CONTEC

Reference Manual

BOX Computer

BX-S3300 Series

CONTENTS

CONTEC CO., LTD.

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Introduction

This section provides necessary information of the product such as the outline, bundled items and manuals before actual use.

1.Related Manuals

The manuals related to the product are listed below.

Read them as necessary along with this document.

◆ Must Read the Following Manuals.

Name	Purpose	Contents	How to get
Reference Manual	Read this when operating the product.	This describes the hardware aspects such as functions and settings.	Included in the package (Driver DVD)

◆ Download Manuals

Download the manuals accordingly from the following URL.

Download https://www.contec.com/download/

2.About the Product

This product is a high-performance embedded-type personal computer equipped with the 9th-generation Intel® Xeon/ Core™ processor. Embedded-type chipset and CPU have been adopted. The use of readily available parts ensures the ease of the use of the product.

3.Product Lineup

The product has three models.

Model	CPU	Optional OS*1	Memory
BX-S3300-DC8800000	Intel® Xeon E-2278GEL	Windows® Server 2019	8GB driver (DDR4 ECC SODIMM)
BX-S3300-DC9800000	Intel® Core™ i3-9100TE	Windows®10 IoT Enterprise LTSC 2019 (64 bit)	
BX-S3300-DCA800000	Intel® Celeron® G4900T		
BX-S3300-DCB800000	Intel® Core™ i5-9500TE	Windows®10 IoT Enterprise LTSC 2021 (64 bit)	8GB (DDR4 NON-ECC SODIMM)
BX-S3300-DCC800000	Intel® Core™ i7-9700TE		

***1 The model No. not including OS more detail please contact your reseller**

4.Features

■ Compatible with Intel® 9th Coffee Lake-Refresh Platform

This product is equipped with the 9th generation Intel® Xeon/ Core™ processor and greatly realizes lower-power consumption while ensuring fine performance of operation tasks and drawing. Adopting embedded-type CPU contributes to a stable supply.
Three types of CPU are lined up.
Intel® Xeon E-2278GEL
Intel® Core™ i7-9700TE
Intel® Core™ i5-9500TE
Intel® Core™ i3-9100TE
Intel® Celeron® G4900T

■ CPU Built-in High-Performance Graphics

Xeon, Core i3, and Celeron Models are corresponded to the Integrated Intel® HD Graphics.
Full HD video can be smoothly played.
It also supports full HD output of the two-screen with the DVI-I and DisplayPort.

■ Adopt Removable Storage

The product adopts front accessible two 2.5-inch SATA storages and support RAID function such as mirroring.

■ Extend Peripherals Freely Rich Interface

This product is equipped with a variety of expansion interfaces such as DVI-I, DisplayPort, 1000BASE-T × 2, USB3.2(Gen2) × 4, USB2.0 × 2, serial (RS-232C) × 3, serial (RS-232C/422/485) × 1, GPIO × 1, audio. You can assist our use in various scenes.

5.Supported OS

- Windows®10 IoT Enterprise LTSC 2019 64 bit
- Windows®10 IoT Enterprise LTSC 2021 64 bit
- Windows® Server 2019 (Only for Intel® Xeon E-2278GEL)

6.Product Configuration List

The product consists of the items listed below.

Check, with the following list, that your package is complete.

If you discover damaged or missing items, contact your retailer or the general CONTEC information.

	BX-S3300-DCxxxxxxx
Name	**Pcs.**
Box PC	1
The attachment Fittings	2
USB removal prevention fitting	1
DVI-analog RGB conversion adapter	1
Rubber foot	4
Washer assembled screw (M4 x 8, black)	8
Washer assembled screw (M3 x 8)	4
Washer assembled screw (M3 x 6)	1
Screws for attachment HDD (or SSD)	8
Power supply connector complete set	
Power connector	1
Contact	4
Cable tie 1	1
Cable tie 2	1
Product Guide	1

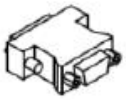
*1 The configuration and parts of this product are shown below.
*2 The user manual for this product is available as a PDF file through CONTEC's website.
*3 We highly recommend using wide temperature HDD. Otherwise, the operation temperature should under 40 ℃, 24 hours

Production Configuration Drawings

BOX PC

The attachment fitting

USB removal prevention fitting



DVI-analog RGB conversion adapter

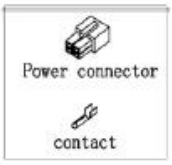
Rubber foot

Washer assembled screw (M4x8, black)

Washer assembled screw (M3x8)

Washer assembled screw (M3x6)

Screws for attachment HDD (or SSD)



Power supply connector complete set

Cable tie 1

Cable tie 2

Product Guide

* See the Product Configuration List to check if all the components are included for the specified number of units.

Safety Precautions

Understand the following definitions and precautions to use the product safely.
Never fail to read them before using the product.

1.Safety Information

This document provides safety information using the following symbols to prevent accidents resulting in injury or death and the destruction of equipment and resources.

Understand the meanings of these labels to operate the equipment safely.

⚠ **DANGER**	DANGER indicates a hazard with a high-risk level. If this hazardous situation is not avoided, it will result in death or serious injury.
⚠ **WARNING**	WARNING indicates a hazard with a medium risk level. If this hazardous situation is not avoided, it could result in death or serious injury.
⚠ **CAUTION**	CAUTION indicates a hazard with a low risk level. If this hazardous situation is not avoided, it could result in minor or moderate injury.
NOTE	This symbol together with the NOTE signal word alerts the reader to a situation which may cause damage or malfunction to the device, hardware/software, or surrounding property.
INFO	Here you will find additional information or detailed sources of information.

2.Handling Precautions

⚠ WARNING

- Always check that the power supply is turned off before connecting or disconnecting power cables.
- Do not modify the product.
- Always turn off the power before inserting or removing circuit boards or cables.
- This product is not intended for use in aerospace, space, nuclear power, medical equipment, or other applications that require a very high level of reliability. Do not use the product in such applications.
- If using this product in applications where safety is critical such as in railways, automotive, or disaster prevention or security systems, please contact your retailer.
- Do not attempt to replace the battery as inappropriate battery replacement poses a risk of explosion.
- For battery replacement, contact your retailer as it must be performed as a process of repair.
- When disposing of a used battery, follow the disposal procedures stipulated under the relevant laws and municipal ordinances. For details on replacing the battery, refer to the appendix.
- This product is connected to a socket-outlet with earthing connection by means of a power cord.
- This product is not suitable for use in locations where children are likely to be present.

⚠ CAUTION

- Do not use or store this product in a location exposed to high or low temperature that exceeds range of specification or susceptible to rapid temperature changes.
  e.g. - Exposure to direct sun - In the vicinity of a heat source
- Do not use this product in extremely humid or dusty locations. It is extremely dangerous to use this product with its interior penetrated by water or any other fluid or conductive dust. If this product must be used in such an environment, install it on a dust-proof control panel, for example.
- Avoid using or storing this product in locations subject to shock or vibration that exceeds range of specification.
- Do not use this product in the vicinity of devices that generate strong magnetic force or noise. Such products will cause this product to malfunction.
- Do not use or store this product in the presence of chemicals.
- To clean this product, wipe it gently with a soft cloth dampened with either water or mild detergent.

- Do not use chemicals or a volatile solvent, such as benzene or thinner, to prevent pealing or discoloration of the paint.
- This product's case may become hot. To avoid being burned, do not touch that section while this product is in operation or immediately after turning off the power. Avoid installation in a location where people may come into contact with that section.
- Always remove the power cable from the power outlet before mounting or removing an expansion board and before connecting or disconnecting a connector.
- To prevent corruption of files, always shutdown the OS before turning off this product.
- CONTEC reserves the right to refuse to service a product modified by the user.
- In the event of failure or abnormality (foul smells or excessive heat generation), unplug the power cord immediately and contact your retailer.
- To connect with peripherals, use a grounded, shielded cable.
- Component Life:
  1) Battery – The internal calendar clock and CMOS RAM are backed by a Lithium primary battery. The backup time at a temperature of 25°C with the power disconnected is 7 years or more.
  2) HDD – HDD models use the HDD to store the operating system
  3) SSD – SSD models use the SSD to store the operating system.

  * Replacement of expendables is handled as a repair (there will be a charge).
  * The service life for consumable parts are reference values and are not guaranteed values.
  * This product's specifications allow the device to be rebooted from the BIOS screen during startup. This has no effect on operation after the OS boots.

1. FCC PART 15 Class A Notice

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.

FCC WARNING

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

3.Security Warning

When connecting to the network, be aware of security-related problems. See the examples of Security measures below and set up the product properly along with the network devices.

1. Information security risks

- Unauthorized access from the outside through a network could cause the system halt, data damage, or exposure to malware. *1
- Invaded and used as a stepping stone, a device might attack the others through networks. (a victim becomes an assailant)
- Information might leak without realizing due to the connection to the network.
- Secondary damages such as harmful rumors, liability in damages, social credibility fall, and opportunity loss are expected led by the troubles described above.

*1: Malware (Malicious Software) is software that brings harm to a computer system and performs unintended operations.

2. Security measures – e.g.

- Do not keep using the default password. (Refer to the product manual for the password setting).
- Set a strong password.

  Combined with upper and lowercase letters, and numbers so that it cannot be easily analogized by others.

- Change the password periodically.
- Disable unnecessary network services and functions.
- Restrict access to the network with network devices. *2
- Restrict ports to be released on the network with network devices. *2
- Create a closed network connection using such as dedicated network or VPN*3

*2: Inquire for setting procedure to manufacturers.

*3: VPN (Virtual Private Network) a secured network that wards off unauthorized access by protecting the communication path with authentication and encryption.

Unfortunately, there are no perfect ways to avert unauthorized access or close a security hole that are endlessly found day and night.

Please understand that risks are always involved with the Internet connection, and we strongly recommend a user should constantly update information security measures.

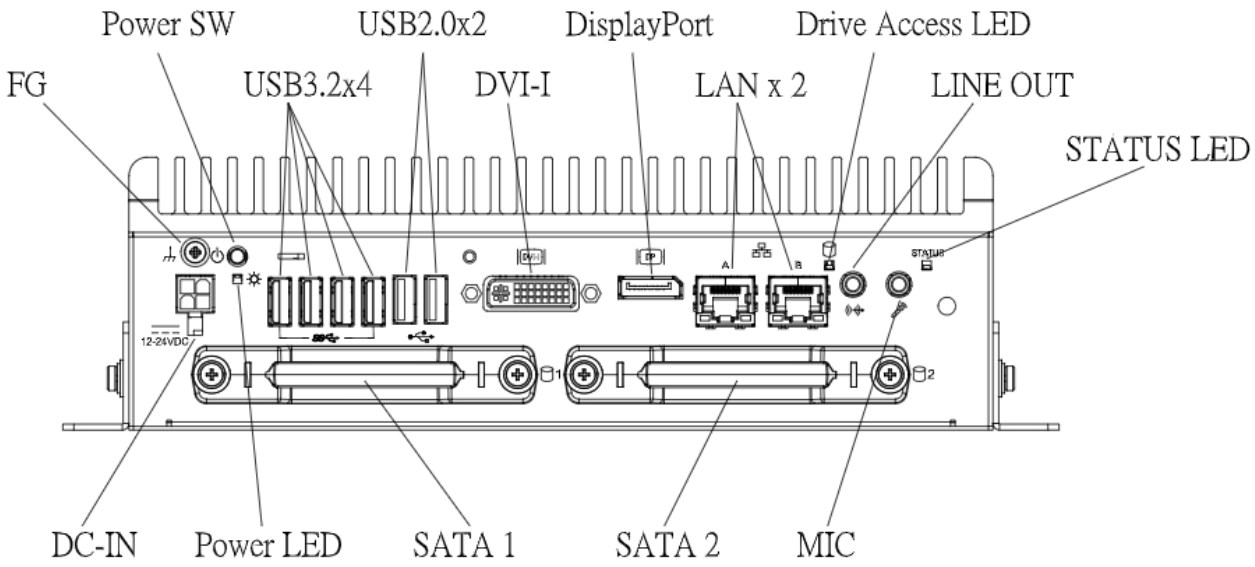
Product Nomenclature and Function

This section describes product component names and their functions, pin assignment of each connector.

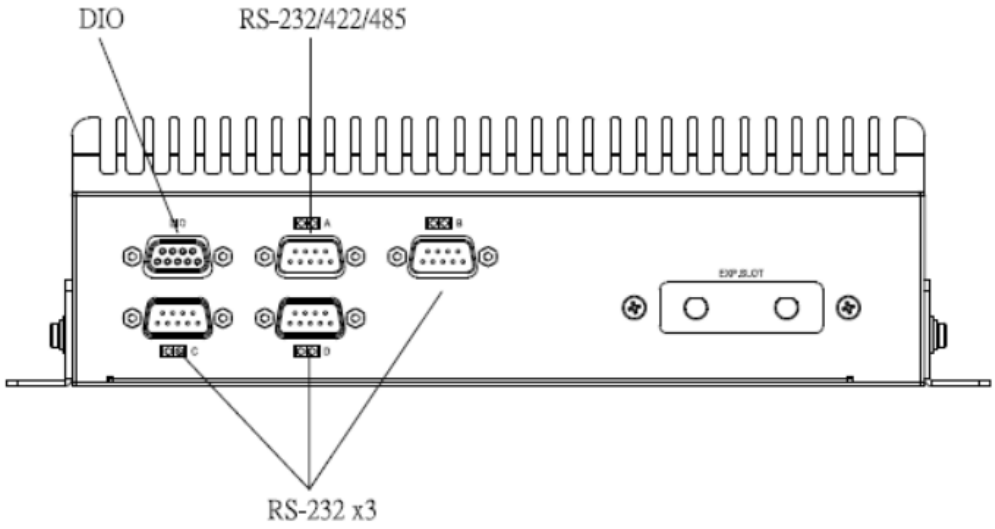
1.Nomenclature of Product Components

Component names of the product are shown in the figure below.

◆ Front View



◆ Rear View



Name	Function
Front	
POWER LED	Power ON indicator LED
STATUS LED	Status LED
DISK ACCESS LED	Disk access indicator LED
DC-IN	DC power input connector
POWER SW	Power switch
MIC IN	Mic in (Ø3.5 PHONE JACK)
LINE OUT	Line out (Ø3.5 PHONE JACK)
DVI-I	Display (29 pin, female)
DISPLAY PORT	Display (20 pin, female)
USB3.0	USB3.2 (Gen 2×1) port TYPE-A connector x 4
USB2.0	USB2.0 port TYPE-A connector x 2
LAN A	Ethernet 1000BASE-T/100BASE-TX/10BASE-T RJ-45 connecter
LAN B	Ethernet 1000BASE-T/100BASE-TX/10BASE-T RJ-45 connecter
HDD/SSD	2.5” SATA HDD slot
Rear	
SERIAL A	RS232C/422/485 connector (9pin D-SUB, male)
SERIAL B	RS232C connector (9pin D-SUB, male)
SERIAL C	RS232C connector (9pin D-SUB, male)
SERIAL D	RS232C connector (9pin D-SUB, male)
DIO	General-purpose I/O connector (9 pin D-SUB, female)

2.Description of Product Components

Components such as connectors, switches are described.

1. LED

There are 3 LEDs in front of this product.

Function	Status	Description
POWER LED	OFF	Indicates that this product is switched off.
	ON (Green)	Indicates that this product is switched on.
Access LED	ON (Orange)	Indicates that the SATA device is being accessed.
Status LED	OFF	You can control the behavior of LED from the used application. *1
	ON (Red)	You can control the behavior of LED from the used application. *1
*1: API that controls Status LED is available. For more information, visit CONTEC's website.		

2. DC Power Input Connector: DC-IN

To supply the power, always use the power supply listed below.

Rated input voltage: 12 - 24 VDC

Range of input voltage: 10.8 – 26.4 VDC

Power capacity: 24V 5A or more

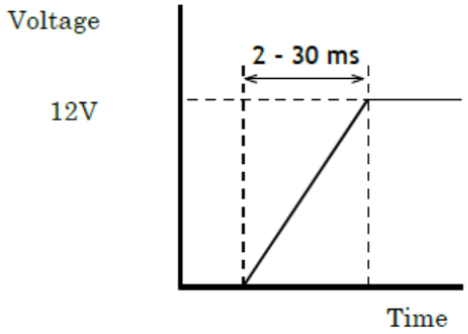
Connector type	9360-04P (mfd. by ALEX)	
	Pin No.	Signal name
	1	GND
	2	GND
	3	12 - 24V
	4	12 - 24V

Applicable connector on the connector side

Housing: Housing: 9357-04 (mfd. by ALEX) or 5557-04R (mfd. by MOLEX)

Contact: 4256T2-LF (AWG18-24) (mfd. by ALEX) or 5556 (AWG18-24) (mfd. by MOLEX)

Rise time of power supply



3. Power SW

Power SW is provided

4. LINE OUT Interface: LINE OUT

The product is equipped with a connector for line output. As such, headphones or an amplified speaker can be connected.

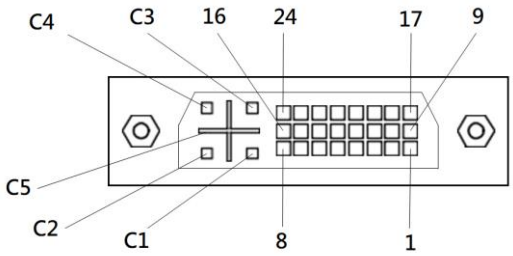
5. MIC IN Interface: MIC

The product is equipped with a connector for microphone input. As such, a microphone can be connected for voice input.

6. DVI-I Interface

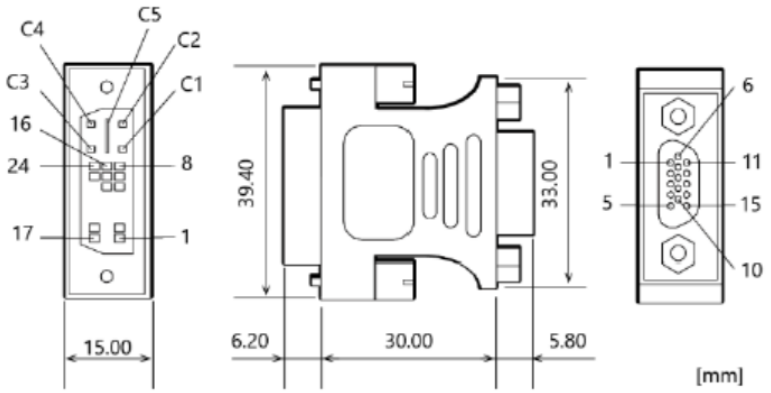
A DVI-I interface is provided. A CRT display (or a 15-pin D-SUB CRT when the included DVI–Analog RGB conversion adapter is used) or a flat-panel display from CONTEC can be connected. The connector name is DVI (DVI-I 29 pin).

Connector type	DVI-I 29 pin



Pin No.	Signal name	Pin No.	Signal name	Pin No.	Signal name
1	DATA2-	13	N.C.	C1	RED
2	DATA2+	14	+5V	C2	GREEN
3	DATA2 SHIELD	15	GND	C3	BLUE
4	N.C.	16	HPD	C4	HSYNC
5	N.C.	17	DATA0-	C5	GND
6	DDC CLK	18	DATA0+		
7	DDC DATA	19	DATA0 SHIELD		
8	VSYNC	20	N.C.		
9	DATA1-	21	N.C.		
10	DATA1+	22	DATA0 SHIELD		
11	DATA1 SHIELD	23	CLK+		
12	N.C.	24	CLK-		

Connector	DVI-I



Analog RGB signals

Pin No.	Signal name	Pin No.	Signal name
1	RED	9	+5V
2	GREEN	10	GND
3	BLUE	11	N.C.
4	N.C.	12	DDC DATA
5	GND	13	HSYNC
6	GND	14	VSYNC
7	GND	15	DDC CLK
8	GND		

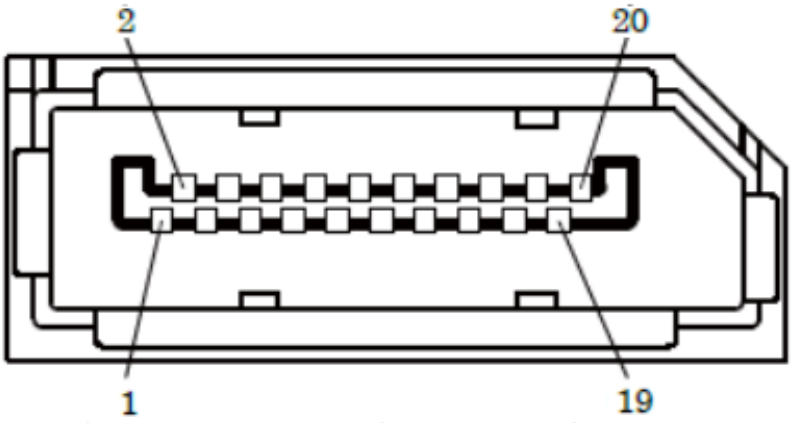
⚠ CAUTION

- If the OS is booted without connecting the display cable to the DVI interface, and then the display is connected after the OS boots, the display may not be shown properly.
- When the analog display is used, Windows MS-DOS may not be properly displayed in full-screen mode.
  This is because the frequency and resolution of Windows and MS-DOS (full-screen display) are the same due to the screen settings while the display parameters are different.
  For display, as only one parameter can be stored for one frequency or resolution, only either of Windows or MS-DOS screen can be displayed properly.
  In this case, change the resolution or display frequency of Windows so that it is not the same as for the MS-DOS display.
- When using a digital display, an analog display may be detected even though no analog display is connected.
- This will not affect how the digital display appears. However, change the multi-display settings as necessary
- To change the settings from digital output to analog output, change the settings from the standard Windows properties screen

7. Display Port Interface

A display port interface is provided. As such, a display equipped with a Display Port can be connected.

Connector type	Display Port 20 pin



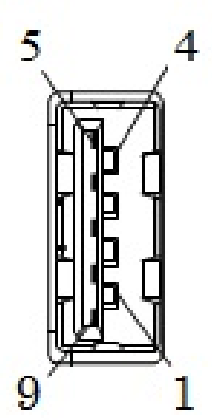
Pin No.	Signal name	Pin No.	Signal name
1	Lane0+	2	GND
3	Lane0-	4	Lane1+
5	GND	6	Lane1-
7	Lane2+	8	GND
9	Lane2-	10	Lane3+
11	GND	12	Lane3-
13	GND	14	GND
15	Aux+	16	GND
17	Aux-	18	HotPlug
19	GND	20	3.3V

⚠ CAUTION

- When using a digital display, an analog display may be detected even though no analog display is connected. This will not affect how the digital display appears. However, change the multi-display settings as necessary.
- To change the settings from digital output to analog output, change the settings from the standard Windows properties screen.

8. USB3.2 (Gen 2×1) Port

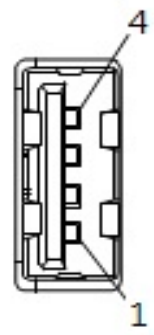
This product is equipped with 4 channels for USB 3.0 TYPE-A interface.



Pin No.	Signal name
	USB3.2
1	USB_VCC
2	DATA-
3	DATA+
4	USB_GND
5	SSRX-
6	SSRX+
7	USB_GND
8	SSTX-
9	SSTX+

9. USB2.0 Port

This product is equipped with 2 channels for USB 2.0 TYPE-A interface.



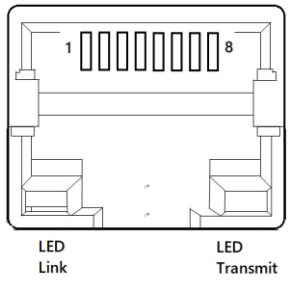
Pin No.	Signal name
	USB2.0
1	USB_VCC
2	DATA-
3	DATA+
4	USB_GND

10. Gigabit-Ethernet

This product is equipped with 2 ports for gigabit.

- Network Type: 1000 BASE-T/ 100 BASE-TX/ 10 BASE-T
- Transmission Speed*1: 1000M/ 100M/ 10M bps
- Max. network path length: 100m/ segment
- Controller: LAN A: LAN-A: Intel® Ethernet Connection I219-LM
  LAN-B: Intel® Ethernet Connection I210-AT

*1 Use a category 5e cable for 1000Mbps operation.



Pin No.	Function	
	100BASE-TX	1000BASE-T
1	TX+	TRD+(0)
2	TX-	TRD-(0)
3	RX+	TRD+(1)
4	N.C.	TRD+(2)
5	N.C.	TRD-(2)
6	RX-	TRD-(1)
7	N.C.	TRD+(3)
8	N.C.	TRD-(3)

LEDs for display of network status:

Left LED	Operation LED 10Mbps: Off 100Mbps: Green 1000Mbps: Orange
Right LED	Link LED Normal connection: Lighting (Green) Operation: Blinking (Green)

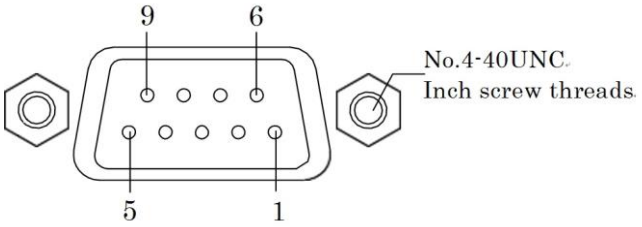
⚠ CAUTION

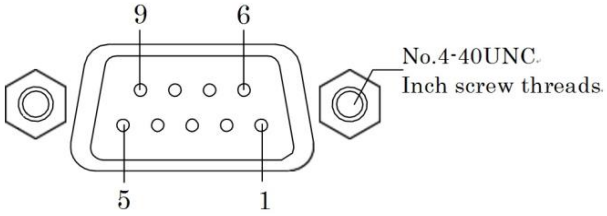
- If you are using an operating system other than the operating system of the preinstalled model, LAN-1 and LAN-2 may not be assigned to the silkscreen-printed “LAN-A” and “LAN-B”.
- Attention should to be paid to the guaranteed operating range of temperature in using 1000BASE-T. For more details on this, refer to chapter 3, Installation Requirements.

11. Serial Port Interface: Serial A, B, C, D

The product has 3 channels of RS-232C and 1 channel of RS-232C/422/485 compliant serial ports supporting up to a baud rate of 115,200bps with a 16-byte transmission-dedicated data buffer and a 16-byte reception-dedicated data buffer. You can use "Chapter 4 BIOS Setup" to configure an I/O address, interrupt and unused state for each of the ports independently. (The same I/O address and IRQ cannot be shared with any other device.)

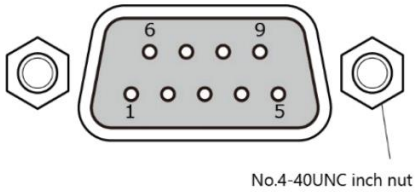
SERIAL	I/O address	Interrupt
A	3F8h - 3FFh	IRQ 4
B	2F8h - 2FFh	IRQ 3
C	3E8h - 3EFh	IRQ 7
D	2E8h - 2EFh	IRQ 5

Connector type	9-pin D-SUB (MALE)		
			
Pin No.	Signal name	Meaning	Direction
1	CD	Carrier detect	Input
2	RD	Received data	Input
3	TD	Transmitted data	Output
4	DTR	Data terminal ready	Output
5	GND	Signal ground	-----
6	DSR	Data set ready	Input
7	RTS	Request to send	Output
8	CTS	Clear to send	Input
9	RI	Ring indicator	Input

Connector type	9-pin D-SUB (MALE)		
			
Pin No.	RS-232C	RS-422	RS-485
1	DCD	TX-	TX-/RX-
2	RX	TX+	TX+/RX+
3	TX	RX+	---
4	DTR	RX-	---
5	GND	GND	GND
6	DSR	RTS-	---
7	RTS	RTS+	---
8	CTS	CTS+	---
9	RI	CTS-	---

12. DIO Port

The product is equipped with an interface to which you can connect a remote switch and a GPIO device. GPIO is not isolated.

Connector type		9-pin D-SUB (FEMALE)
		
Pin No	Signal name	Meaning
1	POWER SW (+)	Remote power switch. Contacting (+) and (–) - makes the operation act like POWER SW.
2	POWER SW (-)	
3	GND	Ground
4	GPIO0	General-purpose I/O Input and output can be selected respectively
5	GPIO1	
6	GPIO2	
7	GPIO3	
8	GPIO4	
9	GPIO5	

Item		Spec
The number of I/O channel		6 (Input and output can be selected with the BIOS settings.)
Input section		
	Input format	Non-isolated 3.3 VTTL level (positive logic; with internal 3.3 V standby, 1 kΩ pull-up)
Output section		
	Output format	Non-isolated 3.3 VTTL level (positive logic; with internal 3.3 V standby, 1 kΩ pull-up)
	Maximum rating	3.3VDC 12mA

Usage method

When controlling the general purpose, I/O ports GPIO0 to GPIO5 and when using I/O, set the data to I/O port addresses 02A8h to 02AAh.

Usage procedure

1) GPIO selection … Set port 02A8h to "04h" in order to enable the control of GPIO0 to GPIO5 with port 02A9h.
2) I/O mode setting … Input data to port 02A9h to set the I/O mode of GPIO0 to GPIO5.
3) I/O … Use port 02AAh to perform I/O.

Register supplemental explanation

02A8h port: General purpose I/O selection register

GPIO0 to GPIO5 use ports GP40 to GP45 of the NCT6106D Super I/O chip (NUVOTON).

Set "06h" to control I/O of GPIO0 to GPIO5.

02A9h port: General purpose I/O switch register

D7	D6	D5	D4	D3	D2	D1	D0	w
—	—	IOR5	IOR4	IOR3	IOR2	IOR1	IOR0	

02AAh port: General purpose I/O register

D7	D6	D5	D4	D3	D2	D1	D0	R/W
—	—	GPIO5	GPIO4	GPIO3	GPIO2	GPIO1	GPIO0	

Input mode: Read the data from GPIO0 to GPIO5. Even if you set values on GPIO ports Specified as input mode, these values will be ignored.

Output mode: Set the data to output from GPIO0 to GPIO5.

Example: With GPIO0 to GPIO2 set to input mode and GPIO3 to GPIO5 set to output mode, to set GPIO3 output and GPIO4 output to "1" and GPIO5 output to "0," specify "0001 1000" ("18h") or "0001 1111" ("1Fh").

Input mode: Set IOR0 to IOR5 to "1".

Output mode: Set IOR0 to IOR5 to "0".

Example 1:

To set GPIO4 to input mode and all the other GPIO ports to output mode, specify "0001 0000" ("10h").

Example 2:

To set GPIO2 and GPIO5 to input mode and all the other GPIO ports to output mode, specify "0010 0100" ("24h").

`

Hardware Setup

This section describes how to install, connect, and set up the product.

1.Before Using the Product for the First Time

Follow the next steps to set up this product:

STEP1 By referring to the information in this section, install, connect and set up this product.

STEP2 Connect cables.

Connect the cable of necessary external devices, such as keyboard and a display, to this product using appropriate cables.

STEP3 Turn on the power.

After verifying that you have correctly followed steps 1 and 2, turn on the power.

If you find any abnormality after turning on the power, turn it off and check to see if the setup has been performed properly.

STEP4 Set up BIOS.

By referring to **"BIOS Setup (page43)"**, set up BIOS. This setup requires a keyboard and a display.

※ Before using this product, be sure to execute "Restore Defaults" to initialize the BIOS settings to their default values.

⚠CAUTION

- Be sure to connect the keyboard and mouse to it before turning the power on for the first time.
- Be sure to connect the display before turning the power on. Connecting the display after turning the power on may prevent it from being displayed properly.

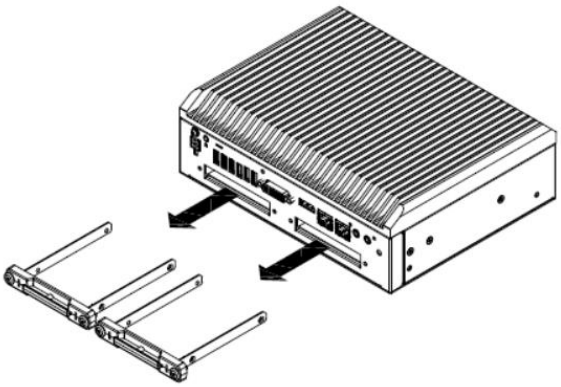
2.Hardware Setup

- Before you start, be sure that the power is turned off.
- Remove only those screws that are explained. Do not move any other screws.
- You can equip the product with slot-in type 2.5-inch SATA storage.

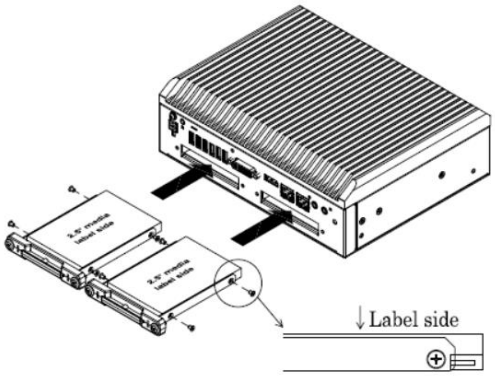
1. Attaching the HDD and SSD

1) Remove the hard disk bracket from the main body.
2) Attach the hard disk or SSD to the hard disk bracket and secure it by tightening the four screws.
3) Inset the hard disk bracket with the hard disk or SSD attached into the main body and endure it by tightening the screw.

(1) Removing the Hard Disk Bracket



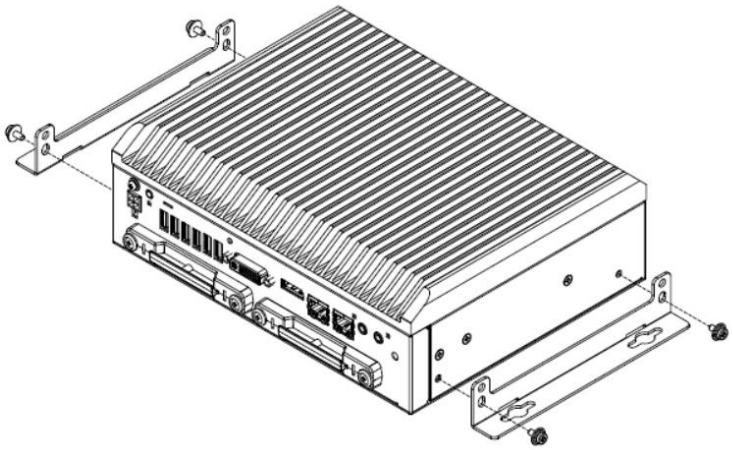
(2) Installing the Hard Disk to the Bracket



Make sure to install the disk in the correct direction!

2. Attaching the Attachment Fittings

Use the screws to attach the bundled attachment fittings with a screw. Do not tighten screws with excess force.

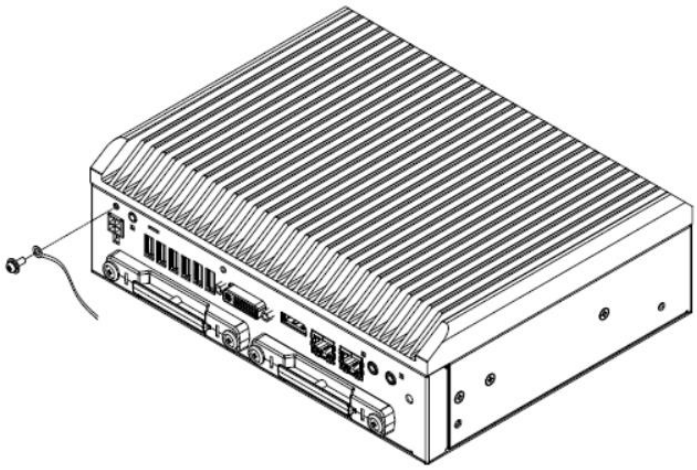


⚠CAUTION

- Screw holes may be damaged if screws are tightened with a torque greater than the specified torque. The specified tightening torque is 5 - 6kgf･cm.

3. Attaching the FG

Use screws to attach the FG.



⚠CAUTION

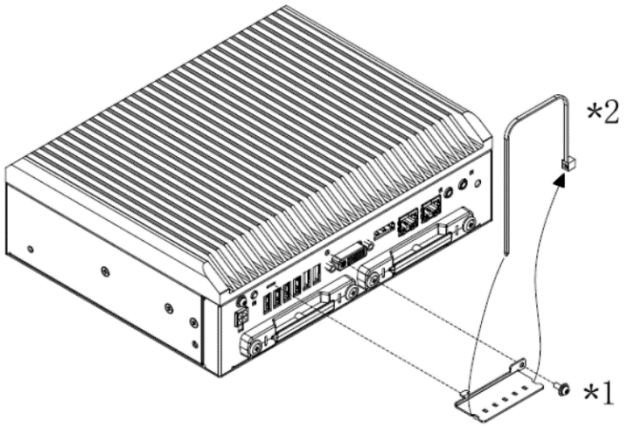
- The FG pin of this product is connected to the GND signal of the DC power connector (DC-IN).
- Note that the connection cannot be cut off.
- Screw holes may be damaged if screws are tightened with a torque greater than the specified torque. The specified tightening torque is 5 - 6kgf･cm.

4. Fastening the Cable

This produce comes with clamps for fixing cables.

Fastening the USB cable.

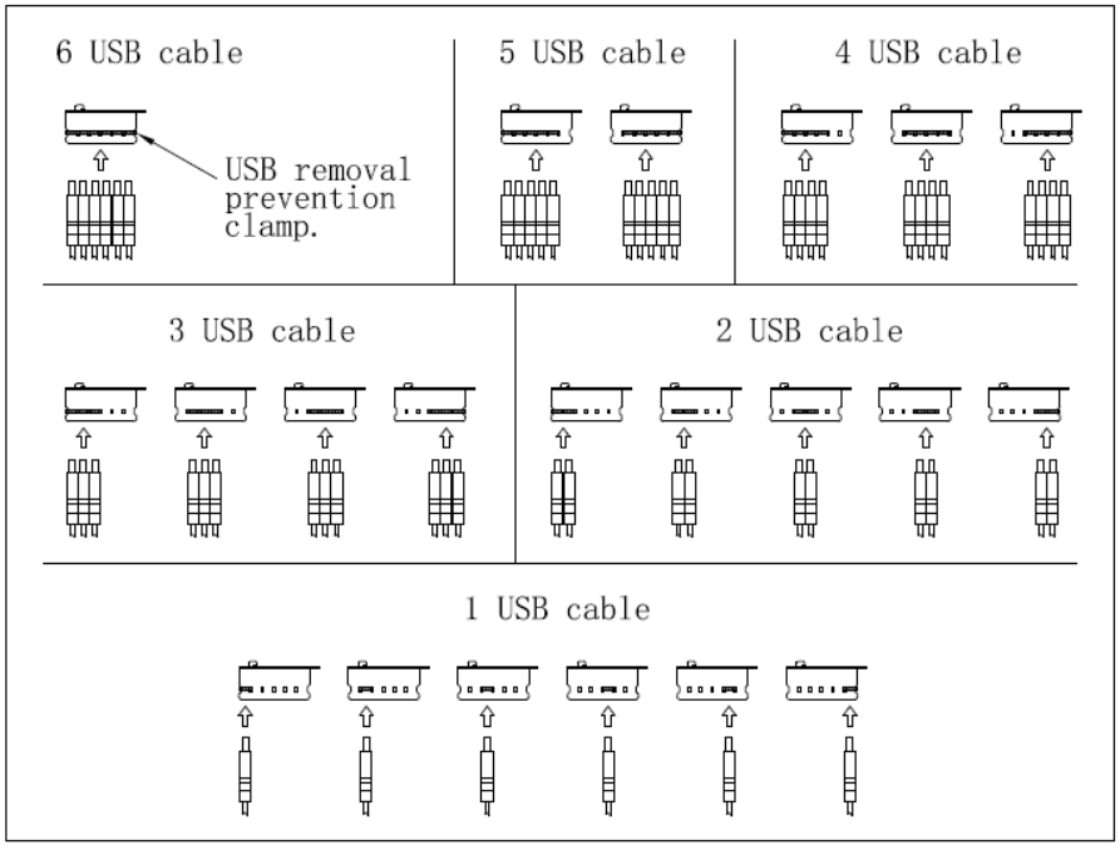
1) The system unit has a hole for attaching cable clamp[*2] to USB[*1] removal prevention fitting. Using a cable clamp for a cable with lock-less connector, such as the USB cable, prevents the connector from being unplugged. Use the cable ties and cable clamps appropriately according to the connecting states and wiring directions of cables.



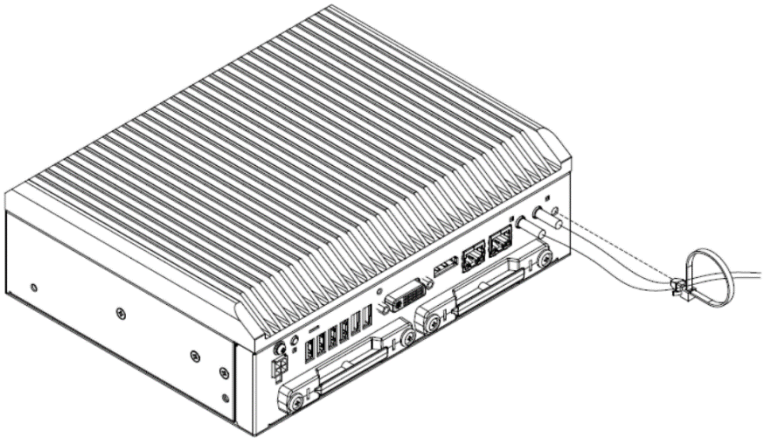
[*1] Attached screw (M3 x 6)

[*2] Attached USB removal prevention clamp.

No. of connected USB cables and winding patterns (removal prevention fitting viewed from above).



2) The photo below shows an example of using a cable clamp. Fix the cable with a clamp without applying stress to the connector.



5. Installation Requirements

There are limits to the ambient temperature range depending on the installation orientation.

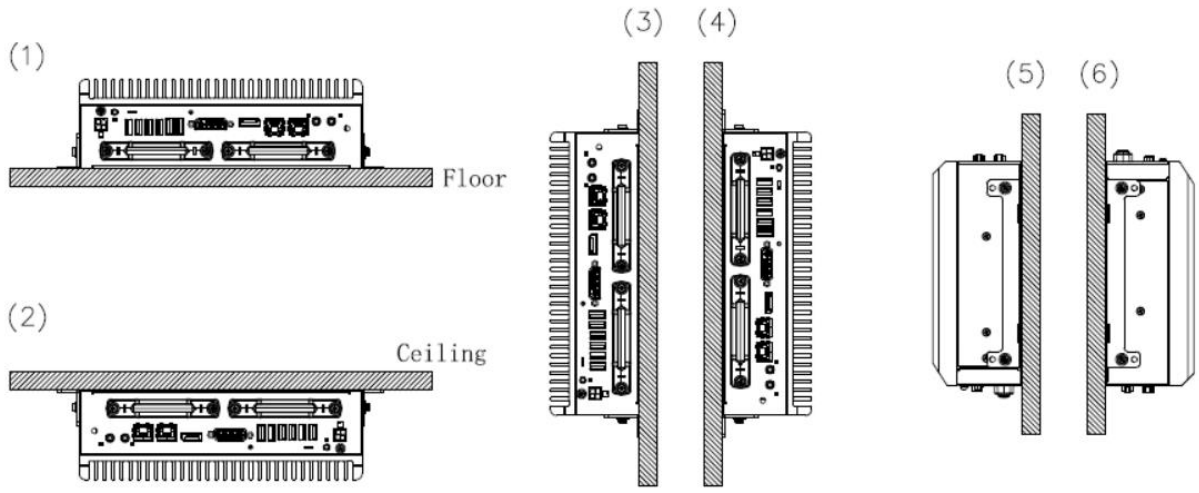
Be sure that the operating temperature is within the range specified in the installation environment requirement by making space between the product and device that generates heat or exhaust air.

BX-S3300 Series

Installable directions at operating temperature

0°C~50°C with Air Flow: 0.7 m/s (w/ Standard Temp. SSD)

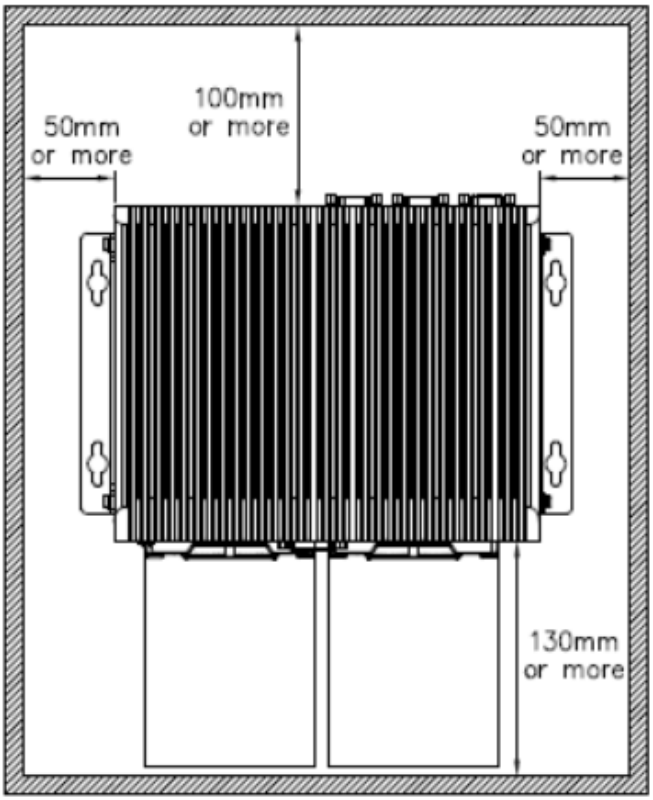
0°C~40°C with Air Flow: 0.7 m/s (w/ Standard Temp. HDD)



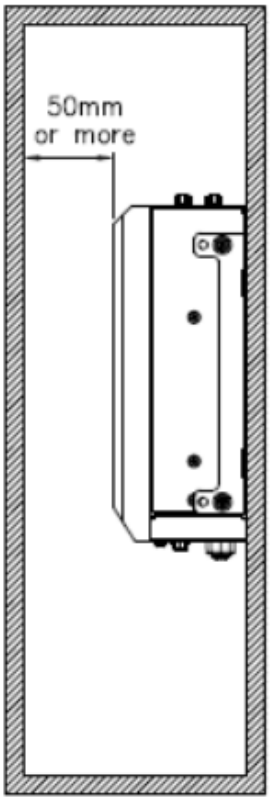
⚠ CAUTION

- Note that even though the ambient temperature is within the specified range, an operational malfunction may occur if there is other device generating high heat; the radiation will influence the product to increase its temperature.

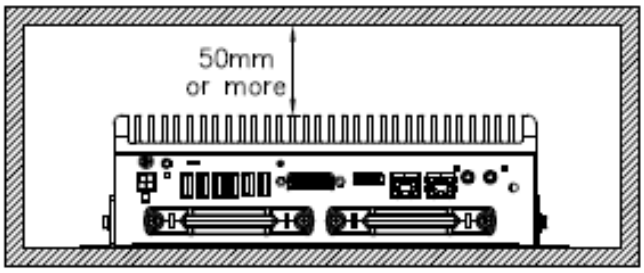
Distances between this product and its vicinity



- Vertical installation



- Horizontal installation



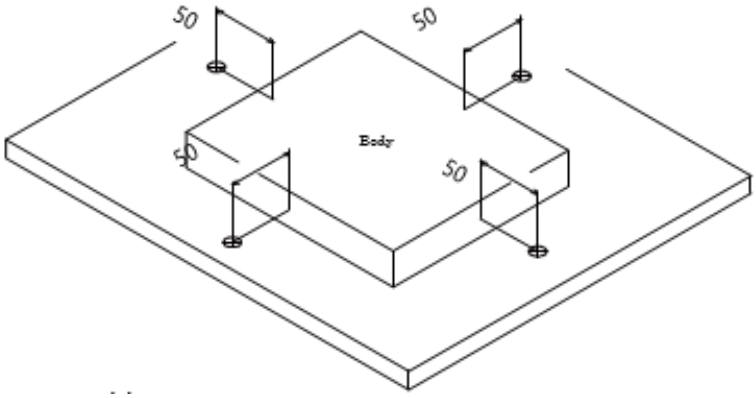
⚠ CAUTION

- Wall temperatures should be within the guaranteed operating temperature range of the product.
- Adjust the air flow so as not to allow waste heat from the product to accumulate around the product.
- Do not install this product in completely sealed spaces, except when it is possible to adjust the internal temperature using an air conditioner or similar equipment. Temperature increase caused by long-term usage may result in operational malfunction or other problems.

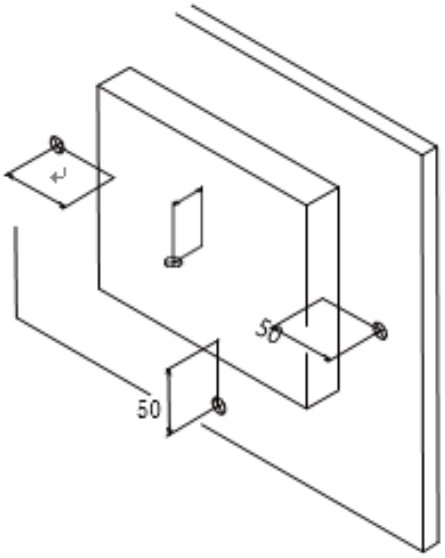
Operating temperature

In this product, the operating temperature is decided from the multiple measurement points as shown below. When making use of the product, the air current should be adjusted to prevent that all the temperatures measured at the measurement points exceed the specified temperature.

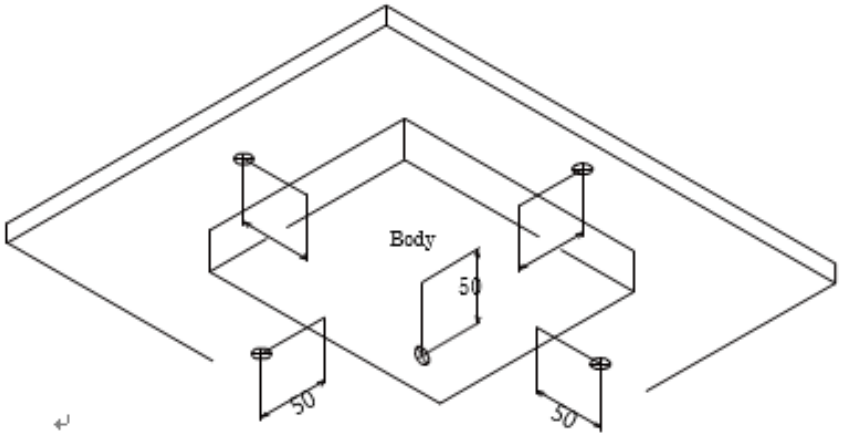
- Ground conditions 1



- Ground conditions 2 to 5



- Ground conditions 6



BIOS Setup

This section describes AMI's Setup program built into the FLASH ROM BIOS.

1.Introduction

This chapter discusses American Megatrends' (AMI) Setup program built into the FLASH ROM BIOS. The Setup program allows users to modify the basic system configuration. This special information is then stored in FLASH ROM so that it retains the Setup information when the power is turned off.

The rest of this chapter is intended to guide you through the process of configuring your system using Setup.

1. Starting Setup

The AMI BIOS is immediately activated when you first power on the computer. The BIOS reads the system information contained in the FLASH ROM and begins the process of checking out the system and configuring it. When it finishes, the BIOS will seek an operating system on one of the disks and then launch and turn control over to the operating system.

While the BIOS is in control, the Setup program can be activated in one of two ways:

- By pressing <Del> or <ESC> immediately after turning on the pc.
- By pressing the <Del> or <ESC> key when the following message appears on the screen during the POST (Power On Self-Test).

  Press <DEL> or <ESC> to enter setup.

  If the message disappears before you respond and you still wish to enter Setup, restart the system to try again by turning it OFF then ON. You may also restart by simultaneously pressing <Ctrl>, <Alt>, and <Delete> keys.

2. Using Setup

In general, you use the arrow keys to highlight items, press <Enter> to select, use the PageUp and PageDown keys to change entries, press <F1> for help and press <Esc> to quit. The following table provides more detail about how to navigate in the Setup program using the keyboard.

Key	Function
Up Arrow	Move to the previous item
Down Arrow	Move to the next item
Left Arrow	Move to the item on the left (menu bar)
Right Arrow	Move to the item on the right (menu bar)
ESC	Main Menu: Quit without saving changes Submenus: Exit Current page to the next higher-level menu
Move Enter	Move to the item you desired
+	Increase the numeric value or make changes
-	Decrease the numeric value or make changes
F1	General help on Setup navigation keys
F2	Load the previous setting.
F3	Load the optimized defaults from BIOS default table
F4	Save all the changed settings to the FLASH ROM and exit

3. Getting Help

Press F1 to pop up a small help window that describes the appropriate keys to use and the possible selections for the highlighted item. To exit the Help Window press <Esc> key or the F1 key again.

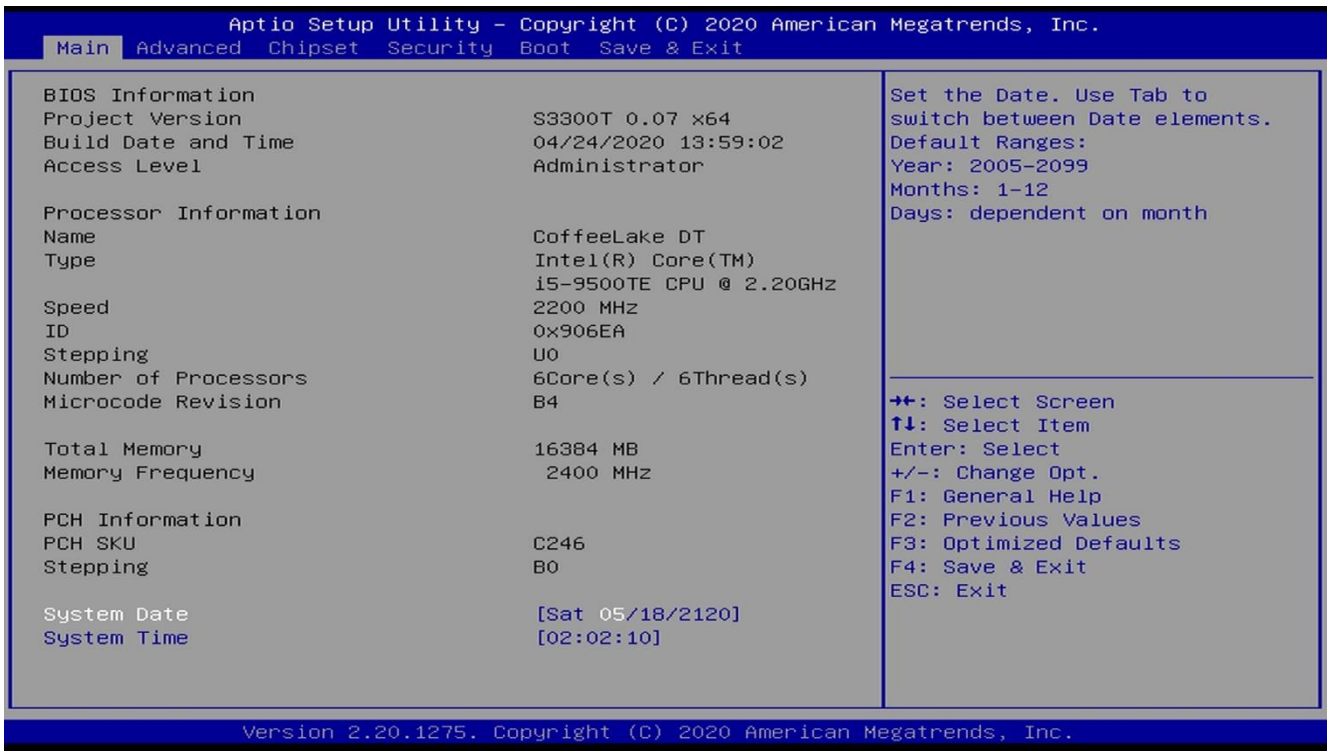
4. In Case of Problems

If you cannot boot the computer after using Setup to change and save system settings, the computer will have to be repaired. It is safest not to change system settings you do not fully understand. Therefore, it is strongly recommended that you do not change any of the default settings for the chipset. These defaults have been selected with sufficient consideration by the AMI and system manufacturers to ensure maximum performance and reliability. Even changing the chipset settings slightly can result in an unavoidable need for repairs.

5. A Final Note About Setup

The information in this section is subject to change without notice.

2.Main Menu



When the setup program (Aptio Startup Utility) is started, the main menu will be displayed. Navigate through the various tabs by pressing the right and left arrow keys.

1. Setup Items

The selectable tabs are as follows.

Main

View the basic system structure and configure the language settings and the date and time settings.

Advanced

Specify the detailed functions that can be set on the system used.

Chipset

Specify the detailed functions that can be set on the system used.

Security

Set the password to be used to protect the security of the system.

Boot

Configure the settings related to how the system will boot.

Save & Exit

Load/ save setup items and exit the setup menu.

3.Main

View the basic system structure. The following items are displayed.

Indication item of the main menu

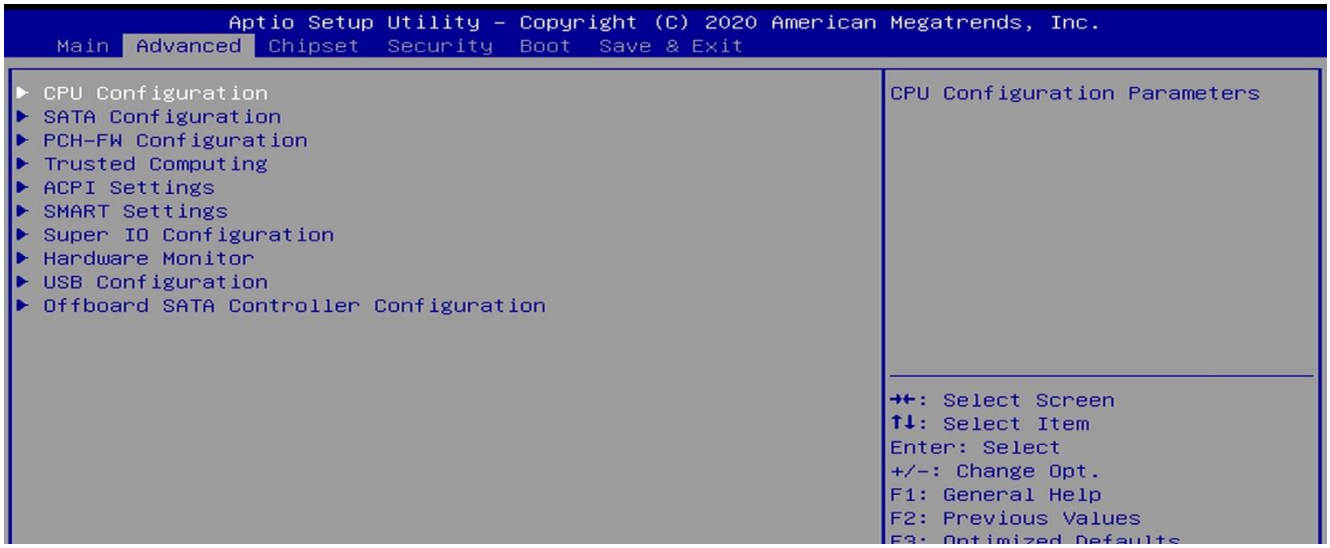
Item	Indication Example	Explanation
Project Version	S3300T x.xx x64	Displays the BIOS version.
Build Date and Time	xx/xx/xxxx xx:xx:xx	Displays the BIOS creation date and time.
Access Level	Administrator	Displays the access rights level.

Main Menu Selections

Item	Option	Description
System Date	Week Day Month / Day / Year	Set the system date. Note that the 'Day' automatically changes when you set the date
System Time	Hour: Minute: Second	Set the system time

4.Advanced

Specify the detailed system functions. The following items are available.



CPU Configuration

Configure the CPU settings.

SATA Configuration

Configure the SATA controller settings.

PCH-FW Configuration

Configure the management engine technology parameters.

Trusted Computing

Configure the trusted computing settings.

ACPI Settings

Configure the ACPI settings.

SMART Settings

Configure the SMART settings.

Super IO Configuration

Configure the Super IO settings.

Hardware Monitor

View such information as the CPU temperature.

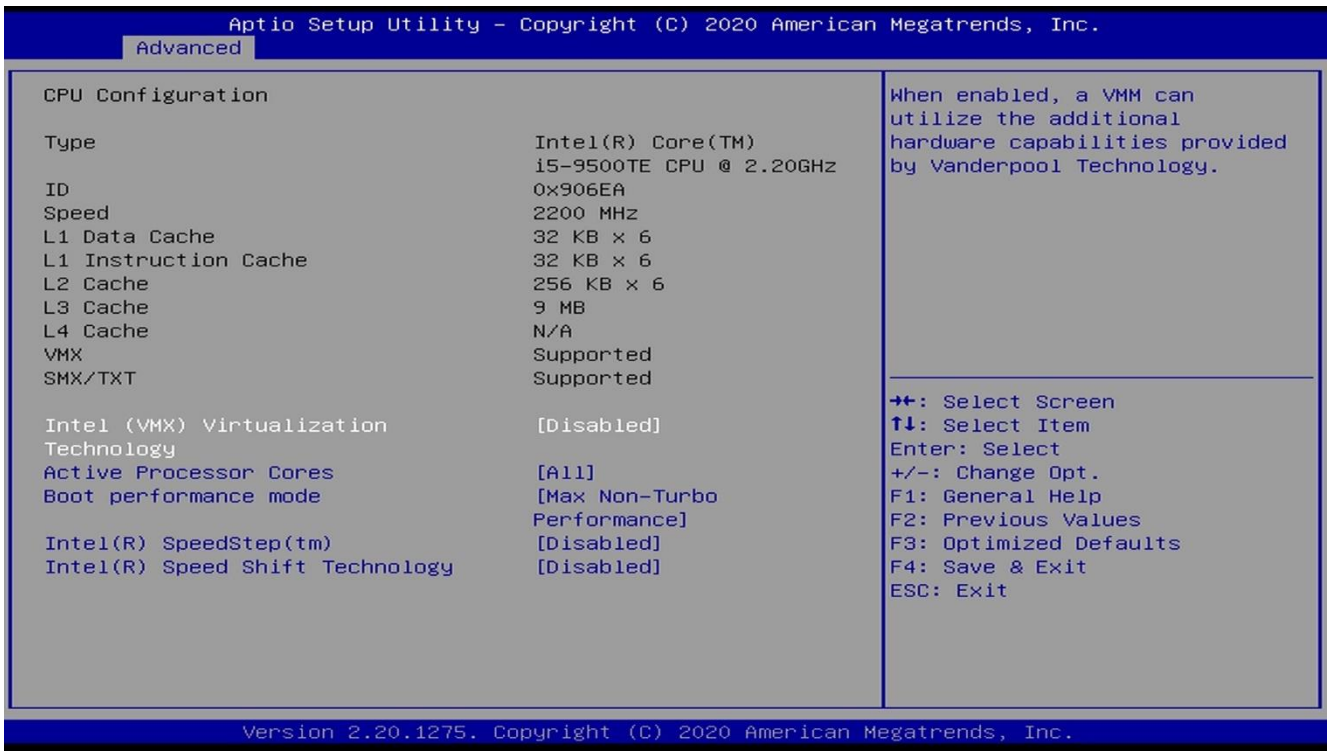
USB Configuration

Configure the USB settings.

Offboard SATA Controller Configuration

Configure the SATA Controller settings.

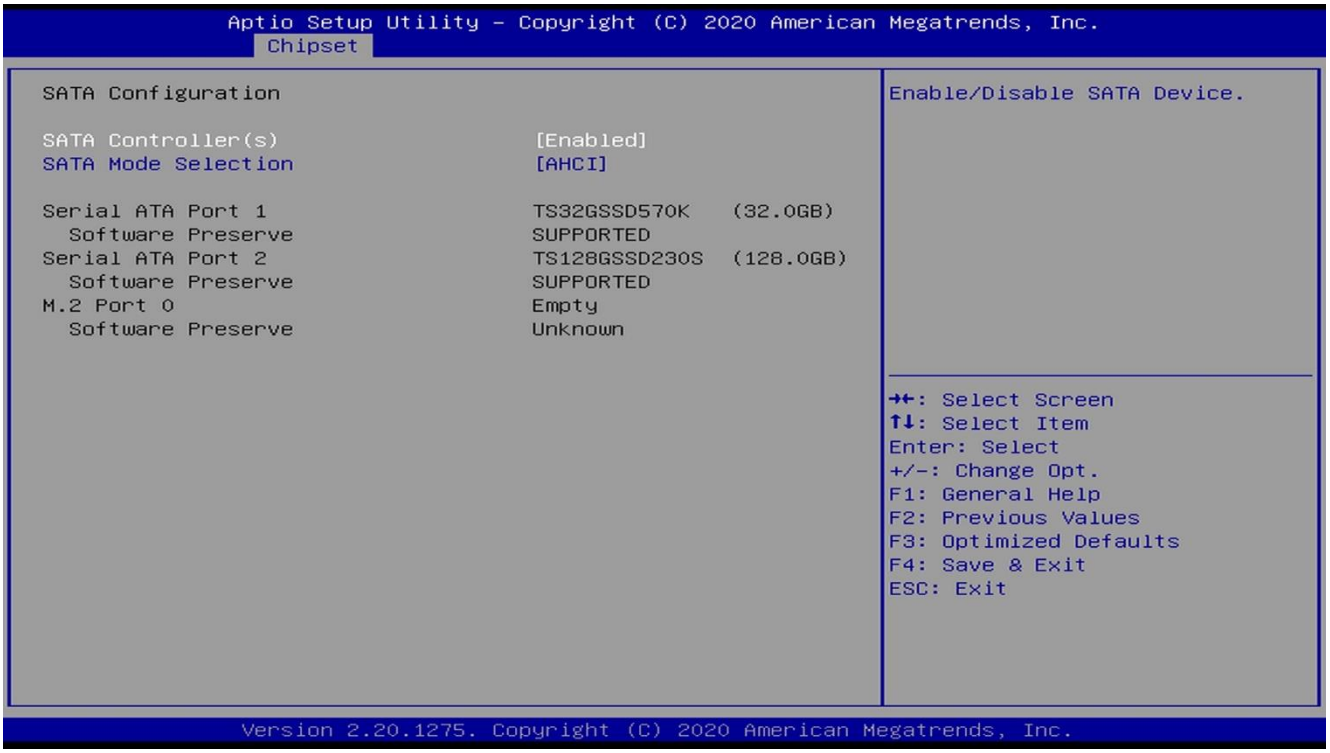
1. CPU Configuration



CPU Configuration

Item	Options	Description
Intel (VMX) Virtualization Technology	Enabled [Disabled]	Do not change this setting.
Active Processor Cores	[All] 1 2 3	Do not change this setting.
Boot performance mode	Max Battery [Max Non-Turbo Performance] Turbo Performance	Do not change this setting.
Intel(R) SpeedStep(tm)	Enabled [Disabled]	Do not change this setting.
Intel(R) Speed Shift Technology	Enabled [Disabled]	Do not change this setting.

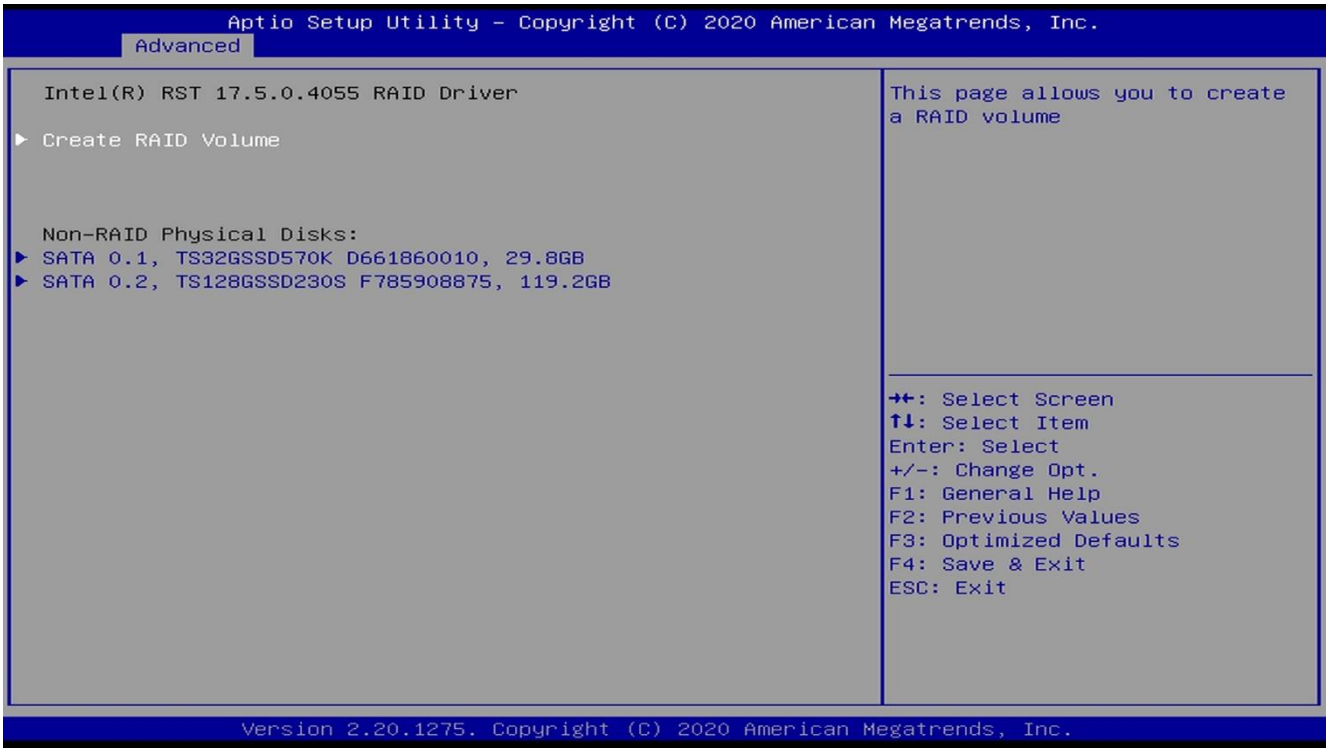
2. SATA Configuration



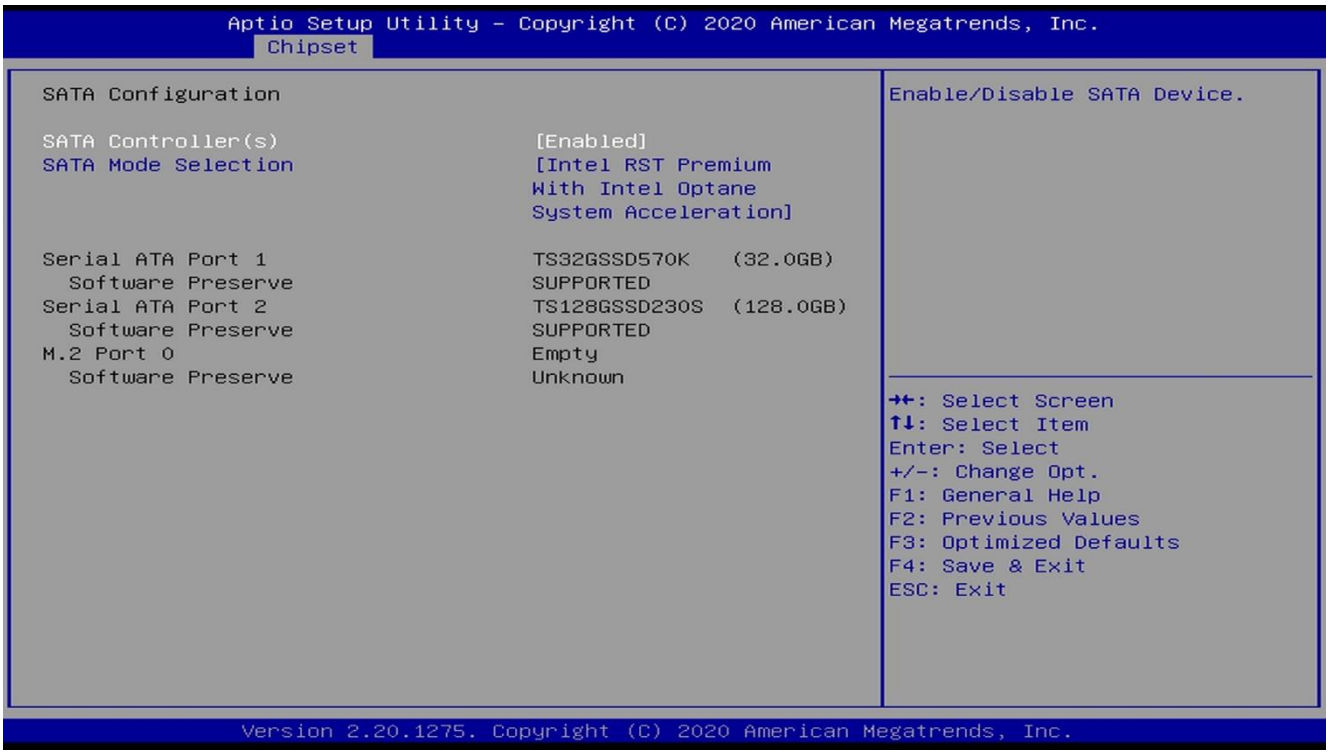
SATA Configuration

Item	Options	Description
SATA Controller(s)	Enabled Disabled	Configure the SATA device.
SATA Mode Selection	AHCI Intel RST Premium	Determines how SATA controller(s) operate.

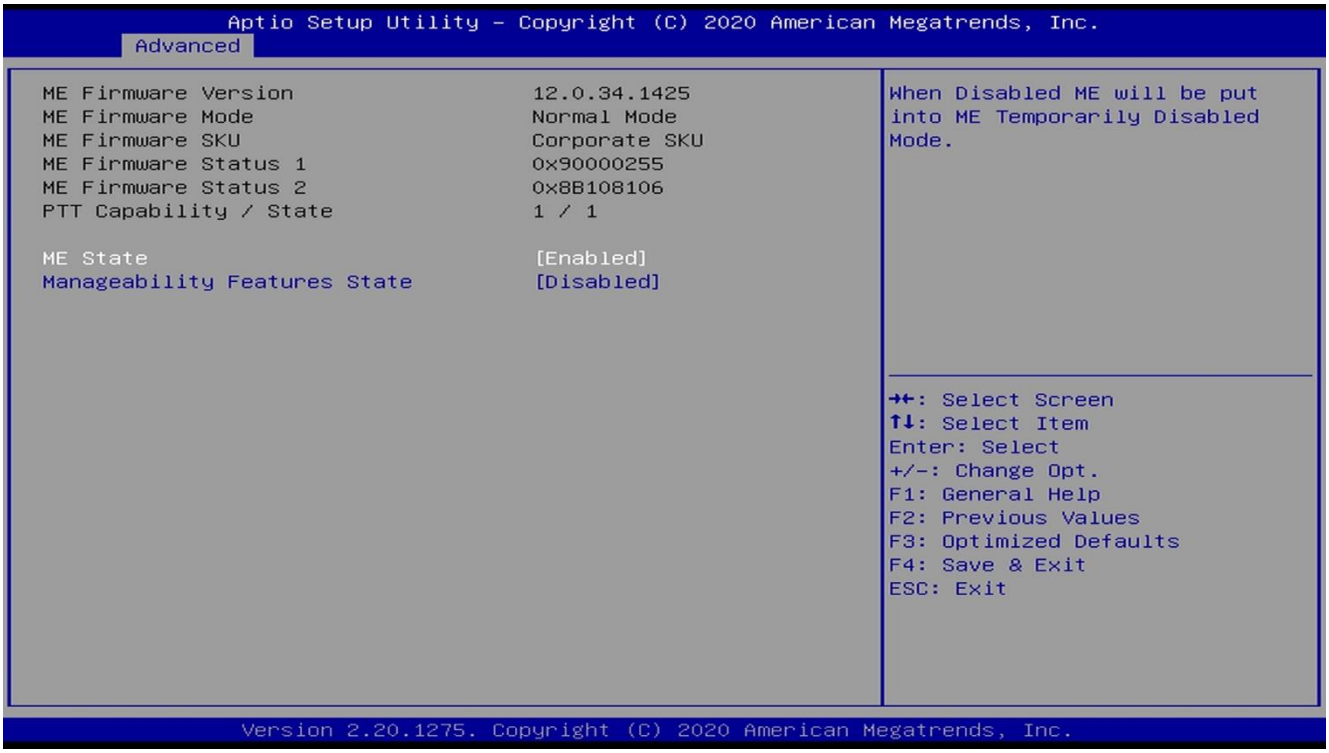
RAID setting



SATA Mode selection change to Intel RST Premium



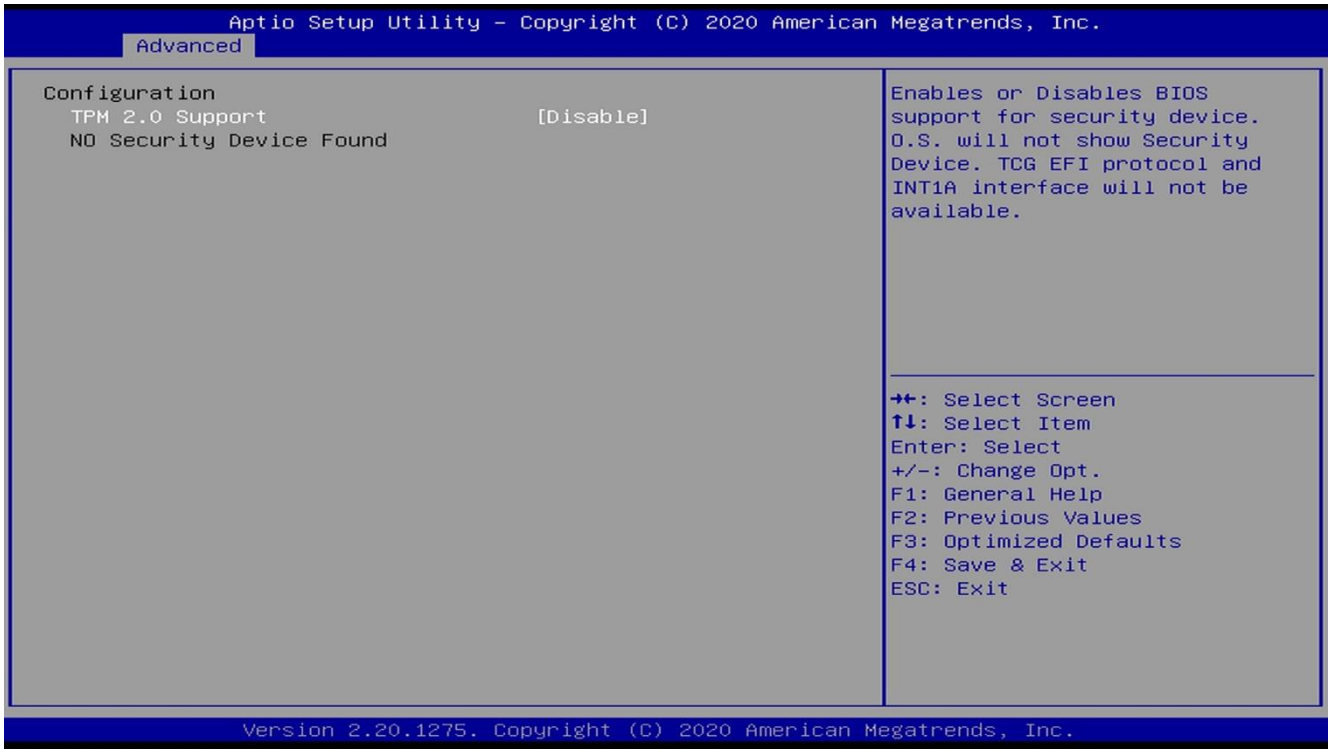
3. PCH-FW Configuration



PCH-FW Configuration

Item	Options	Description
ME State	[Enabled] Disabled	Do not change this setting.
Manageability Features State	Enabled [Disabled]	Do not change this setting.

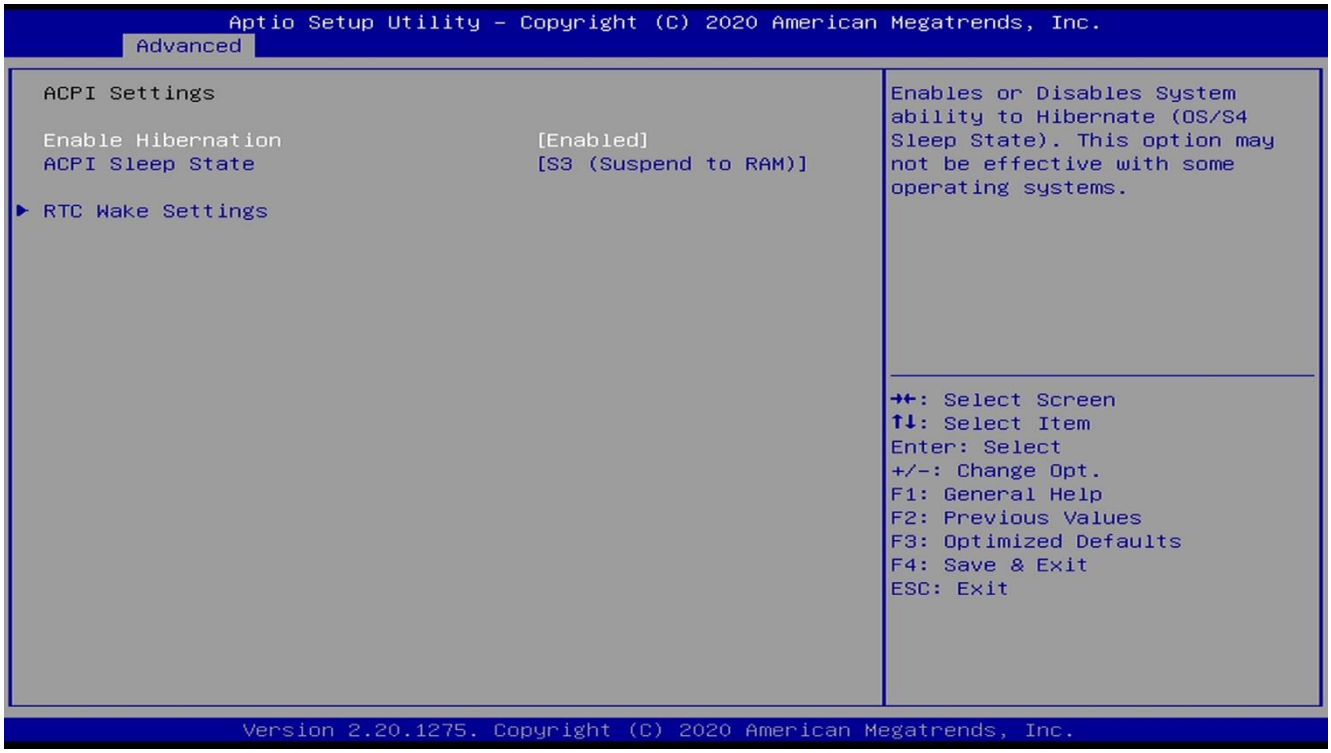
4. TRUSTED Configuration



TRUSTED Configuration

Item	Options	Description
TPM 2.0 Support	Enable Disable	Do not change this setting.

5. ACPI Setting



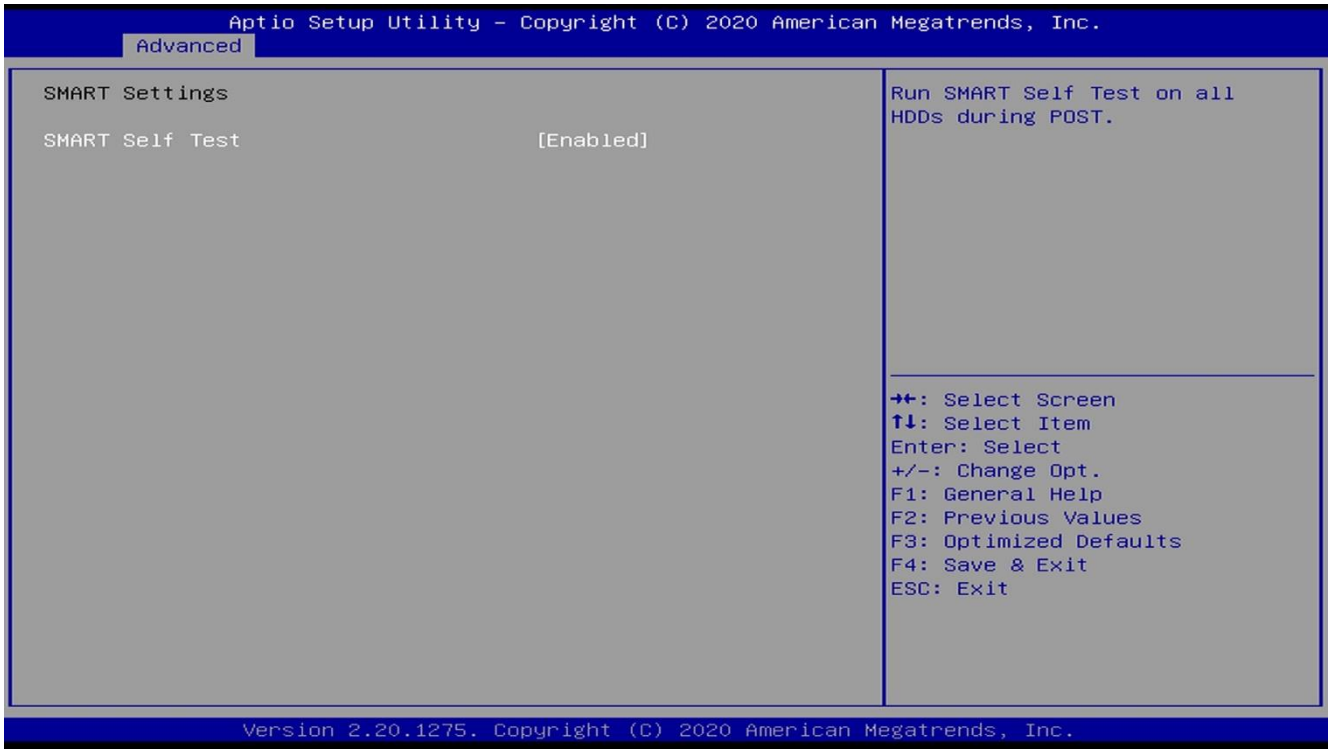
ACPI Setting

Item	Options	Description
Enable Hibernation	[Enabled] Disabled	Configure the Hibernation settings
ACPI Sleep State	Suspend Disabled [S3 (Suspend to RAM)]	Configure the Sleep State settings
RTC Wake Settings	-	Refer to RTC Wake Setting

RTC Wake Setting

Item	Options	Description
Wake System from S5	Enabled [Disabled]	Enables or Disables system wake on alarm event

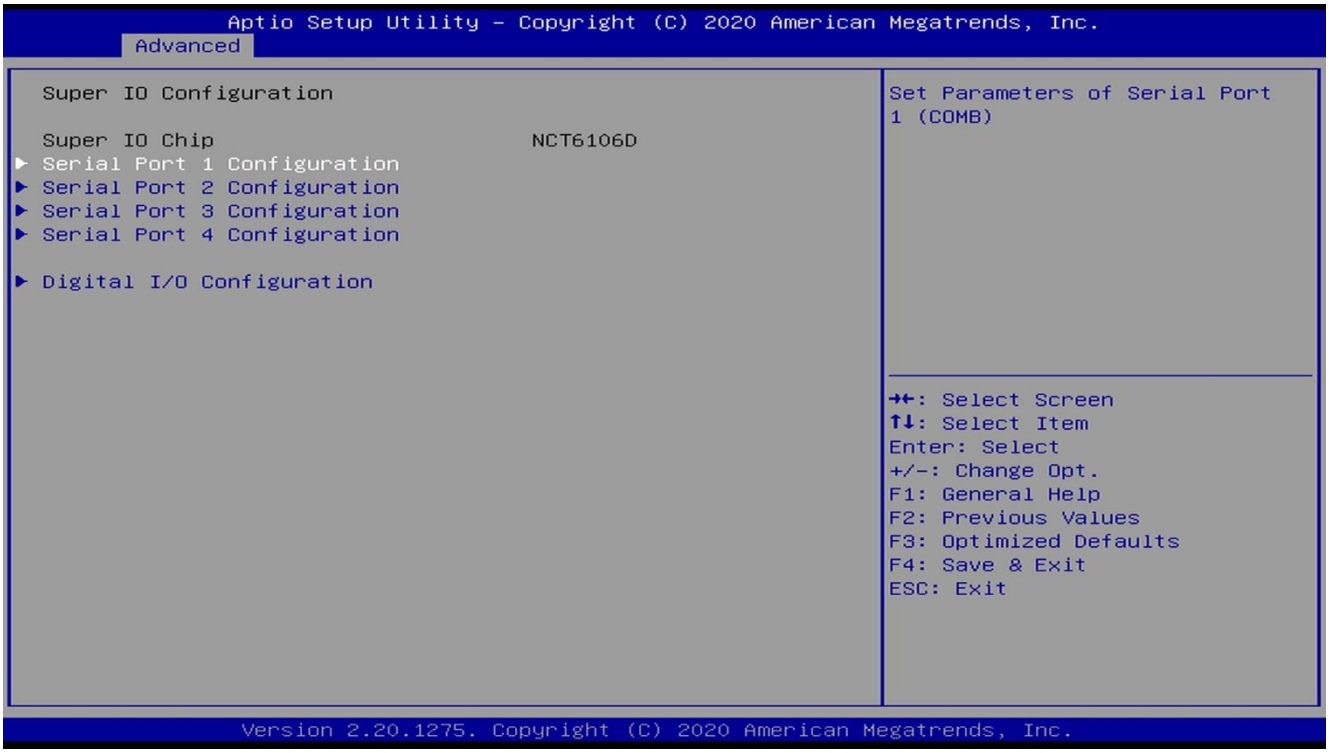
6. SMART Setting



ACPI Setting

Item	Options	Description
SMART Self Test	[Enabled] Disabled	Run SMART Self Test on all HDDs during POST

7. Super IO Configuration



Super IO Configuration

Item	Options	Description
Serial Port 1 Configuration	-	Refer to Serial Port 1 Configuration
Serial Port 2 Configuration	-	Refer to Serial Port 2 Configuration
Serial Port 3 Configuration	-	Refer to Serial Port 3 Configuration
Serial Port 4 Configuration	-	Refer to Serial Port 4 Configuration
Digital I/O Configuration	-	Refer to Digital I/O Configuration

Serial Port 1 Configuration

Item	Options	Description
Serial Port	[Enabled] Disabled	Configure the operation settings for serial port 1
Mode select	[RS-232] RS-485 RS-422	Do not change this setting

Serial Port 2 Configuration

Item	Options	Description
Serial Port	[Enabled] Disabled	Configure the operation settings for serial port 2

Serial Port 3 Configuration

Item	Options	Description
Serial Port	[Enabled] Disabled	Configure the operation settings for serial port 3

Serial Port 4 Configuration

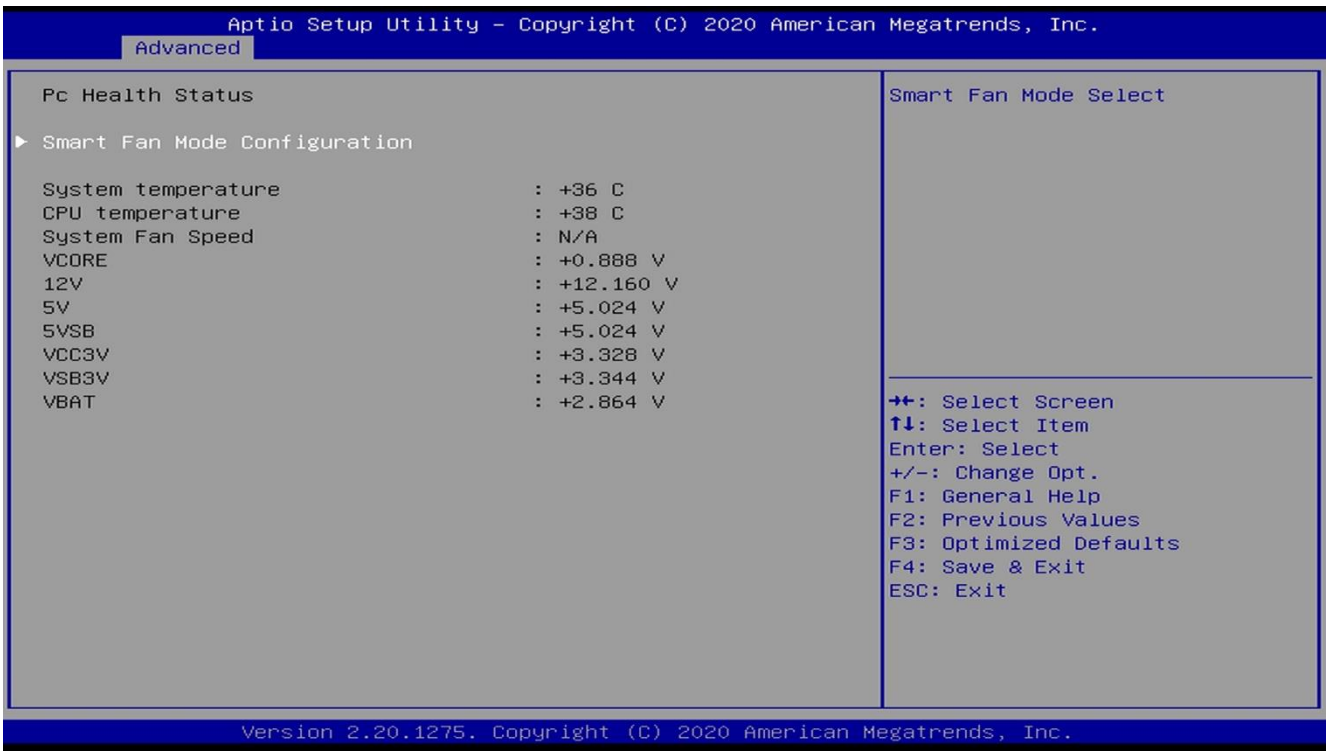
Item	Options	Description
Serial Port	[Enabled] Disabled	Configure the operation settings for serial port 4

Digital I/O Configuration

Item	Options	Description
Digital I/O Pin 0 Digital I/O Pin 1 Digital I/O Pin 2 Digital I/O Pin 3 Digital I/O Pin 4 Digital I/O Pin 5	[Input] Output High Output Low	Configure the operation settings for Digital I/O (input/output). And, configure the operation settings for output-level (High/Low). Input: Use as a general-purpose input. Output High: Use as a general-purpose output. Output Low: Use as a general-purpose output.

8. Hardware Monitor

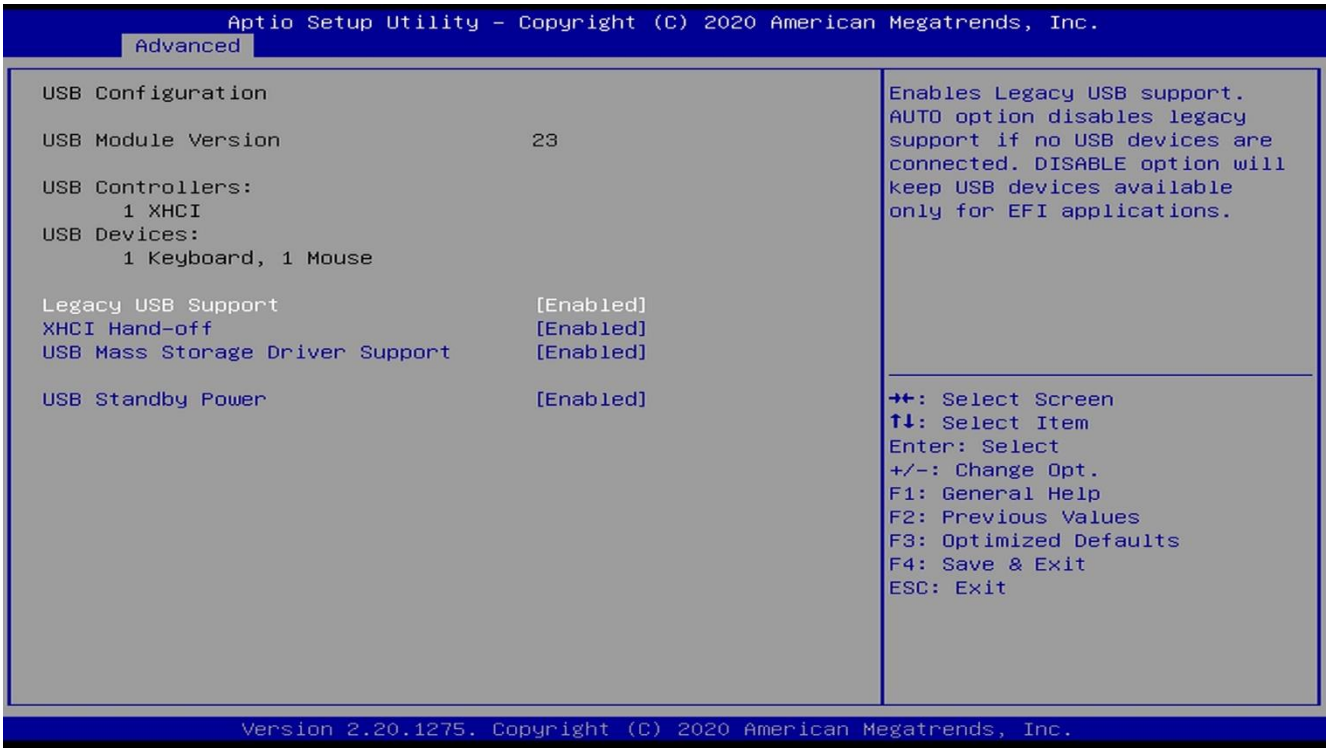
View hardware monitor information such as the CPU temperature.



Smart FAN Mode Configuration

Item	Options	Description
System Smart FAN Mode	PWM Manual Mode Thermal Cruise Mode	Do not change this setting.

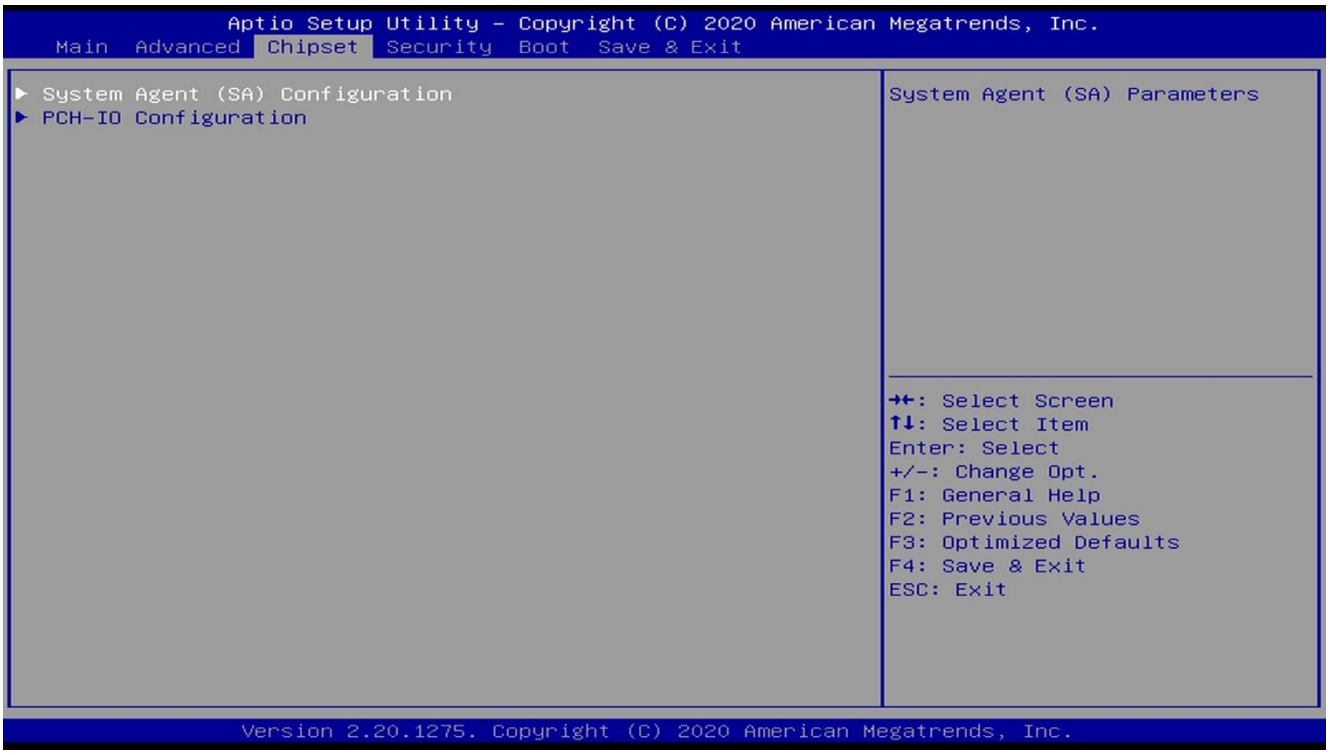
9. USB Configuration



USB Configuration

Item	Options	Description
Legacy USB Support	[Enabled] Disabled Auto	Do not change this setting.
XHCI Hand-off	[Enabled] Disabled	Do not change this setting.
USB Mass Storage Drive Support	[Enabled] Disabled	Do not change this setting.
USB Standby Power	[Enabled] Disabled	Do not change this setting.

5.Chipset



The following items are available

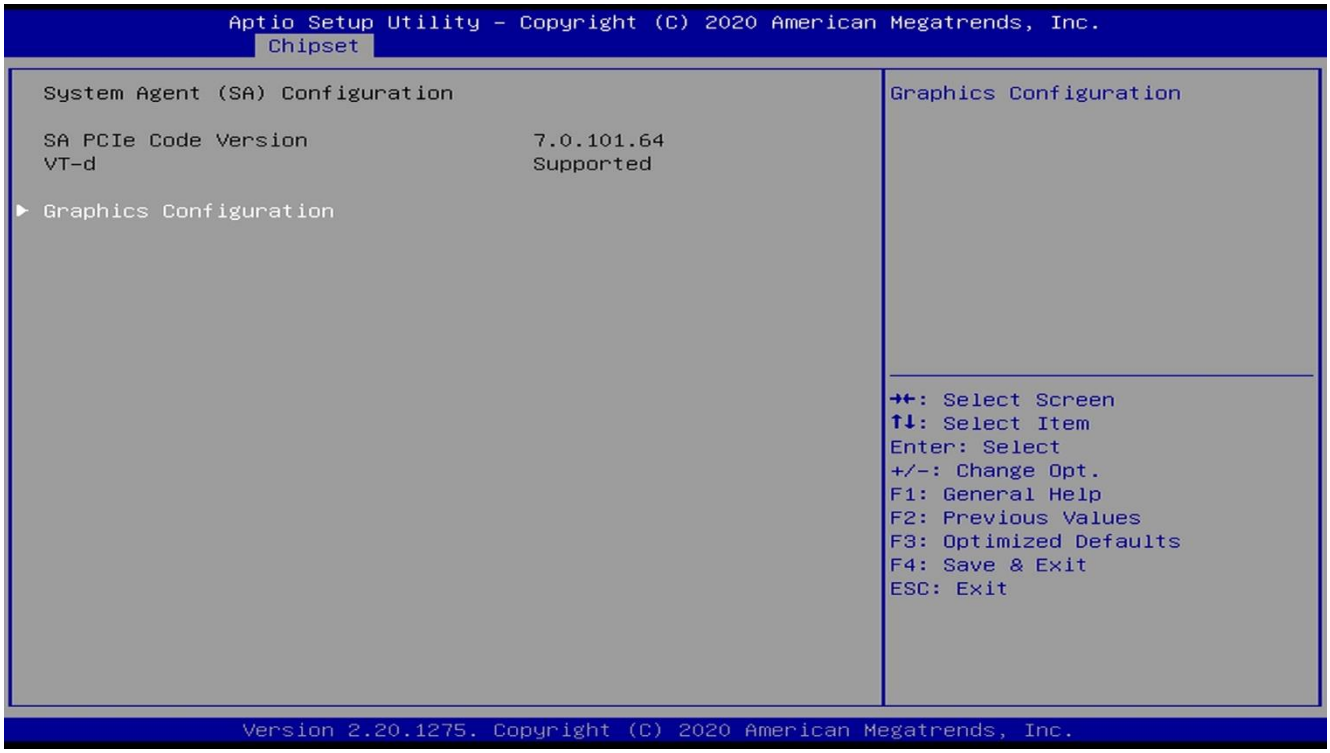
System Agent (SA) Configuration

Configure system agent (SA) settings.

PCH-IO Configuration

Configure the HD Audio subsystem.

1. System Agent (SA) Configuration



Graphic Configuration

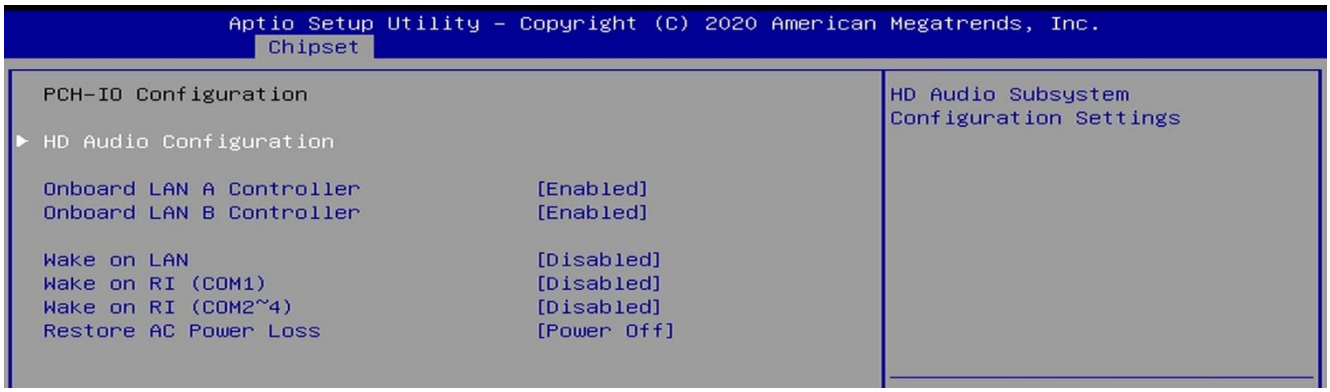
Item	Options	Description
Primary Display	[Auto] IGFX PEG PCI SG	Do not change this setting.
Internal Graphics	[Auto] Enabled Disabled	Do not change this setting.
GTT Size	2MB 4MB [8MB]	Do not change this setting.
Aperture Size	128MB [256MB] 512MB 1024MB 2048MB	Do not change this setting.

Item	Options	Description
DVMT Pre-Allocated	OM [32M] 64M 4M 8M 12M 16M 20M 24M 28M 32M/F7 36M 40M 44M 48M 52M 56M 60M	Do not change this setting.
DVMT Total Gfx Mem	128M [256M] MAX	Do not change this setting.
PAVP Enable	[Enabled] Disabled	Do not change this setting.

2. PCH-IO Configuration

Configure how memory will be used when using the graphic function.

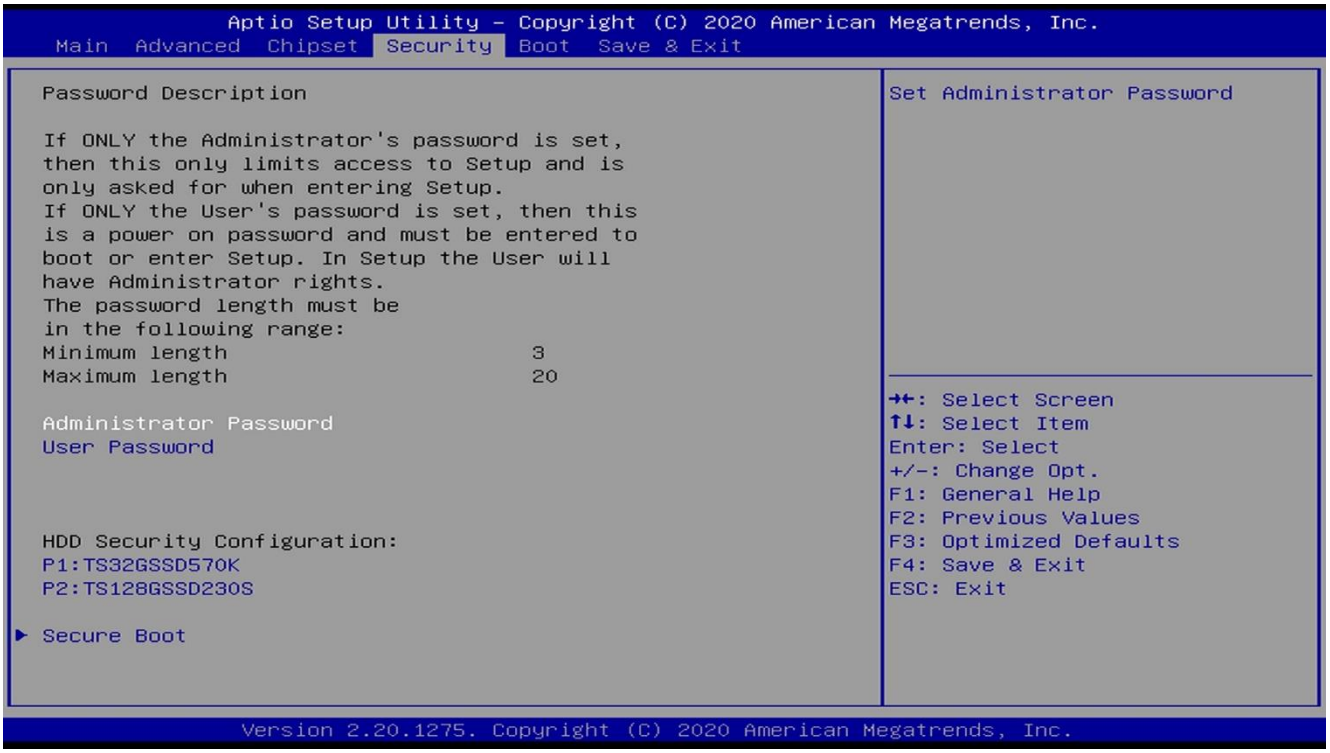
Leave these settings as configured before shipment.



PCH-IO Configuration

Item	Options	Description
HD Audio	[Enabled] Disabled	Do not change this setting.
Onboard LAN A Controller	[Enabled] Disabled	Do not change this setting.
Onboard LAN B Controller	[Enabled] Disabled	Do not change this setting.
Wake on LAN	Enabled [Disabled]	Configure the Wake on LAN settings.
Wake on RI (COM1)	Enabled [Disabled]	Configure the Wake on LAN settings.
Wake on RI (COM2~4)	Enabled [Disabled]	Configure the Wake on LAN settings.
Restore AC Power Loss	Power on [Power off]	Set whether to start the system at the same time the power supply starts. Power OFF: Press the power button to start the system. The system does not start at the same time the power supply starts. Power ON: The system will start at the same time the power supply starts.

6.Security



Administrator Password
Set the Administrator Password.
Press Enter to display the following screen for entering the password.

Administrator Password	
Create New Password	[****]
Confirm New Password	[****]

Enter a password at least 3 characters long twice.
To disable the password, enter the Administrator Password entry screen again.

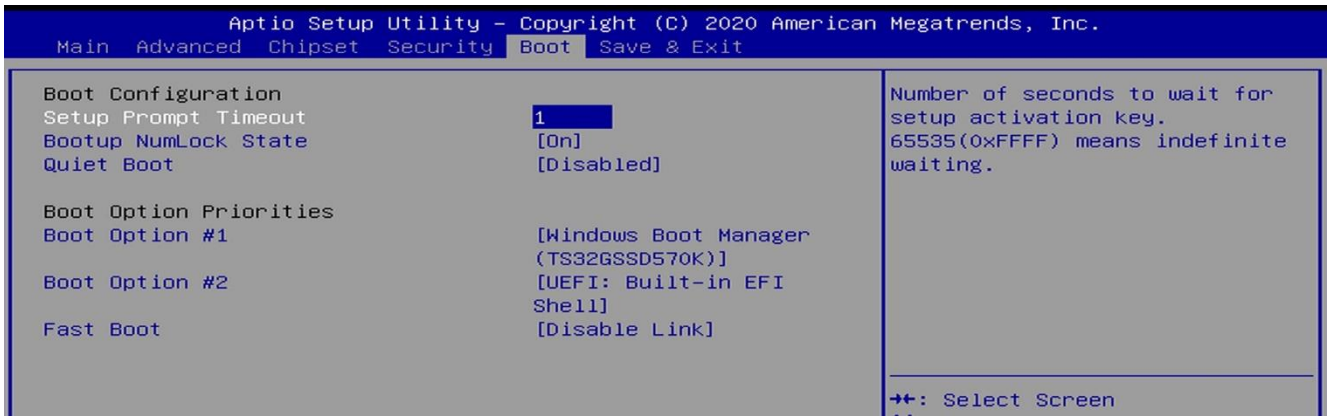
User Password
Set the user password.
Press Enter to display the following screen for entering the password.

User Password	
Create New Password	[****]
Confirm New Password	[****]

Enter a password at least 3 characters long twice.
To disable the password, enter the Administrator Password entry screen again.
Be careful to not forget the password. If you forget the password, the product will have to be repaired at an extra cost.

7.Boot Configuration

Configurate the settings boot devices and other devices



PCH-IO Configuration

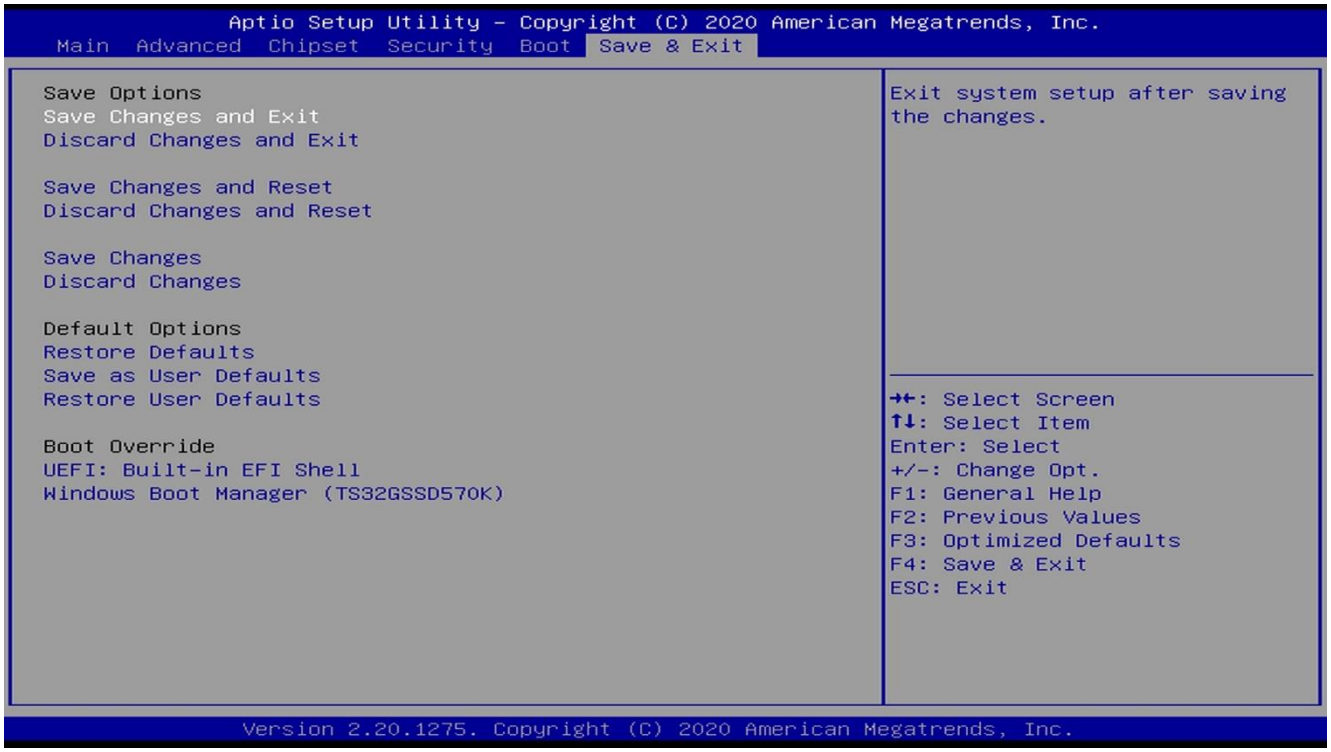
Item	Options	Description
Setup Prompt Timeout	1	Set the standby time for BIOS Setup <DEL> or <F2> input. Unit : [second]
Bootup NumLock State	On Off	Set the NumLock status when the system starts.
Quiet Boot	Enabled Disabled	Do not change this setting.
Boot Option #1		
Boot Option #2	UEFI: Built-in EFI Shell Disabled	Set the system boot order.
Fast Boot	Enabled Disable Link	Do not change this setting.

⚠CAUTION

- In the Boot Option #x device list, the same device may be displayed as follows.
  USB Disk
  UEFI: USB Disk
  In such cases, if (1) is selected, a legacy boot is performed under the assumption the disk is MBR-formatted. If (2) is selected, a UEFI boot is performed under the assumption the disk is GPT-formatted. Make sure to specify (1) as the boot setting. Booting with (2) will result in non-support. Only devices set as the highest in individual settings like CD/DVD ROM Drive BBS Priorities are listed as selectable under Boot Option #x.

7.Save and Exit

Load/ Save setup items and exit the setup menu.



Appendix

This section lists the specifications and the physical dimensions of the product, and the details of model name.

1.System Reference

1. Specifications

Function Specifications

Model Name	BX-S3300 Series
CPU	9th Generation Coffee Lake Refresh Intel® Xeon E-2278GEL Processor 9th Generation Coffee lake Refresh Intel® Core™ i7-9700TE Processor 9th Generation Coffee lake Refresh Intel® Core™ i5-9500TE Processor 9th Generation Coffee lake Refresh Intel® Core™ i3-9100TE Processor 9th Generation Coffee lake Refresh Intel® Celeron® G4900T Processor
Chipset	Intel® C246 Controller Hub
System Memory	DDR4-2666, 260-pin SO-DIMM x 2, Max. 32 GB (ECC support) (i5-9500TE & I7-9700TE SKU support Non-ECC only)
Graphics	Intel® UHD Graphics by CPU SKU
Display interface	DP, DVI-I (DVI-D + VGA)
Storage Slot	2 x 2.5" SATA Gen2/Gen3 HDD&SSD (Removeable Bay) 1 x M.2 key M
Ethernet	Intel® I219-LM(PHY) + Intel® I210-AT
Audio	Mic-in, Line-out
Super I/O	NUVOTON NCT6106D
Expansion Slot	1 x Mini-PCI/e (Full Size) 1 x M.2 key M 2242
Interface	1 x Mic-in and Line-out (front panel) 4 x USB 3.2 Gen 2×1 (front panel) 2 x USB 2.0 (front panel) 1 x 4 PIN power jack 1 x Software-programmable RS-232 / 422 / 485 ports (Rear Panel) 3 x RS-232 D-Sub 9pin port (Rear panel) 6 bit programable + control power button DIO Port TPM 2.0, RAID (0,1), iAMT(11.0)
Power Requirement	
Power Input	12~24V (±10%, DC10.8-26.4V) Wide Rage DC Input w/ Terminal Block Connectivity
Power Adapter	AC to DC, DC 24V/ 5A, 120W adaptor w/ Terminal Block Connectivity
Mechanical	
Thermal Design	Fanless
Mounting	Wall mount, Desktop, VESA mount, DIN Rail
Dimension (WxDxH)	235 x 185 x 74 mm (No protrusions)
Weight	3.0 kg
Material	Top Cover: Aluminum Alloy Bezel and Chassis: Steel
Environmental	
Operating	0°C~50°C with Air Flow: 0.7 m/s (with Standard Temp. SSD)

Model Name		BX-S3300 Series
Temperature*1		0°C~40°C with Air Flow: 0.7 m/s (with Standard Temp. HDD)
Storage Temperature		-10°C~60°C
Humidity		10%~90% RH (No condensation)
Floating dust Particles		Not to be excessive
Corrosive Gases		None
Line noise		AC line/± 2kV Signal line/ ±1kV (IEC61000-4-4 Level 3, EN61000-4-4 Level 3)
Static Electricity Resistance		Contact discharge/ ±4kV (IEC61000-4-2 Level 2, EN61000-4-2 Level 2) Air discharge/ ±8kV (IEC61000-4-2 Level 3, EN61000-4-2 Level 3)
Vibration Resistance		IEC 60068-2-6/ JIS C 60068-2-6
	HDD (Operating)	10~50Hz/4.9m/s2 (0.5G); 1oct/min, 1 cycle (10-150-10 Hz); 5 cycles X, Y, Z per axis (25 mins/axis)
	SSD (Operating):	10~ 57Hz/0.15mm(0-P); 57~ 150Hz/19.6m/s2 (2G); 5 cycles X, Y, Z per axis (40 mins/axis)
Shock Resistance		IEC 60068-2-27/ JIS C 60068-2-27 98m/s2 (10G)/ 11ms/ Sine Half Sine; 3 times per face (Total 6 face, 18 Shocks)
Grounding		Class D Grounding, SG-FG/ Continuity
Certification		RoHS2.0 & CE(*2/*3) & FCC Class A /UKCA , BIS

*1: For more details on this, please refer to chapter 3, "Installation Requirements".

*2: CS field strength of VGA port is 3V; other I/O ports field strength are 10V.

*3: If using USB extended cable, please use below 1.8 m USB cable. (RS)

2. Power Management Features

- Support both ACPI (Advanced Configuration and Power Interface).
- ACPI v2.0 compliant
- Hardware automatic wake-up

3. Power Requirements

Your system requires a clean, steady power source for reliable performance of the high frequency CPU on the product, the quality of the power supply is even more important. For the best performance makes sure your power supply provides a range of 10.8 V minimum to 26.4 V maximum DC power source.

Power Consumption

For typical configurations, this system is designed to operate with at least a 120W power supply. The power supply must meet the following requirements:

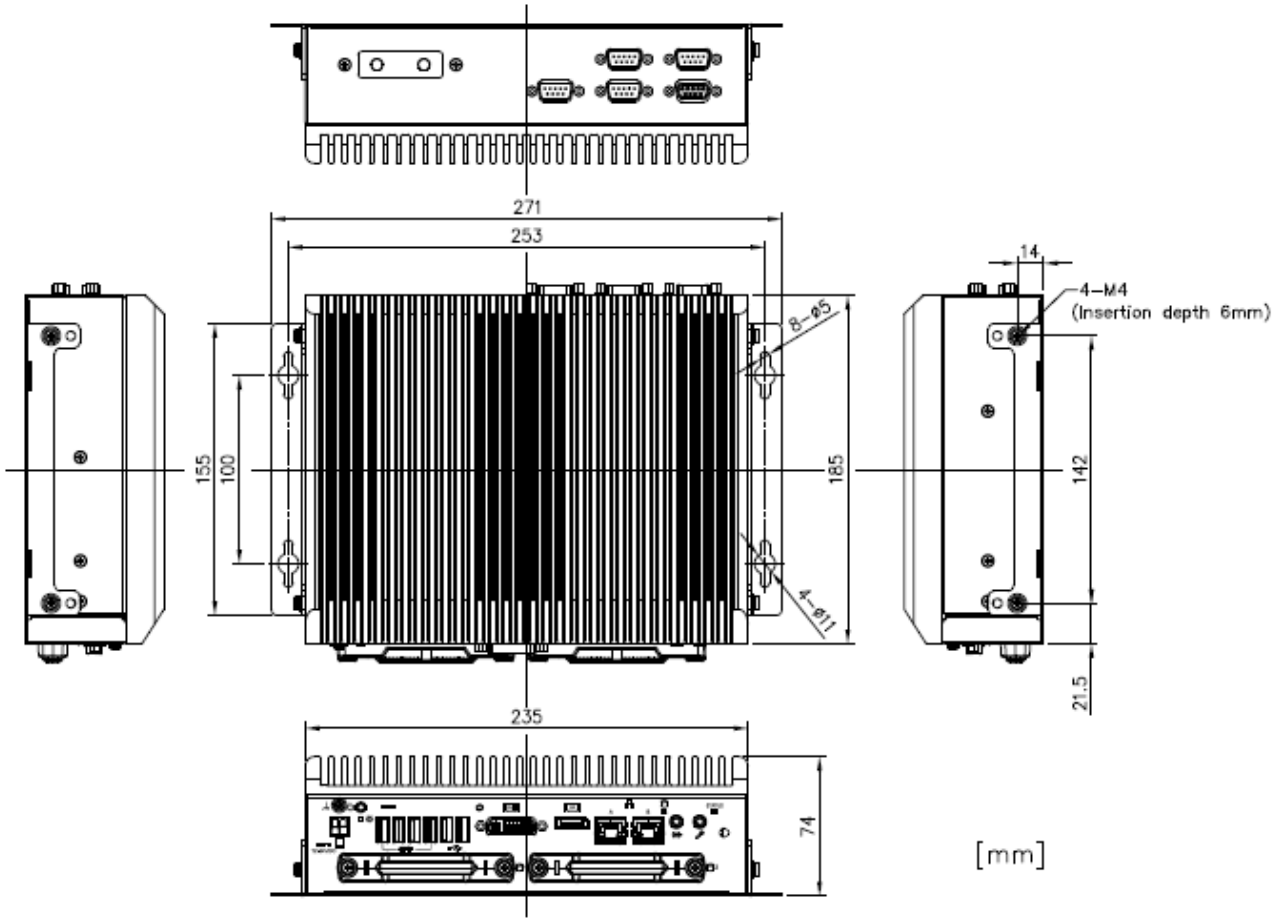
Rise time for power supply: 2 ms - 30 ms

The following table lists the power supply's tolerances for DC voltages:

DC Voltage	Acceptable Tolerance
+12V ~ 24V	+10.8V ~ 26.4V

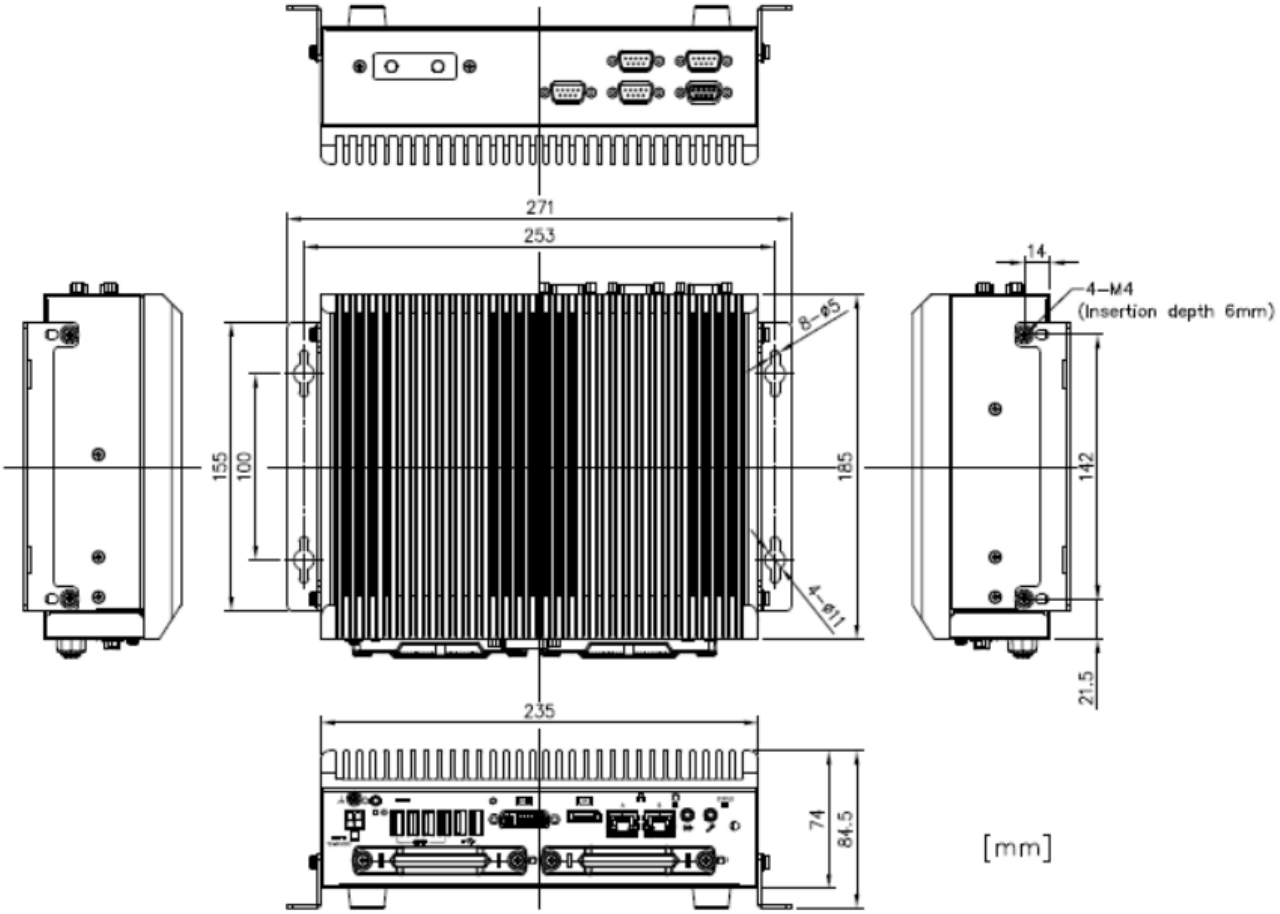
2.Physical Dimensions

All Dimensions shown in mm (millimeters.)



* The length (L) from the tip of M4 boss to the M4 screw tip should be 5mm or less. If not doing so, it may be exactly fixed.

With Buffer Attachment Fittings



3.Maintenance

1.Battery

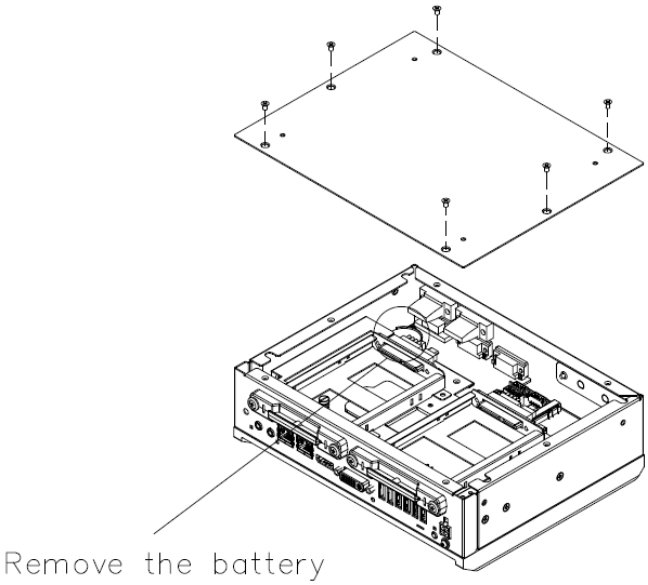
Battery Specification

This product uses the following battery.

- Type: Lithium primary battery
- Model: BR-2032/BN
- Maker: Panasonic
- Nominal voltage: 3V
- Nominal capacity: 190 mAh
- Lithium content: 1g or less

Removing the battery

Remove the battery according to the following figure.



Disposing the battery

Dispose the removed battery properly as instructed by local government.

4.Post Codes

POST (hex)	Description
< Security (SEC) phase >	
1h	Power ON. The detection of the reset kind (Hard/Soft)
2h	Initialize the microcode load previous AP
3h	Initialize the microcode load previous North Bridge
4h	Initialize the microcode load previous South Bridge
5h	Initialize the microcode load previous OEM
6h	Microcode load
7h	Initialize the microcode load previous AP
8h	Initialize the microcode load previous North Bridge
9h	Initialize the microcode load previous South
Ah	Initialize the microcode load previous OEM
Bh	Cache initialization
< Pre-EFI Initialization (PEI) phase >	
10h	Start of the PEI core
11h	PRI memory CPU initialization starts
12h - 14h	PRI memory CPU initialization (Specific CPU module)
15h	PRI memory, North Bridge initialization starts
16h - 18h	PRI memory, North Bridge initialization (Specific North Bridge)
19h	PRI memory, South Bridge initialization starts
1Ah - 1Ch	PRI memory, South Bridge initialization (Specific South Bridge)
1Dh - 2Ah	OEM, PRI memory initialization code
2Bh	Memory initialization: Serial Presence Detect (SPD) Data loading
2Ch	Memory initialization: Memory detection
2Dh	Memory initialization: Programming of the memory timing information
2Eh	Memory initialization: Memory configuration
2Fh	Memory initialization: Others
30h	ASL for reserved (Refer to ACPI/ASL Checkpoints)
31h	Memory installed
32h	CPU post memory initialization starts
33h	CPU post memory initialization: Cache initialization
34h	CPU post memory initialization: Application Processor(s)(AP) initialization
35h	CPU post memory initialization: Boot strap processor (BSP) selection
37h	CPU post memory initialization: System Management Mode (SMM) initialization
38h	Post memory, North Bridge initialization starts
39h - 3Ah	Post memory, North Bridge initialization (Specific North Bridge module)
3Bh	Post memory, South Bridge initialization starts
3Ch - 3Eh	Post memory, South Bridge initialization (Specific South Bridge module)
3Fh - 4Eh	OEM post memory initialization code
4Fh	DXE IPL startup
< Driver Execution Environment (DXE) phase >	
60h	DXE core startup
61h	NVRAM initialization

POST	Description
62h	South Bridge runtime services installation
63h	CPU DXE installation start
64h - 67h	CPU DXE installation start (Specific CPU module)
68h	PCI host bridge installation
69h	North Bridge DXE initialization starts
6Ah	North Bridge DXE SMM initialization starts
6Bh - 6Fh	North Bridge DXE initialization (Specific North Bridge module)
70h	South Bridge DXE initialization starts
71h	South Bridge DXE SMM initialization starts
72h	South Bridge device initialization
73h - 77h	South Bridge DXE initialization (Specific South Bridge module)
78h	ACPI module initialization
79h	CSM initialization
7Ah - 7Fh	For future AMI DXE codes reserved
80h - 8Fh	OEM DXE initialization code
90h	Boot Device Selection (BDS) Phase
91h	Driver connection start
92h	PCI bus initialization starts
93h	PCI bus hot plug controller initialization
94h	Enumerate PCI bus number
95h	PCI bus resource requests
96h	PCI bus resource allocation
97h	Console output device connection
98h	Console input device connection
99h	Super IO initialization
9Ah	USB installation start
9Bh	USB reset
9Ch	USB detection
9Dh	USB enabling
9Eh - 9Fh	For future AMI codes reserved
A0h	IDE initialization starts
A1h	IDE reset
A2h	IDE detection
A3h	IDE enabling
A4h	SCSI initialization starts
A5h	SCSI reset
A6h	SCSI detection
A7h	SCSI enabling
A8h	Confirm Password Setup
A9h	Starting of a setup
AAh	ASL for reserved (Refer to ACPI/ASL Checkpoints)
ABh	Setup input wait
ACh	ASL for reserved (Refer to ACPI/ASL Checkpoints)
ADh	Boot preparation events

POST	Description
AEh	Legacy boot event
AFh	Boot Service event ends
B0h	Virtual address maps run-time settings begin.
B1h	Virtual address maps of runtime configuration exit
B2h	Legacy option ROM initialization
B3h	System reset
B4h	USB hot plug
B5h	PCI bus hot plug
B6h	NVRAM cleanup
B7h	Configuration reset (Reset the NVRAM settings)
B8h - BFh	For future AMI codes reserved
C0h - CFh	OEM BDS initialization code
< ACPI/ASL Checkpoints >	
01h	S1 sleep system during migration.
02h	S2 sleep system during migration.
03h	S3 sleep system during migration.
04h	S4 sleep system during migration.
05h	S5 sleep system during migration.
10h	From S1 sleep state during system restoration
20h	From S2 sleep state during system restoration
30h	From S3 sleep state during system restoration
40h	From S4 sleep state during system restoration
ACh	Move to system ACPI mode. The interrupt controller PIC mode.
AAh	Move to system ACPI mode. The interrupt controller APIC mode.

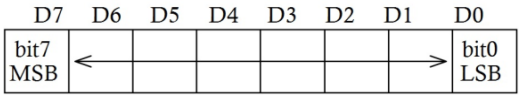
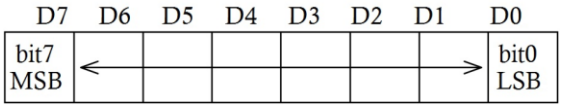
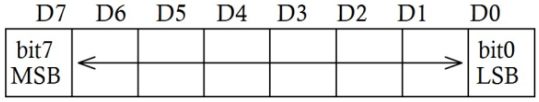
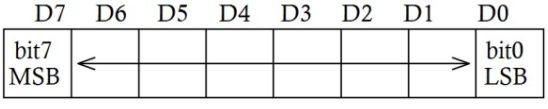
5.Serial I/O Address and Register Function

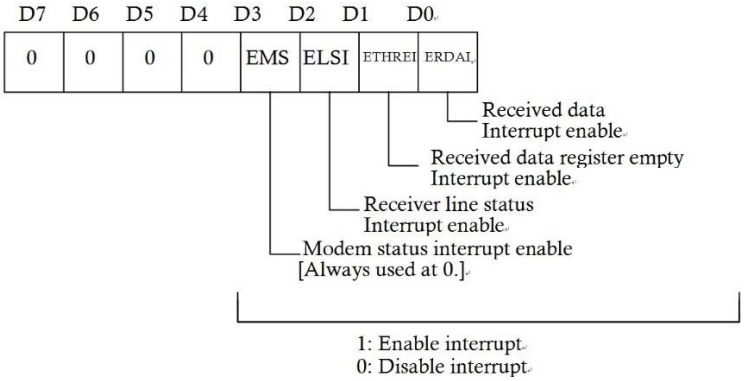
The following table lists the I/O addresses in case of SERIAL A.

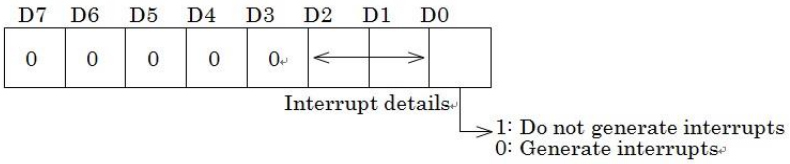
I/O Port Addresses

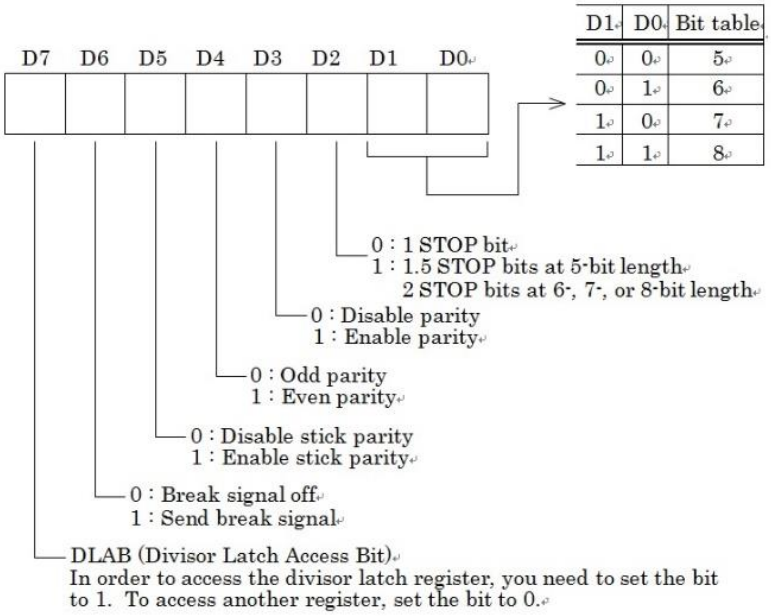
I/O address	DLAB	Read/Write	Register	
03F8H	0	W	Transmitter holding register	THR
		R	Receiver buffer register	RBR
	1	W	Divisor latch register (LSB)	DLL
03F9H	1	W	Divisor latch register (MSB)	DLM
	0	W	Interrupt enable register	IER
03FAH	X	R	Interrupt ID register	IIR
03FBH	X	W	Line control register	LCR
03FCH	X	W	Modem control register	MCR
03FDH	X	R	Line status register	LSR
03FEH	X	R	Modem status register	MSR
03FFH	X	R/W	Scratch register	SCR

Function of Each Register

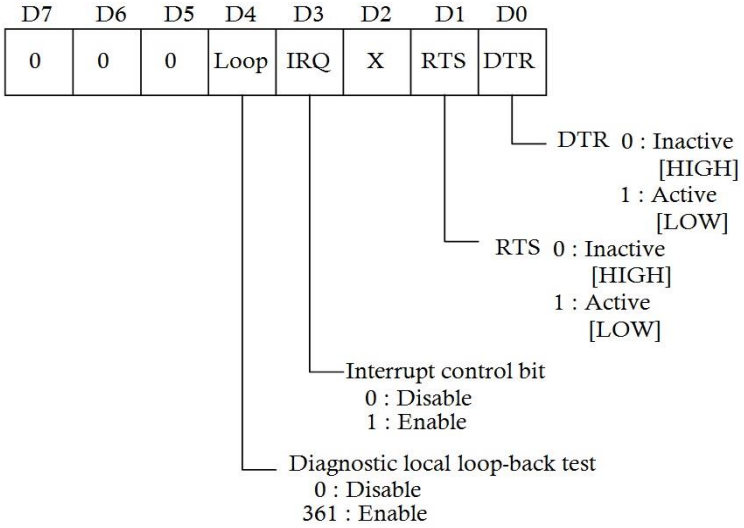
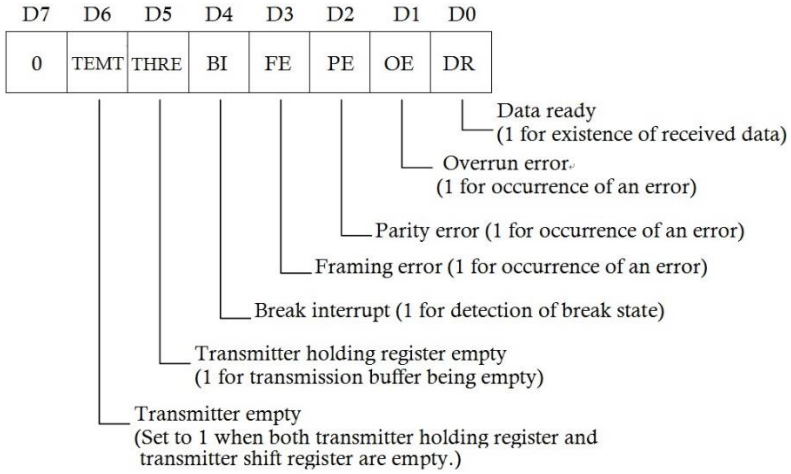
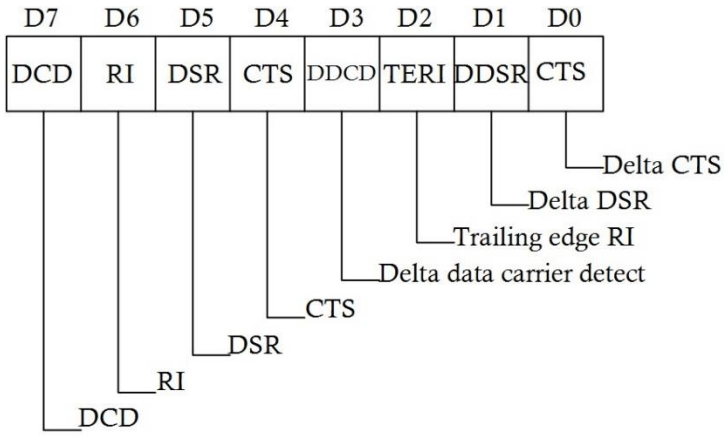
I/O address	Description
03F8H	THR: Transmitter Holding Register [DLAB=0]  Register dedicated to write transmitted data to
03F8H	RBR: Receiver Buffer Register [DLAB=O] 
03F8H	DLL: Divisor Latch (LSB) [DLAB=1]  Baud rate setting register (LSB)
03F9H	DLH: Divisor Latch (MSB) [DLAB=1]  Baud rate setting register (MSB)

<table>
<tr><th>I/O address</th><th>Description</th></tr>
<tr><td>03F9H</td><td>
IER: Interrupt Enable Register [DLAB=0]


</td></tr>
<tr><td>03FAH</td><td>
IIR: Interrupt Identification Register


<table>
<tr><th>bit2</th><th>bit1</th><th>bit0</th><th>Priority</th><th>Description</th></tr>
<tr><td>0</td><td>0</td><td>1</td><td>——</td><td>Interrupts are not generated.</td></tr>
<tr><td>1</td><td>1</td><td>0</td><td>1 (high)</td><td>Generated by overrun, parity, framing error or break interrupt.
Cleared when the line status register is read.</td></tr>
<tr><td>1</td><td>0</td><td>0</td><td>2</td><td>Generated when the receive buffer register is ready.
Cleared when the receiving buffer is read.</td></tr>
<tr><td>0</td><td>1</td><td>0</td><td>3</td><td>Generated when the transmitter holding register is empty. Cleared when the IIR is read or when transmitted data is written to THR.</td></tr>
<tr><td>0</td><td>0</td><td>0</td><td>4 (low)</td><td>Modem status interrupt is generated.
(CTS, DSR, RI, CD)
Cleared when the modem status register is read.</td></tr>
</table>
</td></tr>
<tr><td>03FBH</td><td>
LCR: Line Control Register


</td></tr>
</table>

I/O address	Description
03FCH	MCR: Modem Control Register 
03FDH	LSR: Line Status Register 
03FEH	MSR: Modem Status Register 
03FFH	SCR: Scratchpad Register This is an 8-bit, readable/writable register which is available to the user to allow data to be saved temporarily.

Baud Rate Settings

A baud rate is set by software by dividing the clock input (1.8432MHz). The baud rate in terms of hardware can be set to a maximum of 115,200 bps for SERIAL Port. The baud rates available in practice depend on the operating environment (cable, software, etc.). The table below lists typical baud rates and their respective values to be written to the divisor latch register (LSB, MSB).

Baud rate to be set	SERIAL Port Clock input (1.8432MHz)	
	Value to be set in the divisor register (Decimal)	Setting error (%)
50	2304	---
75	1536	---
110	1047	0.026
134.5	857	0.058
150	768	---
300	384	---
600	192	---
1200	96	---
1800	64	---
2000	58	0.69
2400	48	---
3600	32	---
4800	24	---
7200	16	---
9600	12	---
14400	8	---
19200	6	---
28800	4	---
38400	3	---
57600	2	---
76800	---	---
115200	1	---
153600	---	---
230400	---	---

Example: To set 9,600 bps, write "00" to the (MSB) divisor latch register and "12 (decimal)" to the (LSB) divisor latch register.

6.Watch-Dog-Timer

The watchdog timer serves as a safeguard against possible system lock-up in your industrial computer system. In most industrial environments, there are heavy equipment, generators, high-voltage power lines, or power drops that have adverse effects on your computer system. For instance, when a power drop occurs, it could cause the CPU to come to a halt state or enter into an infinite loop, resulting in a system lock-up.

The application software created by user with the watchdog timer enabled, a RESET automatically generated unless the software periodically triggers the timer within the setting time-out interval. That is, while the system gets hung up, the running program can't trigger the timer periodically. The timer will generate a reset signal to reboot the system.

With this function, running programs can be restarted in the usual way even if an abnormal state occurs.

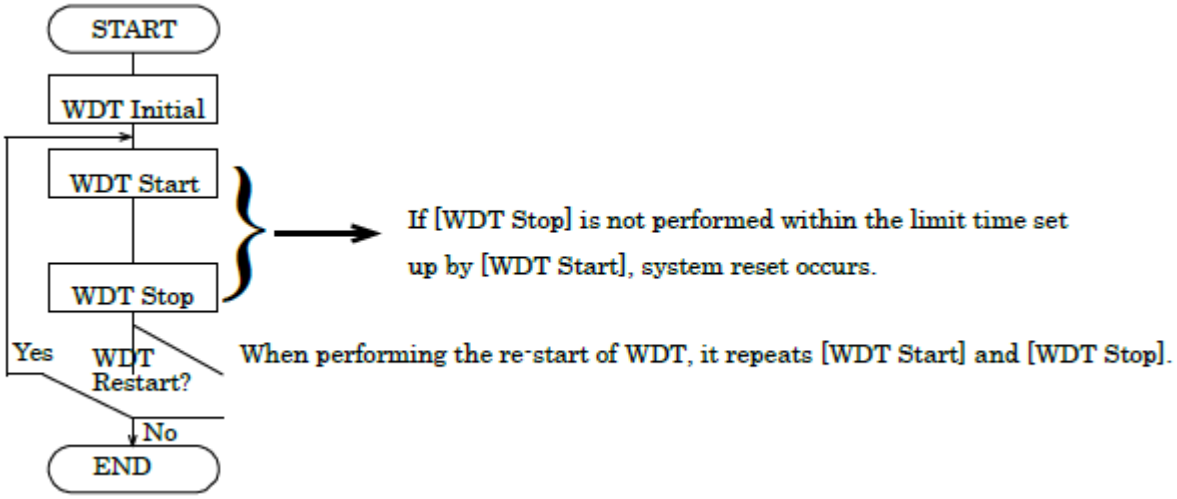
The software can be configured using 255 levels (1 to 255 seconds) of timeout intervals for the watchdog timer. There is also a 2-second tolerance for timeout intervals. To maintain normal system operation, trigger the watchdog timer again using a user-written program with the tolerance in mind.

Ex.) If the time-out interval is set to 30 seconds, the user-created program must retrigger the watchdog timer before 28 seconds will have elapsed in consideration of the tolerance. If the program failed to retrigger the timer (if 28 - 32 seconds have elapsed), the system will automatically reboot.

The I/O port is defined at address 2e/2fH. You can trigger/enable disable the timer by writing address 2e/2fH.

Here is an example for flow chart and programming how to use the watch-dog-timer.

(1) Example flow chart



*It is also possible not to perform [WDT Stop] instead of performing [WDT Stop] to [WDT Start], but to perform [WDT Start] continuously at the time of a re-start.

(2) Example programming

The following example is written in Intel8086 assembly language.

```
;===============
;<WDT Initial>
;===============
;-----------------------------------------
;Enter the extended function mode
;-----------------------------------------
MOV DX,2EH
MOV AL,87H
OUT DX,AL
OUT DX,AL
;-----------------------------------------------
;Select logical device WDT(number 8)
;-----------------------------------------------
MOV DX,2EH
MOV AL,07H
OUT DX,AL
MOV DX,2FH
MOV AL,08H
OUT DX,AL
;-----------------------------------------------
;Activate logical device WDT(number 8)
;-----------------------------------------------
MOV DX,2EH
MOV AL,30H
OUT DX,AL
MOV DX,2FH
MOV AL,03H
OUT DX,AL
;-------------------------------------------------
;Stop WDT
;-------------------------------------------------
MOV DX,2EH
MOV AL,F1H
OUT DX,AL
MOV DX,2FH
```

```
MOV AL,00H
OUT DX,AL
;----------------------------------------
;Exit the extended function mode
;----------------------------------------
MOV DX,2EH
MOV AL,AAH
OUT DX,AL

;================================
;<WDT START: counter set and a start>
;================================
;----------------------------------------------
;Enter the extended function mode
;----------------------------------------------
MOV DX,2EH
MOV AL,87H
OUT DX,AL
OUT DX,AL
;-----------------------------------------------
;Select logical device WDT(number 8)
;-----------------------------------------------
MOV DX,2EH
MOV AL,07H
OUT DX,AL
MOV DX,2FH
MOV AL,08H
OUT DX,AL
;-------------------------------------------------
;Set time of WDT and start to count down
;-------------------------------------------------
MOV DX,2EH
MOV AL,F1H
OUT DX,AL
MOV DX,2FH
;-------------------------------------------------------------------------------
;The data of an example is 15 seconds.(01H=1sec.-FFH=255sec.)
MOV AL,0FH        ;0FH=15Sec
```

```
;--------------------------------------------------------------------------------
OUT DX,AL
;--------------------------------------
;Exit the extended function mode
;--------------------------------------
MOV DX,2EH
MOV AL,AAH
OUT DX,AL

;===============
;<WDT STOP>
;===============
;----------------------------------------
;Enter the extended function mode
;----------------------------------------
MOV DX,2EH
MOV AL,87H
OUT DX,AL
OUT DX,AL
;---------------------------------
;Select logical device WDT(number 8)
;---------------------------------
MOV DX,2EH
MOV AL,07H
OUT DX,AL
MOV DX,2FH
MOV AL,08H
OUT DX,AL
;---------------------------------
;Stop count down of WDT
;---------------------------------
MOV DX,2EH
MOV AL,F1H
OUT DX,AL
MOV DX,2FH
;---------------------------------
;The data of 00H is stop WDT
MOV AL,00H
```

```
;---------------------------------
OUT DX,AL
;---------------------------------
;Exit the extended function mode
;---------------------------------
MOV DX,2EH
MOV AL,AAH
OUT DX,AL
```

⚠ CAUTION

- The timer's intervals have a tolerance of ± 2 seconds.

7.GPIO Sample Code

Sample Code

EX. Sample Code Using GP4X

```
#include <conio.h>
#include <stdio.h>
#include <io.h>
void main(void)
{
unsigned char byte_cr1c;
outportb(0x2e, 0x87); // enter Super I/O configuration mode
outportb(0x2e, 0x87);
outportb(0x2e, 0x07); // locate logical device 7
outportb(0x2f, 0x07);
outportb(0x2e, 0xf0); // set GP40 ~ GP47
outportb(0x2f, 0x0f); // GP44 ~ GP47 as output pins
outportb(0x2e, 0xf1); // set GP40 ~ GP47
outportb(0x2f, 0xf0); // GP44 ~ GP47 as High
```

GPIO Port **pin define mapping**

D-SUB 9P Pin define	I/O Chipset Pin define
GPIO0	GP40
GPIO1	GP41
GPIO2	GP42
GPIO3	GP43
GPIO4	GP44
GPIO5	GP45

List of Optional Products

This section lists optional items that can be used along with the product.

1.Optional Product

Optional product items are as follows, please acquire them as required.

Accessory		
Parts Name	**Product Code**	**Description**
AC Adaptor	43580760	Input: 100-240VAC, Output: 24VDC 5A
VESA & DIN Rail Module		
HDD	48452300	2.5-inch SATA HDD 1TB
SSD	48452050	2.5-inch SATA SSD 64GB

Visit the CONTEC website for the latest optional products.

Download https://www.contec.com/

Customer Support and Inquiry

CONTEC provides the following support services for you to use CONTEC products more efficiently and comfortably.

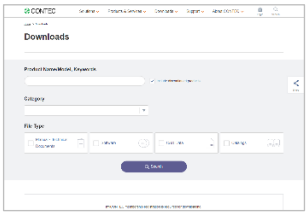
1.Services

CONTEC offers the useful information including product manuals that can be downloaded through the CONTEC website.

Download

https://www.contec.com/download/

You can download updated driver software, firmware, and differential manuals in several languages. Membership registration (myCONTEC) is required to use the services.



Revision History

MONTH YEAR	Summary of Changes
October 2020	The First Edition
January 2021	P.68 Add VESA and DIN support in SPEC
May.2023	Line up Processor SKU & OS supports

CONTEC CO., LTD. 3-9-31, Himesato, Nishiyodogawa-ku, Osaka 555-0025, Japan

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BX-S3300 Series Reference Manual

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