*MIC
- 2*Speaker
- 2*RS485
- 2*CAN
- 4*ANT
- 1*SIM

1.7 Dimension

BRAV-7123 Dimension（Unit：mm）

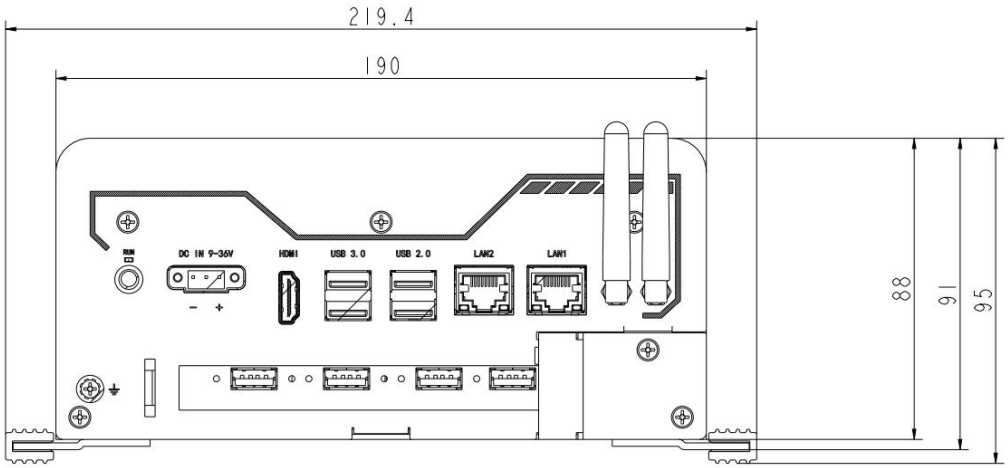

Figure 1.4

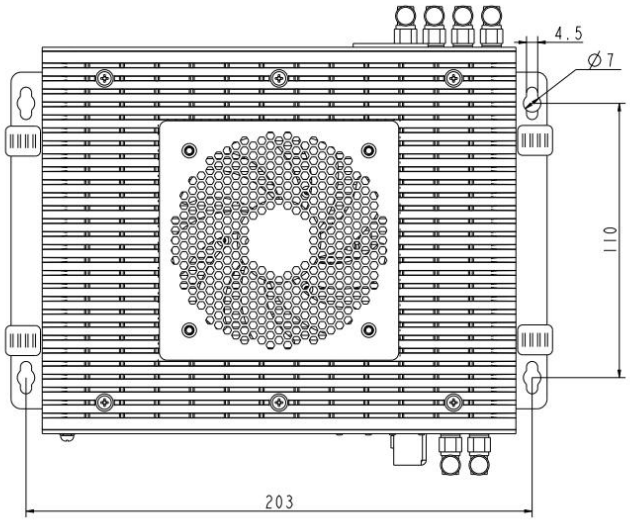

Figure 1.5

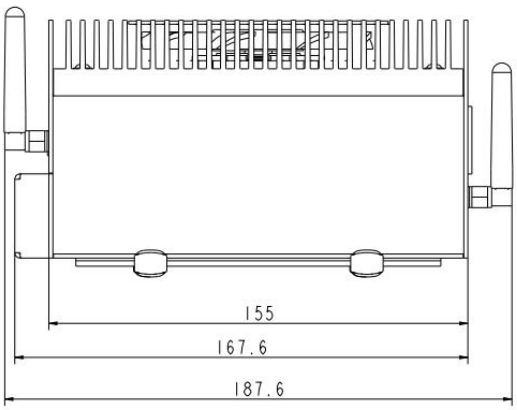

Figure 1.6

CHAPTER 2

Hardware Installation

2.1 Introduction

The following chapters will state the panel DIP switch settings and external connectors and pin assignments of the product.

2.2 I/O Introduction and Pin Assignments

2.2.1 DC-IN

DECA 3Pin terminal 3.81mm Pitch

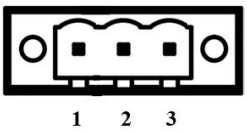

Figure 2.1 DC-IN

Table 2.1: DC-IN Port Pin Assignment			
Pin	Signal	Pin	Signal
1	9~36V	2	NC
3	GND	/	/

2.2.2 CMOS Battery Connector

I912 module and 267 onboard Co-lay, interface package and define the same.

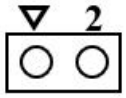

Figure 2.2 CMOS Battery interface

Table 2.2: CMOS battery Port Pin Assignment			
Pin	Signal	Pin	Signal
1	BAT+	2	GND

2.2.3 HDMI 2.0

PIB-319 provides a vertical HDMI display interface with a detailed pin assignment described below.

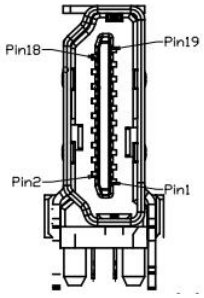

Figure 2.3 HDMI interface

Table 2.3: HDMI Port Pin Assignments					
Pin	Signal	Pin	Signal	Pin	Signal
1	DATA2_P	8	GND	15	SCL
2	GND	9	DATA0_N	16	SDA
3	DATA2_N	10	CLK_P	17	GND
4	DATA1_P	11	GND	18	VCC
5	GND	12	CLK_N	19	DETECT
6	DATA1_N	13	NC	/	/
7	DATA0_P	14	NC	/	/

2.2.4 2*LAN（LAN1/LAN2）

PIB-319 is equipped with 2 * Intel ® I210AT chip, providing two RJ45 gigabit network ports and supporting 10 / 100 / 1000Mbps rate adaptation. The following table provides the detailed pin assignment.

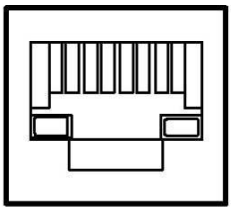

Figure 2.4 RJ45

Table 2.4 : RJ45 Port Pin Assignment			
Pin	10/100/1000BaseT Signal	Pin	10/100/1000BaseT Signal
1	TX+(10/100), LAN_DA+(GHz)	5	LAN_DC-(GHz)
2	TX-(10/100), LAN_DA-(GHz)	6	RX-(10/100), LAN_DB-(GHz)
3	RX+(10/100), LAN_DB+(GHz)	7	LAN_DD-(GHz)
4	LAN_DC+(GHz)	8	LAN_DD-(GHz)

2.2.5 6*USB3.0

PIB-319 provides one PCIeX4 to USB3.0 * 4 Type-A port, four USB3.0 interfaces, and two USB3.0 Type A interfaces through USB 3.0 double-layer connector. The following table assigns the pins.

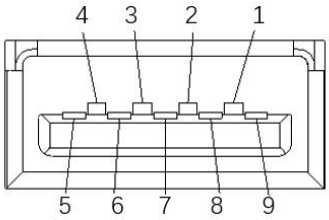

Figure 2.5 USB3.0

Table 2.5 : USB3.0 type A Port Pin Assignments			
Pin	Signal	Pin	Signal
1	VBUS	6	RX+
2	D-	7	GND
3	D+	8	TX-
4	GND	9	TX+
5	RX-	Shell	Shield

2.2.6 2*USB2.0

PIB-319 provides 2*USB2.0 TypeA interfaces through 1*USB 2.0 double-layer connector. The following table assigns the pin with an introduction

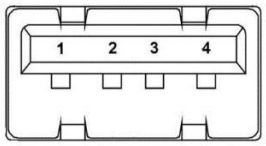

Figure 2.6 USB2.0

Table 2.6 : USB2.0 type A Port Pin Assignments	
Pin	Signal
1	USB_VCC
2	USB_D-
3	USB_D+
4	USB_GND

2.2.7 COM1 (RS485)/COM2 (RS485)，CAN

PIB-319 provides 2-way RS485 signal and 2-way CAN signal through 1 Phoenix terminal socket 2x5Pin 3.5mm DIP90

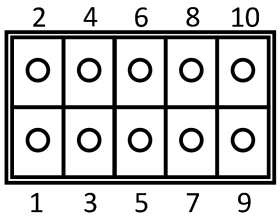

Figure 2.7 2*5 Phoenix terminal

Table 2.7: COM1/2、CAN1/2 Port Pin Assignments			
Pin	Signal	Pin	Signal
1	GND	2	GND
3	CANL2	4	DATA_A2
5	CANH2	6	DATA_B2-
7	CANL1	8	DATA_A1
9	CANH1	10	DATA_B1

2.2.8 M.2 B-Key 3042/3052 (4G/5G)

Band PCIe x 2 + USB2.0, connected to SIM Slot, support 4G or 5G

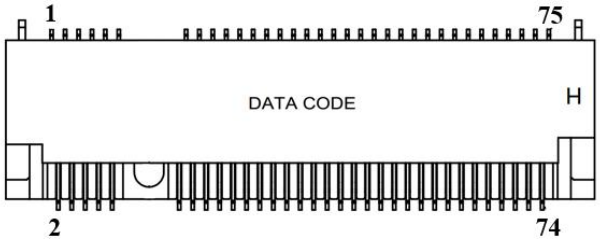

Figure 2.8 M.2 B-Key slot

Table 2.8 : M.2 B-Key 3042/3052 Port Pin Assignments			
Pin	Signal	Pin	Signal
1	GND	2	+V3_M2
3	GND	4	+V3_M2
5	GND	6	+V3_M2
7	USB_P9	8	WIFI_DISABLE
9	USB_N9	20	NC
21	+V3_M2	22	NC
23	NC	24	NC
25	NC	26	NC
27	GND	28	NC
29	NC	30	SIM2_RESET
31	NC	32	SIM2_CLK
33	GND	34	SIM2_DATA

35	NC	36	SIM2_PWR
37	NC	38	SSD_SATA5_DEVSLP
39	GND	40	NC
41	PCIE_RX18-	42	NC
43	PCIE_RX18+	44	NC
45	GND	46	NC
47	PCIE_TX18-	48	NC
49	PCIE_TX18+	50	PLTRST_M2_N
51	GND	52	CLK_REQ15#
53	CLK_PCIe_N15	54	PCH_WAKE_N
55	CLK_PCIe_P15	56	NC
57	GND	58	NC
59	NC	60	NC
61	NC	62	NC
63	NC	64	NC
65	NC	66	SIM_DET
67	+3VS	68	SUSCLK
69	M.2_SSD_PEDET	70	+V3_M2
71	GND	72	+V3_M2
73	GND	74	+V3_M2
75	NC	/	/

2.2.10 M.2 M-Key 2280 (NVME)

Signal band PCIe x1 to realize NVME Storage storage expansion

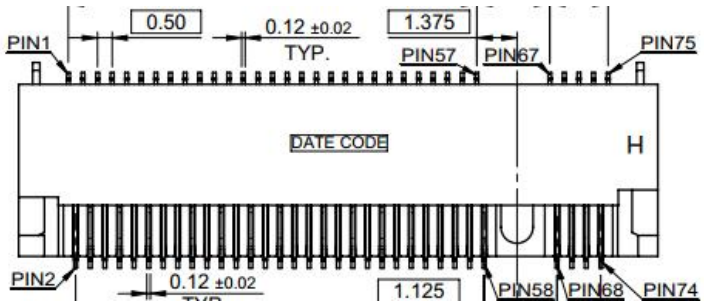

Figure 2.9 M.2 M-Key slot

Table 2.9: M.2 M-Key Port Pin Assignments			
Pin	Signal	Pin	Signal
1	GND	2	+V3.3_M2
3	GND	4	+V3.3_M2

5	GND	6	/
7	USB_D+	8	/
9	USB_D-	10	NC
11	GND	12	NC
13	NC	14	NC
15	NC	16	NC
17	NC	18	NC
19	NC	20	NC
21	GND	22	NC
23	NC	24	NC
25	NC	26	
27	GND	28	NC
29	/	30	/
31	/	32	/
33	GND	34	/
35	/	36	/
37	/	38	/
39	GND	40	NC
41	NC	42	NC
43	NC	44	NC
45	GND	46	NC
47	NC	48	NC
49	NC	50	/
51	GND	52	NC
53	/	54	/
55	/	56	/
57	GND	58	/
59	NC	60	NC
61	NC	62	NC
63	NC	64	NC
65	NC	66	
67	/	68	NC
69	/	70	+V3.3_M2
71	GND	72	+V3.3_M2
73	GND	74	+V3.3_M2

75	NC	/	/

2.3 Installation

This section describes how to install the M. 2230 E-key module, M. 2280 M-key module and M. 2 3052 B-key module.

2.3.1 M.2 2230 E-key module Install

Step 1: Disassemble and disassemble the machine.

Step 2: align the slot of the M.2 module at the slot on the motherboard (below Figure red box), and insert it at a 30 degree Angle with the slot.

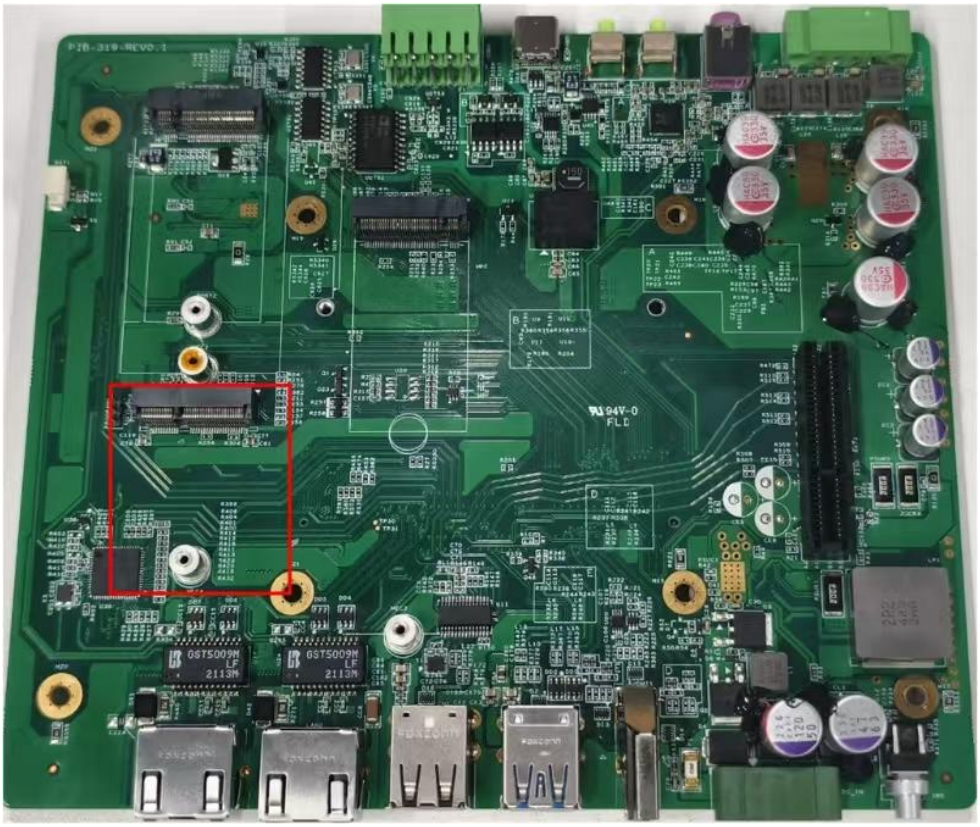

Figure 2.10

Step 3: Attach the M.2 module to the bracket with a screw.

Step 4: Complete the installation of the product according to the reverse disassembly step.

2.3.2 M.2 2280 M-Key module Install

Step 1: Disassemble and disassemble the machine.

Step 2: align the slot of the M.2 module at the slot on the motherboard (below Figure red box), and insert it at a 30 degree Angle with the slot.

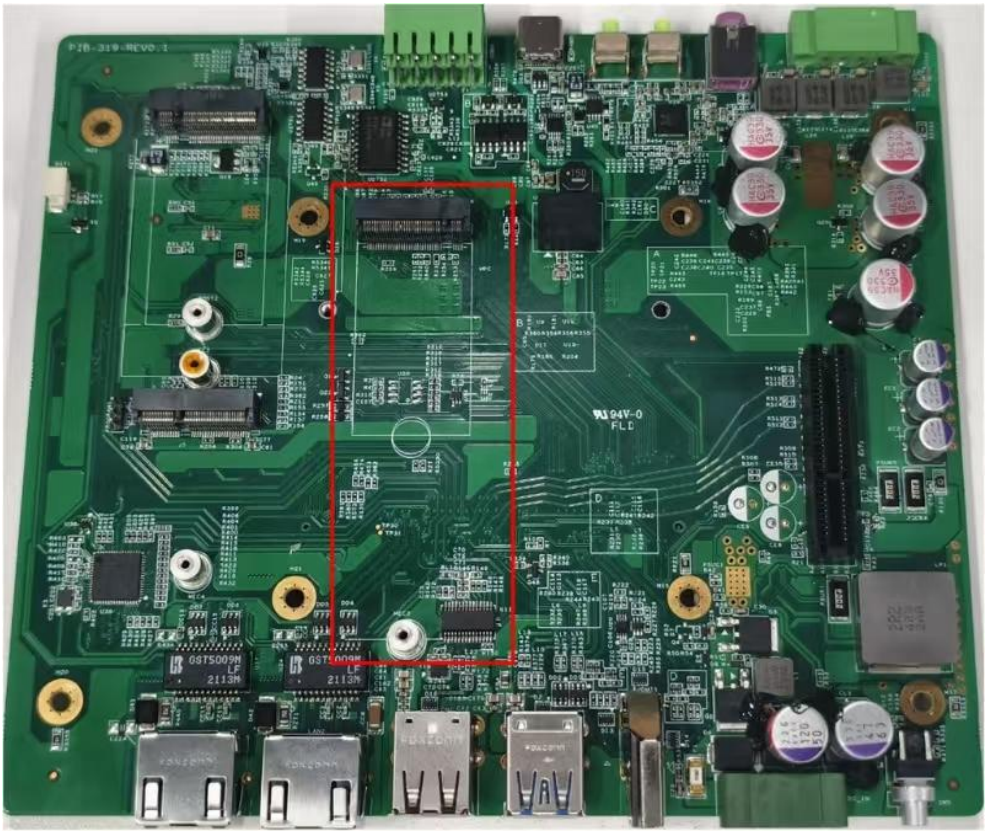

Figure 2.11

Step 3: Attach the M.2 module to the bracket with a screw.

Step 4: Complete the installation of the product according to the reverse disassembly step.

2.3.3 M.2 3052 B-Key module Install

Step 1: Disassemble and disassemble the machine.

Step 2: align the slot of M.2 module at the slot on the motherboard (red box below) and insert it at a 30 degree Angle with the slot.

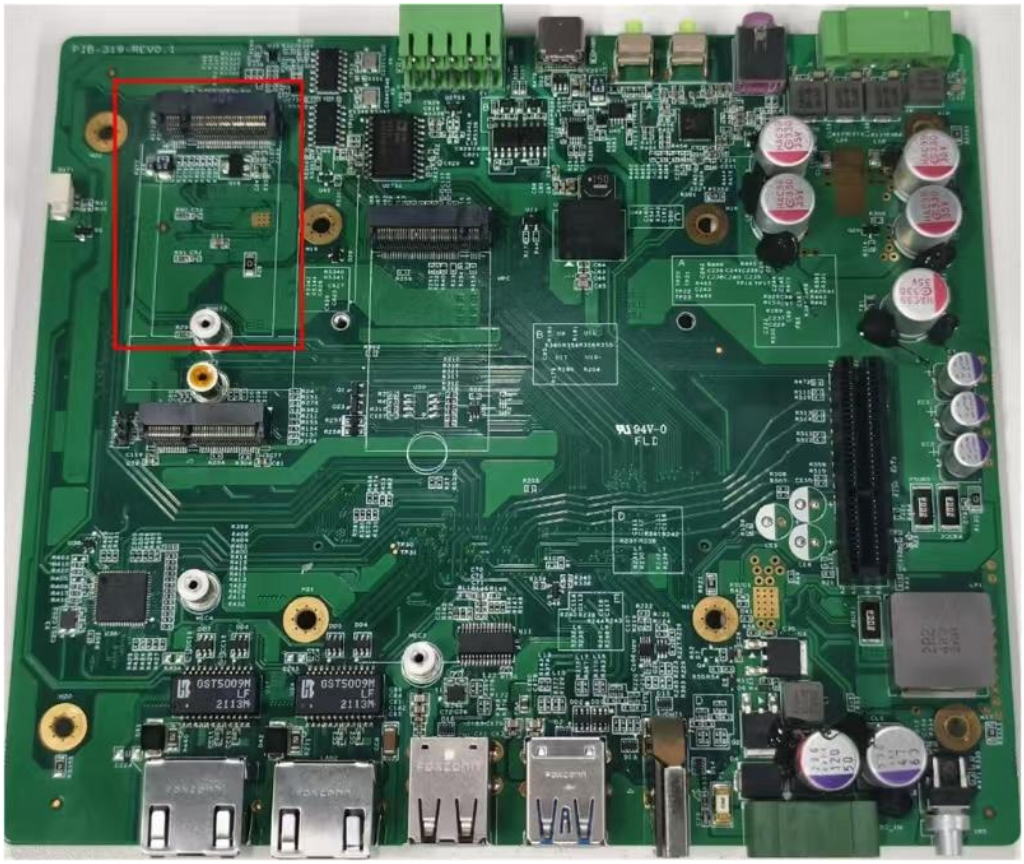

Figure 2.12

Step 3: Attach the M.2 module to the bracket with a screw.

Step 4: Complete the installation of the product according to the reverse disassembly step.