

Fanless Box-PC 790X Series

**Robust Box PC with Intel® Xeon® E3/6th &
7th Generation Core™ i7/i5/i3 Processor**

PKBX2210/-1/-2/-3/-4

PKBX2211/-1/-2/-3/-4

PKBX2212/-1/-2/-3/-4

PKBX2213/-1/-2/-3/-4

User's Manual

Version 1.0



2017.09

Revision History

Version	Release Time	Description
1.0	2017.09	Initial release

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Copyright Notice

All Rights Reserved.

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Declaration of Conformity CE

The CE symbol on the computer indicates that it is in compliance with the directives of the Union European (EU). A Certificate of Compliance is available by contacting Technical Support.

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 DELTA COMPONENTS. Please contact your local supplier for ordering information.

Warning

This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

FCC Class A

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference, and
- (2) This device must accept any interference received, including interference that may cause undesired operation.

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.

RoHS

DELTA COMPONENTS GmbH certifies that all components in its products are in compliance and conform to the European Union's Restriction of Use of Hazardous Substances in Electrical and Electronic Equipment (RoHS) Directive 2002/95/EC.

The above mentioned directive was published on 2/13/2003. The main purpose of the directive is to prohibit the use of lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB), and polybrominated diphenyl ethers (PBDE) in electrical and electronic products. Member states of the EU are to enforce by 7/1/2006.

DELTA COMPONENTS GmbH hereby states that the listed products do not contain unintentional additions of lead, mercury, hex chrome, PBB or PBDB that exceed a maximum concentration value of 0.1% by weight or for cadmium exceed 0.01% by weight, per homogenous material. Homogenous material is defined as a substance or mixture of substances with uniform composition (such as solders, resins, plating, etc.). Lead-free solder is used for all terminations (Sn(96-96.5%), Ag(3.0-3.5%) and Cu(0.5%)).

SVHC / REACH

To minimize the environmental impact and take more responsibility to the earth we live, DELTA COMPONENTS hereby confirms all products comply with the restriction of SVHC (Substances of Very High Concern) in (EC) 1907/2006 (REACH --Registration, Evaluation, Authorization, and Restriction of Chemicals) regulated by the European Union.

All substances listed in SVHC < 0.1 % by weight (1000 ppm)

Important Safety Instructions

Read these safety instructions carefully

1. Read all cautions and warnings on the equipment.
2. Place this equipment on a reliable surface when installing. Dropping it or letting it fall may cause damage
3. Make sure the correct voltage is connected to the equipment.
4. For pluggable equipment, the socket outlet should be near the equipment and should be easily accessible.
5. Keep this equipment away from humidity.
6. The openings on the enclosure are for air convection and protect the equipment from overheating. **DO NOT COVER THE OPENINGS.**
7. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
8. Never pour any liquid into opening. This may cause fire or electrical shock.
9. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
10. If one of the following situations arises, get the equipment checked by service personnel:
 - a. The power cord or plug is damaged.
 - b. Liquid has penetrated into the equipment.
 - c. The equipment has been exposed to moisture.
 - d. The equipment does not work well, or you cannot get it to work according to the user's manual.
 - e. The equipment has been dropped or damaged.
 - f. The equipment has obvious signs of breakage.
11. Keep this User's Manual for later reference.

Warning

The Box PC and its components contain very delicately Integrated Circuits (IC). To protect the Box PC and its components against damage caused by static electricity, you should always follow the precautions below when handling it:

1. Disconnect your Box PC from the power source when you want to work on the inside.
2. Use a grounded wrist strap when handling computer components.
3. Place components on a grounded antistatic pad or on the bag that came with the Box PC, whenever components are separated from the system.

Replacing Lithium Battery

Incorrect replacement of the lithium battery may lead to a risk of explosion.

The lithium battery must be replaced with an identical battery or a battery type recommended by the manufacturer.

Do not throw lithium batteries into the trash can. It must be disposed of in accordance with local regulations concerning special waste.

Technical Support

If you have any technical difficulties, please consult the user's manual first at:
<http://www.delta-components.com>

Please do not hesitate to e-mail our customer service when you still cannot find out the answer.

E-mail: info@delta-components.com

Warranty

This product is warranted to be in good working order for a period of one year from the date of purchase. Should this product fail to be in good working order at any time during this period, we will, at our option, replace or repair it at no additional charge except as set forth in the following terms. This warranty does not apply to products damaged by misuse, modifications, accident or disaster.

Vendor assumes no liability for any damages, lost profits, lost savings or any other incidental or consequential damage resulting from the use, misuse of, or inability to use this product. Vendor will not be liable for any claim made by any other related party.

Vendors disclaim all other warranties, either expressed or implied, including but not limited to implied warranties of merchantability and fitness for a particular purpose, with respect to the hardware, the accompanying product's manual(s) and written materials, and any accompanying hardware. This limited warranty gives you specific legal rights.

Return authorization must be obtained from the vendor before returned merchandise will be accepted. Authorization can be obtained by calling or faxing the vendor and requesting a Return Merchandise Authorization (RMA) number. Returned goods should always be accompanied by a clear problem description.

Chapter 1

Introduction

1.1. The Computer

- Fanless design
- Wide range DC power input (9~36V)
- DP/HDMI Combo x1+HDMI +VGA x1+DVI x1 (support 3 independent display)
- Power on/off delay control / configurable ignition power control
- TPM2.0 support
- RTC battery service window support
- Two-mPCIe for optional WiFi/3G/4G/GPS or I/O expansion supported
- 2 SATA SSD (1 x removable, 1 x internal), support RAID 0,1
- Front-accessible I/O support



1.2. About this Manual

This manual is meant for the experienced users and integrators with hardware knowledge of personal computers. If you are not sure about the description herein, consult your vendor before further handling.

We recommend that you keep one copy of this manual for the quick reference for any necessary maintenance in the future. Thank you for choosing DELTA COMPONENTS products.

1.3. Specifications

System	
CPU	Intel® Xeon® E3/6th & 7th generation Core™ i7/i5/i3 processor in LGA1151 socket
Memory	2 x 260-pin DDR4 SO-DIMM sockets, supporting 2133 MHz SDRAM up to 32GB
Chipset	Intel® C236
Graphics	Integrated Intel® HD Graphics
ATA	2 x Serial ATA ports with 600MB/s HDD transfer rate
LAN Chipset	2 x Intel® WGI211AT GbE controllers 1 x Intel® WGI219LM GbE controller w/ iAMT 11.0
Watchdog Timer	1~255 levels reset
I/O	
Serial Port	2 x RS-232/422/485 configurable via DB-9 connectors
	4 x RS-232 ports via DB-9 connectors
USB Port	6 x USB 3.0/ 2.0 ports
	Internal USB dongle (Optional)
LAN	3 x RJ-45 ports for GbE
Video Port	1 x DP/HDMI Combo
	1 x HDMI
	1 x DB-15 female connector for Analog RGB
	1 x DVI-D female connector for digital video output
	* Support 3 independent display
Selectable Port	1 x DB25 connector for 1 x DIO (8 in/8 out) port or 1 x LPT port (either one)
Audio	Mic-in/Line-out
Expansion Bus	1 full-size & 1 half-size Mini-card interconnected for optional WiFi/3G/4G/GPS or I/O Expansion
	1x SIM socket
	1x PCIe x16 slot + 1x PCI slot (Fanless Box-PC 7901)
	1x PCIe x16 slot + 1x PCIe x8 slot via x4 lanes (F. Box-PC 7902)
	2x PCI (Fanless Box-PC 7903)

Environmental	
Operating Temp.	-20 ~ 55°C (-4 ~ 131°F), ambient w/ air flow, (w/ 35W TDP CPU, fanless) -20 ~ 50°C (-4 ~ 122°F), ambient w/ air flow (w/ 51W/65W TDP CPU, w/ SMART FAN control)
Storage Temp.	-40 ~ 85°C (-40 ~ 185°F)
Operating Humidity	10 ~ 95% @ 70°C (non-condensing)
Vibration	3 Grms/5~500Hz/random operation w/ SSD
Shock	Operating 40G (11ms), Non-operating 60G with SSD
	Crash 100G, 11ms
Qualification	
Certification	CE, FCC Class A
Power Requirement	
Power Input	DC 9~36V input (w/ 4-pin DC input terminal block,combining remote power on/off switch
Ignition Switch	2-pin teminal block : IGN, GND
Power Consumption	Max. 75W (w/o I/O card)
Storage	
Type	2 x 2.5" drive bays
	1 x CFast socket, can be outside accessible
Mechanical	
Construction	Aluminum alloy
Mounting	Wall-mount
Weight	7kg (15.43lb)
Dimensions (W x H x D)	250 x 292 x 120mm (9.84" x 11.50" x 4.72")
OS Support	
Windows 10 IOT (For 7th Gen Intel CPU)	
Windows 7 / Windows8.1/ Windows 10 IOT (For 6th Gen Intel CPU)	
Linux (Kernal 4.4.x)	
F. Box-PC 7901	Fanless box PC for 35W CPU, w/ 1 x PCIe x16 + 1 x PCI
F. Box-PC 7902	Fanless box PC for 35W CPU, w/ 1 x PCIe x16 + 1 x PCIe x8
F. Box-PC 7903	Fanless box PC for 35W CPU, w/ 2 x PCI

F. Box-PC 7901-W65	Box PC for 51W/65W CPU w/ SMART FAN, 1 x PCIe x16 + 1 x PCI (BTO)
F. Box-PC 7902-W65	Box PC for 51W/65W CPU w/ SMART FAN, 1 x PCIe x16 + 1 x PCIe x8 (BTO)
F. Box-PC 7903-W65	Box PC for 51W/65W CPU w/ SMART FAN, 2 x PCI (BTO)

1.4. Inside the Package

Upon opening the package, carefully inspect the contents. If any of the items is missing or appears damaged, contact your local dealer or distributor. The package should contain the following items:



1 x 790X Series
Robust System



1 x Driver DVD
1 x User's Manual

1.5. Ordering Information

w/o Expansion

- PKBX2210 Fanless Box-PC 7900, Barebone
1x VGA, 1x DP/HDMI, 1x HDMI, 1x DVI-D, 3x GbE LAN, w/o expansion
- PKBX2210-1 Fanless Box-PC 7900, 6.Gen Intel Xeon E3-1268L-V5, 2.4GHz
1x VGA, 1x DP/HDMI, 1x HDMI, 1x DVI-D, 3x GbE LAN, w/o expansion
- PKBX2210-2 Fanless Box-PC 7900, 7.Gen Intel Core i7-7700T, 2.9GHz
1x VGA, 1x DP/HDMI, 1x HDMI, 1x DVI-D, 3x GbE LAN, w/o expansion
- PKBX2210-3 Fanless Box-PC 7900, 7.Gen Intel Core i5-7500T, 2.7GHz
1x VGA, 1x DP/HDMI, 1x HDMI, 1x DVI-D, 3x GbE LAN, w/o expansion
- PKBX2210-4 Fanless Box-PC 7900, 7.Gen Intel Core i3-7101TE, 3.4GHz
1x VGA, 1x DP/HDMI, 1x HDMI, 1x DVI-D, 3x GbE LAN, w/o expansion

1x PCI + 1x PCIe x16 Expansion

- PKBX2211 Fanless Box-PC 7901, Barebone
1x VGA, 1x DP/HDMI, 1x HDMI, 1x DVI-D, 3x GbE LAN, 1x PCI + 1x PCIe x16
- PKBX2211-1 Fanless Box-PC 7901, 6.Gen Intel Xeon E3-1268L-V5, 2.4GHz
1x VGA, 1x DP/HDMI, 1x HDMI, 1x DVI-D, 3x GbE LAN, 1x PCI + 1x PCIe x16
- PKBX2211-2 Fanless Box-PC 7901, 7.Gen Intel Core i7-7700T, 2.9GHz
1x VGA, 1x DP/HDMI, 1x HDMI, 1x DVI-D, 3x GbE LAN, 1x PCI + 1x PCIe x16
- PKBX2211-3 Fanless Box-PC 7901, 7.Gen Intel Core i5-7500T, 2.7GHz
1x VGA, 1x DP/HDMI, 1x HDMI, 1x DVI-D, 3x GbE LAN, 1x PCI + 1x PCIe x16
- PKBX2211-4 Fanless Box-PC 7901, 7.Gen Intel Core i3-7101TE, 3.4GHz
1x VGA, 1x DP/HDMI, 1x HDMI, 1x DVI-D, 3x GbE LAN, 1x PCI + 1x PCIe x16

1x PCIe x8 + 1x PCIe x16 Expansion



- PKBX2212 Fanless Box-PC 7902, Barebone
1x VGA, 1x DP/HDMI, 1x HDMI, 1x DVI-D, 3x GbE LAN, 1x PCIe x8 + 1x PCIe x16
- PKBX2212-1 Fanless Box-PC 7902, 6.Gen Intel Xeon E3-1268L-V5, 2.4GHz
1x VGA, 1x DP/HDMI, 1x HDMI, 1x DVI-D, 3x GbE LAN, 1x PCIe x8 + 1x PCIe x16
- PKBX2212-2 Fanless Box-PC 7902, 7.Gen Intel Core i7-7700T, 2.9GHz
1x VGA, 1x DP/HDMI, 1x HDMI, 1x DVI-D, 3x GbE LAN, 1x PCIe x8 + 1x PCIe x16
- PKBX2212-3 Fanless Box-PC 7902, 7.Gen Intel Core i5-7500T, 2.7GHz
1x VGA, 1x DP/HDMI, 1x HDMI, 1x DVI-D, 3x GbE LAN, 1x PCIe x8 + 1x PCIe x16
- PKBX2212-4 Fanless Box-PC 7902, 7.Gen Intel Core i3-7101TE, 3.4GHz
1x VGA, 1x DP/HDMI, 1x HDMI, 1x DVI-D, 3x GbE LAN, 1x PCIe x8 + 1x PCIe x16

2x PCI Expansion

- PKBX2213 Fanless Box-PC 7903, Barebone
1x VGA, 1x DP/HDMI, 1x HDMI, 1x DVI-D, 3x GbE LAN, 2x PCI
- PKBX2213-1 Fanless Box-PC 7903, 6.Gen Intel Xeon E3-1268L-V5, 2.4GHz
1x VGA, 1x DP/HDMI, 1x HDMI, 1x DVI-D, 3x GbE LAN, 2x PCI
- PKBX2213-2 Fanless Box-PC 7903, 7.Gen Intel Core i7-7700T, 2.9GHz
1x VGA, 1x DP/HDMI, 1x HDMI, 1x DVI-D, 3x GbE LAN, 2x PCI
- PKBX2213-3 Fanless Box-PC 7903, 7.Gen Intel Core i5-7500T, 2.7GHz
1x VGA, 1x DP/HDMI, 1x HDMI, 1x DVI-D, 3x GbE LAN, 2x PCI
- PKBX2213-4 Fanless Box-PC 7903, 7.Gen Intel Core i3-7101TE, 3.4GHz
1x VGA, 1x DP/HDMI, 1x HDMI, 1x DVI-D, 3x GbE LAN, 2x PCI







1.5.1. Optional Accessories

The following items are normally optional, but some vendors may include them as a standard package, or some vendors may not carry all the items.

GZXX8150	Wall-mount kit for Fanless Box-PC 7XXX Series	
NASX5301	120W AC/DC adapter kit w/ 2-pin/3-pin/4-pin block	

1.5.2. Configure-to-Order Service

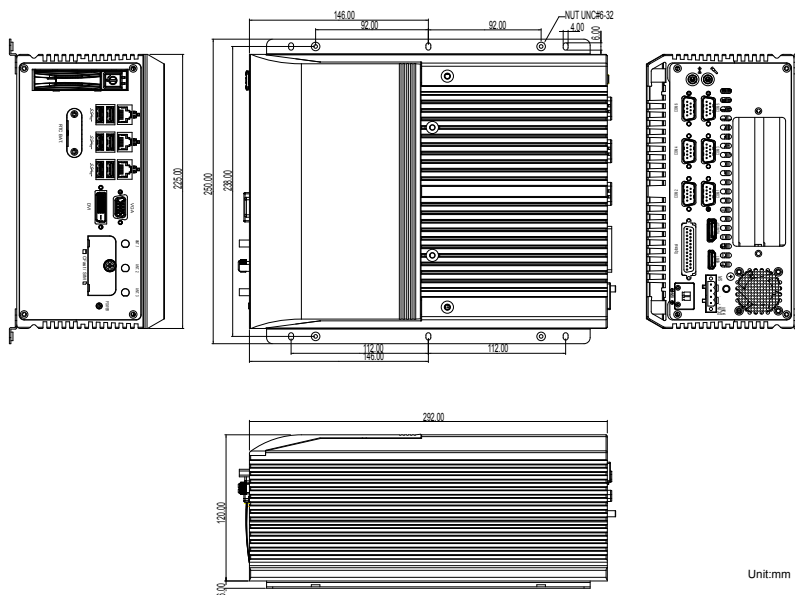
Make the computer more tailored to your needs by selecting one or more components from the list below to be fabricated to the computer.

PKPZ8082	Intel® 2.5" 150GB SATAIII SSD kit	
PKPZ8082	Atheros AR9462 Wi-Fi module w/ 20&30cm internal wires	
PKPZ8063	1 x 2dBi HSUPA antenna	
PKPZ8061	1 x WiFi dual-band 2.4G/5G antenna	
PZSS3250	DDR4-2133 4GB SDRAM DIMM kit	
PZSS3251	DDR4-2133 8GB SDRAM DIMM kit	

Chapter 2

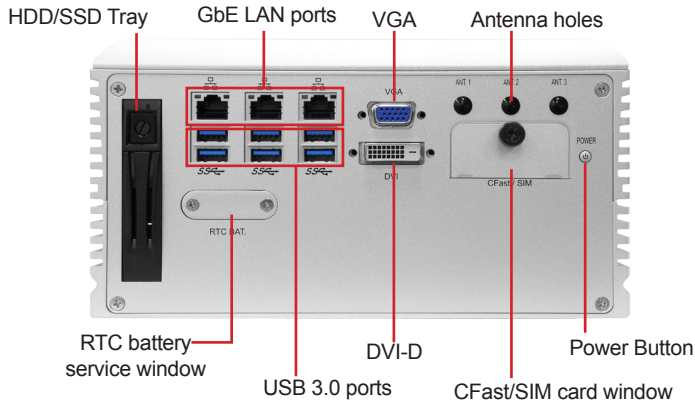
System Overview

2.1. Dimensions

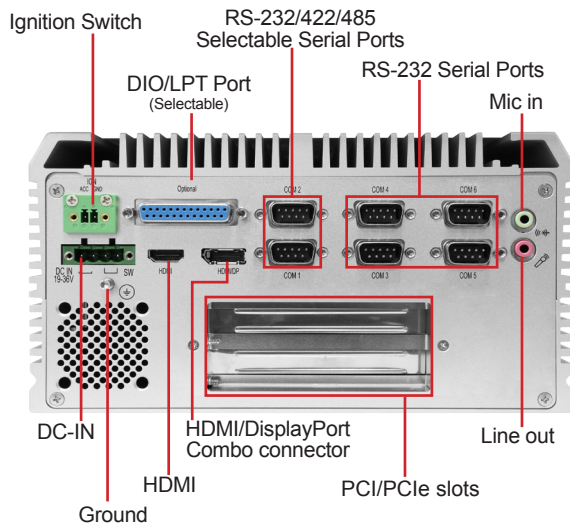


2.2. Take A Tour

2.2.1. Front Views



2.2.2. Rear Views



2.3. Driver Installation Notes

The Fanless Box-PC 790X Series support the operating systems of Windows and Linux. For Windows O.S., find the necessary device drivers on the CD that comes with your purchase. For different O.S., the installation of drivers/utilities may vary slightly, but generally they are similar.

Paths to find various drivers on the CD:

Windows 10

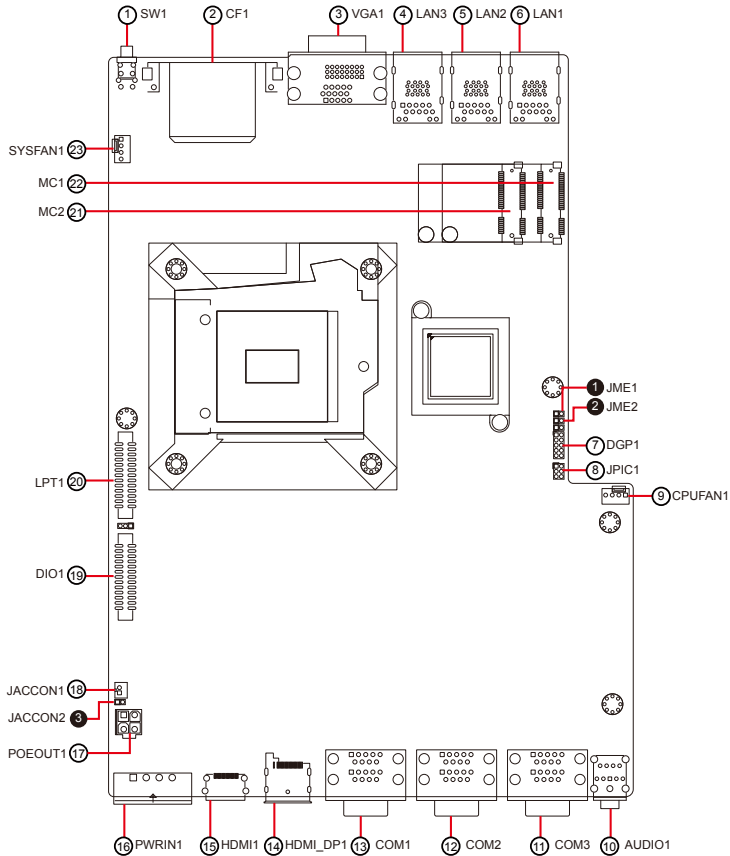
Driver	Path
Chipset	\\WIN10\\Chipset\\10.1.1.42\\SetupChipset.exe
LAN	\\WIN10\\Ethernet\\PROWinx64.exe
VGA	\\WIN10\\Graphics\\Setup.exe
Audio	\\WIN10\\AUDIO\\0006-64bit_Win7_Win8_Win81_Win10_R279.exe
ME	\\WIN10\\ME_11.6\\SetupME.exe

Chapter 3

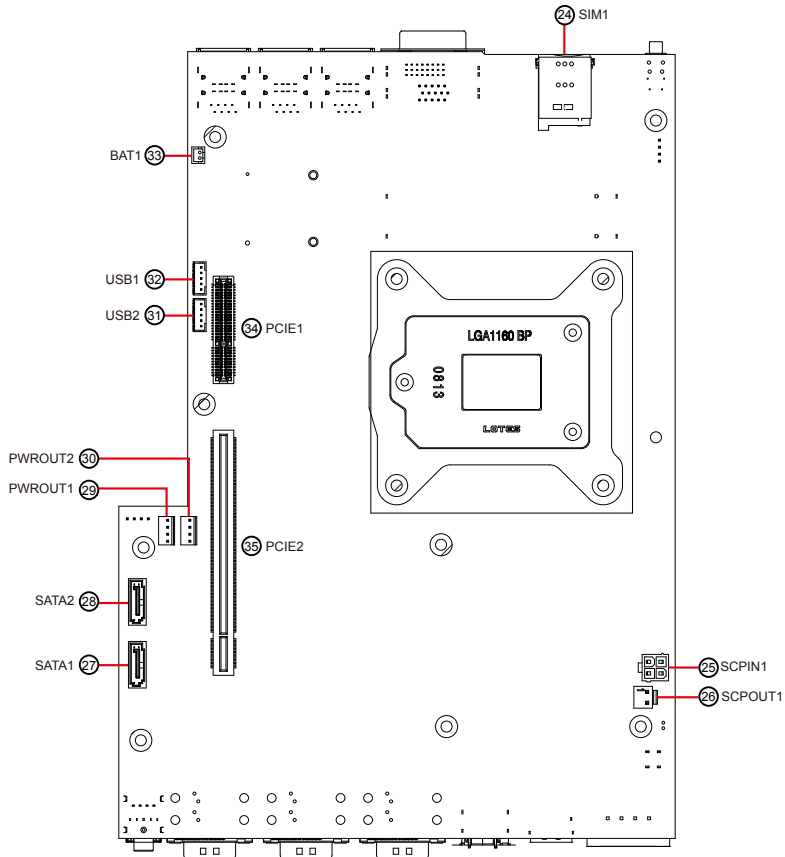
System Configuration

3.1. Board Layout

Board Top



Board Bottom



Engine of the Computer

Jumpers

Label	Description
① JME1	ME FLASH Selection
② JME2	CMOS Settings
③ JACCON2	Ignition power mode

Connectors

Label	Description
① SW1	Power button
② CF1	CFast Card Type I/II slot
③ VGA1	Analog RGB & DVI-D connector
④ ⑤ ⑥ LAN3, 2, 1	GbE RJ-45 Ethernet connector & dual USB3.0 connectors
⑦ DPG1	External 80 port
⑧ JPIC1	PIC programming pin header
⑨ CPUFAN1	Fan power connector
⑩ AUDIO1	Audio connector
⑪ COM3	RS-232 Serial Port (Panel label: COM6, COM5)
⑫ COM2	RS-232 Serial Port (Panel label: COM4, COM3)
⑬ COM1	RS-232/422/485 Selectable Serial Port (Panel label: COM2, COM1)
⑭ HDMI_DP1	HDMI/DP combo connector
⑮ HDMI1	HDMI connector
⑯ PWRIN1	DC adapter power input
⑰ POEOUT1	PoE power connector
⑱ JACCON1	Vehicle Acc mode selection
⑲ DIO1	Digital IO Connector
⑳ LPT1	On-board parallel port connector
㉑ ㉒ MC1, 2	PCI Express Mini-card full/half size socket
㉓ SYSFAN1	Fan power connector
㉔ SIM1	SIM card socket
㉕ SCPIN1	Supercapacitor power in



②⑥	SCPOUT1	Supercapacitor power out
②⑦ ②⑧	SATA1, SATA2	Serial ATA connector
②⑨ ③⑩	PWROUT1, 2	SATA HDD power connector
③① ③②	USB2, 1	USB 3.0/2.0 connectors
③③	BAT1	RTC battery
③④	PCIE1	PCIe x4 slot
③⑤	PCIE2	PCIe x16 slot

3.2. Jumpers and Connectors

3.2.1. Jumpers



① JME1

Function: ME Flash Selection
Jumper Type: 2.54mm pitch, 1x2-pin header
Setting:

Pin	Description	
Short	ME Flash enable	1  2
Open	ME Flash disable (default)	1  2



② JME2

Function: Clear CMOS Selection
Jumper Type: 2.54mm pitch, 1x2-pin header
Setting:

Pin	Description	
Short	Clear CMOS	1  2
Open	Keep CMOS (default)	1  2

③ JACCON2

Function: Vehicle Acc mode selection
Jumper Type: Onboard 2.00mm-pitch 2-pin header
Setting:

Pin	Description	
Short	For automation mode (default)	1  2
Open	For vehicle mode	1  2

3.2.2. Connectors

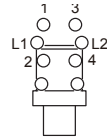
① SW1

Function Power Button

Connector Type: LED tact switch with green and red colors

Pin Assignment:

Pin	Description	Pin	Description
1	GND	2	N/A
3	BTN	4	N/A
L1	SW1_LED_N	L2	SW1_LED_P



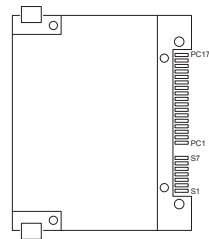
② CF1

Function: CFast Card Type I/II slot

Connector Type: 7+17-pin CFast Card connector consisting of a SATA compatible 7-pin signal connector and a 17-pin power and control connector.

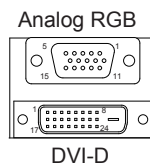
Pin Assignment:

Pin	Desc.	Pin	Desc
S1	SGND1	PC6	TBD
S2	TXP	PC7	GND
S3	TXN	PC8	LED1
S4	SGND2	PC9	LED2
S5	RXN	PC10	IO1
S6	RXP	PC11	IO2
S7	SGND	PC12	IO3
PC1	CDI	PC13	3.3V
PC2	GND	PC14	3.3V
PC3	TBD	PC15	GND
PC4	TBD	PC16	GND
PC5	TBD	PC17	CD0



③ VGA1

Function: Analog RGB & DVI-D Connector
Connector Type: Analog RGB (D-Sub 15-pin female type)
 + DVI-D (DVI-D female connector)



Pin Assignment:

Analog RGB Connector

Pin	Desc.	Pin	Desc.	Pin	Desc.
1	RED	6	GND	11	N/C
2	GREEN	7	GND	12	VDDAT
3	BLUE	8	GND	13	HSYNC
4	N/C	9	+5V	14	VSYN
5	GND	10	GND	15	VDCLK

DVI-D Connector

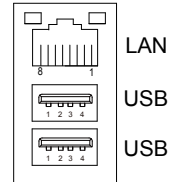
Pin	Desc.	Pin	Desc.	Pin	Desc.
1	TMDS Data 2-	9	TMDS Data 1-	17	TMDS Data 0-
2	TMDS Data 2+	10	TMDS Data 1+	18	TMDS Data 0+
3	GND	11	GND	19	GND
4	NC	12	NC	20	NC
5	NC	13	NC	21	NC
6	DDC clock	14	+5V	22	GND
7	DDC data	15	GND	23	TMDS clock+
8	NC	16	Hot plug detect	24	TMDS clock-

④⑤⑥ LAN3, 2, 1

Function: GbE RJ-45 Ethernet connector & dual USB3.0 connectors

Connector Type: RJ-45 connector that supports 10/100/1000Mbps fast Ethernet
USB3.0 connector Type-A connectors

Pin Assignment: The pin assignments conform to the industry standard.



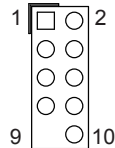
⑦ DGP1

Function: External 80 port

Connector Type: 2.00mm-pitch 2x5-pin header

Pin Assignment:

Pin	Description	Pin	Description
1	CLK	2	GND
3	FRAME#	4	LAD0
5	PLTRST#	6	N.C
7	LAD3	8	LAD2
9	VCC3	10	LAD1



⑧ JPIC1

Function: PIC programming pin header

Connector Type: Onboard 2.00mm-pitch 2x3-pin header

Pin Assignment:

Pin	Description	Pin	Description
1	PIC_TX	2	ICSP-CLK
3	ICSP-DAT	4	LAD0
5	VCC5	6	MCU_RST



⑨②③ CPUFAN1, SYSFAN1

Function: Fan Power Connector
Connector Type: Onboard 2.54mm pitch 1x4-pin one-wall wafer connector
Pin Assignment:

Pin	Description
1	GND
2	+12V
3	RPM
4	Control



⑩ AUDIO1

Function: Audio connector
Connector Type: Double-stacked ø3.5mm stereo audio jacks
Pin Assignment:

Description
Line-out
Mic-in

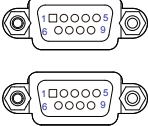


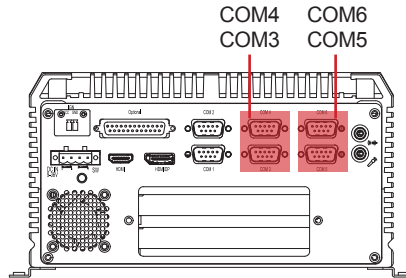
⑪ COM3 (Panel label: COM6, COM5)

⑫ COM2 (Panel label: COM4, COM3)

Function: RS-232 Serial Port
Connector Type: External double-stacked 9-pin D-sub male connector
Pin Assignment:

Pin	Description	Pin	Description
1	DCD	2	RXD
3	TXD	4	DTR
5	GND	6	DSR
7	RTS	8	CTS
9	RI	10	N.C





⑬ COM1 (Panel label: COM2, COM1)

Function:

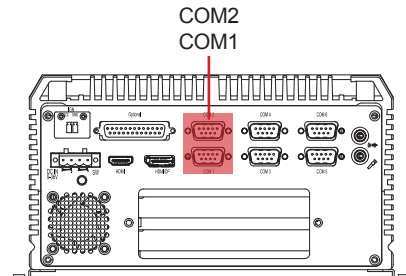
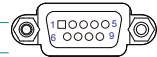
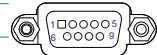
RS-232/422/485 Selectable Serial Port

Connector Type:

External double-stacked 9-pin D-sub male connector

Pin Assignment:

Pin	Desc.	Pin	Desc.
1	DCD / (RS422 TX-) / (RS485-)	6	DSR
2	RXD / (RS422 TX+) / (RS485+)	7	RTS
3	TXD / (RS422 RX+)	8	CTS
4	DTR / (RS422 RX-)	9	RI
5	GND		



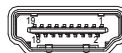
⑭ HDMI_DP1

Function: HDMI/DP combo connector
Connector Type: 19-pin HDMI / DisplayPort connector
Pin Assignment: The pin assignments conform to the industry standard.



⑮ HDMI1

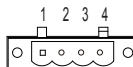
Function: HDMI connector
Connector Type: 19-pin HDMI connector
Pin Assignment: The pin assignments conform to the industry standard.



⑯ PWRIN1

Function: DC Adapter Power Input
Connector Type: 4-pin Terminal block
Pin Assignment:

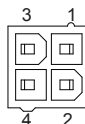
Pin	Desc.
1	VIN+
2	VIN-
3	Switch -
4	Switch +



⑰ POEOUT1

Function: PoE Power Connector
Connector Type: 2.54mm-pitch 4-pin header
Pin Assignment:

Pin	Desc.
1	GND
2	GND
3	DCIN
4	DCIN



⑮ JACCON1

Function: Ignition Power Connector
Connector Type: Onboard 2x1-pin box connector
Pin Assignment:

Pin	Desc.
1	Acc_ON
2	GND



⑯ DIO1

Function: Digital IO Connector
Connector Type: 2.0mm pitch 2x13 pin box header
Pin Assignment:

Pin	Desc.	Pin	Desc.
1	DIO0	14	DIO8
2	DIO1	15	DIO9
3	DIO2	16	DIO10
4	DIO3	17	DIO11
5	DIO4	18	DIO12
6	DIO5	19	DIO13
7	DIO6	20	DIO14
8	DIO7	21	DIO15
9	+5V	22	GND
10	+5V	23	GND
11	N.C	24	N.C
12	N.C	25	N.C
13	N.C	26	N.C



②① LPT1

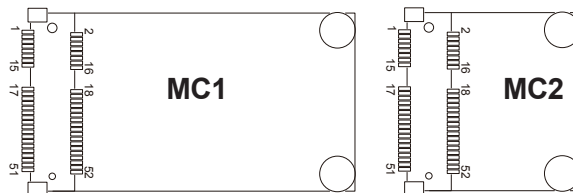
Function: On-board Parallel Port Connector
Connector Type: 2.00mm pitch 2 x13-pin box header
Pin Assignment:

Pin	Desc.	Pin	Desc.
1	STB#	14	AFD#
2	PD0	15	ERR#
3	PD1	16	INIT#
4	PD2	17	SLIN#
5	PD3	18	GND
6	PD4	19	GND
7	PD5	20	GND
8	PD6	21	GND
9	PD7	22	GND
10	ACK#	23	GND
11	BUSY	24	GND
12	PE	25	GND
13	SLCT	26	N.C



②①②② MC1, 2

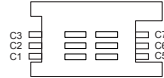
Function: MC1: PCI Express Mini-card Full Size socket
 MC2: PCI Express Mini-card Half Size socket
Connector Type: Onboard 0.8mm pitch 52-pin edge card connector
Pin Assignment: The pin assignments conform to the industry standard.



②④ SIM1

Function: SIM Card Socket
Connector Type: 6-pin SIM card socket
Pin Assignment:

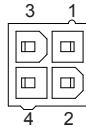
Pin	Desc.	Pin	Desc
C5	GND	C1	POWER VOLTAGE
C6	NC	C2	RESET SIGNAL
C7	I/O	C3	CLOCK SIGNAL



②⑤ SCPIN1

Function: Supercapacitor power in
Connector Type: 2.54mm-pitch 4-pin header
Pin Assignment:

Pin	Desc.
1	GND
2	GND
3	+12V
4	+12V



②⑥ SCPIN2

Function: Supercapacitor power out
Connector Type: 2.00mm-pitch 2-pin header
Pin Assignment:

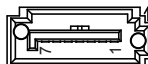
Pin	Desc.
1	+12V
2	GND



②⑦ ②⑧ SATA1~2

Function: Serial ATA Connector
Connector Type: On-board Serial ATA Connector
Pin Assignment:

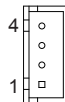
Pin	Description
1	GND
2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	GND



②⑨ ③① PWROUT1, 2

Function: SATA HDD Power Connector
Connector Type: 2.54mm pitch 1x4-pin one-wall connector
Pin Assignment:

Pin	Desc.
1	+5V
2	GND
3	GND
4	+12V



③① ③② USB2, 1

Function: USB 3.0/2.0 Connectors
Connector Type: On-board 1.25mm pitch 1x5 pin wafer connector
Pin Assignment:

Pin	Description.
1	+5V
2	D-
3	D+
4	GND
5	GND



③③ BAT1

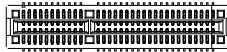
Function: RTC Battery
Connector Type: Onboard 2x1-pin box connector
Pin Assignment:

Pin	Desc.
1	BAT+
2	BAT-



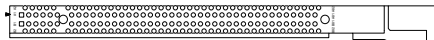
③④ PCIE1

Function: PCIe x4 slot
Pin Assignment: The pin assignments conform to the industry standard.



③⑤ PCIE2

Function: PCIe x16 slot
Pin Assignment: The pin assignments conform to the industry standard.



Chapter 4

Installation and Maintenance

4.1. Install Hardware

The Fanless Box-PC 790X Series is constructed based on modular design to make it easy for users to add hardware or to maintain the computer. The following sections will guide you to the simple hardware installations for the computer.

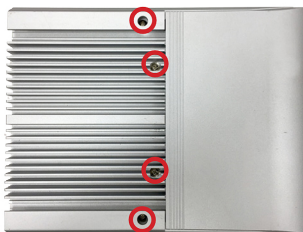
4.1.1. Open the Computer

For the computer, removing the top and bottom covers is essential to open the computer and access the inside. Follow through the steps below to remove the top cover and bottom cover from the computer.

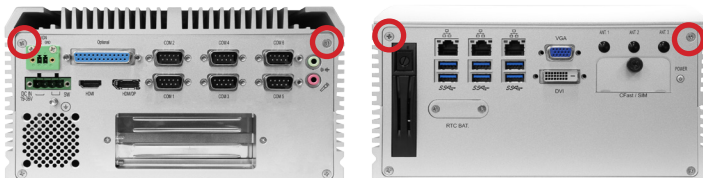
4.1.1.1. Remove Top Cover

All jumpers, CPU socket, MiniCard socket, SDRAM SO-DIMM slots, DIO/ LPT ports are built on the top side of the main board. To access these components, the computer's top cover has to go. Follow through the steps below to remove the top cover.

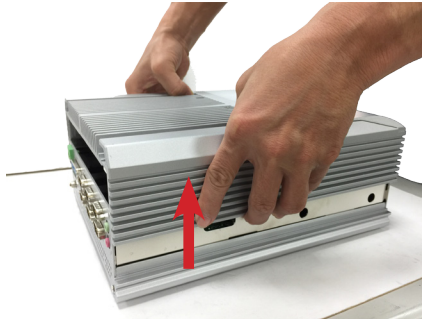
1. Place the computer on a flat surface. Loosen and remove the 4 screws as shown below.



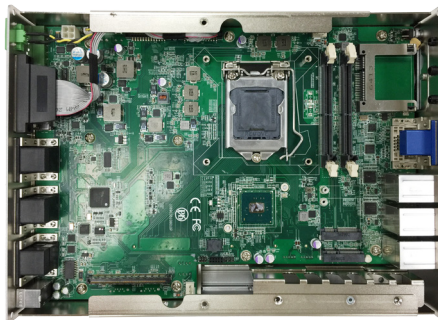
2. Loosen and remove the 2 screws on the front and rear panels respectively as shown below.



3. Carefully lift the top cover and then completely part the top cover from the computer.



The inside of the computer comes to view.

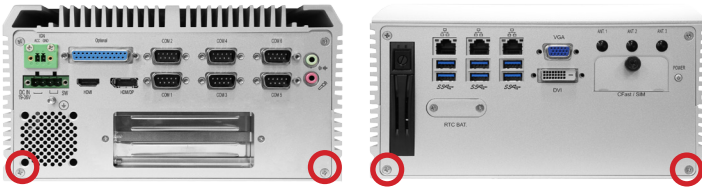


4.1.1.2. Remove the Bottom Cover

The Serial ATA connectors, the power connectors for SATA storage devices, and the internal USB ports, PCI/PCIe slots are all built on the bottom side of the main board. To access these connectors, the computer's bottom cover has to be removed. Follow through the steps below to remove the bottom cover from the computer.

Installation & Maintenance

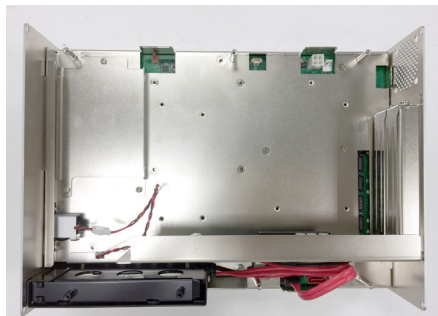
1. Place the computer upside down on a flat surface. Loosen and remove the 2 screws on the bottom side of front and rear panels respectively as shown below.



2. After removing the screws, carefully lift and remove the bottom cover from the computer.



The inside of the computer comes to view.

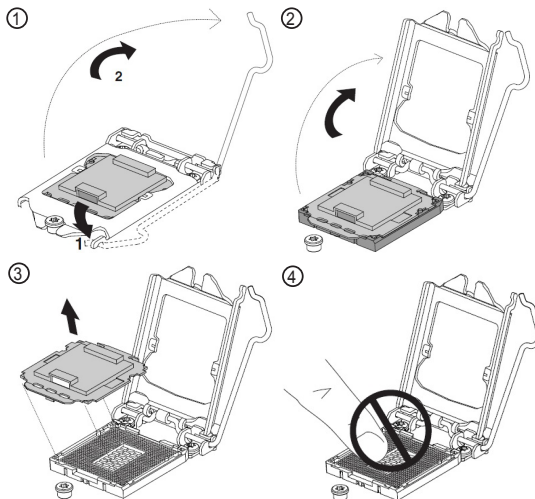


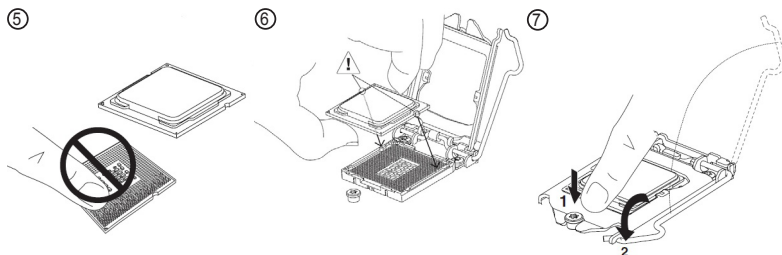
4.1.2. Install CPU

1. Remove the top cover from the computer as described in [4.1.1.1. Remove Top Cover](#) on page 32.
2. Locate the CPU socket on the main board

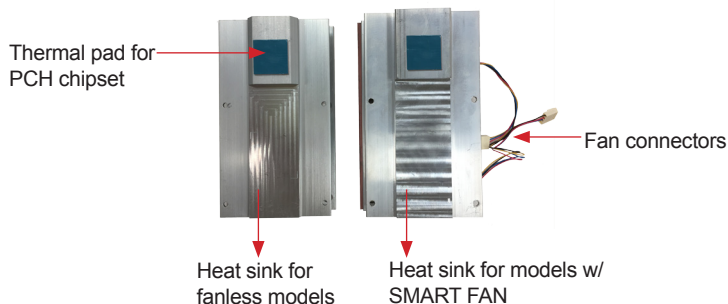


The processor socket comes with a lever to secure the processor. Please refer to the pictures step by step as below and note that the cover of the socket must always be installed during transportation to avoid damage to the socket.

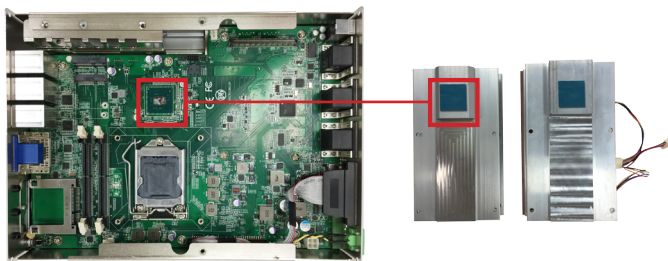




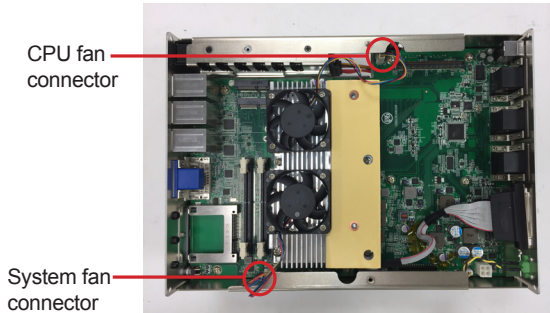
3. Find the heat sink in the accessory box. Attach the thermal pad to the heatsink, and remove the blue release liner.



4. Apply the thermal paste to the CPU.
5. Place the heat sink on the CPU and PCH. Make sure that the thermal pad is in complete contact with the PCH chipset and the heat sink is in complete contact with the CPU to avoid overheating problem. If not, it would cause your system or CPU hanged, unstable or damaged.



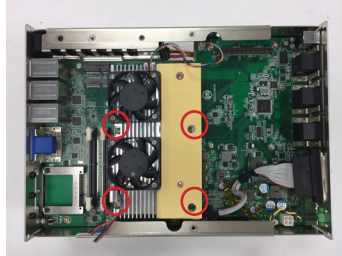
6. For heat sink w/ SMART FAN, connect the fan cable of each fan to the connectors on the system board.



7. Secure the heat sink with 4 screws.

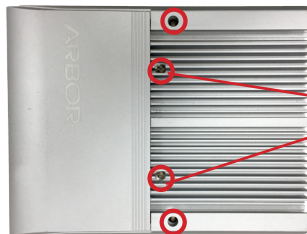


Heat sink for fanless models



Heat sink for models w/ SMART FAN

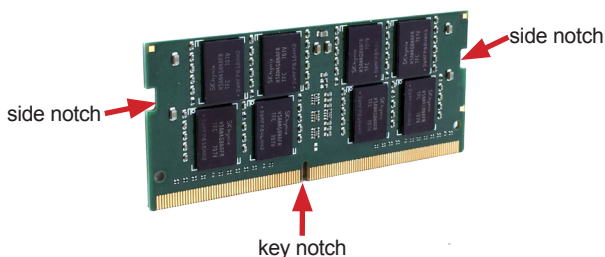
8. Restore the top cover to the computer by fastening the 4 screws as shown below. Note that the 2 screws in the middle are used to secure the top cover to the heat sink. Make sure they are tightened to ensure the heat dissipation.



Make sure to tighten the screws to ensure the heat dissipation.

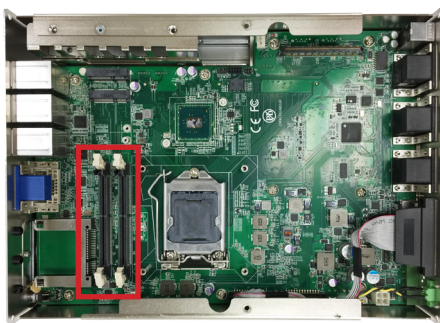
4.1.3. Install/Uninstall Memory Modules

The main board has two memory module (DIMM) sockets. Increase memory capacity to make programs run faster on the system. The memory module for the Fanless Box-PC 790X Series' SO-DIMM sockets should be a 260-pin DDR4 with a "key notch" off the centre among the pins, which enables the memory module for particular applications. There are another two notches at each left and right side of the memory module to help fix the module in the socket.



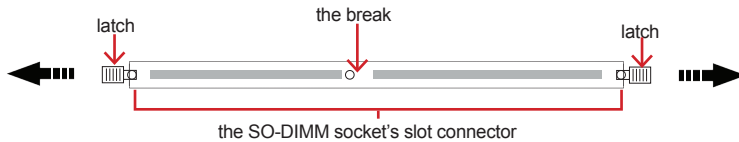
To install a DDR4 memory module:

1. Remove the top cover from the computer as described in [4.1.1.1. Remove Top Cover](#) on page [32](#).
2. Locate the SO-DIMM sockets on the main board.



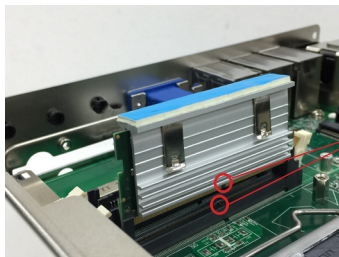
The SO-DIMM sockets are vertical type, and each socket has two latches for fixing the memory modules. The memory module can only be installed by one direction due to the notch.

3. Pull back both latches from the socket.



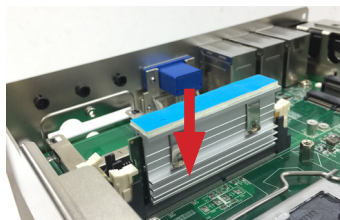
vertical-type SO-DIMM socket (overview)

4. Confront the memory module's edge connector side at the SO-DIMM socket. Position the memory module at the SO-DIMM socket, with the memory module's key notch aligned at the break of the SO-DIMM's slot connector.



Align the notch on the memory module with the notch in the memory socket.

5. Vertically plug the memory module to the DIMM socket. "Fully" plug the memory module until both latches auto-lock the memory module in place.



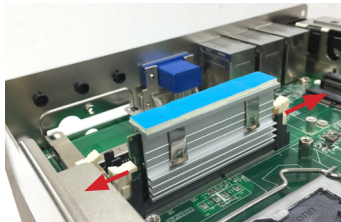
Installation & Maintenance

6. Restore the top cover to the computer.

To uninstall a DDR4 memory module:

1. Pull back both latches from the SO-DIMM socket.

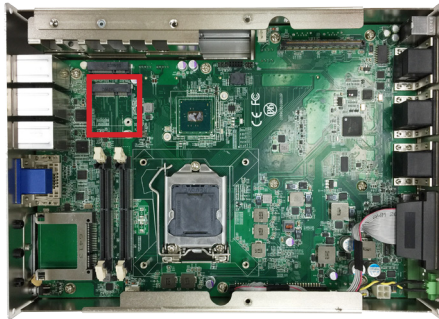
The DDR4 memory module will be auto-released from the socket.



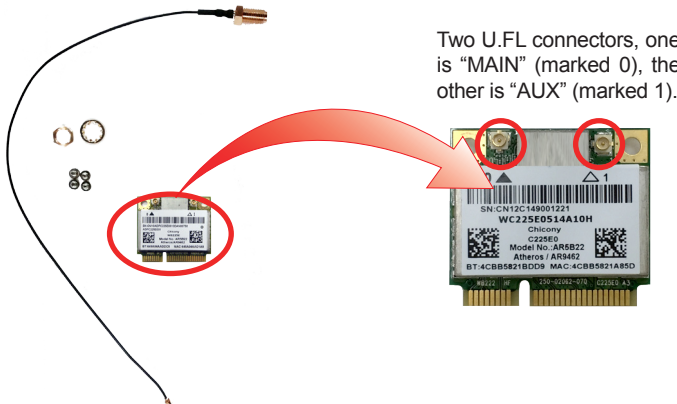
2. Remove the memory module.
3. Restore the top cover to the computer.

4.1.4. Install Wi-Fi Module

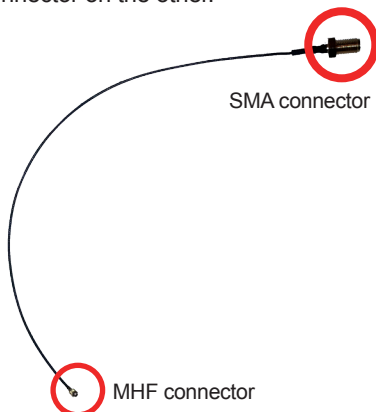
1. Remove the top cover from the computer as described in [4.1.1.1. Remove Top Cover](#) on page 32.
2. Locate the **PCI Express Mini-card** socket for wireless module.



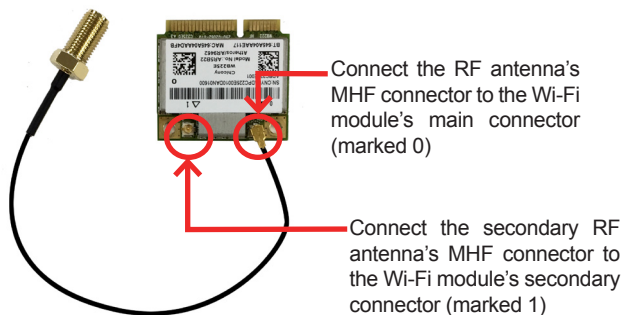
3. Prepare the Wi-Fi module kit. The module is a half-size module of **PCI Express Mini-card** form factor, with two U.FL connectors, one is "MAIN", and the other is "AUX".



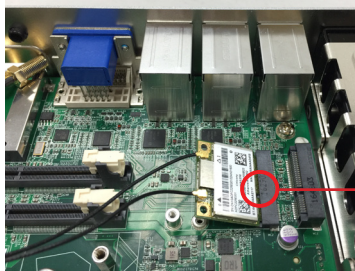
4. Have the RF antenna. The antenna has an SMA connector on one end and an MHF connector on the other.



5. Connect the RF antenna's MHF connector to the Wi-Fi module's main connector marked 0. If you are going to connect a secondary antenna, connect it to the connector marked 1.



6. Plug the Wi-Fi module to the socket's connector by a slanted angle. Fully plug the module, and note the notch on the wireless module should meet the break of the connector.

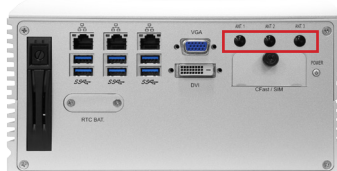


The module's key notch should meet the connector's break.

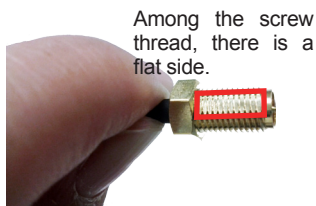
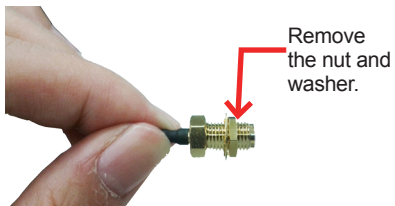
7. Press the module down and fix the module in place using one screw.



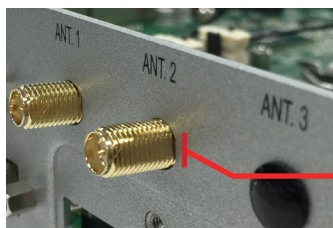
8. Locate the SMA antenna holes on front panel. Remove the plastic plug to make an antenna hole. Keep the plastic plug for any possible restoration in the future.



9. From the other end of the RF antenna, which is an SMA connector, remove the washer and the nut. Note the SMA connector has the form of a threaded bolt, with one flat side.



10. Pull the SMA connector through the above mentioned antenna hole. Note to meet the aforesaid flattened side with the antenna hole's flat side.



Arrange the flat side of the SMA connector to meet the flat side of the antenna hole.

11. Mount the washer first and then the nut to the SMA connector. Make sure the nut is tightened.



Mount the washer and the nut to the SMA connector. Tighten the nut.

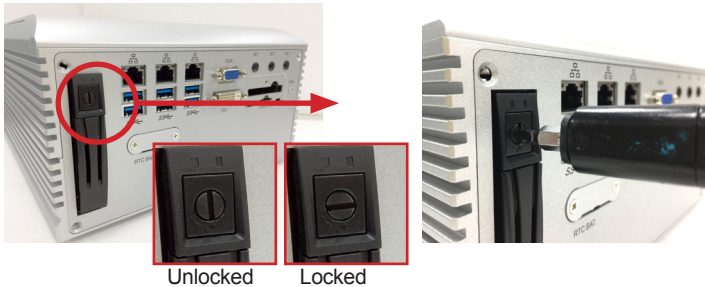
12. Have the external antenna(s). Screw and tightly fasten the antenna(s) to the SMA connector.



4.1.5. Install SATA Storage Devices

4.1.5.1. Install Outside Accessible SATA Storage Device

1. The outside accessible HDD/SSD tray comes with a lock. To eject the tray, use a flat head screwdriver to unlock the tray.



2. Press the drive eject button as shown below to eject the HDD/SSD tray.
3. Slide the HDD/SSD storage device into the bracket with the connector side facing toward the internal side.



4. Fix the storage device in place by fastening the 2 screws on both sides of the tray .



5. Slide the tray back into the slot.

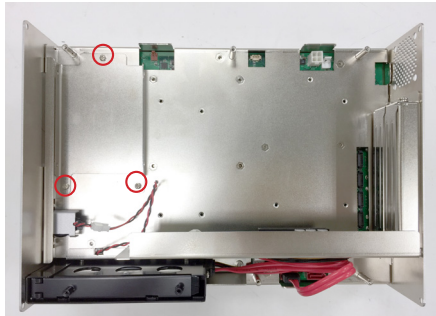


6. Press the eject button first to further slide in the tray. (Do not press the lever directly.) When the lever returns a little bit, press the lever to completely slide the tray back into the drive bay.

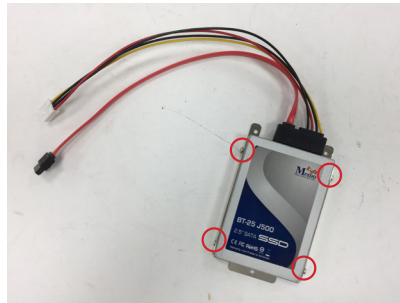


4.1.5.2. Install Internal SATA Storage Device

1. Remove the bottom cover from the computer as described in [4.1.1.2. Remove the Bottom Cover](#) on page [33](#).
2. Find the HDD/SSD brackets inside the computer. Loosen and remove the screws as marked in the illustration below. Then dismount the brackets from the computer.



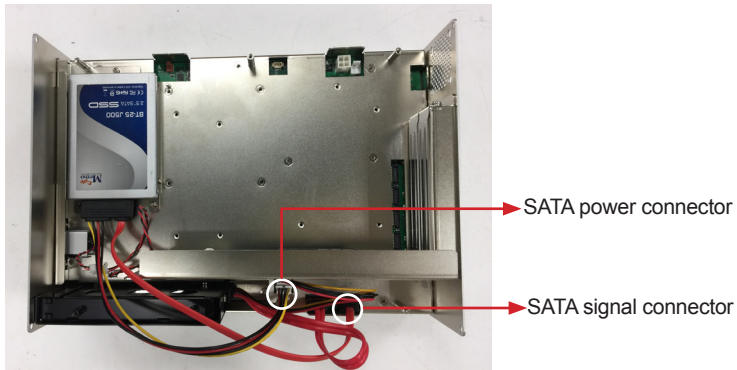
3. Attached the SATA cable to the HDD/SSD storage device. Slide the HDD/SSD storage device into the bracket and fix the storage device in place by fastening the 2 screws on both sides of the bracket .



4. Install the bracket with the storage device back into the computer by refastening the 3 screws.



5. Connect the SATA signal cable and power cable.

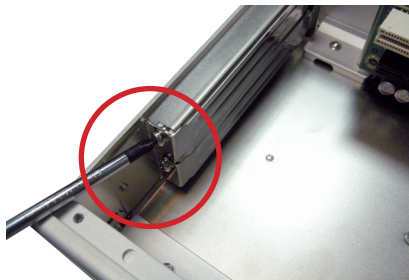


6. Restore the bottom cover to the computer.

4.1.6. Install PCI and PCI Express Cards

To install a PCI or PCI Express card:

1. Remove the bottom cover from the computer as described in [4.1.1.2. Remove the Bottom Cover](#) on page [33](#).
2. Use a cross head screwdriver to loose the screw that secure the expansion slot bracket. And then you can install a PCIe card to this expansion slot.



3. Restore the bottom cover to the computer.

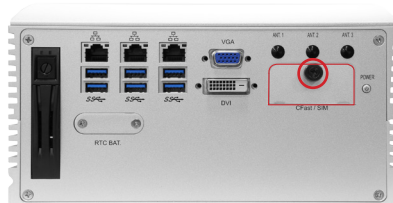
4.1.7. Install/uninstall CFast Card

The computer supports a CFast card for storage and comes with an outside-accessible CFast slot. Follow through the guide below to install a CFast card to the computer.

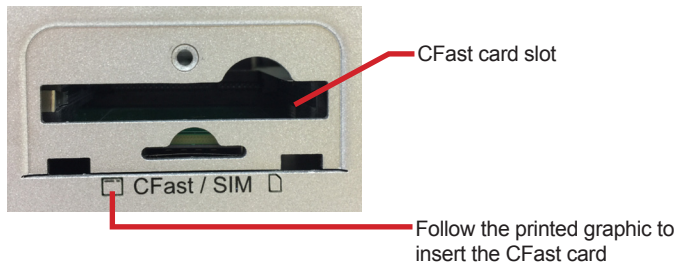
Note: Be sure to turn off the computer before installing or uninstalling the CF card if the OS is installed on the card.

To install the CFast card:

1. From the front panel of the computer, find the door to the CFast slot. Loosen and remove the screw that locks the door.



2. Once the screw is removed, open the door. The CFast slot then comes to view.



3. Position the CFast card as directed by the graphic printed on the front panel. Insert the CFast card all the way into the slot.



To uninstall the CFast card:

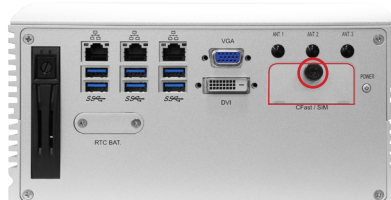
1. Loosen and remove the card door screw and open the card door.
2. Push-eject the CFast card.
3. Remove the CFast card.
4. Refasten the screw to close the card door.

Note: Make sure to refasten the screw to close the card door each time the CFast card is installed or uninstalled.

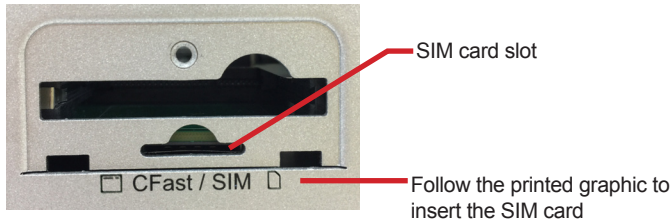
4.1.8. Install/uninstall SIM Card

To install the SIM card:

1. From the front panel of the computer, find the door to the SIM card slot. Loosen and remove the screw that locks the door.



2. Once the screw is removed, open the door. The SIM card slot then comes to view.



3. Position the SIM card at the slot as directed by the graphic printed on the inner side of the door. Push-insert the SIM card.



To uninstall the SIM card:

1. Loosen and remove the card door screw and open the card door.
2. Push-eject the SIM card.
3. Remove the SIM card.
4. Refasten the screw to close the card door.

Note: Make sure to refasten the screw to close the card door each time the SIM card is installed or uninstalled.

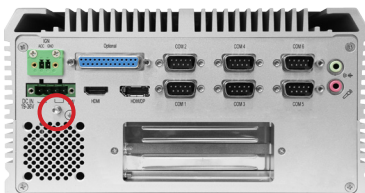
4.2. Ground the Computer

Follow the instructions below to ground the computer to land. Be sure to follow every grounding requirement in your place.



Warning Whenever the unit is installed, the ground connection must always be made first of all and disconnected lastly.

1. See the illustration below. Remove the ground screw from the rear panel.
2. Attach a ground wire to the rear panel with the screw.



4.3. Wire DC-in Power Source

4.3.1 Automation Mode

Follow the instructions below for connecting the computer to a DC-input power source.

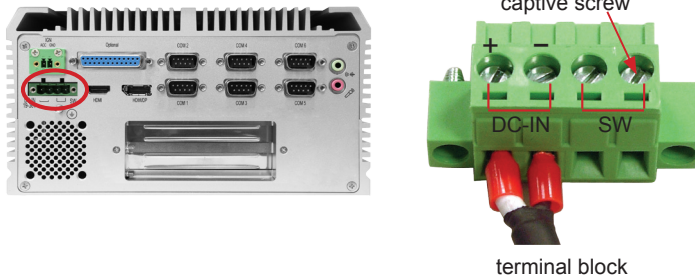


Warning Only trained and qualified personnel are allowed to install or replace this equipment.

1. Before wiring, make sure the power source is disconnected.
2. Find the terminal block in the accessory box.
3. Use the wire-stripping tool to strip a short insulation segment from the output wires of the DC power source.
4. Identify the positive and negative feed positions for the terminal block

connection. See the symbols printed on the rear panel indicating the polarities and DC-input power range in voltage.

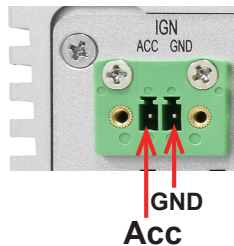
5. Insert the exposed wires into the terminal block plugs. Only wires with insulation should extend from the terminal block plugs. Note that the polarities between the wires and the terminal block plugs must be positive to positive and negative to negative.
6. Use a slotted screwdriver to tighten the captive screws. Plug the terminal block firmly, which wired, into the receptacle on the rear panel.



4.3.2 Vehicle Application Mode

Follow the instructions below for connecting the computer to a vehicle power source.

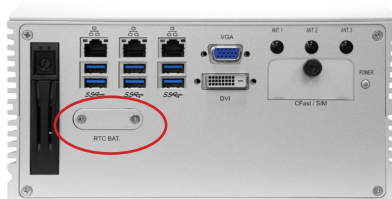
1. Make sure JACCON2 jumper is open for vehicle power mode. (Refer to [Section 3.2.1. Jumpers on page 18](#).)
2. For vehicle application, DC power Input wiring pin configuration is as below. Please connect the Acc pin with your car Acc, and the device will be activated when you turn your ignition key to Acc.



4.4. Replace RTC Battery

The computer comes with a built-in supercapacitor CMOS so that users can replace RTC battery without losing settings. To replace the RTC battery:

1. Remove the 2 screws that secure the RTC service battery window.



2. Pull out the RTC battery and disconnect the battery cable from its connector on the system board.



3. Using a non-metallic tool, pry up the RTC battery from the adhesive that secures it to bracket.
4. Replace the RTC battery and reconnect the battery cable to the connector on the system board.
5. Restore the service window and fasten the 2 screws to secure the RTC service battery window.