BRAV-7520/7521

User's Manual





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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.

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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 resident installation. 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. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, 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



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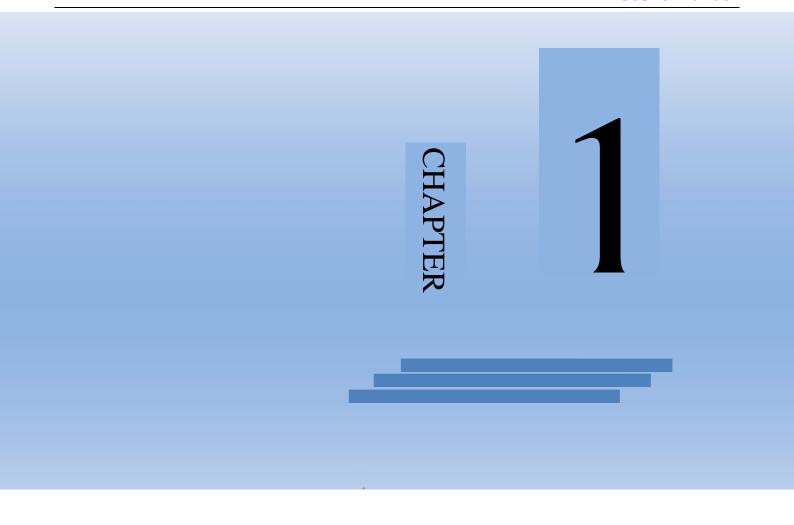


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General Information

1



1.1 Introduction

BRAV-7520/BRAV-7521 is an edge computing system for AIOT and industry 4.0 applications of JHCTECH. It powered by the Gen. 9th Intel[®] Coffee lake-R CPU, Up to 8-Core, running with workstation-grade Intel[®] C246/Q370 Chipset. 2-Ch DDR4, 4*SODIMM 2666/2400MHz memory, up to 128GB. Advanced Intel[®] UHD Graphics 630, supporting DirectX 11.1, OpenGL 5.0 and OpenCL 2.1 or PCIe X16 GPU interface.

BRAV-7520/BRAV-7521 offers 1*VGA, 2*DP, support 3 independent displays, 3*GbE LANs, 6*USB3.1, 4*COM RS232/422/485, 16-bit DIO, 1*F-Mini PCIe with SIM slot, which supports 4G LTE/Wifi/BT/GPS, it can automatically detect mSATA . 1*M.2 E-Key 2230; 1*M.2 B-Key 3052 with SIM slot, which supports 5G; 1*M.2 2280 M-Key, support NVMe storage. BRAV-7520 provides 2*2.5"SATA3 (6Gbps) HDD/SSD are used for storage, support raid 0/1/, 1*PCIe X16, support 1*350W GPU (the length of the GPU must be less than 300mm), 1*PCIe X4 (in X16 slot), support 1*75W AI Module (the length of the module must be less than 300mm). BRAV-7521 provides 4*2.5"SATA3 (6Gbps) HDD/SSD are used for storage, support raid 0/1/5/10, 2*PCIe X8 (in X16 slot), support 2*350W GPU (the length of the GPU must be less than 300mm), 2*PCIe X4 (in X16 slot), support 2*75W AI Module (the length of the module must be less than 300mm), up to 7 extension slots can be supported. DC 12V power supply, workstation level system performance, rich expansion flexibility, industrial level product design which is very suitable for industrial automation, AI edge computing, small intelligent workstations, multimedia service systems, high-precision machine vision and so on.

1.2 Features

Key Features

- 9th generation Intel[®] Xeon[®]/CoreTM i7/i5/i3 (Coffee Lake-R)
- Workstation-grade Intel® C246/Q370 chipset
- Large memory, 4*DDR4 up to 128G ECC/non-ECC
- UHD dual 4K and 3 independent displays, 2*DP+1*VGA
- 3* Gig-LAN ,Opt. Multi-ch 10Gig-SFP
- Multi-ch PCIe standard slot, supports multiple high speed extension interface modules
- Super storage configuration,4*SATA3.0, 1*M.2 2280 M-Key
- Support AMT12.0, Intel[®] iVpro and TPM2.0



- CPU fanless, AI/GPU efficient fan cooling design
- Super deep learning ability, support dual 350W GPU/75W PGPU/AI acceleration card

型号规格参数	BRAV-7520- S001	BRAV-7520- S002	BRAV-7521- S001	BRAV-7521- S002
CPU	Intel [®] Coffeelake-R LGA1151 CPU	Intel [®] Coffeelake-R LGA1151 CPU	Intel [*] Coffeelake-R LGA1151 CPU	Intel* Coffeelake-R LGA1151 CPU
芯片组	Intel [®] Q370	Intel*C246	Intel*Q370	Intel*C246
Mermory	4*DDR4 最大128GB	4*DDR4 最大128GB	4*DDR4 最大128GB	4*DDR4 最大128GB
LAN	3	3	3	3
USB3. 1	6	6	6	6
USB2. 0	2	2	2	2
COM	4	4	4	4
DIO	16-bit Iso.	16-bit Iso.	16-bit Iso.	16-bit Iso.
DP	2	2	2	2
VGA	1	1	1	1
PCIe	1*PCIe X16, 1*PCIe X4	1*PCIe X16, 1*PCIe X4	2*PCIe X8, 2*PCIe X4	2*PCIe X8, 2*PCIe X4
Mini PCIe	1	1	1	1
M. 2	1*M.2 E-Key,	1*M.2 E-Key,	1*M.2 E-Key,	1*M.2 E-Key,



	1*M.2 B-Key, 1*M.2 M-Key	1*M.2 B-Key, 1*M.2 M-Key	1*M.2 B-Key, 1*M.2 M-Key	1*M.2 B-Key, 1*M.2 M-Key
2.5" SSD	2	2	4	4
Power input	DC 12V	DC 12V	DC 12V	DC 12V

1.3 Specifications

1.3.1 General

CPU: 9th generation Intel[®] Xeon[®]/CoreTM i7/i5/i3 (Coffee Lake-R)

System Memory: 4*DDR4 2666/2400MHz DIMM, Up to 128GB (When installing 4*DDR4, first

install the upper two slots and then the lower two slots.)

Watchdog Timer: 255-level interval timer, setup by software

Serial Ports: 2* RS232/422/485 DB9 male, 2*RS232 DB9 male

USB: 6*USB 3.1 gen2 Type A, 2*USB2.0 Type A

DIO: 16-bit Iso.DIO (2*10Pin Phoenix), 8-bit Iso. DI (High:5-24V,Low:0-1.5V) and 8-bit Iso.

DO(200mA)

Expansion Interface:

1*Full size Mini PCIe (PCIeX1+USB) with SIM slot

1*M.2 E-Key 2230

1*M.2 B-Key 3052& SIM slot, Support 5G

1*M.2 2280 M-Key(Gen3, PCIeX4), Support NVMe storage

1*PCIe X16, support 1*350W GPU (BRAV-7520)

1*PCIe X4 (in X16 slot) support 1*75W AI Module (BRAV-7520)

2*PCIe X8, support 2*350W GPU (BRAV-7521)

2*PCIe X4 (in X16 slot) support 2*75W AI Module (BRAV-7521)

Note: The length of the GPU and AI Module must be less than 300mm

Storage:

2*2.5" HDD SATA bay, (BRAV-7520)

4*2.5" HDD SATA bay, (BRAV-7521)

1.3.2 Display

Chipset: Intel® UHD Graphics

Display Memory: Shared system memory

Resolution: VGA 1900x1200@60Hz; DP 4096x2160@60Hz



1.3.3 Ethernet

Chipset: 2*Intel® I210AT Ethernet controllers

1* Intel® I219LM Ethernet controller, supports iAMT 12.0

Speed: 10/100/1000 Mbps Integrated

Interface: 3*RJ45

1.3.4 Audio

Chipset: Realtek ALC662VD controller

Interface: 1*Line-out, 1*MIC, 3.5mm phone jack

1.3.5 Power Consumption

Power Consumption:

BRAV-7520: TDP 12V/27A (I7-8700 CPU 32GB DDR4 1*2080TI GPU)

BRAV-7521: TDP 12V/47A (I7-8700 CPU 32GB DDR4 2*2080TI GPU)

Power Supply: DC 12V,5-Pin phoenix

1.4 Environmental Specifications

Operating temperature:

BRAV-7520: -20~60°C (35W/65W CPU No GPU)

BRAV-7520: 0~45°C (35W /65W CPU 1*2080TI GPU)

BRAV-7521: -20~60°C (35W/65W CPU No GPU)

BRAV-7521: 0~45°C (35W/65W CPU 2*2080TI GPU)

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

Storage temperature: $-40 \sim 85$ °C ($-40 \sim 185$ °F)

Vibration loading during operation:

With SSD: 5.0 Grms, random, 5 ~ 500 Hz

With HDD:1.0 Grms, random, 5 ~ 500 Hz

Shock during operation:

With SSD: 50g, peak acceleration (11 ms duration)

With HDD:20g peak acceleration (11 ms duration)

EMC: CE, FCC Class B



1.5 Order Information

Model No.	Introduction
BRAV-7520/S001	Edge Computing system, Intel® Coffeelake-R LGA1151 CPU, Q370 PCH, 4*DDR4, 3*LAN, 6*USB3.1, 2*USB2.0, 4*COM, 1*Mini PCIe, M.2 E-Key, M.2 B-Key, 1*PCIe X16, 1*PCIe X4, 1*VGA, 2*DP, Audio out, Mic, 16-bit Iso. DIO, 2*2.5" SATA, 1*M.2 2280 M-Key, DC 12V.
BRAV-7520/S002	Edge Computing system, Intel® Coffeelake-R LGA1151 CPU, C246 PCH, 4*DDR4, 3*LAN, 6*USB3.1, 2*USB2.0, 4*COM, 1*Mini PCIe, M.2 E-Key, M.2 B-Key, 1*PCIe X16, 1*PCIe X4, 1*VGA, 2*DP, Audio out, Mic, 16-bit Iso. DIO, 2*2.5" SATA, 1*M.2 2280 M-Key, DC 12V.
BRAV-7521/S001	Edge Computing system, Intel® Coffeelake LGA1151 CPU, Q370 PCH, 4*DDR4, 3*LAN, 6*USB3.1, 2*USB2.0, 4*COM, 1*Mini PCIe, M.2 E-Key, M.2 B-Key, 2*PCIe X8, 2*PCIe X4, 1*VGA, 2*DP, Audio out, Mic, 16-bit Iso. DIO, 4*3.5" SATA, 1*M.2 2280 M-Key, DC 12V.
BRAV-7521/S002	Edge Computing system, Intel® Coffeelake LGA1151 CPU, C246 PCH, 4*DDR4, 3*LAN, 6*USB3.1, 2*USB2.0, 4*COM, 1*Mini PCIe, M.2 E-Key, M.2 B-Key, 2*PCIe X8, 2*PCIe X4, 1*VGA, 2*DP, Audio out, Mic, 16-bit Iso. DIO, 4*3.5" SATA, 1*M.2 2280 M-Key, DC 12V.

1.6 Mechanical Specifications

The BRAV-7520/BRAV-7521 is the edge computing system of JHCTECH, consists of a JHC OSBC single board computer (AXM-I960) and the Sub-card (ECB-9600、OFX-1000、ECX-254、ECX-255) of JHC, and installed in the universal aluminum rectangular profile housing. Among them, sub-card ECX-254 is only assembled in BRAV-7521, sub-card ECX-255 is only assembled in BRAV-7520.



Main Board Front (AXM-I960)



Figure 1.1

Main Board Rear (AXM-I960)

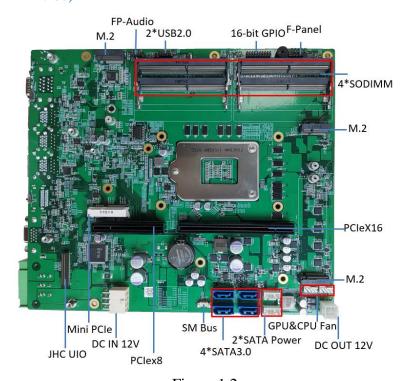


Figure 1.2

Sub-card (ECB-9600)



Figure 1.3



Sub-card (OFX-1000)



Figure 1.4

Sub-card (ECX-254)---BRAV-7521



Figure 1.5

Sub-card (ECX-255)---BRAV-7520



Figure 1.6



BRAV-7520 Fornt

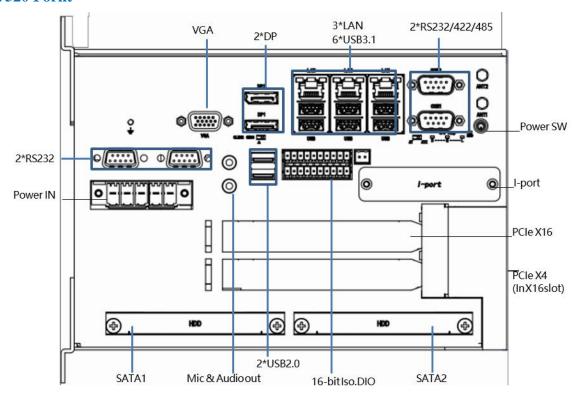


Figure 1.7

BRAV-7521 Fornt

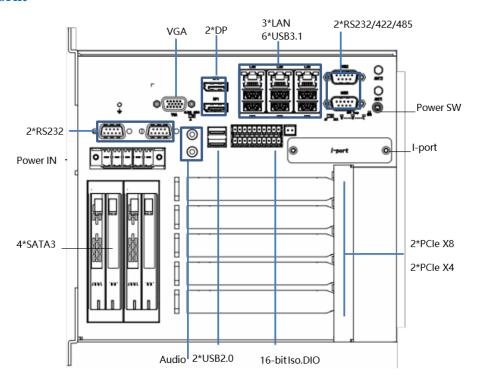
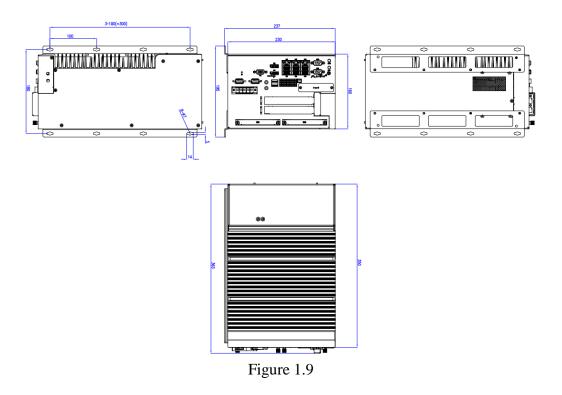


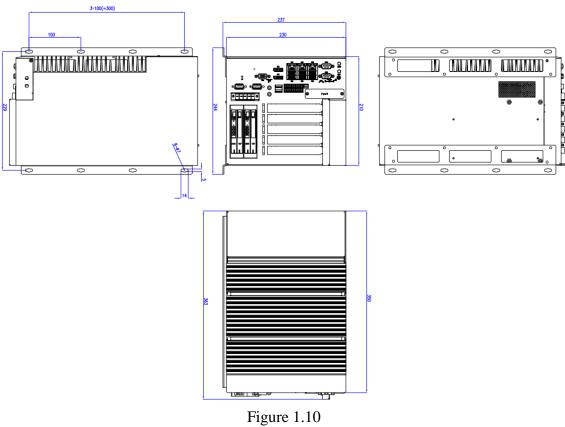
Figure 1.8



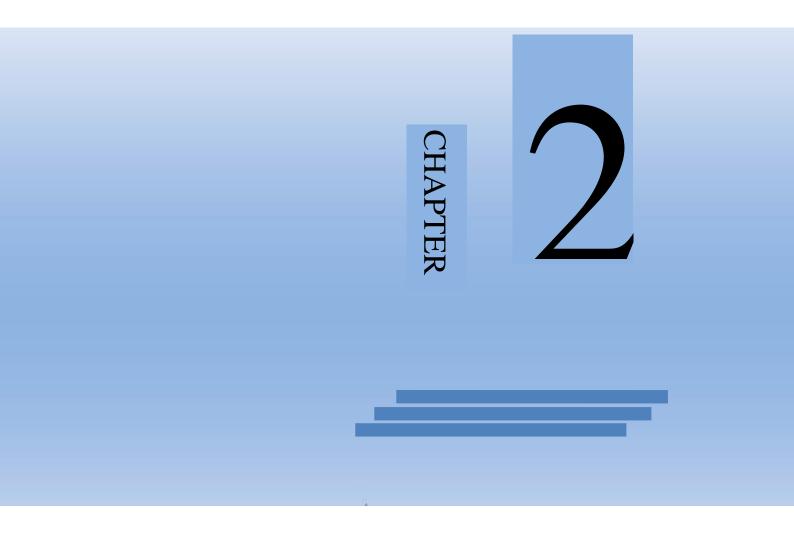
BRAV-7520 Dimension: Unit: mm



BRAV-7521 Dimension: Unit: mm







Hardware Installation



2.1 Introduction

The following sections show jumpers settings and the external connectors and pin assignments for applications.

2.2 Jumpers setting

The BRAV-7520/BRAV-7521 Box Computer has a number of jumpers that allows you to configure your system to suit your application. The table below shows the function of each of the board's Jumpers:

Jumpers

Jumpers	Name	Description
CLEAR/CMOS	Clear CMOS Data Setting	Jumper
AT/ATX	Set Power-on mode at AT or ATX	Jumper

2.2.1 CMOS -Clear CMOS Data jumper

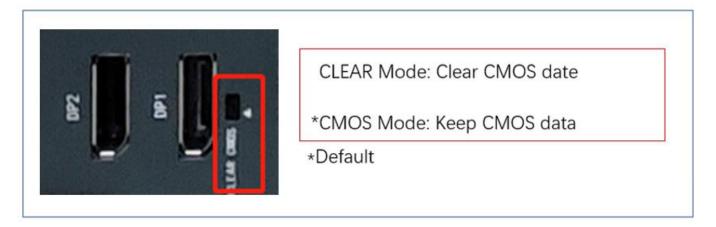


Figure 2. 1

If you encounter the followings

- a) CMOS data becomes corrupted.
- b) You forget the supervisor or user password.

you can reconfigure the system with the default values stored in the ROM BIOS.

To load the default values stored in the ROM BIOS, please follow the steps below.

- 1. Power-off the system and unplug the power cord.
- 2. Set CMOS pins 2 and 3 to On. Wait for a few seconds and set CMOS back to its default setting, pins 1 and 2 On.
- 3. Now plug the power cord and power-on the system.



2.2.2 ATX- AT/ATX Power on mode selection

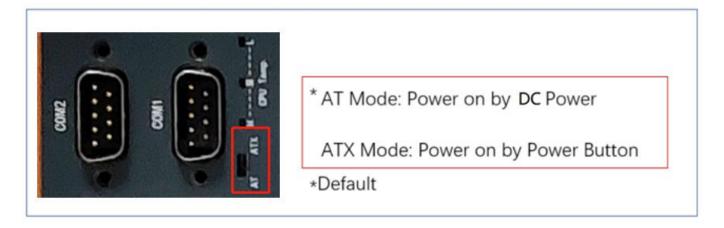


Figure 2. 2

The BRAV-7520/BRAV-7521 provides a AT/ATX jumper, which users can set Power-on mode by it. When you set pins 2 and 3 on, it means power on by AC Power; When you set pins 1 and 2 on, it means power on by Power button.

2.3 I/O Ports Indication

BRAV-7520 Front Panel I/O Ports

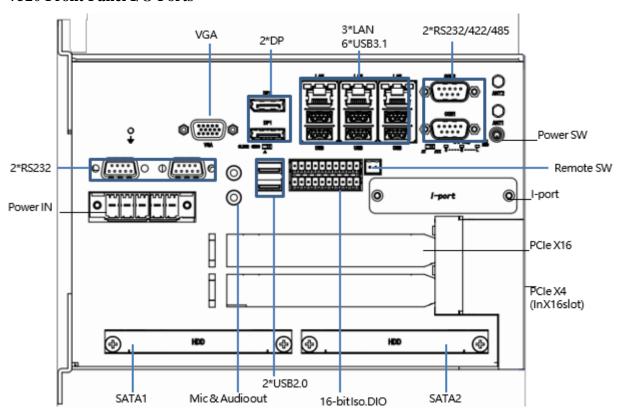


Figure 2. 3

The Rear panel I/O ports consist of the following:

• 1*DC-IN Power: 1*5 Pin phoenix DC 12V



- 6*USB3.1 Type A 、 2*USB2.0 TypeA
- 2*DP, 1*VGA
- 3*LAN: RJ45
- 4*COM: DB9
- 1*Audio、1*Mic 3.5mm phone jake
- 16-bit DIO: 2*10 Pin phoenix
- 1*Remote SW: 1*2 Pin phoenix
- 1*I-port: Optional 16-bit GPIO, USB2.0 or Mini PCIe and M.2 I/O ports(such as serial ports)
- 1*PCIeX16、1*PCIeX4
- 2*2.5"SATA3 tray

BRAV-7521 Front Panel I/O Ports

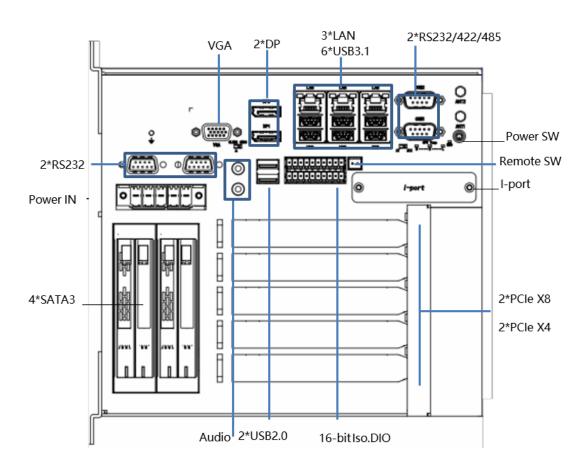


Figure 2. 4

The Front panel I/O ports consist of the following:

• 1*DC-IN Power: 1*5 Pin phoenix DC 12V



• 6*USB3.1 Type A \ 2*USB2.0 TypeA

• 2*DP, 1*VGA

• 3*LAN: RJ45

● 4*COM: DB9

• 1*Audio、1*Mic 3.5mm phone jake

• 16-bit DIO: 2*10 Pin phoenix

• 1*Remote SW: 1*2 Pin phoenix

• 1*I-port: Optional 16-bit GPIO, USB2.0 or Mini PCIe and M.2 I/O ports(such as serial ports)

• 2*PCIeX8、2*PCIeX4

• 4*2.5"SATA3 tray

2.3.1 Ethernet Connector

The BRAV-7520/BRAV-7521 is equipped with 2*Intel I210AT chips and 1*Intel I219LM for 10/100/1000Mbps Ethernet controllers. The product provides 3*RJ45, with LED indicators on the front side to show its Active/Link status (Green LED) and Speed status (yellow LED).

Table 2.1 for pin assignments.

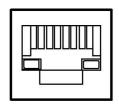


Figure 2. 5

Table	Table 2.1: RJ-45 Connector pin assignments					
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)			



2.3.2 USB Connector

The USB device allows data exchange between your computer and a wide range of simultaneously accessible external Plug and Play peripherals.

The BRAV-7520/BRAV-7521 provides 6*USB3.1 gen2, 2*USB2.0. The USB interface can be disabled in the system BIOS setup. Table 2.2 for USB 3.1 pin assignments.

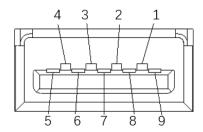


Figure 2. 6

Table 2.2: USB3.1 Port Pin Assignments					
Pin	Signal	Pin	Signal		
1	VBUS	6	StdA_SSRX+		
2	D-	7	GND_DRAIN		
3	D+	8	StdA_SSTX-		
4	GND	9	StdA_SSTX+		
5	StdA_SSRX-	Shell	Shield		

Table 2.3 for USB2.0 pin assignments.

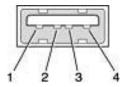


Figure 2. 7

Table 2.3: USB2.0 Port Pin Assignments					
Pin	Signal	Pin	Signal		
1	USB_VCC	2	USB_D-		
3	USB_D+	4	USB_GND		



2.3.3 VGA

The BRAV-7520/BRAV-7521 provides a standard VGA display port. They can support the most resolution up to 1900*1200@60Hz.

Table 2.4 for VGA pin assignments.

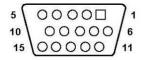


Figure 2. 8

Table	Table 2.4: VGA Pin Assignments					
Pin	Signal	Pin	Signal	Pin	Signal	
1	VGA_z_R	6	GND_RGB	11	SPD	
2	VGA_z_G	7	GND_7	12	VGA_SDA	
3	VGA_z_B	8	GND_RGB	13	MONHSYNC	
4	SPC	9	VGA_5V	14	MONVSYNC	
5	GND	10	GND	15	VGA_SCL	

2.3.4 DP

The BRAV-7520/BRAV-7521 provides 2 high-resolution DP ports, it supports the most resolution up to 4096*2160@60Hz.

Table 2.5 for DP pin assignments.

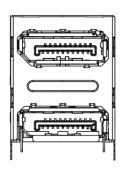


Figure 2. 9

Table	Table 2.5: DP Pin Assignments						
Pin	Signal	Pin	Signal	Pin	Signal		
1	DATA0_P	8	GND	15	AUXP		
2	GND	9	DATA2_N	16	GND		
3	DATA0_N	10	DATA3_P	17	AUXN		
4	DATA1_P	11	GND	18	HPD		
5	GND	12	DATA3_N	19	GND		



6	DATA1_N	13	CTRL	20	PWR
7	DATA2_P	14	GND		

2.3.5 DIO Connector

The BRAV-7520/BRAV-7521 provides 16-bit Iso. DIO by a 2*10pin phoenix connector, 8-bit Iso.

DI(High:5-24V,Low:0-1.5V) and 8-bit Iso. DO(200mA). Table 2.6 for Pin assignments.

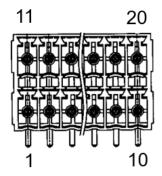


Figure 2. 7

Table 2.6: 16-bit DIO Pin Assignments						
Pine	DIO Signal	Pin	DIO Signal			
1	DI0	11	DO0			
2	DI1	12	DO1			
3	DI2	13	DO2			
4	DI3	14	DO3			
5	DI4	15	DO4			
6	DI5	16	DO5			
7	DI6	17	DO6			
8	DI7	18	DO7			
9	ECOM1	19	E_GND			
10	VCC_ISO	20	PCOM1			

(All of the above DIOs are TTL signals, digital inputs (high level 1: 2-5.25V, low level 0: 0-0.8V), digital output (high level 1: minimum 2.4V, low level 0: Maximum 0.4V).)

2.3.6 COM Connector

The BRAV-7520/BRAV-7521 provides 4 serial ports of COM1/2/3/4 by 4*D-sub 9-pin connectors. COM1/2 can be configured as RS232、RS422 or RS485 by BIOS setup. COM3/4 only support RS232. Table 2.7 for COM1/2 pin assignments. Table 2.8 for COM3/4 pin assignments.



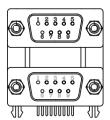


Figure 2. 8

Table 2.7: COM1/2 Serial Ports Pin Assignments					
Pin	RS-232 Signal	RS-422 Signal	RS-485 Signal		
1	DCD	TX-	DATA-		
2	RxD	TX+	DATA+		
3	TxD	RX+	NC		
4	DTR	RX-	NC		
5	GND	GND	GND		
6	DSR	NC	NC		
7	RTS	NC	NC		
8	CTS	NC	NC		
9	RI	NC	NC		

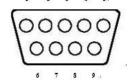


Figure 2. 9

Table 2.8: COM3/COM4 Serial Ports Pin Assignments					
Pin	Signal	Pin	Signal		
1	COM_DCD	2	COM_SIN3		
3	COM_SOUT	4	COM_DTR		
5	GND	6	COM_DSR		
7	COM_RTS	8	COM_CTS		
9	COM_RI				

2.3.7 DC Power

The BRAV-7520/BRAV-7521 provides a DC 12V power supply by 1*5pin phoenix connectors. Table 2.9 for pin assignments.



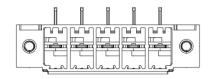


Figure 2. 10

Table 2.9: DC12-24V Pin Assignments					
Pin	Signal	Pin	Signal		
1	12V+	2	12V+		
3	GND	4	GND		
5	EATH_GND				

2.3.8 Serial ATA

The BRAV-7520 provides 2*SATA3.0, BRAV-7521 provides 4*SATA3.0, data transfer rate up to 6Gb/s. Table 2.10 for pin assignments.



Figure 2. 11

Table 2.10: Serial ATA pin assignments					
Pin	Signal	Pin	Signal		
1	GND	5	RX-		
2	TX+	6	RX+		
3	TX-	7	GND		
4	GND				

2.3.9 Serial ATA Power

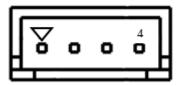


Figure 2. 12

Table 2.11 for pin assignments.



Table 2.11: Serial ATA Power pin assignments					
Pin	Signal	Pin	Signal		
1	5V	3	GND		
2	GND	4	12V		

2.3.10 Remote SW

The BRAV-7520/ BRAV-7521 provides a remote switch by 1*2pin phoenix. Table 2.12 for pin assignments.

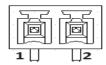


Figure 2. 13

Table 2.12: Remote Switch pin assignments				
Pin	Signal			
1	PWR_BTN			
2	GND			

2.3.11 Mini-PCIe Connector

The BRAV-7520/BRAV-7521 provides a Mini PCIe. Mini PCIe interface with PCIe and USB signal, Install Mini PCI Express cards such as network cards or other cards that comply to the Mini PCI Express specifications into the Mini PCI Express slot. Table 2.13 for pin assignments.

(Note: SIM1 slot is connected to MPE1 slot)

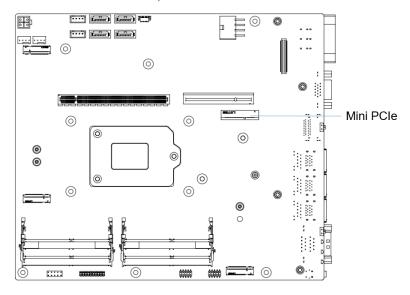


Figure 2. 14



Table 2.13	3: Mini-PCIe pin assignmen	ts	
Pin	Signal	Pin	Signal
1	PCIE_WAKE_N	2	+V3.3_MINICARD2
3	NC	4	GND
5	NC	6	+V1.5
7	+V3.3_MINICARD2	8	+VUIM_PWR
9	GND	10	UIM_DATA
11	PCIe_MINI_CLK5-	12	UIM_CLK
13	PCIe_MINI_CLK5+	14	UIM_RESET
15	GND	16	+VUIM_VPP
17	NC	18	GND
19	NC	20	WIFI2_DISABLE#
21	GND	22	PLTRST_MINIPCIE_N
23	SATA_RXP_PCIE17+	24	+V3.3_MINICARD2
25	SATA_RXP_PCIE17-	26	GND
27	GND	28	+V1.5
29	GND	30	SMB_CLK_RESUME
31	SATA_TXN_PCIE17-	32	SMB_DATA_RESUME
33	SATA_TXN_PCIE17+	34	GND
35	GND	36	USB_N6
37	GND	38	USB_P6
39	+V3.3_MINICARD2	40	GND
41	+V3.3_MINICARD2	42	NC
43	SATA_PCIE0_DET	44	SIM1_DET
45	NC	46	NC
47	NC	48	+V1.5
49	NC	50	GND
51	NC	52	+V3.3_MINICARD2

2.3.12 M.2 connector

BRAV-7520/BRAV-7521 provides 3*M.2, 1*M.2 2280 M-Key with PCIeX4 signal, support NVMe storage; 1*H-M.2 B-Key 3052 with SIM slot and PCIeX1+USB signal, support 5G wifi; 1*H-M.2 E-Key 2230 with PCIeX1+USB signal. Table 2.14 for M.2 2280 M-Key pin assignments. Table 2.15 for M.2 3052 B-Key pin assignments. Table 2.16 for M.2 2230 E-Key pin assignments.



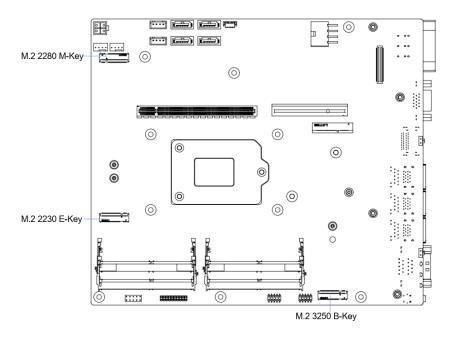


Figure 2. 18

riguic 2. 10						
Table 2.14: M. 2 2280 M-Key (NGFF) pin assignments						
Pin	Signal	Pin	Signal			
1	GND	2	+V3.3_M2			
3	GND	4	+V3.3_M2			
5	PCIE_M2_RX24-	6	NC			
7	PCIE_M2_RX24+	8	NC			
9	GND	10	+V3.3_M2			
11	PCIE_M2_TX24-	12	+V3.3_M2			
13	PCIE_M2_TX24+	14	+V3.3_M2			
15	GND	16	+V3.3_M2			
17	PCIE_M2_RX23-	18	+V3.3_M2			
19	PCIE_M2_RX23+	20	NC			
21	GND	22	NC			
23	PCIE_M2_TX23-	24	NC			
25	PCIE_M2_TX23+	26	NC			
27	GND	28	NC			
29	PCIE_M2_RX22-	30	NC			
31	PCIE_M2_RX22+	32	NC			
33	GND	34	NC			
35	PCIE_M2_TX22-	36	NC			



37	PCIE_M2_TX22+	38	SSD_SATA_DEVSLP
39	GND	40	NC
41	PCIE_M2_RX21-	42	NC
43	PCIE_M2_RX21+	44	NC
45	GND	46	NC
47	PCIE_M2_TX21-	48	NC
49	PCIE_M2_TX21+	50	PLTRST_M2_N
51	GND	52	CLK_REQ6#
53	PCIe_M2_CLK6-	54	PCH_WAKE_N
55	PCIe_M2_CLK6+	56	NC
57	GND	58	NC
59	NC	60	NC
61	NC	62	NC
63	NC	64	NC
65	NC	66	NC
67	NC	68	SUSCLK_R
69	M.2_SSD_DET	70	+V3.3_M2
71	GND	72	+V3.3_M2
73	GND	74	+V3.3_M2
75	GND	76	

Table 2.15: M. 2 B-Key 3052 (NGFF1) 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		

Table 2.16: M. 2 E-Key 2230 (NGFF2) pin assignments				
Pin	Signal	Pin	Signal	
1	GND	2	+V3.3M2SB	
3	USB_P5	4	+V3.3M2SB	
5	USB_N5	6	NC	
7	GND	8	M.2_BT_PCMCLK	



9	CNV_WR_D1_DN	10	M.2_BT_PCMFRM_CRF_RST_N
11	CNV_WR_D1_DP	12	M.2_BT_PCMIN
13	GND	14	M.2_BT_PCMOUT_CLKREQ
15	CNV_WR_D0_DN	16	NC
17	CNV_WR_D0_DP	18	GND
19	GND	20	UART_BT_WAKE_N
21	CNV_WR_CLK_DN	22	M.2_CNV_BRI_DT_BT_UART0_RX
23	CNV_WR_CLK_DP	32	M.2_CNV_RGI_DT_BT_UART0_TX
33	GND	34	M.2_CNV_RGI_RSP_BT_UART0_CTS
35	PCIE_X4_TX12+	36	M.2_CNV_BRI_DT_BT_UART0_RTS
37	PCIE_X4_TX12-	38	M.2_WLAN_CL_RST_N
39	GND	40	M.2_WLAN_CL_DATA
41	PCIE_X4_RX12+	42	M.2_WLAN_CL_CLK
43	PCIE_X4_RX12-	44	DISC_WLAN_WWAN_COEX3
45	GND	46	DISC_WLAN_WWAN_COEX2
47	CLK_PCIe_P14	48	DISC_WLAN_WWAN_COEX1
49	CLK_PCIe_N14	50	SUSCLK
51	GND	52	PLTRST_M2_N
53	CLK_REQ14#	54	NC
55	PCH_WAKE_N	56	NC
57	GND	58	NC
59	CNV_WT_D1_DN	60	NC
61	CNV_WT_D1_DP	62	NC
63	GND	64	PULSAR_38P4M_REFCLK
65	CNV_WT_D0_DN	66	NC
67	CNV_WT_D0_DP	68	GPPC_B10_CLKREQ5_WIGIG_R_N
69	GND	70	+V3.3M2SB
71	CNV_WT_CLK_DN	72	+V3.3M2SB
73	CNV_WT_CLK_DP	74	+V3.3M2SB
75	GND		



2.3.13 PCIe X4 (BRAV-7521)

BRAV-7521 provides 2*PCIeX4 expansion slot by ECX-254 for connecting PCIeX4 extension devices, such as motion control card, data acquisition card, etc. The maximum support is 2*75W AI acceleration card, the length of the extension card is not more than 300mm.



Figure 2. 19

2.3.14 PCIe X8 (BRAV-7521)

BRAV-7521 provides 2*PCIeX8 expansion slot by ECX-254 for connecting PCIeX8 extension devices, such as motion control card, data acquisition card, etc. The maximum support is 2*350W AI acceleration card, the length of the extension card is not more than 300mm.



Figure 2. 20

2.3.15 PCIe X4 (BRAV-7520)

BRAV-7520 provides 1*PCIeX4 expansion slot by ECX-255 for connecting PCIeX4 extension devices, such as motion control card, data acquisition card, etc. The maximum support is 1*75W AI acceleration card, the length of the extension card is not more than 300mm.





Figure 2. 15

2.3.16 PCIeX16 (BRAV-7520)

BRAV-7520 provides 1*PCIeX16 expansion slot by ECX-255 for connecting PCIeX16 extension devices, such as motion control card, data acquisition card, etc. The maximum support is 1*350W AI acceleration card, the length of the extension card is not more than 300mm.



Figure 2. 16

2.3.17 LED

The BRAV-7520/BRAV-7521 panel has one power indicator, one hard disk indicator, three network connection status indicators, and three CPU operating temperature indicators. When the CPU operating temperature ≤85°C, the green light; When the CPU temperature is between 86°C and 95°C, the yellow light is on, and when the CPU operating temperature is ≥96°C, the red light is on. If you keep the CPU running at a red light, it will affect the life of the machine.



Figure 2. 17



2.4 Installation

2.4.1 HDD/SSD Installation (BRAV-7521)

- Step 1: Press the HDD Tray Switch button to open the HDD tray;
- Step 2: Install a 2.5-inch hard disk into the hard disk bracket;
- Step 3: Put the hard drive tray back into the hard drive case;





2.4.2 HDD/SSD Installation (BRAV-7520)

Step 1: unscrew the 2 screws on the HDD/SSD bracket of the rear panel.

Step 2: remove the HDD/SSD stent.

Step 3: load the HDD/SSD into the bracket and tighten the 4 screws on the left and right sides to fix the HDD/SSD.

Step 4: push the bracket with HDD/SSD into the slot and tighten the 2 screws on the bracket.









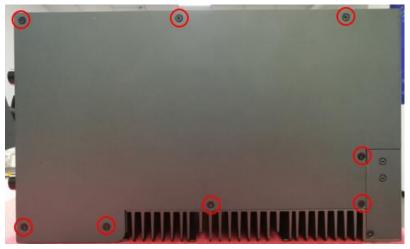


2.4.3 Installing M.2

Installation steps of M.2 Module BRAV-7520 are consistent with BRAV-7521. BRAV-7521 is taken as an example below.

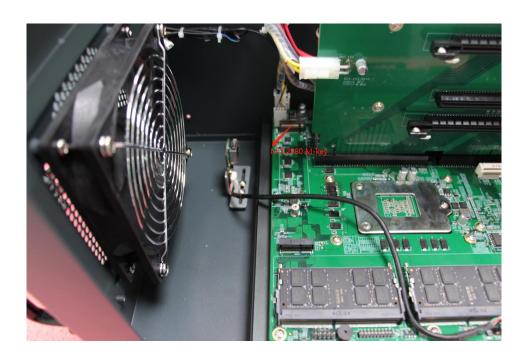
- Step 1: Unscrew the 9 screws on the side plate and remove the cover plate
- Step 2: Insert the corresponding M.2 module into the corresponding slot and fix it by locking the screw.
- Step 3: Use the opposite steps to complete the installation of the machine











2.4.4 Installing Mini PCIe

Installation steps of Mini PCIe Module BRAV-7520 are consistent with BRAV-7521. BRAV-7521 is taken as an example below.

Step 1: The step here is the same as above chapter "2.4.3 Installing M.2 Module", For details, please refer to the above chapter "2.4.3 Installing M.2 Module"





2.4.5 Installing Expansion Functional Module

Installation steps of expansion functional Module BRAV-7520 are consistent with BRAV-7521. BRAV-7521 is taken as an example below.

Step 1: The step here is the same as above chapter "2.4.3 Installing M.2 Module", For details, please refer to the above chapter "2.4.3 Installing M.2 Module"

Step 2: Take down the corresponding number of extension baffles according to the requirements of extension function modules

Step 3: Insert the extension function module into the corresponding extension slot and fix it with screws Step 4: Use the opposite steps to complete the installation of the machine

Note: BRAV-7520 contains 1*PCIeX4 and 1*PCIeX16 extended slots. BRAV-7521 contains 2*PCIeX4 and 2*PCIeX8 extended slots.





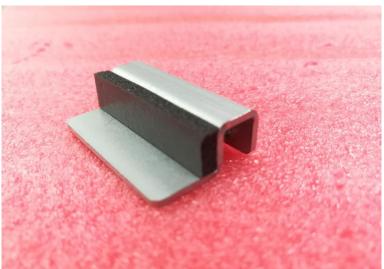


If two GPU graphics cards need to be assembled, the following steps shall be taken to install the video card mounting bracket:

- (1) Assemble the GPU fixing frame and GPU adjusting frame and fix them with 8 screws
- (2) Fix the fixing frame on the structure with 2 screws, and the position of the GPU fixing frame can be adjusted according to the need. The picture shows the installation position of the GPU fixing frame of a short GPU graphics card. If it is a long GPU graphics card, the GPU fixing frame should be installed in the position of the red box. The maximum length of GPU graphics card shall not exceed 300mm.















BIOS Setup



3.1 BIOS Description

BIOS is the communication bridge between hardware and software. How to correctly set the BIOS parameters is crucial for the system to work stably and whether the system works at its best.

This chapter describes how to change the system settings through the BIOS settings.

Note: For the purpose of better product maintenance, the manufacture reserves the right to change the BIOS items presented in this manual. The BIOS setup screens shown in this chapter are for reference only and may differ from the actual BIOS.

You need to make SETUP settings as follows:

- 1. An error message appears on the screen during the system self-test and asks for the SETUP setting.
- 2. You want to change the factory default settings based on customer characteristics.

(But in general, customers are not recommended to set it up. In most cases, using the default value is already the best setting.)

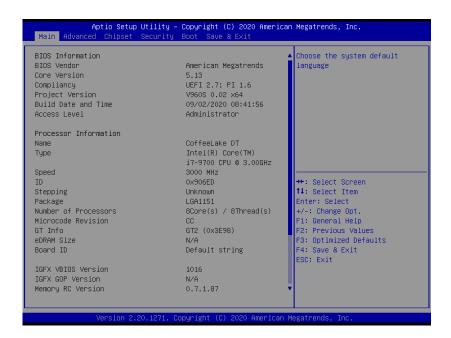
The BIOS Setup Utility enables you to configure:

- Hard drives, diskette drives and peripherals
- Video display type and display options
- Password protection from unauthorized use
- Power Management features

3.1.1 Entering the Setup Utility

When you power on the system, BIOS enters the Power-On Self-Test (POST) routines. POST is a series of built-in diagnostics performed by the BIOS. After the POST routines are completed, Press the "DEL" key to enter BIOS Setup Utility.





3.2 BIOS parameter settings

When you start the Setup Utility, the main menu appears. The main menu of the Setup Utility displays a list of the options that are available. A highlight indicates which option is currently selected. Use the cursor arrow keys to move the highlight to other options. When an option is highlighted, execute the option by pressing <Enter>.

Some options lead to pop-up dialog boxes that prompt you to verify that you wish to execute that option. Other options lead to dialog boxes that prompt you for information.

Some options (marked with a triangle) lead to submenus that enable you to change the values for the option. Use the cursor arrow keys to scroll through the items in the submenu.

In this manual, default values are enclosed in parenthesis. Submenu items are denoted by a triangle .

The default BIOS setting for this motherboard apply for most conditions with optimum performance. We do not suggest users change the default values in the BIOS setup and take no responsibility to any damage caused by changing the BIOS settings.



3.2.1 BIOS Navigation Keys

Enter the SETUP settings interface, The BIOS navigation keys are listed below:

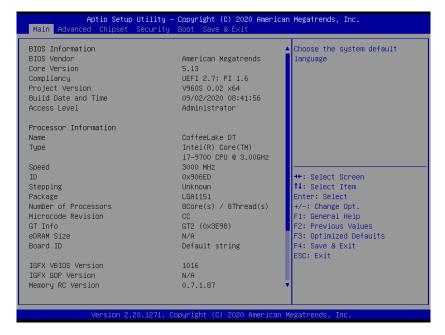
Table 3.1: The BIOS navigation keys	
KEY	FUNCTION
ESC	Exit the current menu
$\uparrow \downarrow \rightarrow \leftarrow$	Scrolls through the items on a menu
+/-	Change Opt.
Enter	Select
F1	General Help
F2	Previous Values
F3	Optimized Defaults
F4	Save & Exit

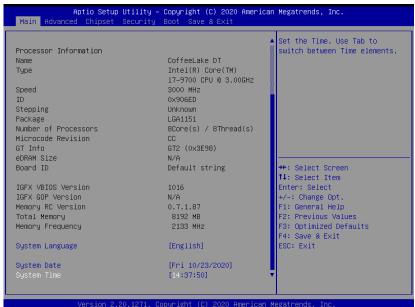
3.2.2 Main Menu

When you enter the BIOS Setup program, the main menu appears, giving you an overview of the basic system information. Select an item and press <Enter> to display the submenu. Press <Esc> to back to the main menu.

The BIOS setup program provides a help screen. You can call up this help screen from any menu by simply pressing the <F1> key. This help screen lists the corresponding keys and possible selections. Press <Esc> to exit the help screen.







BIOS Information

This item shows the information of the BIOS vendor, version, build date and time etc.

Board Information

This item shows the basic information of the motherboard, including the Board ID and BIOS Version of the motherboard.

Processor Information

This item shows the basic information about the currently used processor, including name, type, speed, ID, core, Microcode version, etc.

IGFX VBIOS Version

This item shows the Current VBIOS version of the CPU integrated graphics.



Total Memory

This item shows the total memory size of the current motherboard.

Memory Frequency

This item shows the current memory operating frequency

PCH Information

This item shows the basic information about PCH, including name, model, type, etc.

ME FW Version

This item shows the version number of the ME firmware

ME firmware SKU

This item shows the ME firmware model number

System Language

Set the language interface of the BIOS.

System Date

Set the date. The format of the date is <week><month><day><year>.

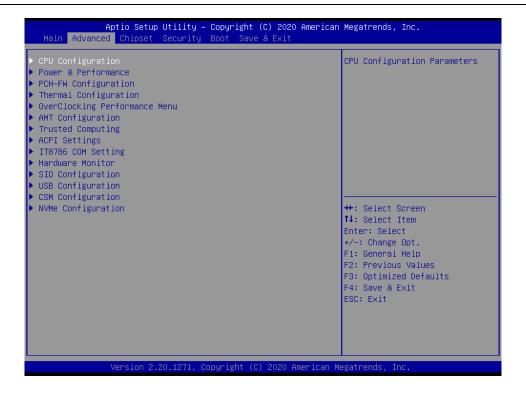
System Time

Set the time. The format of the time is <hour><minute><second>.

3.2.3 Advanced Menu

This page sets up more advanced information about your system. Handle this page with caution. Any changes can affect the operation of your computer.





CPU Configuration

The configuration of the central processor, enter this sub-menu, there will be detailed details of the CPU, as well as various settings of the CPU.

Power & Performance Configuration

This item contains the Power & Performance configuration, enter this sub-menu, there will be detailed details of the Power & Performance, as well as related settings of the Power & Performance function.

Thermal Configuration

Thermal configuration, enter this sub-menu, there will be the setting of the thermal configuration parameter.

AMT Configuration

This item contains the AMT configuration, enter this sub-menu, there will be detailed details of the ATM, as well as related settings of the configure intel (R) Active Management Technology parameters.

Trusted Computing

Trusted computing, enter this sub-menu, there will be the setting of the encryption security module (the motherboard will install the encryption module hardware will take effect)

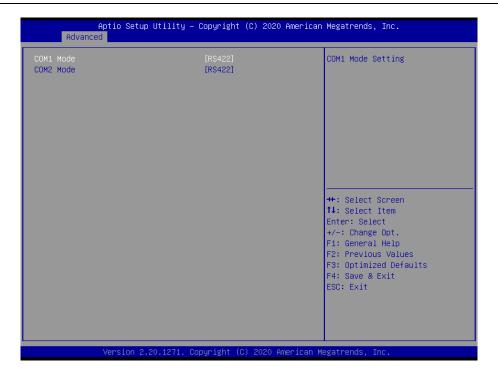
ACPI Settings

Advanced configuration and power management interface settings, enter this submenu, there will be ACPI related settings

IT8786 COM setting

COM port settings, enter this sub-menu, there will be set COM working mode: RS422, RS232, RS485





Hardware Monitor

Hardware monitoring, enter this sub-menu, there will be CPU temperature, fan speed, status display of each common working voltage, as well as parameter settings of intelligent fan control.



SIO Configuration

Super IO configuration, enter this sub-menu, there will be the port configuration of the serial/parallel port which are included in IO.

CSM Configuration



CSM (Compatibility Support Module) configuration, enter this sub-menu, there will be various settings to support UEFI startup and non-UEFI startup. If you need to start the traditional MBR device, you need to enable CSM. Turning off the CSM turns it into a pure UEFI boot.

USB Configuration

USB configuration, enter this sub-menu, there will be USB-related detailed settings.

NVMe Configuration

NVMe device settings, enter this sub-menu, there will be set NVMe device.

3.2.4 Chipset Menu

The chipset menu items allow you to change the settings for the North Bridge chipset, South Bridge chipset and other system.



System Agent (SA) Configuration

Memory Configuration

Memory configuration, enter this submenu, there will be detailed memory information.

Graphics Configuration

Image processing configuration, enter this sub-menu, there will be CPU-integrated graphics related settings.

PEG Port Configuration

PEG graphics configuration, enter this sub-menu, there will be related settings for the external graphics



card.

PCH-IO Configuration (South Bridge Configuration)

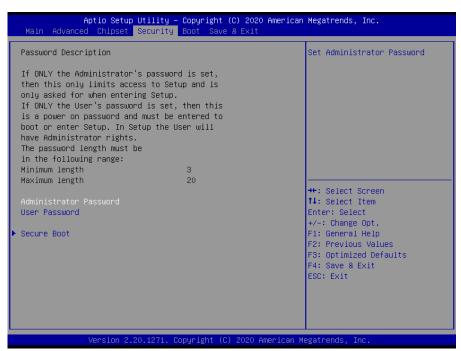
SATA And RST Configuration

SATA hard disk and fast storage configuration, enter this sub-menu, there will be related settings of the hard disk.

HD Audio Configuration

High-fidelity audio, which controls the switch settings of the motherboard's sound card.

3.2.5 Security menu



Administrator Password

This item sets the information of the administrator password.

User Password

This item sets the information of the normal user password.

Secure Boot

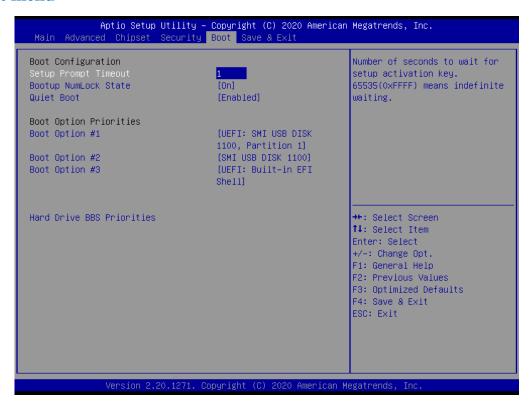
This item sets the information of the secure boot. Secure Boot feature is Actice if Secure Boot is

Enabled, Platform key(PK) is enrolled and mode change requires platform reset





3.2.6 Boot menu



Setup Prompt Timeout

Setup prompts for waiting time. This option is to set the time to wait for the Del key to enter the BIOS setup after booting.

Bootup NumLock State



Set the state of the small numeric keypad at startup.

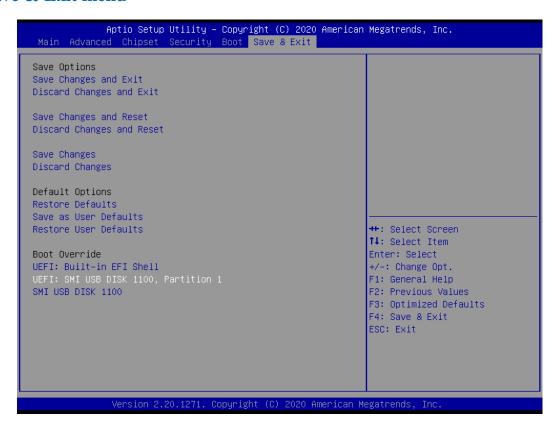
Quiet Boot

Switch full screen logo control

Set Boot Priority

Start device priority settings. If the user wants to install the operating system, please set "Boot Option #1" as your CD-ROM device or your U disk device (make sure that your CD-ROM drive has an operating system or your U disk has a PE system). After the setting is completed, press the "F4" button to save and exit. The system will boot from your CD-ROM drive or USB flash drive.

3.2.7 Save & Exit menu



Save changes and Exit;

This item enables you to save the changes that you have made and exit.

Discard Changes and Exit;

This item enables you to discard the changes that you have made and exit.

Save Changes and Reset;

This item enables you to save the changes that you have made and reset.

Discard Changes and Reset;

This item enables you to discard the changes that you have made and reset.



Save Changes;

This item enables you to save the changes that you have made.

Discard Changes;

This item enables you to discard the changes that you have made.

Restore Defaults;

This item enables you to restore the system defaults.

Save as User Defaults;

This item enables you to save the changes as user defaults that you have made.

Restore User Defaults;

This item enables you to restore the user defaults.

3.3 Updating the BIOS

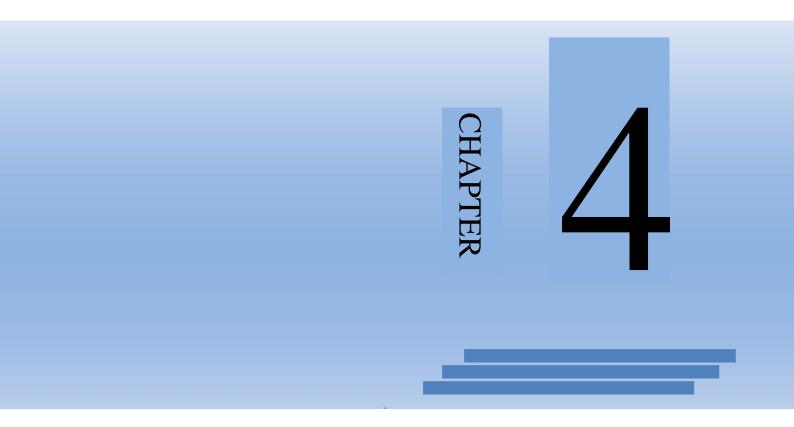
The BIOS (Basic Input and Output System) Setup Utility displays the system's configuration status and provides you with options to set system parameters. The parameters are stored in battery-backed-up CMOS RAM that saves this information when the power is turned off. When the system is turned back on, the system is configured with the values you stored in CMOS.

The BIOS provides the underlying driver for hardware resources and is the bridge between hardware and operating system. Now hardware and various applications are constantly updated. When your system encounters problems, such as the system does not support the latest published CPU, you need to upgrade your BIOS.

NOTE:

- 1. Only upgrade the BIOS if you encounter problems and need to.
- 2. To upgrade the BIOS, please use the BIOS read/write program attached to our driver CD or download the updated version of the program from the relevant website.
- 3. Do not turn off the power or reboot the system during the upgrade process, so your BIOS data will be damaged and the system may not boot.
- 4. After the refresh is complete, you need to manually optimize the LOAD Default.
- 5. To prevent accidents, please backup the current BIOS data first.





Driver Installation



The BRAV-7520/BRAV-7521 comes with a CD-ROM that contains all drivers and utilities that meet your needs.

4.1 Follow the sequence below to install the drivers:

Audio	2019/12/23 17:58	文件夹
Chipset	2019/11/21 18:07	文件夹
Graphic	2019/3/19 12:37	文件夹
Lan	2020/3/25 18:45	文件夹
ME-Consumer	2019/12/27 18:15	文件夹

Figure 5. 1

- Step 1 Install Graphic Driver
- Step 2 Install Audio Driver
- Step 3 Install Chipset Driver
- Step 4 Install LAN Driver
- Step 5 Install ME Driver

Please read instructions below for further detailed installations.

4.2 Installation:

Insert the BRAV-7520/BRAV-7521 CD-ROM into the CD-ROM drive. And install the drivers in turn.

Step 1 – Install Graphic Driver

- 1. Double click on the AMT folder and double click on the Setup.exe
- 2. Follow the instructions that the window shows
- 3. The system will help you install the driver automatically

Step 2 – Install Audio Driver

- 1. Double click on the Audio folder and double click on the Setup.exe
- 2. Follow the instructions that the window shows
- 3. The system will help you install the driver automatically

Step 3 –Install Chipset Driver

- 1. Double click on the Chipste folder and double click on the Setup.exe
- 2. Follow the instructions that the window shows
- 3. The system will help you install the driver automatically

Step 4 –Install LAN Driver

- 1. Double click on the LAN folder and double click on the Setup.exe
- 2. Follow the instructions that the window shows



3. The system will help you install the driver automatically

Step 5 –Install ME Driver

- 1. Double click on the ME folder and double click on the Setup.exe
- 2. Follow the instructions that the window shows
- 3. The system will help you install the driver automatically

4.4 Utility Software Reference

All the utility software available from this page is Windows compliant. They are provided only for the convenience of the customer. The following software is furnished under license and may only be used or copied in accordance with the terms of the license. These software(s) are subject to change at any time without prior notice. Please refer to the support disk for available software.



HAPTE

5

SYSTEM RESOURCE



5.1 WDT and GPIO

/ * =	
1	* void jhctech_init();
2	* function description: library initializated, This function must be called before calling other
fun	actions
3	* parameter description:
4	* creation date:
5*	·=====================================
/* =	
1	* void jhctech_init();
2	* function description: library release, Pair with jhctech_init, release the library's occupied resources
wh	en not needed
3	* parameter description:
4	* creation date:
5*	·*/
/ * =	:======================================
1	* void watchdog_set(int time);
2	* function description: Watchdog function
3	* parameter description: time is to Set the dog feeding time, Value between 0 and 255
	Setting 0 means to turn off the watchdog
4	* creation date:
5*=	*/
/ * =	
1	* void smbus_8pin_gpio_mode(int port,int mode);
2	* function description: Subcard input and output mode settings
3	* parameter description:



Parameter: port represents the number of the GPIO, 1 or 2

Mode 8 bit of a bit, each bit controls the input and output mode of a GPIO pin,

Bit =1, the corresponding pin is used as the input port.

Bit =0, the corresponding pin is used as an output port.

Return value	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
GPIO pin	PIN8	PIN7	PIN6	PIN5	PIN4	PIN3	PIN2	PIN1

Note: The output value is valid only when the pin is in output mode.

4	4	4.	1 4
4	4	creation	date.

5	**	4/

/*_____

- 2 * function description: high and low levels output of the subcard
- 3 * parameter description:

Parameter: port represents the number of the GPIO, 1 or 2

Level 8 bit of a bit, each bit controls a GPIO pin output value,

Bit =1, means output high level

Bit =0, means output low level

Return value	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
GPIO pin	PIN8	PIN7	PIN6	PIN5	PIN4	PIN3	PIN2	PIN1

Note: The output value is valid only when the pin is in output mode.

4	*	creation	data.
4	•	Creation	uale:

5*_____*/

^{*} void sio_gpio_output(WORD port,BYTE value);



/*_____

- * int sio_gpio_input(WORD port);
- 2 * function description: read the motherboard GPIO input level
- 3 * parameter description:

Return value: return a byte (8 bit), each bit of the 8-bit corresponding to the level state of a GPIO pin

Return value	Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
GPIO pin	PIN8	PIN7	PIN6	PIN5	PIN4	PIN3	PIN2	PIN1

parameter: port fill in sub-card GPIO number, 1 or 2

Note: The read value is valid only when the pin is in input mode

4 * creation date:



Note: If you want more programs of the motherboard's watchdog and GPIO, please call +86-0755-86021176-(8021)/+86-0755-86021176-(8023) for more information.