IPC Series

BOX-PC
for BX-T1000 Series

User's Manual

CONTEC CO., LTD.

Check Your Package

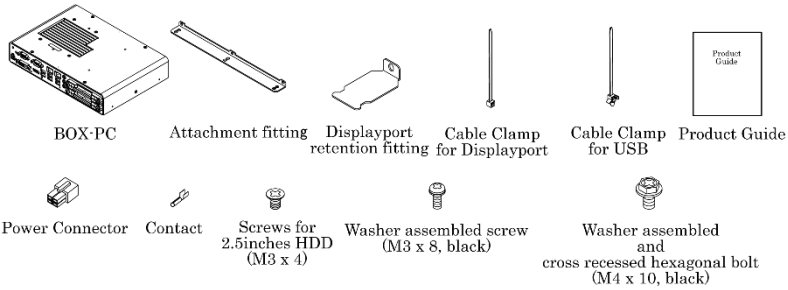
Thank you for purchasing the CONTEC product.
The product consists of the items listed below.
Check, with the following list, that your package is complete. If you discover damaged or missing items, contact your retailer.

Product Configuration List

Name		BX-T10x0-NA02 [Base Model] Pcs.	BX-T10x0-xxxxxxxxx *1 [OS Pre-install Model] Pcs.
Box-Pc		1	1
Attachment Fitting		2	2
Displayport Retention Fitting		1	1
Screws for 2.5inches HDD (M3 x 4)		8	8
Washer Assembled Screw (M3 x 8, black)		7	7
Washer Assembled and Cross Recessed Hexagonal Bolt (M4 x 10, black)		6	6
Power Supply Connector	Power Connector	1	1
Complete Set	Contact	4	4
Cable Clamp for USB		1	1
Cable Clamp for Displayport		1	1
Product Guide		1	1

*1 Except for base model.

Product Configuration Image



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

Related Manuals

Must Read the Following Manuals.

Name	Purpose	Contents	How to get
Product Guide	Must read this after opening the package.	This lists the product configuration and describes the precautions.	Included in the package (Printed matter)
User's Manual (This Document)	Read this when operating the product.	This describes the hardware aspects such as functions and settings.	Download from the CONTEC website (PDF)
IPC Precaution List	Read this before operating the product.	This describes the precautions when using the product.	Download from the CONTEC website (PDF)
MICROSOFT SOFTWARE LICENSE TERMS *1	Must read this after opening the package.	This describes the rights and conditions of user when using Windows software.	Download from the CONTEC website (PDF)
Manual for OS Pre-installed Model *1	Must read this after opening the package.	This describes the basic information of OS, and the procedures of setup and recovery.	Download from the CONTEC website (PDF)

*1 Reference for pre-installed models only.

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Table of Contents

1. Introduction

About the Product

This product is a fanless and high-performance embedded type computer with the seventh-generation Intel® CPU processor for industrial applications. Achieving great performances and power saving, it also contains rich interfaces, and realizes total natural cool down (FAN-less).
CPU processor can be chosen from Core i7 7600U, Core i5 7300U, or Celeron 3965U.
It has extension interfaces such as dual-LAN, USB3.0, Displayport, DVI-D, and RS-232C. It employs slot-in type of 2.5-inch SATA disk slots, providing the appropriate ability to display images including digital signage.

Embedded-type CPU has been adopted. The use of readily available parts ensures the product to be applied easily. In addition, Contec-customized BIOS allows support to be provided at the BIOS level.

This product is available in the following models:

- Base model with Intel Core i7 Processor 7600U 2.80GHz
  BX-T1000-NA02 (Memory 8GB, without OS, without storage devices)

- Base model with Intel Core i5 7300U 2.60GHz
  BX-T1010-NA02 (Memory 8GB, without OS, without storage devices)

- Base model with Intel Celeron 3965U 2.20GHz
  BX-T1020-NA02 (Memory 8GB, without OS, without storage devices)

- OS-installed model with Intel Core i7 Processor 7600U 2.80GHz
  BX-T1000-W10M02H07 (Memory 8GB, Windows 10 IoT Enterprise LTSB 2016 64bit (Japanese, English, Chinese, Korean), 2.5 inch HDD 100GB)

  BX-T1000-W10M02M08 (Memory 8GB, Windows 10 IoT Enterprise LTSB 2016 64bit (Japanese, English, Chinese, Korean), 2.5 inch SSD (MLC) 256GB)

  BX-T1000-W19M02H07 (Memory 8GB, Windows 10 IoT Enterprise 2019 LTSC 64bit (Japanese, English, Chinese, Korean), 2.5 inch HDD 100GB)

  BX-T1000-W19M02M08 (Memory 8GB, Windows 10 IoT Enterprise 2019 LTSC 64bit (Japanese, English, Chinese, Korean), 2.5 inch SSD (MLC) 256GB)

  BX-T1000-W19M02L08 (Memory 8GB, Windows 10 IoT Enterprise 2019 LTSC 64bit (Japanese, English, Chinese, Korean), 2.5 inch SSD (TLC) 256GB)

- OS-installed model with Intel Core i5 7300U 2.60GHz
  BX-T1010-W19M02H07 (Memory 8GB, Windows 10 IoT Enterprise LTSB 2016 64bit (Japanese, English, Chinese, Korean), 2.5 inch HDD 100GB)

  BX-T1010-W19M02M08 (Memory 8GB, Windows 10 IoT Enterprise LTSB 2016 64bit (Japanese, English, Chinese, Korean), 2.5 inch SSD (MLC) 256GB)

  BX-T1010-W19M02L08 (Memory 8GB, Windows 10 IoT Enterprise 2019 LTSC 64bit (Japanese, English, Chinese, Korean), 2.5 inch SSD (TLC) 256GB)

- OS-installed model with Intel Celeron 3965U 2.20GHz
  BX-T1020-W19M02H07 (Memory 8GB, Windows 10 IoT Enterprise LTSB 2016 64bit (Japanese, English, Chinese, Korean), 2.5 inch HDD 100GB)

  BX-T1020-W19M02M08 (Memory 8GB, Windows 10 IoT Enterprise LTSB 2016 64bit (Japanese, English, Chinese, Korean), 2.5 inch SSD (MLC) 256GB)

  BX-T1020-W19M02L08 (Memory 8GB, Windows 10 IoT Enterprise 2019 LTSC 64bit (Japanese, English, Chinese, Korean), 2.5 inch SSD (TLC) 256GB)

Features

- Seventh-generation Core i7, Core i5, Celeron processor adopted

This product adopts the CPU that saves power consumption and also provides high computing and graphic performances. Embedded-type CPU makes the stable supply possible.

- Fan-less design reduces maintenance work

The product is fanless to ensure a totally spindleless design that simplifies maintenance, relieving the concern about dust or foreign matter to get into the product. Moreover, along with minimized use of degrading parts greatly reduce maintenance work.

- A wide range of power supplies (10.8 - 31.2VDC) supported

As the product supports a wide range of power (10.8 - 31.2VDC), it can be used in a variety of power environments. The separately available AC adapter adds support for 100 - 240VAC power.

- Major types of peripherals are supported with rich interfaces

It has a variety of extended interface such as DVI-D x 1, Displayport×1, 1000BASE-T x 2, USB3.0 x 4, USB2.0 x 2, and serial (RS-232C) x 2.
It has two slot-in type of 2.5-inch SATA disk slots, providing the ability to separate data from the operating system, as well as the convenience of being able to use one slot for system startup and the other for maintenance or for taking home system logs or collected data.

- With retention fitting and cable clamp to stay trouble-free

This product stays trouble-free, being equipped with cable clamp for connectors with no locking mechanism, such as USB cable.

- "Power failure protection system" features power-off without OS shutdown

Equipped with the "Power failure protection system" function that protects data and prohibits writing to storage in the event of power failure *1. Along with the lockdown (disk writing suppression) function of Windows IoT Enterprise, power can be safely turned off without a shutdown process. Moreover, file system damage or data damage caused by sudden power failure can be avoided.

*1 Only the SSD 256GB (TLC) model are compatible with the " Power failure protection system “.

- Safety design required for embedded applications

For Windows 10 IoT Enterprise LTSB 2016 or Windows 10 IoT Enterprise 2019 LTSC installed model, it is possible to use the WF*2 function of OS. It is designed for safety required for embedding purpose, for example, prohibiting unwanted writing to the HDD or SSD with WF function will relieve the concern about the writing limits to the HDD or SSD and prevent an unintentional system alteration.

*2 UWF (Unified Write Filter) is a function of Windows 10 IoT Enterprise LTSB 2016 or Windows 10 IoT Enterprise 2019 LTSC. They protect the disk from being actually written by redirecting the writing to RAM.

Supported OS

- Windows 10 IoT Enterprise LTSB 2016 64bit or Windows 10 IoT Enterprise 2019 LTSC (Japanese, English, Chinese, and Korean)

Customer Support

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

Web Site

https: //www.contec.com/

Latest product information

CONTEC provides up-to-date information on products.
CONTEC also provides product manuals and various technical documents in the PDF.

Free download

You can download updated driver software and differential files as well as sample programs available in several languages.

Note! For product information

Contact your retailer if you have any technical question about a CONTEC product or need its price, delivery time, or estimate information.

How to Obtain Service

For replacement or repair, return the device freight prepaid, with a copy of the original invoice. Please obtain a Return Merchandise Authorization number (RMA) from the CONTEC group office where you purchased before returning any product.

* No product will be accepted by CONTEC group without the RMA number.

Liability

The obligation of the warrantor is solely to repair or replace the product. In no event will the warrantor be liable for any incidental or consequential damages due to such defect or consequences that arise from inexperienced usage, misuse, or malfunction of this device.

Safety Precautions

Understand the following definitions and precautions to use the product safely.

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	Signal word used to indicate an imminently hazardous situation which, if not avoided, will result in death or serious injury.
⚠ WARNING	Signal word used to indicate a potentially hazardous situation which, if not avoided, could result in death or serious injury.
⚠ CAUTION	Signal word used to indicate a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.

Caution on the BX-T1000 Series

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.

⚠ 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.
  Example: - 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.
- CONTEC does not provide any guarantee for the integrity of data on SSD/HDD.
- Always remove the power cable from the power outlet before mounting or removing an expansion board and before connecting or disconnecting a connector.
- Always remove the power cable from the power outlet before connecting or disconnecting a connector.
- As for the product with a D-SUB connector, the appropriate tightening torque for the cable connector is less than 2 kgf·cm.
- 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.
- SATA disk slot is not hot-swappable. Do not insert or remove the SATA disk while the product power is on. It may result in malfunctions or system damages.
- 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 10 years or more.

  (2) SSD ---SSD is used for the OS storage area with the SSD model. The estimated failure rate is 1 every 3,000 rewrites. For details, refer to "Life of SSD" in the Appendix.

  (3) HDD ---HDD is used for the OS storage area with the HDD model. The estimated failure rate is, with the conditions described below, 20,000 hours (Power on hours) or 5 years, whichever comes first.
  Power on hours: Less than 333 hours/month
  Operating: Less than 20% of power on hour

  * 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.

FCC PART15 Class A Notice

NOTE

This equipment has been tested and found to comply with the limits for a ClassA 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.

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.

[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.

[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.
- 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.

2. System Reference

Specifications

Table 2.1. Functional Specifications < *1 / 2* >

Model		BX-T1000- xxxxxxxxx	BX-T1010-xxxxxxxxx	BX-T1020-xxxxxxxxx
CPU		Intel® Core™ i7 Processor 7600U (2.80GHz)	Intel® Core™ i5 Processor 7300U (2.60GHz)	Intel® Celeron Processor 3965U (2.20GHz)
BIOS		BIOS (mfd. by AMI)		
Memory		8GB (260- pin SO-DIMM), PC4-17000 (DDR4-2133)		
Graphic		Intel® HD Graphics 620 (built-in CPU)		Intel® HD Graphics 610 (built-in CPU)
System resolution	DVI-D	800x600, 1,024x768, 1,152x864, 1,280x600, 1,280x720, 1,280x800, 1,280x960, 1,280x1,024, 1,360x768, 1,366x768, 1,400x10,50, 1,440x900, 1,600x900, 1,600x1,200, 1,920x1,080, 1,920x1,200 (16,770,000 colors)		
	Displayport	800x600, 1,024x768, 1,152x864, 1,280x600, 1,280x720, 1,280x800, 1,280x960, 1,280x1,024, 1,360x768, 1,366x768, 1,400x10,50, 1,440x900, 1,600x900, 1,600x1,200, 1,680x1,050, 1,790x1,344, 1,856x1,392,1,920x1,080, 1,920x1,200, 1,920x1,440, 2,048x1,152, 2,048x1,536, 2,560x1,440, 2,560x1,600, 2,560x1,920, 2,560x2,048, 3,840x2,160 (16,770,000 colors)		
Audio		HD Audio compliant, LINE OUT x 1, LINE IN x 1, MIC IN x 1		
SATA		Slot-in 2.5 inches SATA hard disk x 2 Serial ATA 3.0 compliant support		
		BX-T10x0-NA02:- BX-T10x0-W1xM02H07: Built-in SATA HDD (100GB, 1 partition) *1 BX-T10x0-W1xM02M08: Built-in SATA SSD (MLC) (256GB, 1 partition) *1 BX-T10x0-W1xM02L08: Built-in SATA SSD (TLC) (256GB, 1 partition) *1		
LAN		Intel I210IT Controller 1000BASE-T/100BASE-TX/10BASE-T 2 port (Wake On LAN support)		
USB		USB 3.0 compliant 4 port USB 2.0 compliant 2 port		
Serial I/F		RS-232C (general-purpose) : 2port (SERIAL PORTA, B), 9pin D-SUB connector (male) Baud rate : 50 - 115,200bps		
Hardware monitoring		Monitoring CPU temperature, power voltage		
Watchdog timer		Software programmable ,255 level(1sec - 255sec) Time up allows reset or shutdown.		
RTC/CMOS		Lithium backup battery life: 10 years or more. The real-time clock is accurate within ±3 minutes (at 25°C) per month		
Power Management		Power management setup via BIOS, Power On by Ring / Wake On LAN, Supports ACPI Power management		
Secutity (TPM)		TCG TPM2.0		

*1: The capacity of HDD or SDD is a value when 1GB is calculated by 1 billion bytes. The capacity that can be recognized from OS might be displayed fewer than an actual value.

Table 2.1. Functional Specification < *2 / 2* >

Model		BX-T1000- xxxxxxxx	BX-T1010-xxxxxxxx	BX-T1020-xxxxxxxx
Interface				
	Display	DVI-D x 1 (25pin DVI-D connector), Displayport x 1		
	Audio	LINE OUT : 3.5φ Stereo mini jack, Full-scale output level 1.2Vrms(Typ.) LINE IN : 3.5φ Stereo mini jack, Full-scale output level 1.4Vrms(Typ.) MIC IN : 3.5φ Stereo mini jack, Full-scale input level 1.4Vrms(Typ.)		
	Serial ATA slot	Slot-in 2.5 inches SATA hard disk x 2		
	LAN	2 port (RJ-45 connector)		
	USB	USB3.0 compliant 4port (TYPE-A connector) USB2.0 compliant 2port (TYPE-A connector)		
	RS-232C	2 port (9pin D-SUB connector [male])		
Power supply				
	Rated input voltage	12 - 24VDC *2		
	Range of input voltage	10.8 - 31.2VDC		
	Power consumption	12V 5.2A, 24V 2.7A	12V 4.2A, 24V 2.2A	12V 4.1A, 24V 2.1A
	External device power supply capacity	Serial ATA slot : +5V : 2A(1,00mAx2) USB3.0 I/F : +5V : 3.6A (900mAx4) USB2.0 I/F : +5V : 1.0A (500mAx2)		
Physical dimensions (mm)		262 (W) x 180(D) x 49(H) (No protrusions)		
Weight		About 2.0kg (Excluding attachment fittings)		

*2: Use a power cable shorter than 3m.

Table 2.2. Installation Environment Requirements

Model			BX-T10x0-xxxxxxxx
Ambient specifications	Operating temperature		0 - 55°C (With 1000BASE-T : 0 - 50°C), airflow 0.7m/s 0 - 45°C (With 1000BASE-T : 0 - 40°C), no airflow
	Storage temperature		-10 - +60°C
	Humidity		10 - 90%RH (No condensation)
	Floating dust particles		Not to be excessive
	Corrosive gases		None
	Line-noise resistance	Line noise	AC line / ±2kV *3 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) Atmospheric discharge / ±8kV (IEC61000-4-2 Level 3, EN61000-4-2 Level 3)
	Vibration resistance	Sweep resistance	When the HDD is on : 10 - 50Hz/ 0.5G 25 min. each in x, y, and z directions (JIS C60068-2-6-compliant, IEC60068-2-6-compliant)
			When the HDD is off : 10 - 57Hz/semi-amplitude 0.15mm 57 - 150Hz/2.0G 40 min. each in x, y, and z directions (JIS C60068-2-6-compliant, IEC60068-2-6-compliant)
	Impact resistance		10G, half-sine shock for 11 ms in x, y, and z directions (JIS C 60068-2-27-compliant, IEC 60068-2-27-compliant)
	Grounding		Class D grounding, SG-FG / continuity
	Standard		VCCI Class A, FCC Class A, CE Marking (EMC Directive Class A, RoHS Directive), UKCA

*3 : When AC adapter "ACAP12-06A" is used.

Power Management Features

- Support both ACPI (Advanced Configuration and Power Interface).
- ACPI v5.0 compliant
- Hardware automatic wake-up

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 31.2 V maximum DC power source.

Power Consumption

For typical configurations, the CPU card is designed to operate with at least 84W 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:

Table 2.3. DC voltage tolerance

DC Voltage	Acceptable Tolerance
+ 12V - 24V	+ 10.8V - 31.2V

Physical Dimensions

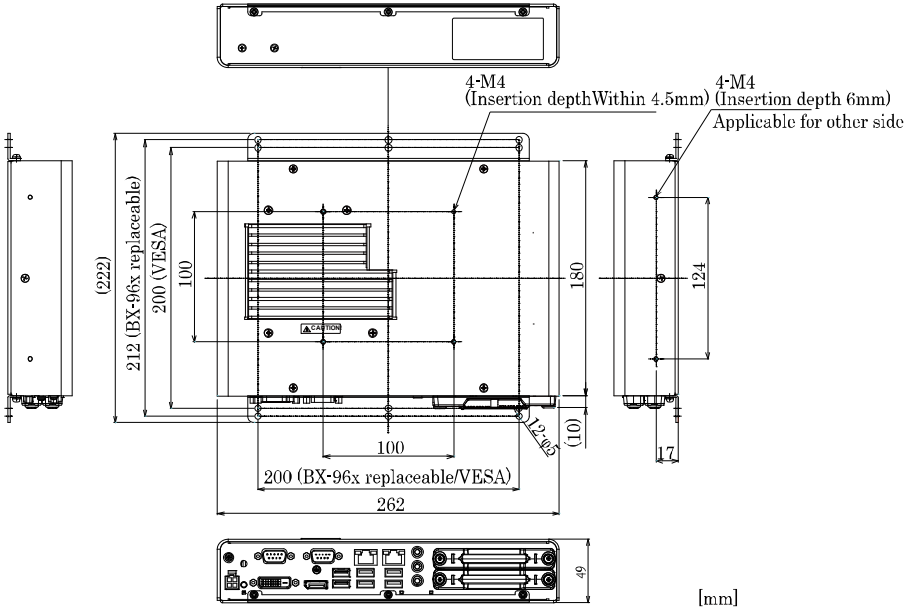


Figure 2.1. Physical Dimensions (With the bundled attachment fittings)

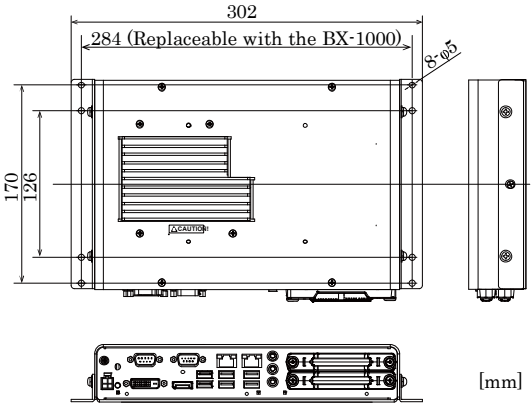


Figure 2.2. Physical Dimensions (With the BX-BKT-FIX04 (optional brackets))

3. Hardware Setup

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 chapter, install, connect and set 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 Chapter 4, 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.
(See Chapter 4, “Save & Exit.")

⚠ 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.

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.
- Only 2.5 inches SATA HDD / SSD can be installed to this drive bay.

Installing the Hard Disk

(1) Remove the hard disk bracket from the product.

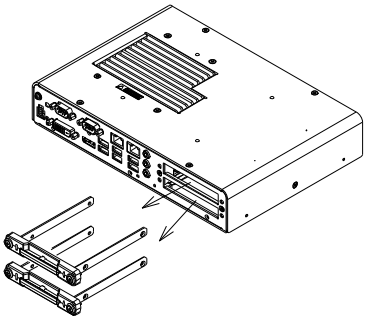


Figure 3.1. Removing the Hard Disk Bracket

(2) Install the HDD/SSD into the hard disk bracket, and then fix it in place with screws in four locations. The specified tightening torque is 5kgf·cm.

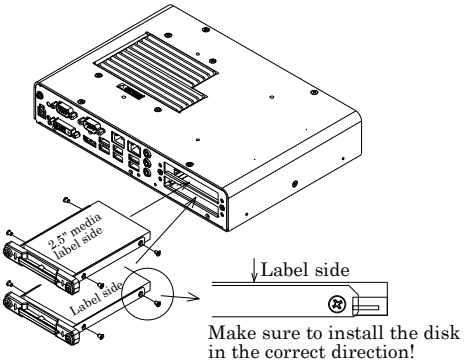


Figure 3.2. Installing the Hard Disk to the Bracket

⚠ CAUTION

- When tightening the screws to fasten the HDD / SDD to the bracket or the HDD mounted bracket to the product, do not use any tool such as an electric screwdriver, which vibrates the HDD / SDD. Not doing so will damage the HDD / SDD.
- If you use a HDD/SSD other than the optional product, we cannot guarantee the specifications of this product. If you want to use the product within its specifications, be sure to use the optional HDD.

- To prevent potential damage caused by static electricity, take appropriate anti-static measures (for example, wearing an anti-static wristband) when inserting or removing the HDD/SSD
- Do not touch the terminals on the HDD/SSD. Doing so may damage the card.
- Do not insert the HDD/SSD with the incorrect orientation. Also, do not apply excessive force when inserting the HDD/SSD. Doing so may damage the connectors.
- Before inserting the HDD/SSD, do not drop it or otherwise subject it to strong impacts. Doing so may lead to malfunctions.
- Do not cover BREATING HOLE. Doing so may lead to malfunctions.

Attaching the Attachment Fittings

(1) Use screws to attach the bundled attachment fittings.
Do not tighten screws with excess force.

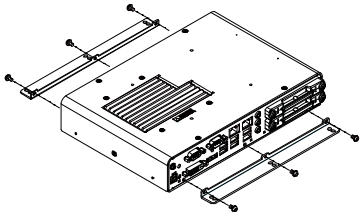


Figure 3.3. Attaching the Attachment Fittings

When using the BX-BKT-FIX04 (optional brackets), the following attachement is possible.

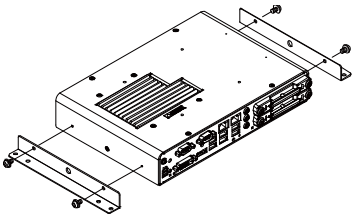


Figure 3.4. Attaching the Optional Brackets

⚠ 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.

Attaching the FG

(1) Use screws to attach the FG.

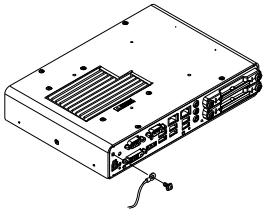


Figure 3.5. Attaching the FG

⚠ 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.

Fastening the Cable

This product comes with clamps for fixing cables.

Fastening the Audio, USB Cable

The product has a hole for attaching a cable clamp. Using a cable clamp for a cable with lock-less connector, such as the Audio and 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) Attach each cable to the product and tie them with a cable clamp, attach the clamp to the product.

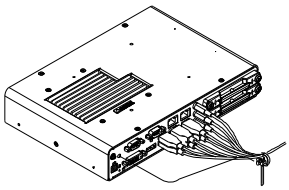


Figure 3.6. Attaching the Cable Camp

Fastening the Displayport Cable

(1) Attach the displayport retention fitting to the product.

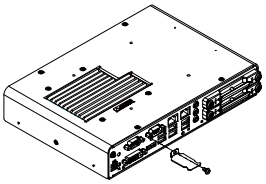


Figure 3.7. Attaching the Displayport Retention Fitting

(2) Fasten the displayport cable and the displayport retention fitting with a cable clamp for displayport.

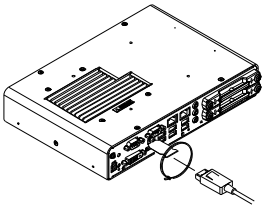


Figure 3.8. Fastening the Displayport Cable

Installation Requirements

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.

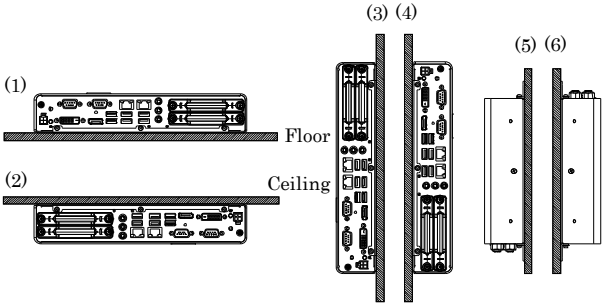
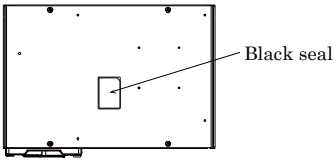


Figure 3.9. Installation Orientation

⚠ 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.
- Do not take off the black seal on the bottom. It may cause malfunction or damage to the product. Bear in mind that taking off the seal is considered as modifying the product.



Distances between this product and its vicinity

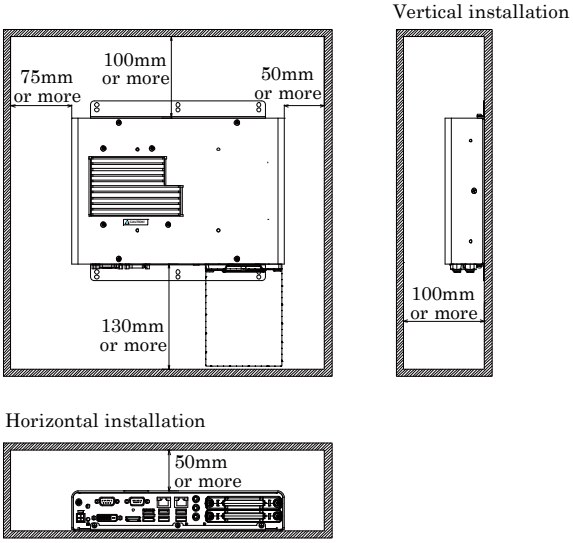


Figure 3.10. Distances between this product and its vicinity

Minimum distance for installing / removing drive

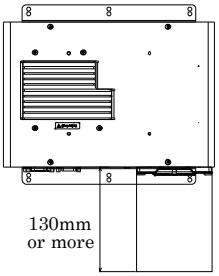


Figure 3.11. Minimum distance for installing / removing drive

⚠ 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.

Definition of ambient 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.

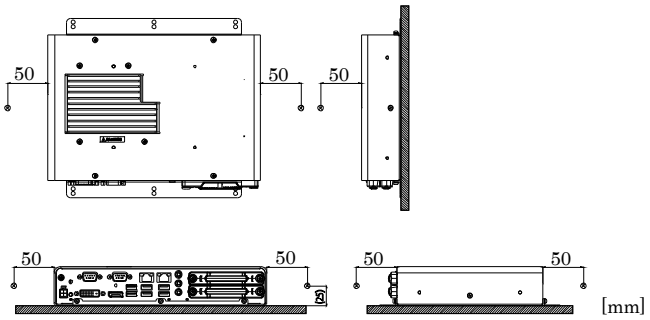


Figure 3.12. Measurement point of ambient temperature

4. BIOS Setup

Introduction

This chapter discusses American Megatrends's (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.

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:

1 By pressing <Del> or <ESC> immediately after switching the system on, or

2 By pressing the <Del> or <ESC> key when the following message appears briefly at the bottom of the screen during the POST (Power On Self-Test).

Press <DEL> ot <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 on the system case. You may also restart by simultaneously pressing <Ctrl>, <Alt>, and <Delete> keys.

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.

Table 4.1. Using Setup

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
+ key	Increase the numeric value or make changes
- key	Decrease the numeric value or make changes
F1 key	General help on Setup navigation keys
F2 key	Load the previous settings.
F3 key	Load defaults from BIOS default table.
F4 key	Save all the changed settings to the FLASH ROM and exit

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> or the F1 key again.

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.

A Final Note About Setup

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

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.

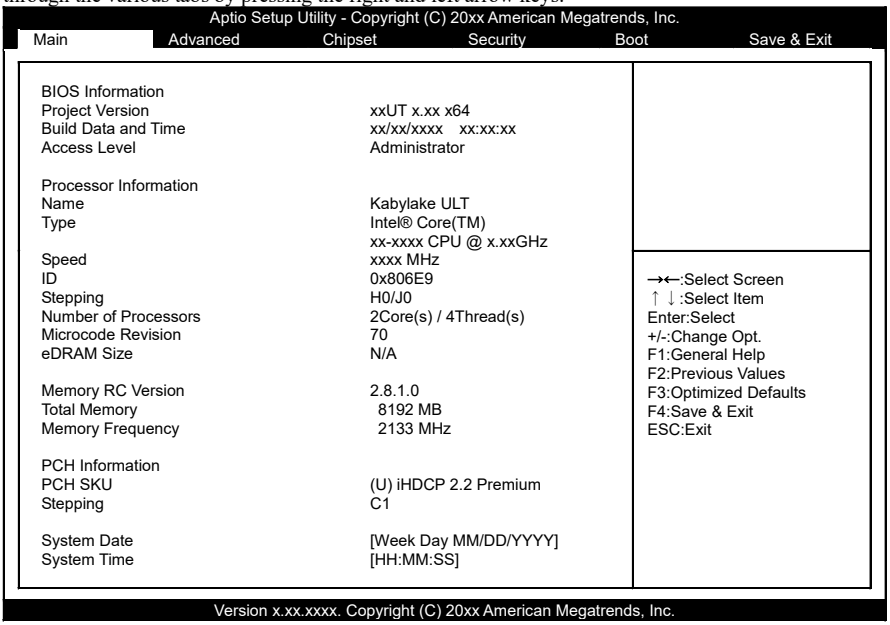


Figure 4.1. Main Menu (Actual Display May Vary)

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.

Main

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

Table 4.2. Indication item of the main menu

Item	Indication example	Explanation
Project Version	xxxUT x.xx x64	Displays the BIOS version.
Build Data and Time	xx/xx/xxxx xx:xx:xx	Displays the BIOS creation date and time.

This table shows the selections that you can make on the Main Menu.

Table 4.3. Main Menu Selections

Item	Options	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

Advanced

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

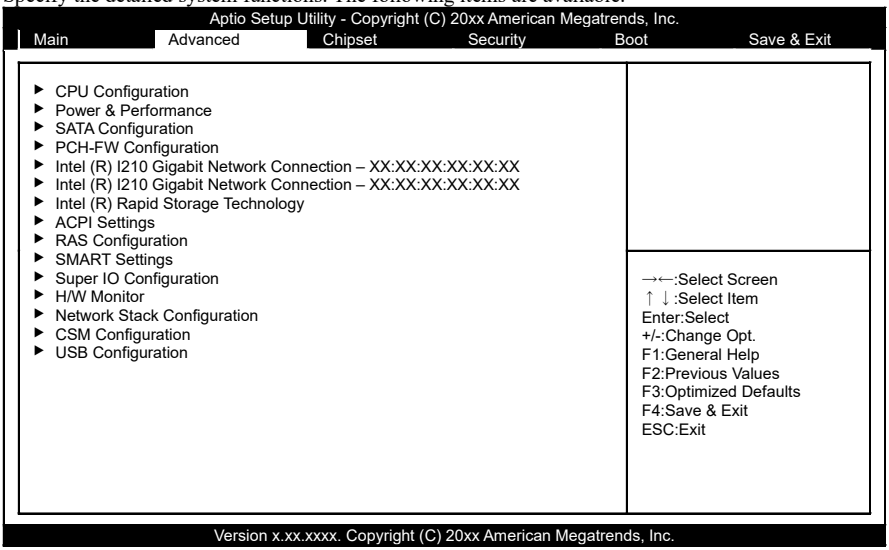


Figure 4.2. Advanced Menu

CPU Configuration
Check the CPU Information.

Power & Performance
Use this menu to check the power and performance settings.

SATA Configuration
Configure the SATA controller settings.

PCH-HW Configuration
Check the version of PCH-FW and configure the TPM.

Intel (R) I210 Gigabit Network Connection
Configure the LAN UEFI driver settings.

Intel (R) Rapid Storage Technology
Use this menu to configure the RAID settings. This is displayed when the RAID configuration is enabled.

ACPI Settings
Configure the ACPI settings.

RAS Settings
Configure the RAS settings.

SMART Settings
Check the SMART settings.

Super IO Configuration
Configure the Super IO settings.

H/W Monitor
View such information as the CPU temperature.

Network Stack Configuration
Configure the UEFI network function settings.

CSM Configuration
Configure such settings as the boot options.

USB Configuration
Configure the USB settings.

⚠ CAUTION

If SATA Mode Selection is not set to Intel RST(RAID), Intel (R) Rapid Storage Technology cannot be viewed. Refer to " Software RAID Setup (page67)" for the configuration".

CPU Settings

Configure the information of CPU.

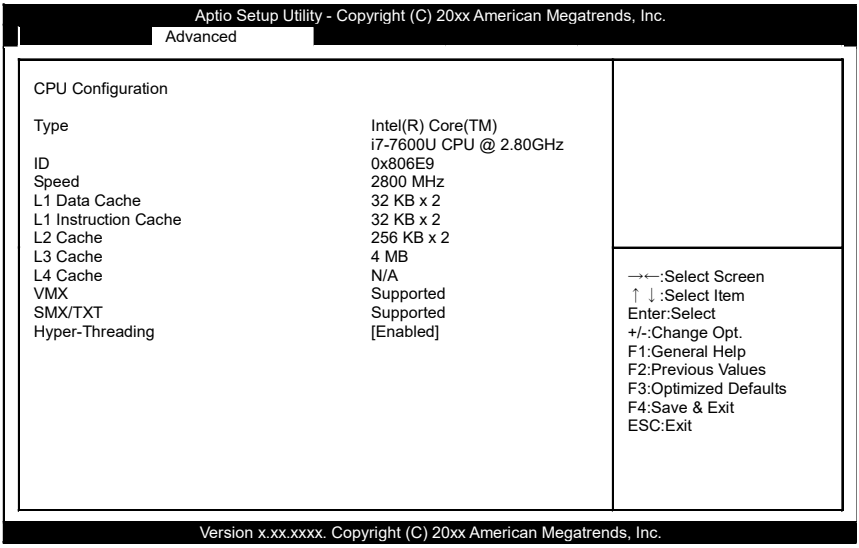


Figure 4.3. CPU Configuration

Table 4.4. CPU Configuration (The i7 model and the i5 model only)

Item	Option	Description
Hyper-Threading	[Enabled] Disabled	Configure the Hyper-threading settings.

Power & Performance

Use this menu to check the power and performance settings.

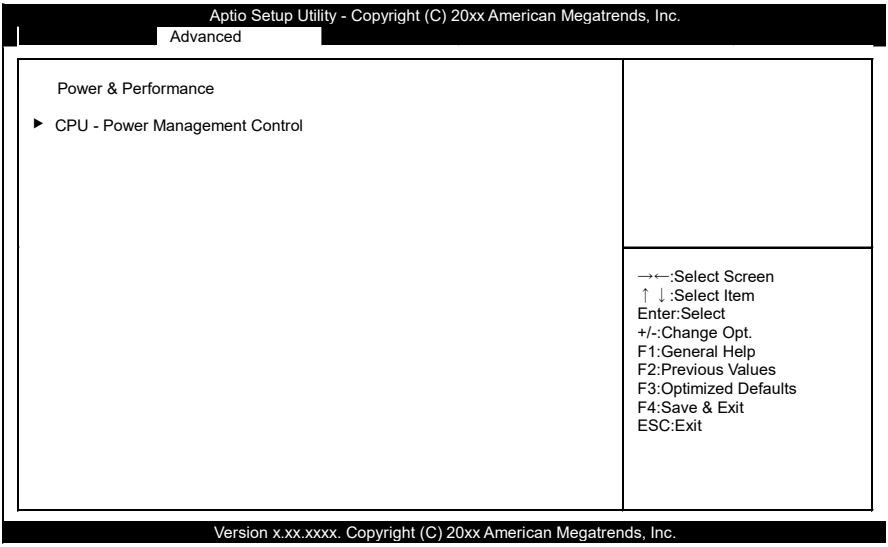


Figure 4.4. Power & Performance

CPU - Power Management Control

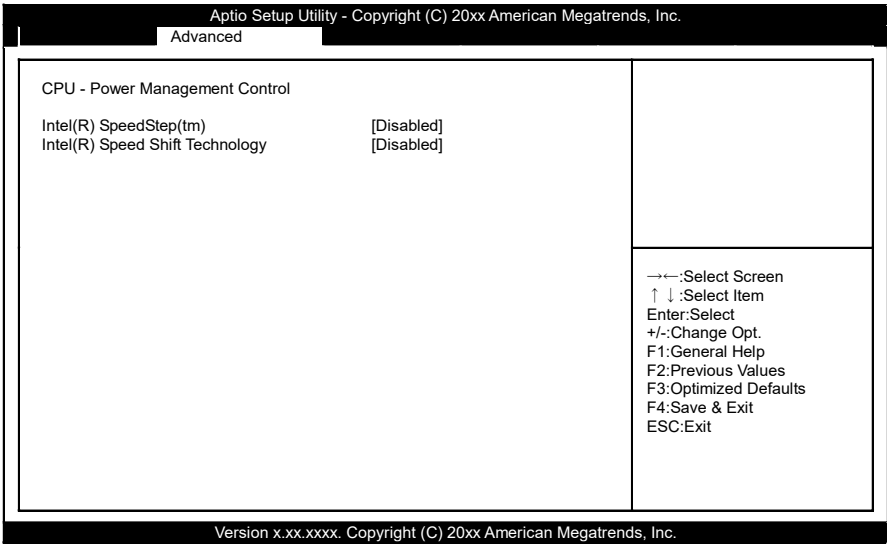


Figure 4.5. CPU - Power Management Control

Table 4.5. CPU - Power Management Control

Item	Option	Description
Intel(R) SpeedStep(tm)	Enabled [Disabled]	Do not change this setting.
Intel(R) Speed Shift Technology	Enabled [Disabled]	Do not change this setting.

Table 4.6. CPU - Power Management Control
(Only available when "Intel(R) SpeedStep(tm)" is selecting Enabled)

Item	Option	Description
Turbo Mode	Enabled [Disabled]	Do not change this setting.

View/Configure Turbo Options
(Only available when "Intel(R) SpeedStep(tm)" is selecting Enabled)

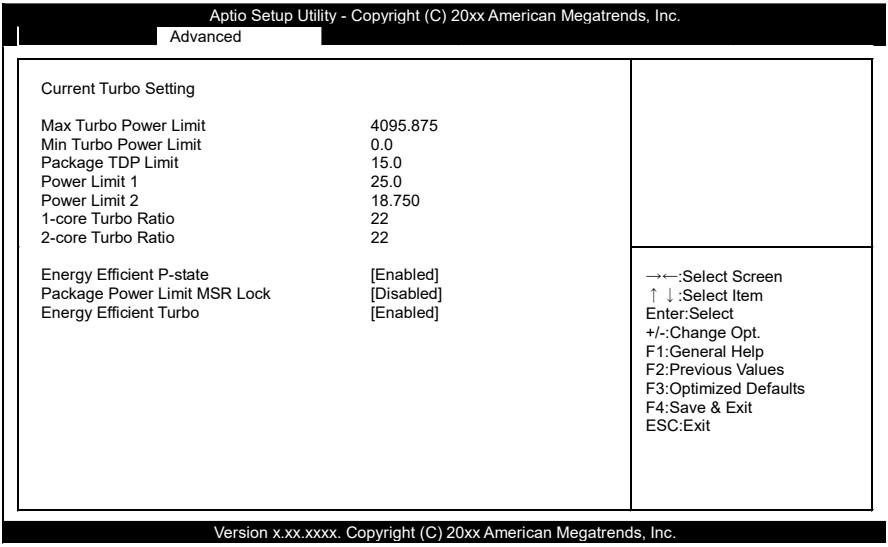


Figure 4.6. View/Configure Turbo Options (Actual Display May Vary by Hardware Components)

Table 4.7. Current Turbo Setting

Item	Option	Description
Energy Efficient P-state	[Enabled] Disabled	Do not change this setting.
Package Power Limit MSR Lock	Enabled [Disabled]	Do not change this setting.
Energy Efficient Turbo	[Enabled] Disabled	Do not change this setting.

SATA Configuration

Configure the SATA controller settings.

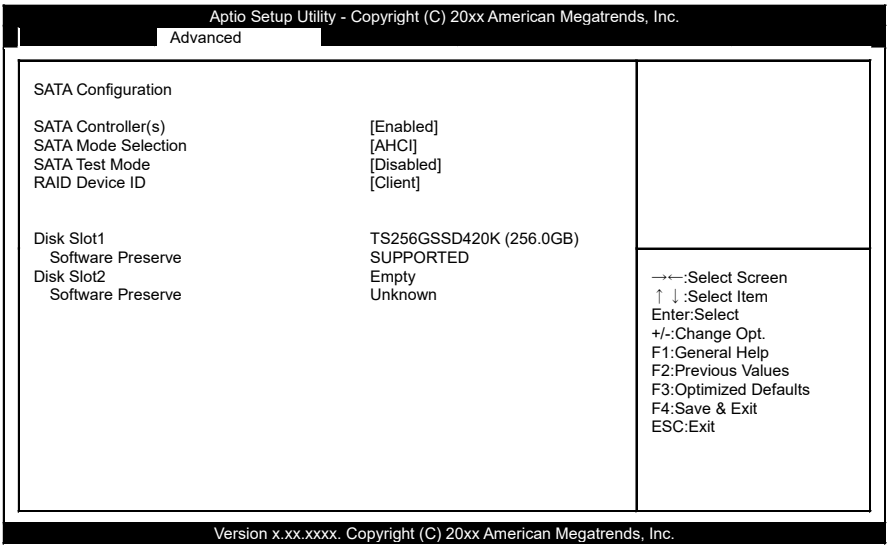


Figure 4.7. SATA Configuration(Actual Display May Vary by Hardware Components)

Table 4.8. SATA Configuration

Item	Option	Description
SATA Controller(s)	[Enabled] Disabled	Configure the SATA controller operation settings. Changing this setting will cause the drive to become unrecognized.
SATA Mode	Intel RST (RAID) [AHCI Mode]	Specify the SATA device mode. Changing this setting will require the OS to be reinstalled.
SATA Test Mode	Enabled [Disabled]	Do not change this setting.
Disk Slot1	-	Display the information of the SATA device connected to Disk Slot 1.
Disk Slot2	-	Display the information of the SATA device connected to Disk Slot 2.

Table 4.9. SATA Configuration (Only available when "SATA Mode" is selecting Intel RST (RAID)

Item	Option	Description
RAID Device ID	Client Alternate	Do not change this setting.

PCH-FW Configuration

Check the version of PCH-FW and configure the TPM.

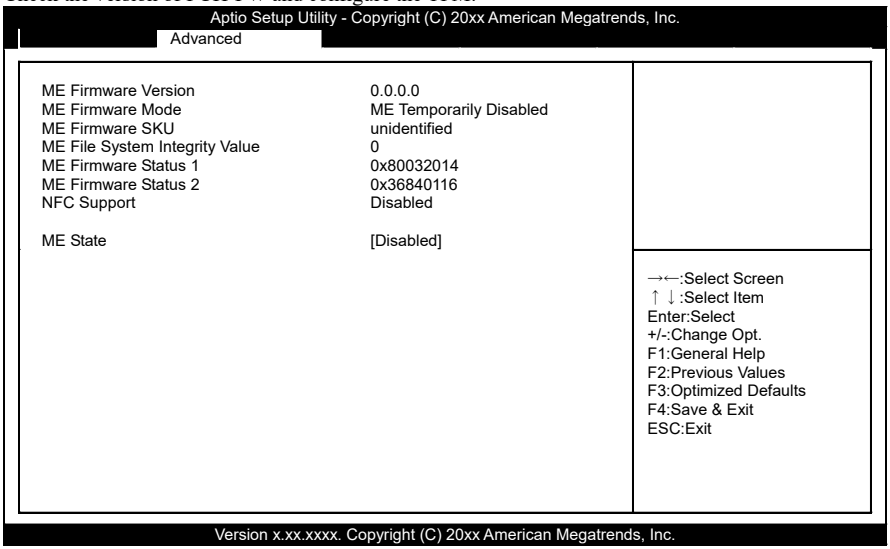


Figure 4.8. Main Menu (Actual Display May Vary by Settings)

Table 4.10. PCH-FW Configuration

Item	Option	Description
ME State	[Disabled] Enabled	Set to Enabled when using TPM. When TPM is not used, set to Disabled.

Table 4.11. PCH-FW Configuration (Only available when "ME State" is selecting Enabled)

Item	Option	Description
ME Unconfig on RTC Clear	Disabled [Enabled]	Do not change this setting.
Comms Hub Support	[Disabled] Enabled	Do not change this setting.
JHI Support	[Disabled] Enabled	Do not change this setting.
Core Bios Done Message	Disabled [Enabled]	Do not change this setting.

Table 4.12. Firmware Update Configuration (Only available when "ME State" is selecting Enabled)

Item	Option	Description
Me FW Image Re-Flash	[Disabled] Enabled	Do not change this setting.

Table 4.13. PTT Configuration (Only available when "ME State" is selecting Enabled)

Item	Option	Description
TPM Device Selection	[PTT] dTPM	Do not change this setting.
PTP aware OS	[PTP Aware] Not PTP Aware	Do not change this setting.

Intel (R) I210 Gigabit Network Connection

Configure the UEFI driver settings for LAN NIC I210.

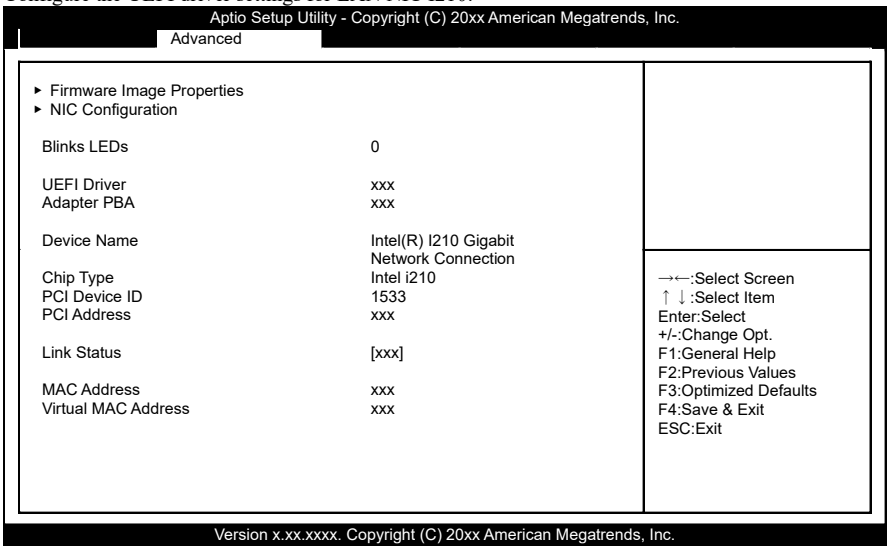


Figure 4.9. Intel (R) I210 Gigabit Network Connection (Actual Display May Vary.)

Table 4.14. NIC Configuration

Item	Option	Description
Link Speed	10 Mbps Half 10 Mbps Full 100 Mbps Half 100 Mbps Full [Auto Negotiated]	Do not change this setting.
Wake on LAN	Disabled [Enabled]	Do not change this setting.

Intel(R) Rapid Storage Technology

⚠ CAUTION

If SATA Mode Selection is not set to Intel RST(RAID), Intel(R) Rapid Storage Technology will not be displayed. Refer to "Chapter 5 Software RAID Setup" for the setting procedure.

Use this menu to configure the RAID settings. The following items are available:

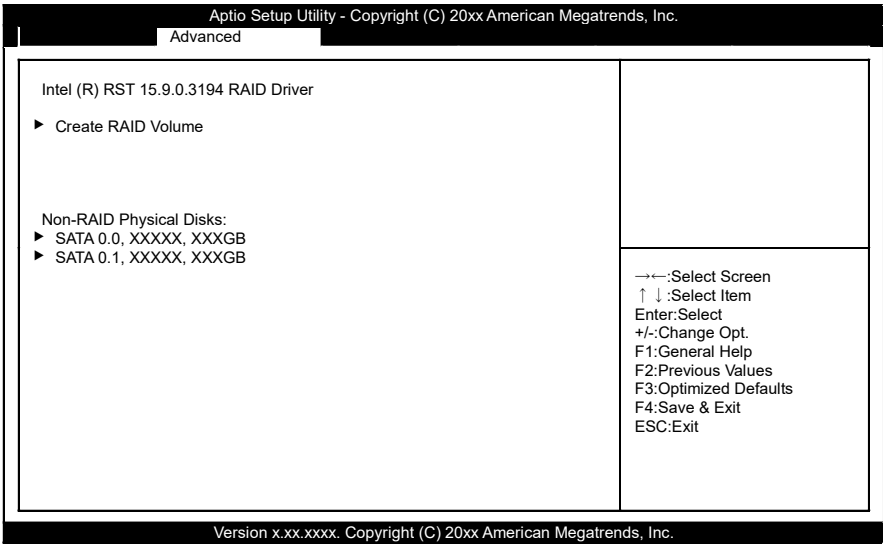


Figure 4.10. Intel(R) Rapid Storage Technology

Create RAID Volume
Create RAID volume.

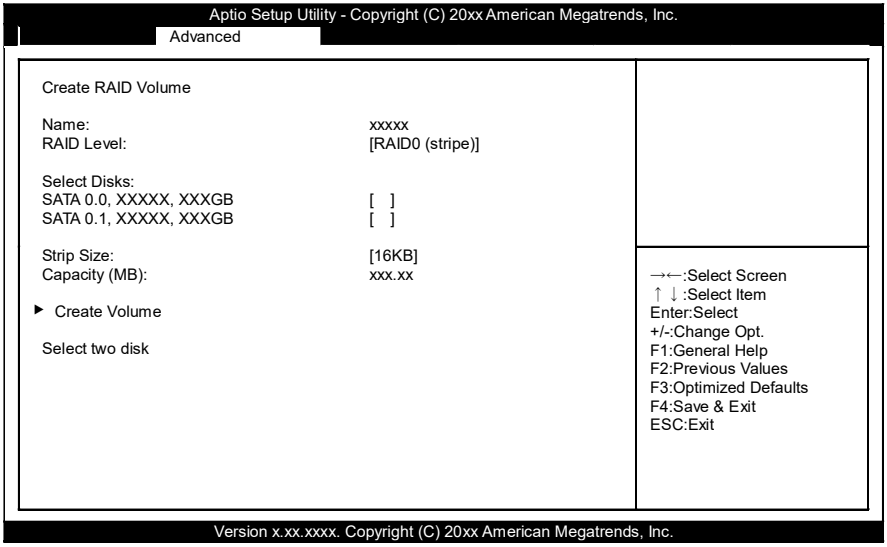


Figure 4.11. Create RAID Volume

Table 4.15. Create RAID Volume

Item	Option	Description
Name	Volume1	Set the volume name of RAID volume.
RAID Level	RAID0 (Stripe) RAID1(Mirror) Recovery	Set the type of RAID volume. Do not set other than RAID1(Mirror)
Select Disks	- / X	Set SATA disk that configures RAID volume. SATA disk can be specified with [X].
Stripe Size	4KB 8KB 16GB 32KB 64KB 128KB	Set the stripe size. *This is not used with this product.
Capacity (MB)	xxx.xx	Set the capacity of RAID volume.
Synchronization	On Request Continuous	This is displayed when Recovery is selected. *This is not used with this product.
▶ Create Volume	-	Create RAID volume.

Table 4.16. Non-RAID Physical Disks

Item	Option	Description
SATA 0.0, XXXXX, XXXGB	-	The model, the serial number, capacity, and state of SATA disk without RAID setting are displayed.
SATA 0.1, XXXXX, XXXGB	-	The model, the serial number, capacity, and state of SATA disk without RAID setting are displayed.

⚠ CAUTION

- Always refer to “Chapter 5 Software RAID Setup" when creating RAID volume.
- The CONTEC only supports mirroring. If you intend to create RAID volume other than mirroring, we leave it as user’s option.

ACPI Settings

Configure the settings for ACPI power management.

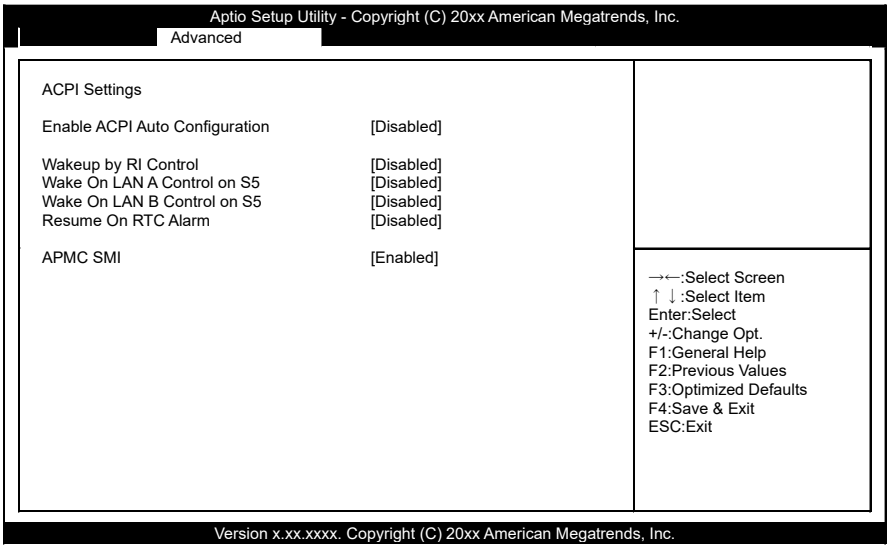


Figure 4.12. ACPI Settings

Table 4.17. ACPI Settings

Item	Option	Description
Enable ACPI Auto Configuration	[Disabled] Enabled	Do not change this setting.
Wakeup by RI Control	[Disabled] Enabled	Configure resume on Ring function settings.
Wake on LAN A Control on S5	[Disabled] Enabled	Configure the Wake on LAN settings for LAN A port.
Wake on LAN B Control on S5	[Disabled] Enabled	Configure the Wake on LAN settings for LAN B port.
Resume on RTC Alarm	[Disabled] Enabled	Enable or disable the function for automatically turning on the system at the specified date and time. When enabled, use the following items to set the date and time the system will automatically turn on.
APMC SMI	Disabled [Enabled]	Do not change this setting.

Table 4.18. Resume On RTC Alarm (Only Available When "Enabled" Is Selected)

Item	Option	Description
RTC Wake up Day	0-31	Set the day the system will automatically turn on.
RTC Wake up Hour	0-23	Set the time the system will automatically turn on.
RTC Wake up Minute	0-59	Set the minute the system will automatically turn on.
RTC Wake up Second	0-59	Set the second the system will automatically turn on.

RAS Configuration

Configure the RAS settings.

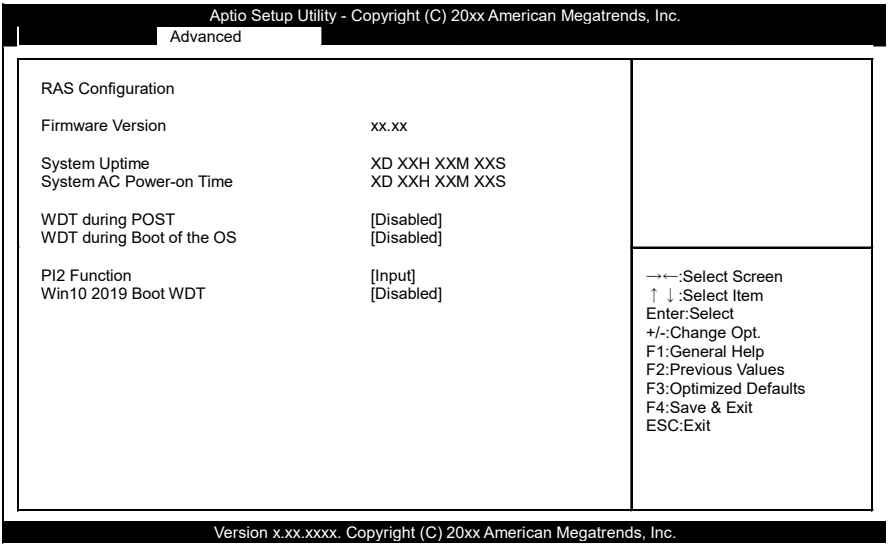


Figure 4.13. RAS Configuration (Actual Display May Vary.)

Table 4.19. RAS Configuraiton

Item	Option	Description
Firmware Version	-	Check the firmware version of the sub controller.
System Uptime	-	Check the total operation time of the system.
System AC Power-on Time	-	Check the total time of the power supplied to the system.
WDT during POST	Disabled Enabled	Configure WDT function upon booting of BIOS.
WDT during Boot of the OS	Disabled Enabled	Configure WDT function upon booting of the OS. Installing Contec Manager is necessary to use WDT function. (For the product without OS model only) (Refer to Table 4.12.)
Win10 2019 Boot WDT	Disabled Enabled	This watchdog timer monitors Windows10 2019 booting. Set this to "Enabled" only when using Windows10 2019 (BX-T1000x0-W19Mxxxxx). However, set this to "Disabled" when copying a disk during the recovery.

Item	Option	Description
		Set this to "Disabled" if not using the indicated OS.

Table 4.19. WDT during Boot of the OS Configuration (Only available when "WDT during Boot of the OS" is selecting Enabled)

Item	Option	Description
WDT Value (Seconds)	254	Configure the time-out time of WDT functions. Unit: [Seconds]
WDT Timeup Function	None [Reset] Shutdown	Configure the time-out behavior of WDT functions.

SMART Settings

Check the SMART settings.

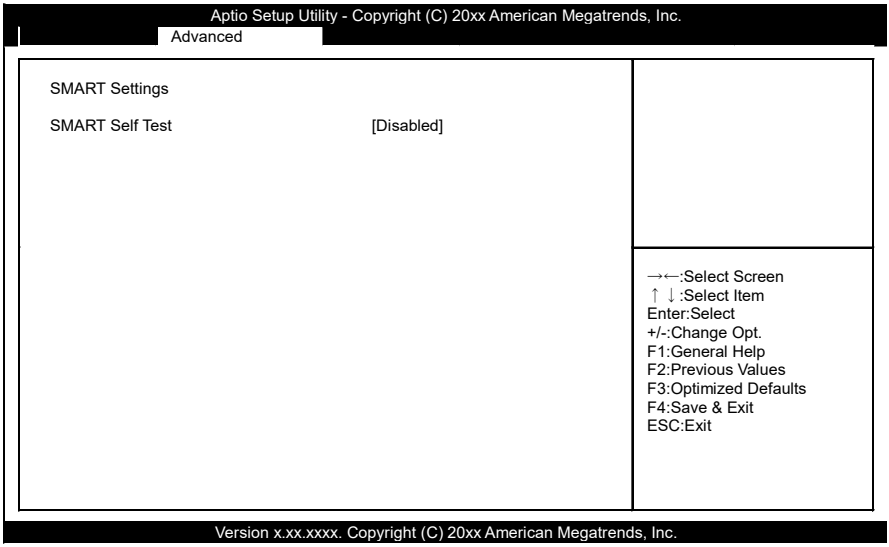


Figure 4.14. SMART Settings

Table 4.21. SMART Settings

Item	Option	Description
SMART Self Test	[Disabled] Enabled	Do not change this setting.

Super IO Configuration

Configure the operation settings for Super IO.

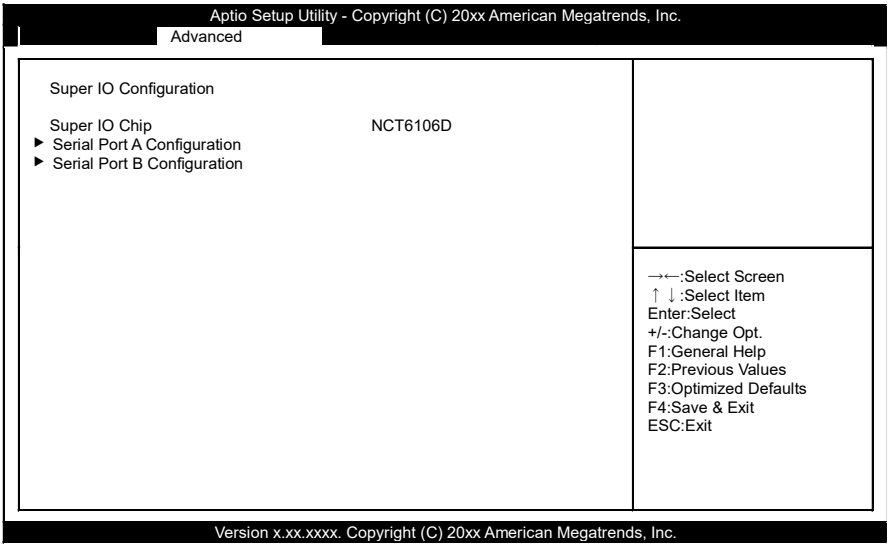


Figure 4.15. Super IO Configuration

Table 4.22. Super IO Configuration

Item	Option	Description
Serial Port A Configuration	Refer to Table 4.23.	-
Serial Port B Configuration	Refer to Table 4.24.	-

Table 4.23. Serial Port A Configuration

Item	Option	Description
Serial Port	Disabled [Enabled]	Configure the operation settings for serial port A.
Device Settings	IO=3F8h; IRQ=4;	The device setting is displayed.

Table 4.24. Serial Port B Configuration

Item	Option	Description
Serial Port	Disabled [Enabled]	Configure the operation settings for serial port B.
Device Settings	IO=2F8h; IRQ=3;	The device setting is displayed.

H/W Monitor

View hardware monitor information such as the CPU temperature.

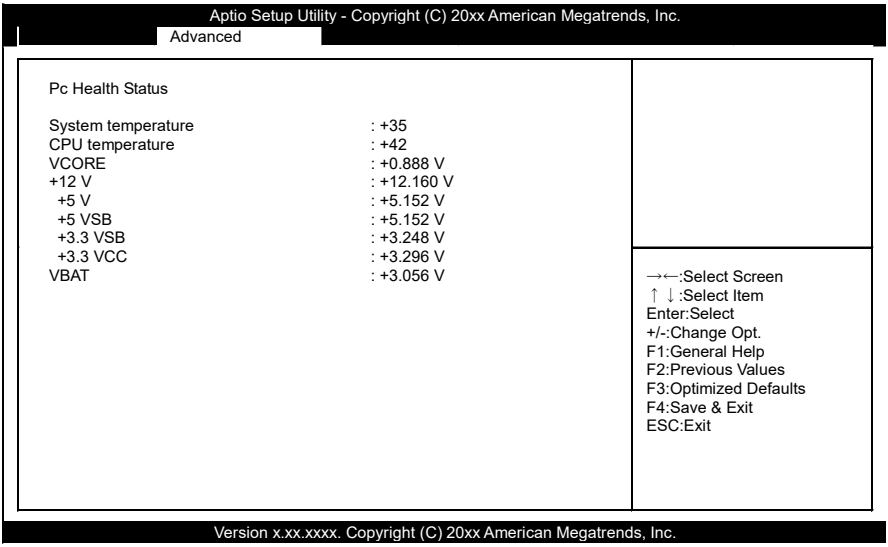


Figure 4.16. H/W Monitor (Actual Display May Vary.)

Network Stack Configuration

Configure the UEFI network function settings.

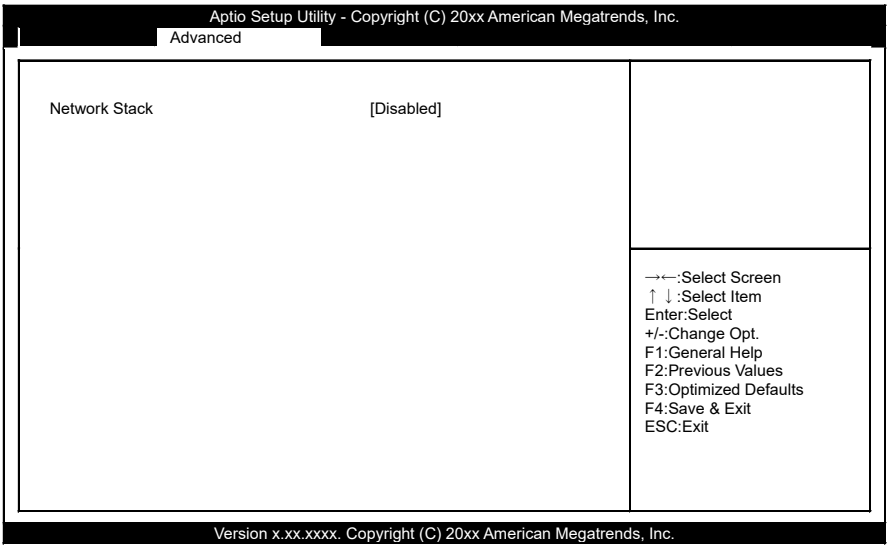


Figure 4.17. Network Stack Configuration

Table 4.25. Network Stack Configuration

Item	Option	Description
Network Stack	[Disabled] Enabled	Configure network functions on UEFI.
Ipv4 PXE Support	[Disabled] Enabled	Configure IPv4 PXE.
Ipv4 HTTP Support	[Disabled] Enabled	Configure IPv4 HTTP.

CSM Configuration

The settings of CSM (Compatibility Support Module) can be checked.

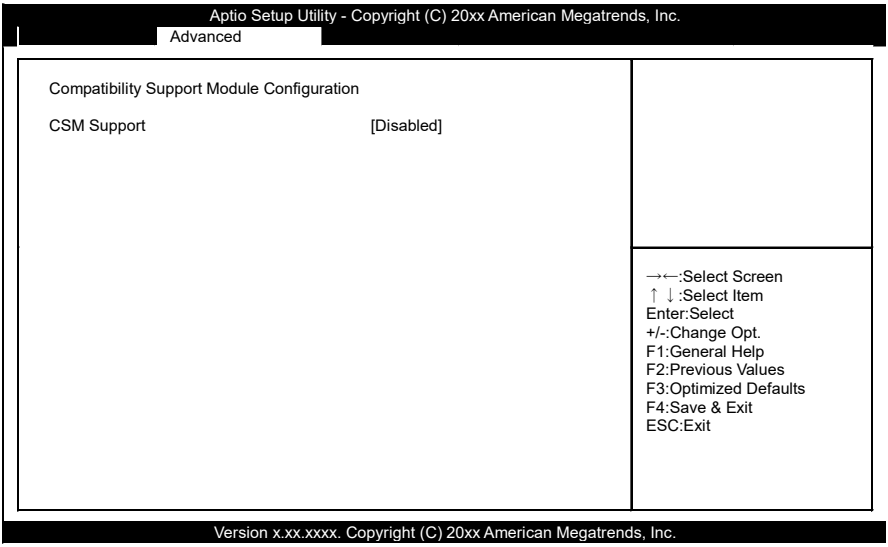


Figure 4.18. CSM Configuration

Table 4.26. CSM Configuration

Item	Option	Description
CSM Support	[Disabled] Enabled	Do not change this setting.

USB Configuration

Configure the operation settings for USB controllers.

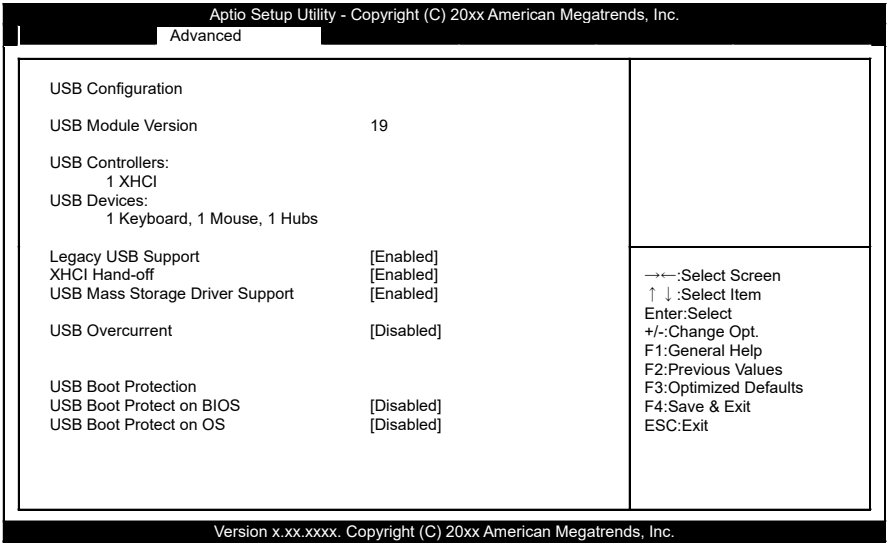


Figure 4.19. USB Configuration (Actual Display May Vary by Hardware Components)

Table 4.27. USB Configuration

Item	Option	Description
Legacy USB Support	[Enabled] Disabled Auto	Configure whether USB keyboards and similar devices will be usable with legacy operating systems (such as MS-DOS).
XHCI Hand-off	[Enabled] Disabled	Do not change this setting.
USB Mass Storage Driver Support	Disabled [Enabled]	Configure the USB storage support settings with BIOS.
USB Overcurrent	[Disabled] Enabled	Configure the behavior of the overcurrent detention of USB port power.
USB Boot Protect on BIOS / OS	[Disabled] Enabled	Selecting Enabled stores the information of the USB device connected at the time onto NVRAM. When entering BIOS setup menu or OS, the stored information and the information of the USB device currently connected will be compared. Processing stops if they are not the same.

Table 4.28. Only available when "USB Boot Protect on BIOS / OS" is selecting Enabled

Item	Option	Description
Protect by Vendor / Product / S/N	Disabled [Enabled]	Select which USB information should be compared. Vendor : Compare vendor names. Product : Compare product names. S/N : Compare serial numbers.
XXXXXXXXXXX (USB Device name) (Vendor name)	Disabled Ignored [Enabled]	Set whether the information should be compared per device stored in NVRAM. Enabled : The information should be compared. Disabled : The information should not be compared. *When this device is found, it indicates the information is not the same. Ignored : Even when this device cannot be found, the comparison will be ignored.

⚠ CAUTION

Do not forget USB configuration you stored. If you cannot recover it, contact your retailer.

Chipset

Specify the detailed chipset functions.

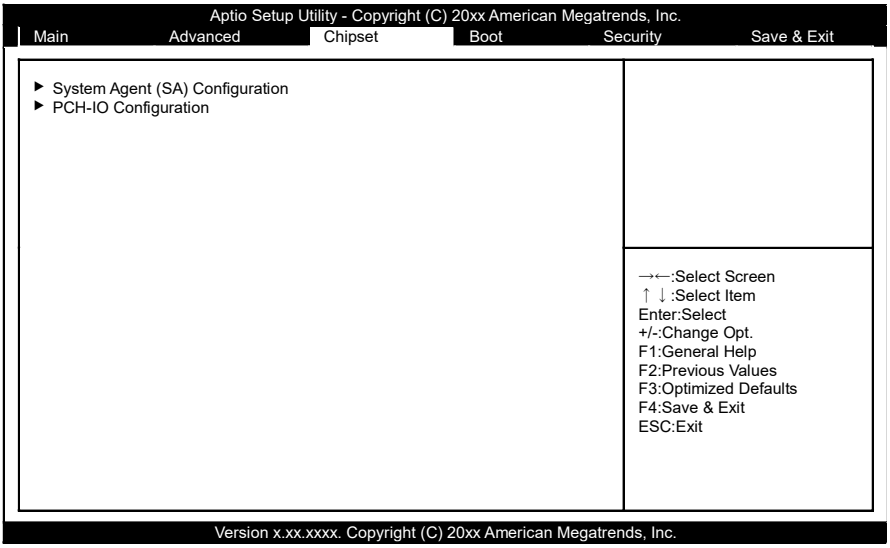


Figure 4.20. Chipset

The following items are available.

System Agent (SA) Configuration
Check the information for System Agent Configuration.

PCH-IO Configuration
Configure the operation settings for PCH-IO.

System Agent Configuration

Check the information for System Agent Configuration.

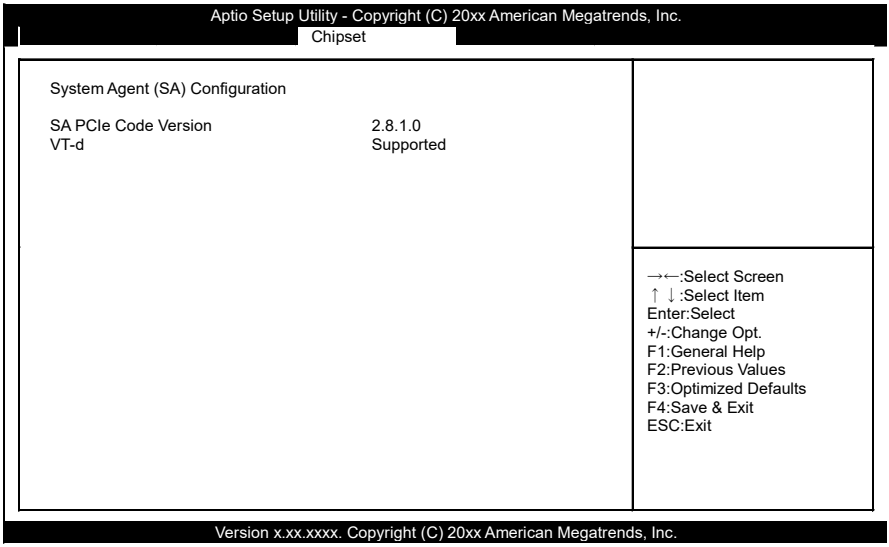


Figure 4.21. System Agent Configuration

PCH-IO Configuration

Configure the PCH settings.

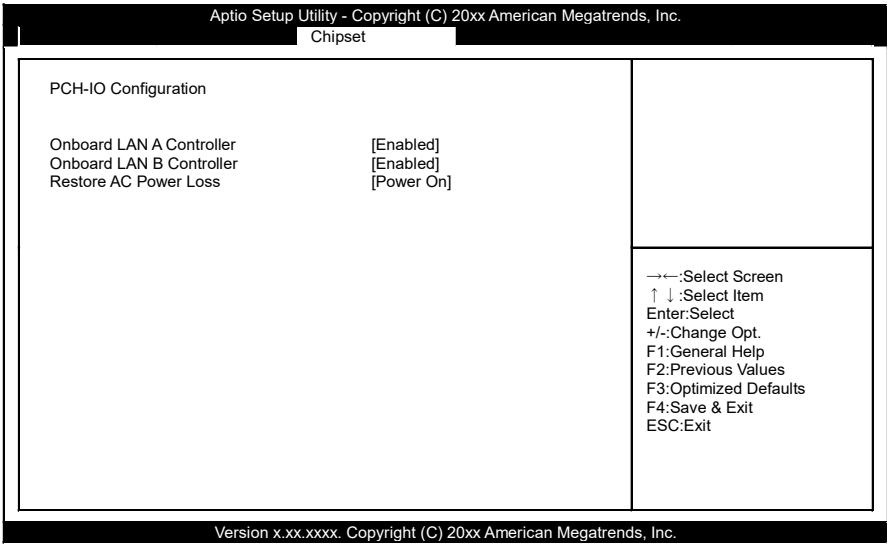


Figure 4.22. PCH Configuration

Table 4.29. PCH Configuration

Item	Option	Description
Onboard LAN A Controller	Enabled Disabled	Configure the LAN A Controller settings.
Onboard LAN B Controller	Enabled Disabled	Configure the LAN B Controller 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.

Security

Configure the security of the system settings.

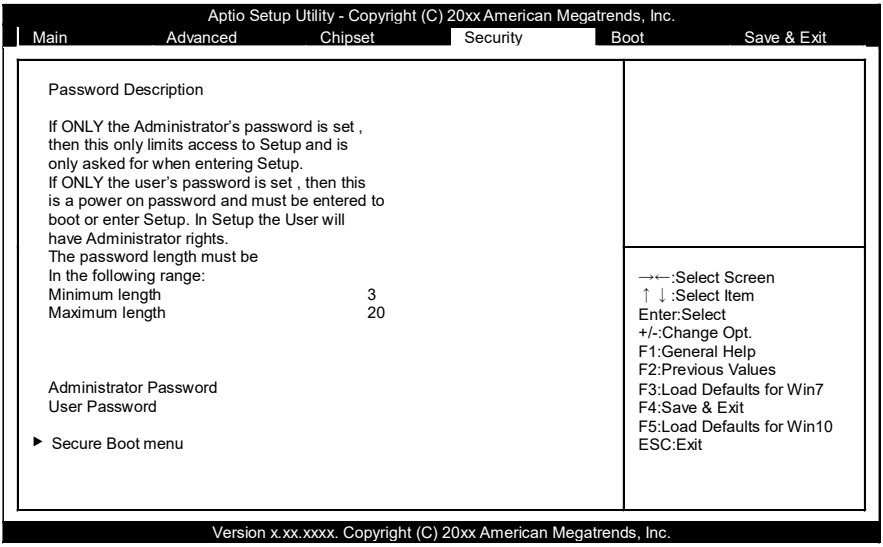


Figure 4.23 Security

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.

⚠ CAUTION

Be careful to not forget the password. If you forget the password, the product will have to be repaired at an extra cost.

Secure Boot menu

Configure the Secure Boot settings.
Leave these settings as configured before shipment.

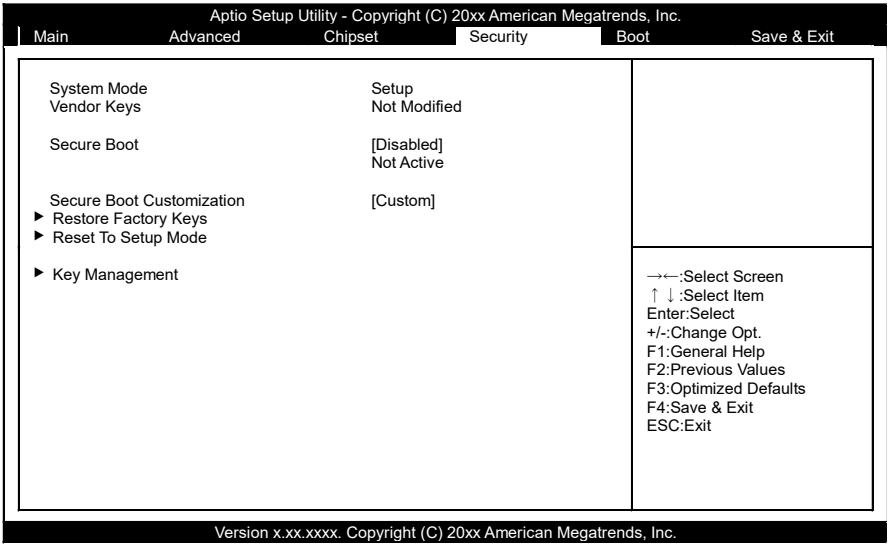


Figure 4.24. Secure Boot menu

Table 4.30. Secure Boot

Item	Option	Description
Secure Boot	Enabled [Disabled]	Do not change this setting.
Secure Boot Customization	Standard [Custom]	Do not change this setting.
Restore Factory Key	-	Do not change this setting.
Reset To Setup Mode	-	Do not change this setting.
Key Management	-	Do not change this setting.

Boot Configuration

Configure the settings boot devices and other devices.

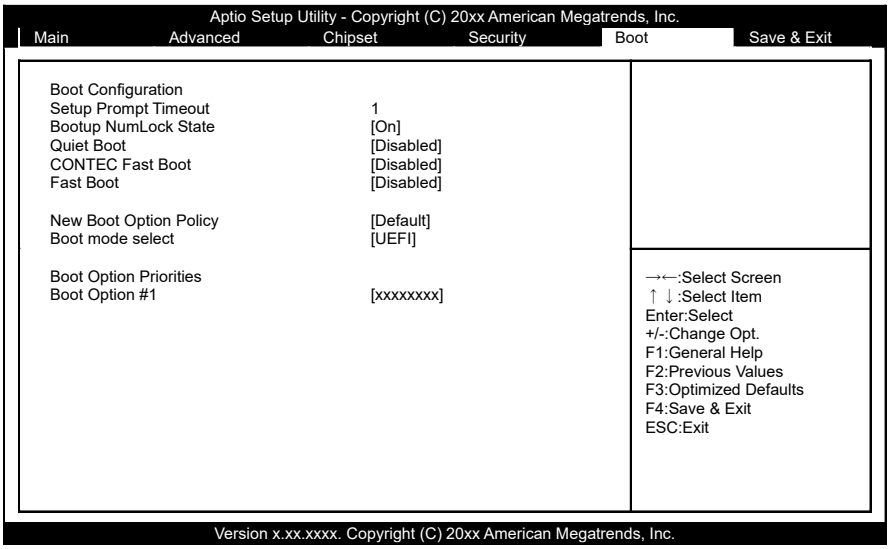


Figure 4.25. Boot Configuration

Table 4.31. Boot Configuration

Item	Option	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	Disabled Enabled	Do not change this setting.
CONTEC Fast Boot	Disabled Enabled	Configure this setting for faster startup times. When this function is enabled, Network Stack and SMART Self Test on BIOS cannot be used.
Boot Option #x	XXXXXXXX (Specify any device)	Set the start order of the connected USB floppy drives.*1
Fast Boot	Disabled Enabled	Do not change this setting.
New Boot Option Policy	Default Place First Place Last	Do not change this setting.

Save & Exit

Load/save setup items and exit the setup menu.

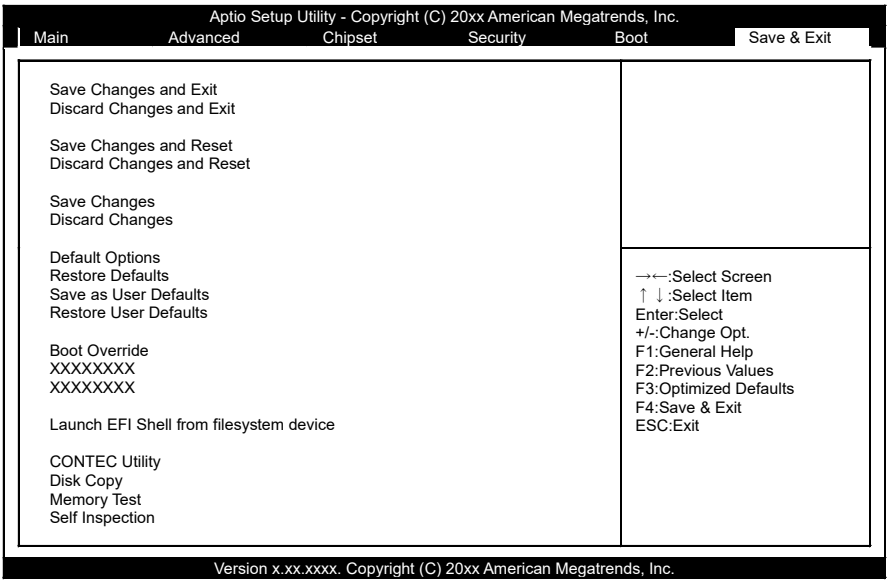


Figure 4.26. Save & Exit

Saving Changes and Exit
Save the changed settings and exit.

Discard Change and Exit
Exit without saving the changed settings.

Save Changes and Reset
Save the changed settings and restart.

Discard Change and Reset
Restart without saving the changed settings.

Save Changes
Save the changed settings.

Discard Changes
Discard the changed settings.

Restore Defaults
Restore settings to Defaults.

Save as User Defaults
Save the settings as the user default values.

Restore User Defaults
Return the settings to the user default values.

Boot Override
Configure the settings for temporary booting from a connected device other than that set in Boot Configuration. The bootable devices will be displayed in place of XXXX.
CONTEC Utility
Use utilities that operate in the UEFI environment. See the next section for details and usage methods.

CONTEC Utility

Utility that runs on the UEFI environment can be used. The following items are available.

Disk Copy
Copy the disk and perform such functions as backup and restore.
Memory Test
Execute the Memory Test of the PASSMARK.
Self Inspection
Execute the Self Inspection.

Disk Copy

Copy the disk and perform such functions as backup and restore. Available only when two or more storage devices are connected.

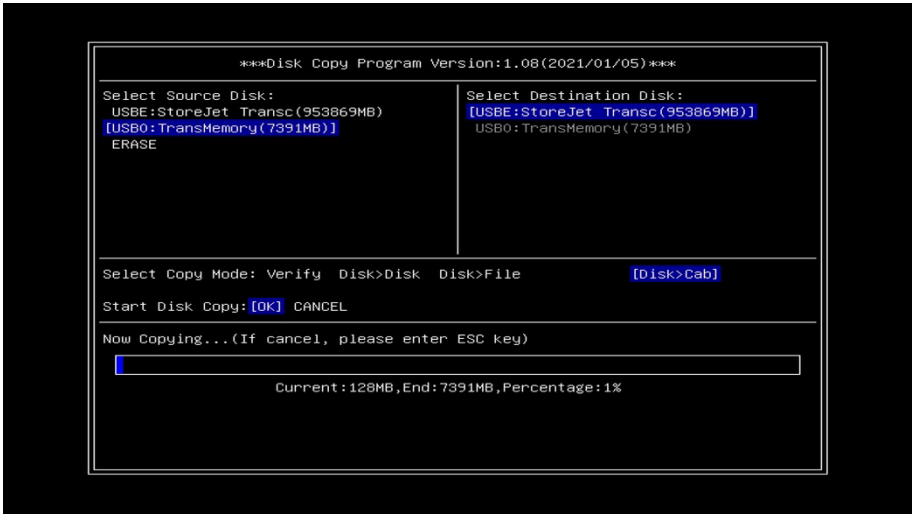


Figure 4.27. Disk Copy

Table 4.32. Disk Copy

Item	Option	Description
Select Source Disk	Disk Slotx: xxx M.2: xxx USBx:xxx Erase	Displays the names of the connected USB and SATA devices. Select the copy source disk. When Erase is selected, the entire disk selected as the copy destination is filled with 0x00.
Select Destination Disk	Disk Slotx: xxx M.2: xxx USBx:xxx	Displays the names of the connected USB and SATA devices. Select the copy source disk.
Select Copy Mode	Verify Disk to Disk Disk to File File to Disk Disk to Cab Cab to Disk	Select the copy mode. Verify: The disks are only compared. Disk to Disk: The copy source disk data is completely copied to the copy destination disk. The size of the data being copied will be that of the smaller disk. Disk to File: The copy source disk data is copied as a file to the copy destination disk. The file is saved with the name “conback_x” (where “x” is a sequential number). The copy destination

Item	Option	Description
		disk must be in FAT32 format. Copying ends when the size limit for the copy destination disk is reached, even if the copy has not yet been completed. File to Disk: The copy source disk file data is copied to the copy destination disk. The file must be saved with the name "conback_x" (where "x" is a sequential number). The copy source disk must be in FAT32 format. Copying ends when the size limit for the copy destination disk is reached, even if the copy has not yet been completed. Disk to Cab: The copy source disk data is copied to the copy destination disk as a compressed file. The file is saved with the name "concab_x" (where "x" is a sequential number). The copy source disk must be in FAT32 format. Copying ends when the size limit for the copy destination disk is reached, even if the copy has not yet been completed. Cab to Disk: The compressed file data from the copy source disk is decompressed and copied to the copy destination disk. The file must be saved with the name "concab_x" (where "x" is a sequential number). The copy destination disk must be in FAT32 format. Copying ends when the size limit for the copy destination disk is reached, even if the copy has not yet been completed.
Data Verification	No Yes	If Yes is selected, the data is compared with the source data to see if the data was copied correctly every time a unit block is copied. If a mismatch occurs, the operation ends with an error. This option is not available when the copy mode is [Disk to Cab] or [Cab to Disk].

⚠ CAUTION

- Because copying is performed according to the capacity of the smaller disk with [Disk to Disk], booting the OS as is cannot be guaranteed.
  To boot the OS directly after copying with [Disk to Disk], copy only between disks with the same capacity, or copy to a disk with a larger capacity before writing back to the source disk.
- After the backup is complete, turn OFF the power and remove one of the storage devices from the product.

Self Inspection

Use this menu item to perform self-inspection.

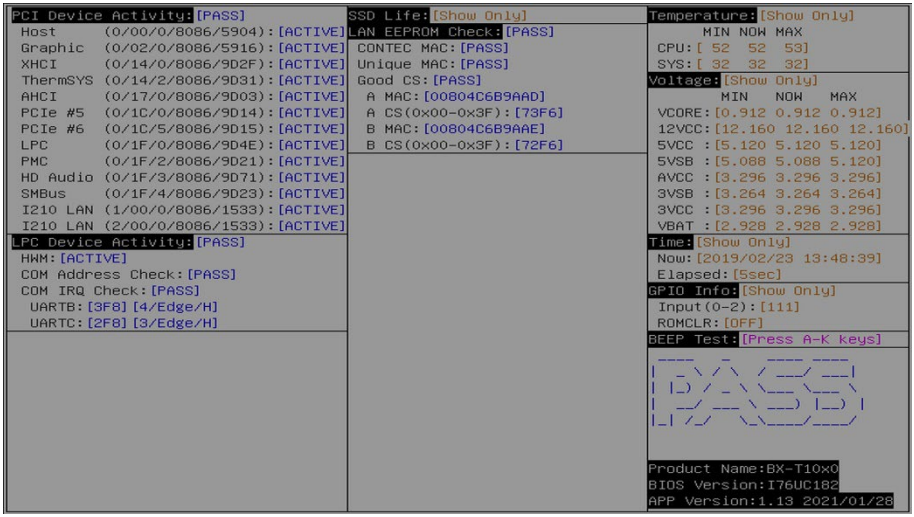


Figure 4.28. Self Inspection

Table 4.33. Self Inspection

Item	Option	Description
PCI Device Activity	PASS FAIL	Checks whether the expected PCI devices are present. [PASS] is displayed if all devices are present. [FAIL] is displayed if even one expected device cannot be confirmed.
Host	ACTIVE INACTV	Checks whether the expected PCI devices are present. [ACTIVE] is displayed if the device is confirmed as present. [INACTV] is displayed if the device cannot be confirmed.
Graphic		
XHCI		
ThermSYS		
AHCI		
PCIe #5		
PCIe #6		
LPC		
PMC		
HD Audio		
SMBus		
I210		
LPC Device Activity	PASS FAIL	Check the operations of LPC devices. [PASS] is displayed if all devices are present. [FAIL] is displayed if even one expected device cannot be confirmed or resources are inappropriate.
HWM	ACTIVE INACTV	Checks whether the expected HWM devices are present. [ACTIVE] is displayed if the device is confirmed as present. [INACTV] is displayed if the device cannot be

Item	Option	Description
		confirmed.
COM Address Check	PASS FAIL	Check whether the address for COM resource is correctly set.
COM IRQ Check	PASS FAIL	Check whether the IRQ for COM resource is correctly set.
UARTx	xxx x/x/x	Display the address and the IRQ for each COM.
SSD Life	Display only	Displays the SATA drive service life information. Information will be displayed correctly only for the M.2 SATA drive equipped as standard.
LAN EEPROM Check	PASS FAIL	Check whether the LAN EEPROM data is correct. Checking will not be possible if no LAN device is found.
CONTEC MAC	PASS FAIL	Check whether the MAC data from CONTEC has been written.
Unique MAC	PASS FAIL	Check whether the MAC data is unique in the actual device.
Good CS	PASS FAIL	Check whether the checksum is correct.
x MAC	xxxxxxxxxxxx	Displays the MAC data for each port.
x CS (0x00-0x3F)	xxxx	Displays the checksum for each port.
Temprature	MIN NOW MAX	Displays the minimum, maximum, and current CPU temperature and system temperature values during self-diagnosis.
Voltage	MIN NOW MAX	Displays the minimum, maximum, and current voltage values during self-diagnosis.
Time	Now Elapsed	Displays the current time and the elapsed self-diagnosis run time.
GPIO Info		Displays the GPIO information.
Input (0-2)	Xxx	Displays the signal level of GPIO pins 0 to 2.
ROMCLR	OFF ON	Displays the ROM clear switch status.
BEEP Test	A-K	Press the keys from A to K to check the BEEP tone of each scale.
The overall Pass or Fail	PASS FAIL	[PASS] is displayed if all PCI Device Activity and LAN EEPROM Check items pass. [FAIL] is displayed if even one item fails.

5. Software RAID Setup

This chapter describes software mirroring (RAID1) setup.

The CONTEC only supports mirroring. We do not support operation for other RAIDs. Be aware that functions not supported are outside the scope of the warranty.

Software RAIDs are not hot-swappable.

Refer to “BIOS Setup” for details on how to display the BIOS setup screen and the operation.

⚠ CAUTION

A RAID volume can be created in SATA disk. It cannot be created in the disk connected externally (such as HDD and SSD connected with USB, or USB memory).

Create RAID Volume (RAID1(Mirror))

Describe the procedure for creating RAID volume.

Follow the steps below on the BIOS setup screen.

⚠ CAUTION

- If RAID settings are changed, all data on SATA disk that configures RAID will be erased. Back up necessary data in advance.
- Make sure to create RAID volume first, then install operating system. If you create a RAID volume after installing OS, data will be erased and it cannot start OS.
- The CONTEC only supports mirroring. If you intend to create RAID volume other than mirroring, we leave it as user's option.

Setup

(1) Go to Advanced> SATA Configuration> SATA Mode Selection. Set Intel RST (RAID) for SATA Mode Selection.

(2) Press [F4] key, select [Save & Exit Setup]. Please select [Yes] and press [ENTER] key to save the setting.

You have now finished the setup.

Intel(R) Rapid Storage Technology will be displayed in Advanced after completing the setup.

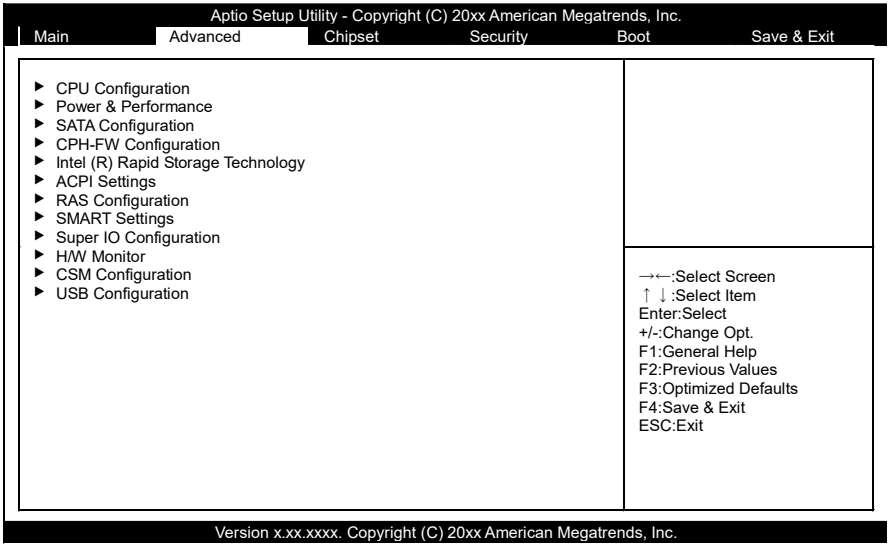


Figure 5.1. Setup menu

Create RAID volume

(1) Go to Advanced> Intel(R) Rapid Storage Technology> Create RAID Volume.

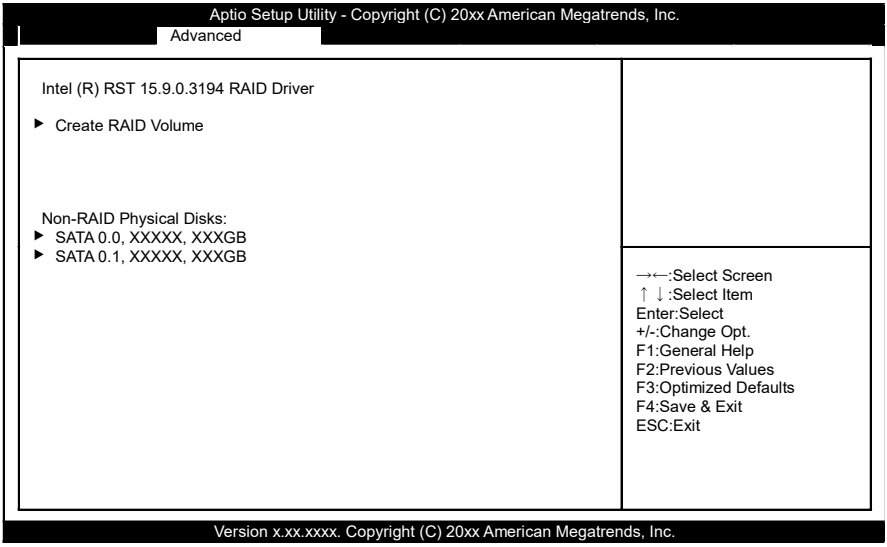


Figure 5.2. RAID Volume

(2) Set RAID Level for <RAID1 (Mirror)>.

(3) In Select Disks, set <x> in [ ] for two of SATA disks that configure RAID.

(4) Select <Create Volume> to create RAID volume.

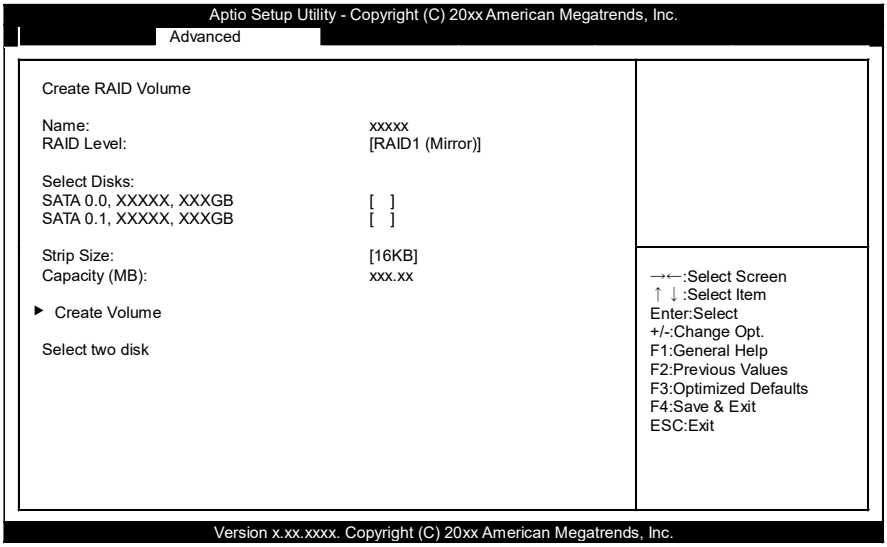


Figure 5.3. Create Volume

(5) Press [F4] key, select [Save & Exit Setup]. Please select [Yes] and press [ENTER] key.

You have now finished creating RAID volume.

After RAID volume has been created, the volume will be displayed in Advanced> Intel(R) Rapid Storage Technology> RAID Volumes.

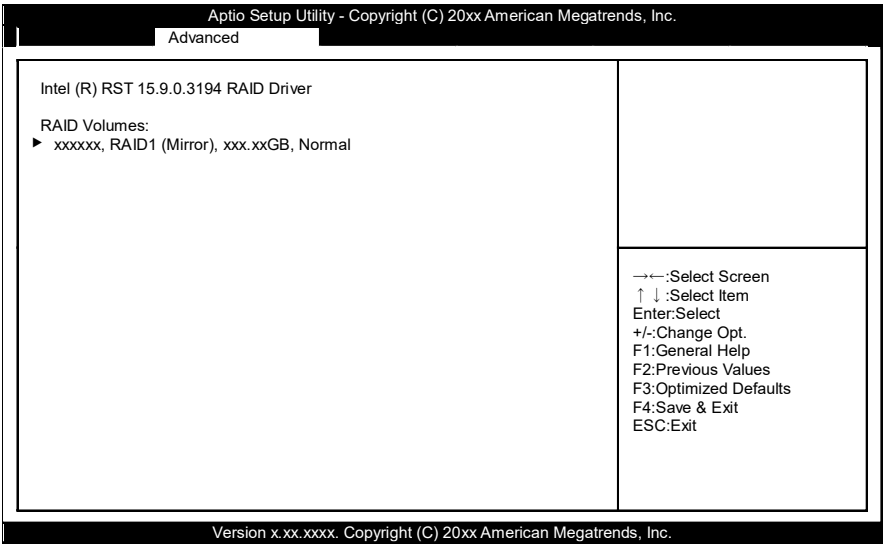


Figure 5.4. RAID Volumes

* Actual display may differ depending on the storage used

RAID Volume

The state of RAID volume can be checked and deleted.

Also, the state of SATA disk that configures RAID volume can be checked.

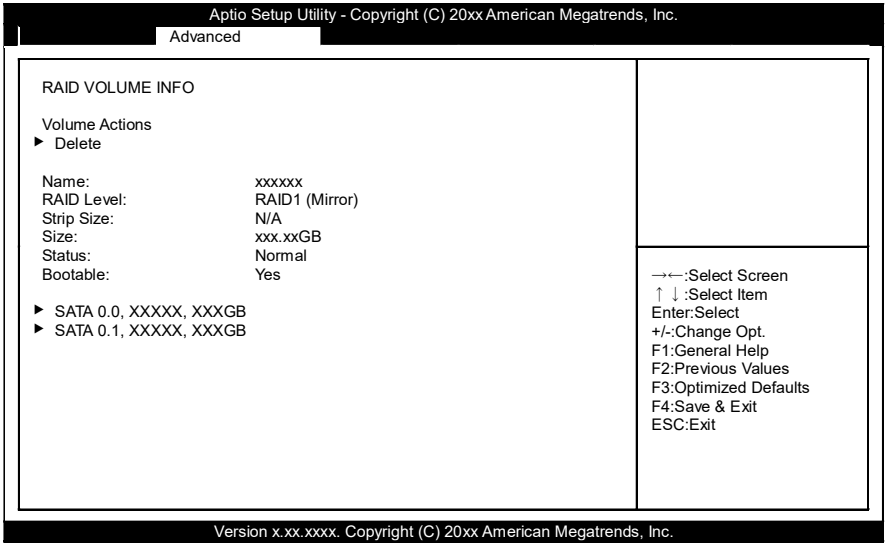


Figure 5.5. RAID Volume

Table 5.1. RAID VOLUME INFO

Item	Options	Description
▶ Delete	-	Delete RAID volume.
SATA 0.0, XXXXX, XXXGB	Refer to PHYSICAL DISK INFO	The state of SATA disk that configures RAID can be checked and RAID settings can be reset.
SATA 0.1, XXXXX, XXXGB	Refer to PHYSICAL DISK INFO	The state of SATA disk that configures RAID can be checked and RAID settings can be reset.

Table 5.2. PHYSICAL DISK INFO

Item	Options	Description
Reset to non-RAID	Yes/No	Reset RAID configuration.

Delete RAID Volume (RAID1(Mirror))

Describe the procedure for deleting RAID volume.

Follow the steps below on the BIOS setup screen.

⚠ CAUTION

Data may be lost if an existing RAID volume is deleted. Back up the data on a RAID volume before deleting it if the data is important.

(1) Go to Advanced> Intel(R) Rapid Storage Technology> RAID Volumes. Select the RAID volume you intend to delete.

(2) Select <Delete> from Volume Actions.

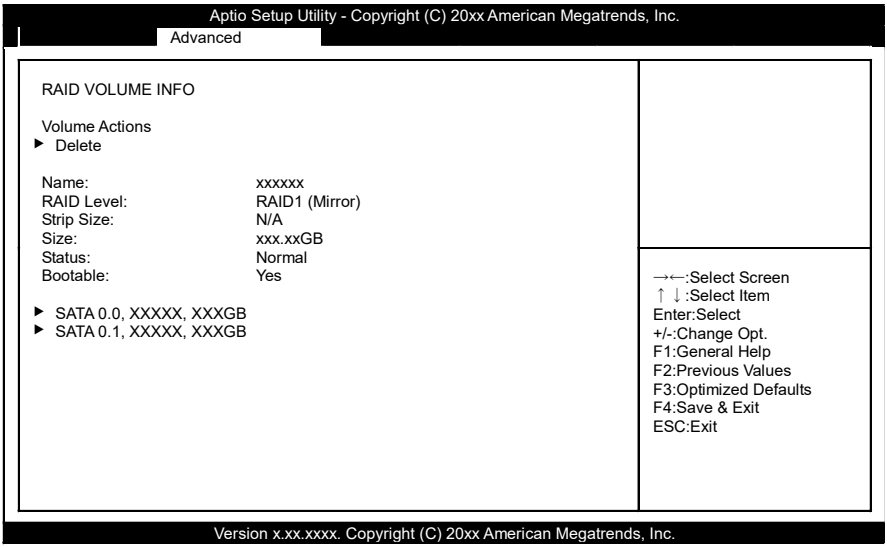


Figure 5.6. Volume Actions

(3) When the following message appears, select <Yes>.

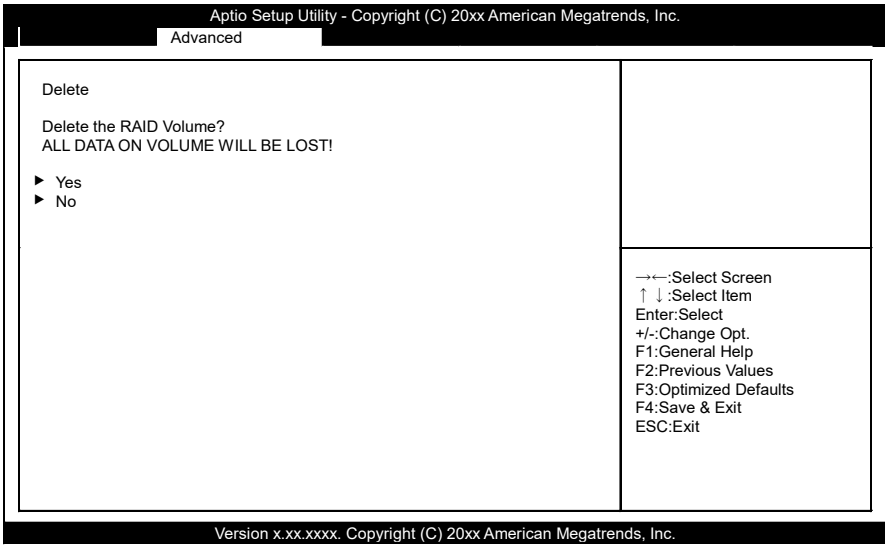


Figure 5.7. Delete

(4) Press [F4] key, select [Save & Exit Setup]. Please select [Yes] and press [ENTER] key to save the setting.

You have now finished deleting RAID volume.

The volume will be deleted from Advanced> Intel(R) Rapid Storage Technology> RAID Volume.

SATA disk that configured RAID volume will be displayed in "Non-RAID Physical Disks".

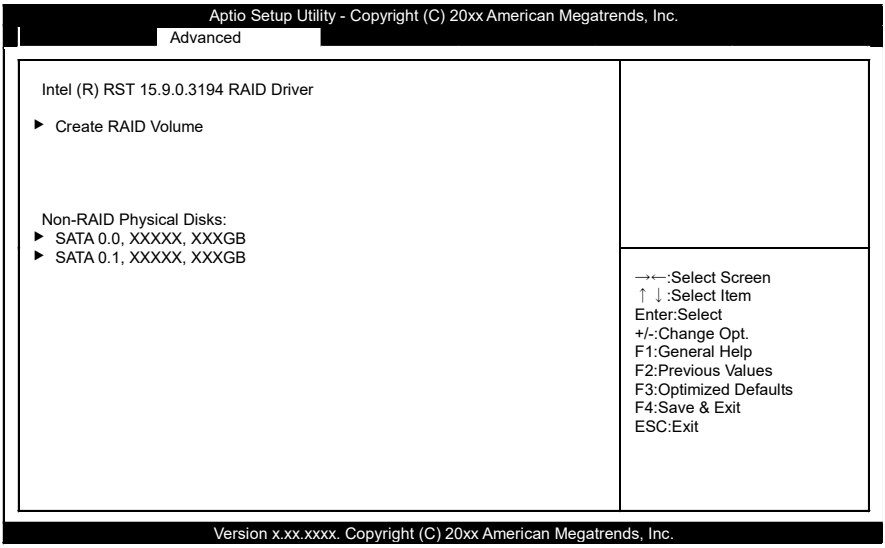


Figure 5.8. Non-RAID Physical Disks

* Actual display may differ depending on the storage used

RAID setup when replacing SATA disk

If you replace SATA disk while setting the software mirroring (RAID1), you need to rebuild the mirroring RAID drive.

After replacing SATA disk , follow the steps below on the BIOS setup screen.

⚠ CAUTION

- RAIDs in this product are not hot-swappable. Always turn off the power before replacing SATA disk.
- Data may be lost if RAID settings are changed. Back up the data on RAID volume before deleting it if the data is important.

(1) Replace SATA disk device.

(2) Go to Advanced> Intel(R) Rapid Storage Technology> RAID Volumes. Select RAID volume you intend to reconfigure.

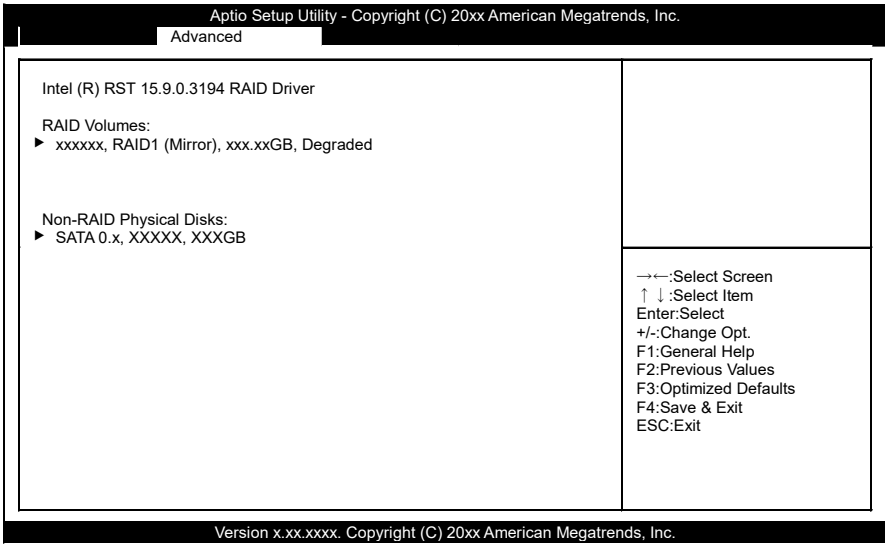


Figure 5.9. RAID Volumes

(3) Select <Rebuild> from Volume Actions.

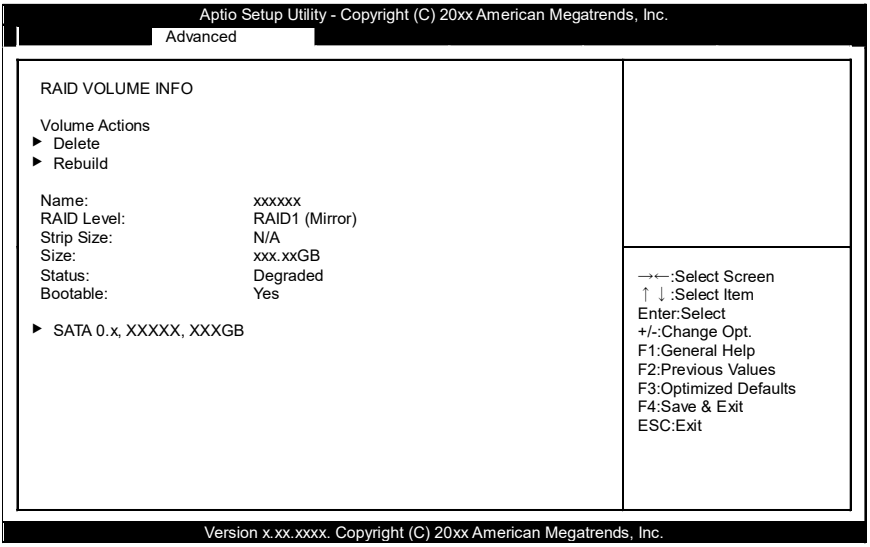


Figure 5.10. RAID Action

(4) Select SATA disk you intend to rebuild.

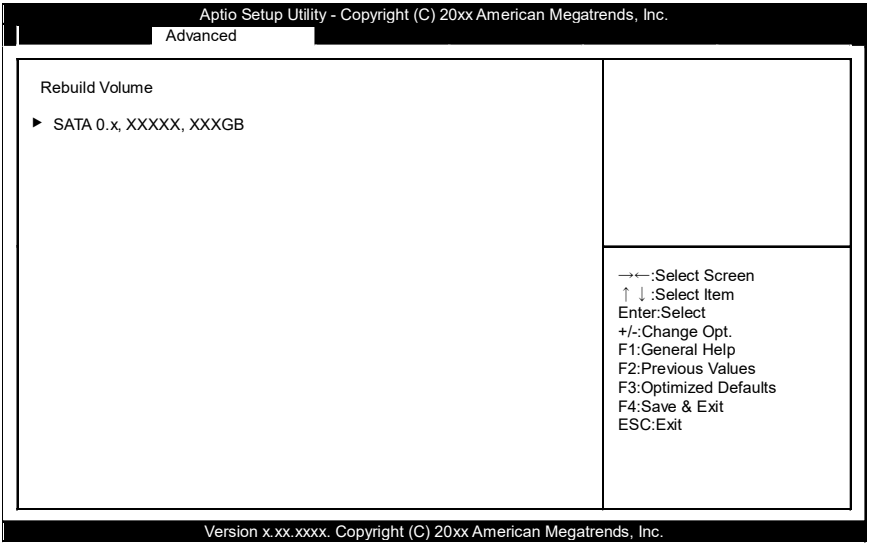


Figure 5.11. Rebuild Volume

(5) Press [F4] key, select [Save & Exit Setup]. Please select [Yes] and press [ENTER] key to save the setting.

You have now finished replacing SATA disk device.

6. Each Component Function

Component Name

Front View

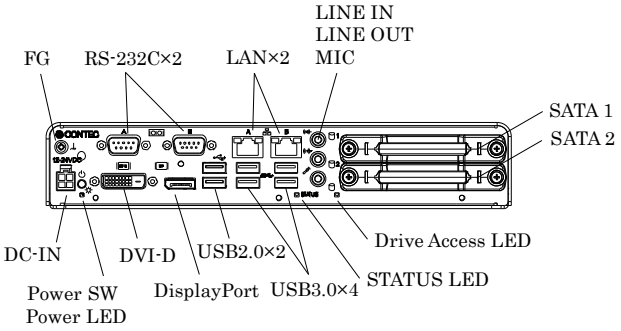


Figure 6.1. Component Name

Table 6.1. Component Function

Name	Function
POWER-SW	Power switch
POWER LED	Power ON display LED
STATUS LED	Status LED
ACCESS LED	HDD/SSD access display LED
DC-IN	DC power input connector
LINE IN	Line in (ϕ3.5 PHONE JACK)
LINE OUT	Line out (ϕ3.5 PHONE JACK)
MIC IN	Mike in (ϕ3.5 PHONE JACK)
LAN A	Ethernet 1000BASE-T/100BASE-TX/10BASE-T RJ-45 connector
LAN B	Ethernet 1000BASE-T/100BASE-TX/10BASE-T RJ-45 connector
USB3.0	USB3.0 port TYPE-A connector x 4
USB2.0	USB2.0 port TYPE-A connector x 2
SERIAL A	Serial port A connector (9pin D-SUB, male)
SERIAL B	Serial port B connector (9pin D-SUB, male)
DVI-D	Display (25 pin, female)
Display Port	Display (20 pin, female)
SATA1	HDD slot (Serial-ATA)
SATA2	HDD slot (Serial-ATA)

Component Function

LED: POWER, ACCESS, STATUS

There are 3 LED in front of this product.

Table 6.2. Display Contents of LED

LED name	State	Display contents
POWER LED	OFF	Indicate that this product is switched off.
	ON (Green)	Indicate that this product is switched on.
ACCESS LED	ON (Orange)	Indicate that the SATA device is being accessed.
STATUS LED	OFF	You can control the behavior of LED from the user application. *1
	ON (Red)	You can control the behavior of LED from the user application. *1 This LED blinks upon time-out when the watchdog timer is enabled

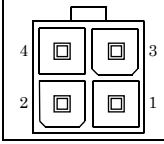
*1 API that controls STATUS LED is available. For more information, visit the CONTEC's Web site.

DC Power Input Connector: DC-IN

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

Rated input voltage : 12 - 24VDC
Range of input voltage : 10.8 - 31.2VDC
Power capacity : 12V 5.2A or more, 24V 2.7A or more

Table 6.3. DC Power Connector

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 : 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

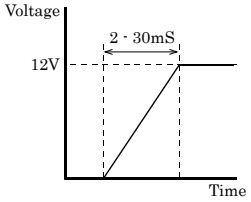


Figure 6.2. Graph of Rise Time of Power Supply

POWER SW

POWER SW is provided.

LINE IN Interface: LINE IN

The product is equipped with a connector for line input. You can connect a CD player or other audio output device to the product, and then record audio to the system or play back audio from LINE OUT.

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.

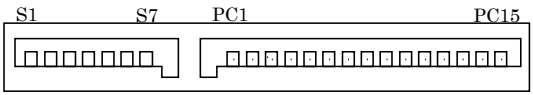
MIC IN Interface: MIC IN

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

Serial-ATA : SATA 1, SATA 2

The product has two serial ATA 3.0 compliant controllers.

Table 6.4. SATA Connector

Connector type	SATA Connector		
			
Pin No.	Signal name	Pin No.	Signal name
PC1	N.C.	S1	GND
PC2	N.C.	S2	TX+
PC3	N.C.	S3	TX-
PC4	GND.	S4	GND
PC5	GND	S5	RX-
PC6	GND	S6	RX+
PC7	+5V	S7	GND
PC8	+5V		
PC9	+5V		
PC10	GND		
PC11	N.C.		
PC12	GND		
PC13	+12V		
PC14	+12V		
PC15	+12V		

⚠ CAUTION

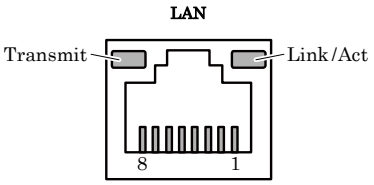
SATA disk slot is not hot-pluggable. Do not touch SATA disk, or insert /remove the disk while the product power is on. Doing so may lead to malfunctions or system damages.

Giga bit-Ethernet: LAN A, B

This product is equipped with 2 ports for giga bit.

- Network type : 1000BASE-T/100BASE-TX/10BASE-T
- Transmission speed : 1000M/100M/10M bps
- Max. network path length : 100m/segment
- Controller : Intel I210IT controller

Table 6.5. Giga bit-Ethernet Connector



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 statuses:

Right LED : Link LED
Normal connection - Green ON,
Operation - Green Blinking

Left LED : Operation LED
10M - Off
100M - Green
1000M - Orange

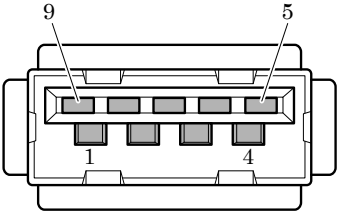
⚠ CAUTION

- If you are using an operating system other than the operating system of the pre-installed model, the display order of the network adapter for the silkscreen-printed "LAN-A" and "LAN-B" might be changed since the recognition order of operating system is undefined.

USB3.0 Port: USB3.0

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

Table 6.6. USB3.0 Connector

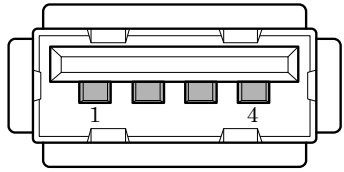


Pin No.	Signal name
	USB3.0
1	USB_VCC
2	DATA-
3	DATA+
4	USB_GND
5	SSRX-
6	SSRX+
7	USB_GND
8	SSTX-
9	SSTX+

USB2.0 Port: USB2.0

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

Table 6.7. USB2.0 Connector



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

Serial Port Interface: SERIAL A, B

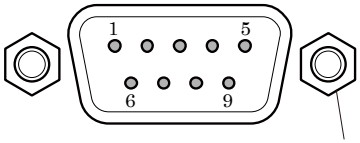
The product has 2 channels of RS-232C compliant serial ports supporting up to a baud rate of 115,200bps with a 16-byte transmission-dedicated data buffer and a 16-byte reception-dedicated data buffer. You can use “Chapter 4 BIOS Setup” to configure unused state for each of the ports independently.

For details of I/O address and register function, see SERIAL I/O Address and Register Function in chapter 6.

Table 6.8. SERIAL A, B, I/O Addresses and Interrupts

SERIAL	I/O address	Interrupt
A	3F8h - 3FFh	IRQ 4
B	2F8h - 2FFh	IRQ 3

Table 6.9. Serial Port Connector

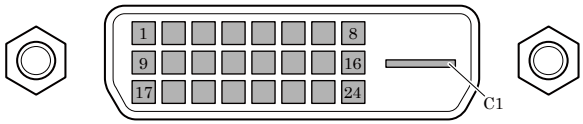
Connector type	9-pin D-SUB (MALE)		
9-pin D-SUB (MALE)  No.4-40UNC Inch screw threads			
Pin No.	Signal name	Meaning	Direction
1	CD	Carrier detect	Input
2	RD	Received data	Input
3	TD	Transmitted data	Output
4	DTR	Data terminal ready	Output
5	GND	Signal ground	-----
6	DSR	Data set ready	Input
7	RTS	Request to send	Output
8	CTS	Clear to send	Input
9	RI	Ring indicator	Input

DVI Interface: DVI-D

A DVI interface is provided. A display of DVI-D interface can be connected.

Table 6.10. DVI Connector

Connector type	DVI-D 25 pin



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

⚠ CAUTION

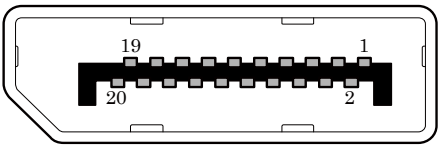
The display may not be viewed if you start the BIOS setup menu without connecting the display cable to the DVI interface, then connect the display cable after booting.

Display port Interface: Display port

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

Table 6.11. Display port Connector

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

The display may not be viewed if you start the BIOS setup menu without connecting the display cable to the Display port interface, then connect the display cable after booting.

7. Appendix

POST Codes

Table 7.1. POST Codes < *1 / 3* >

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 PEIcore
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
62h	South Bridge runtime services installation

Table 7.1. POST Codes < *2 / 3* >

POST (hex)	Description
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
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

Table 7.1. POST code < *3 / 3* >

POST (hex)	Description
B4h	USB hotplug
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.

SERIAL I/O Address and Register Function

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

Table 7.2. I/O Port Addresses

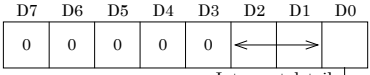
I/O address	DLAB	Read/Write	Register	
03F8H	0	W	Transmitter holding register	THR
		R	Receive buffer register	RBR
	1	W	Divisor latch register (LSB)	DLL
03F9H	1	W	Divisor latch register (MSB)	DLM
	0	W	Interrupt enable register	IER
03FAH	X	R	Interrupt ID register	IIR
03FBH	X	W	Line control register	LCR
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

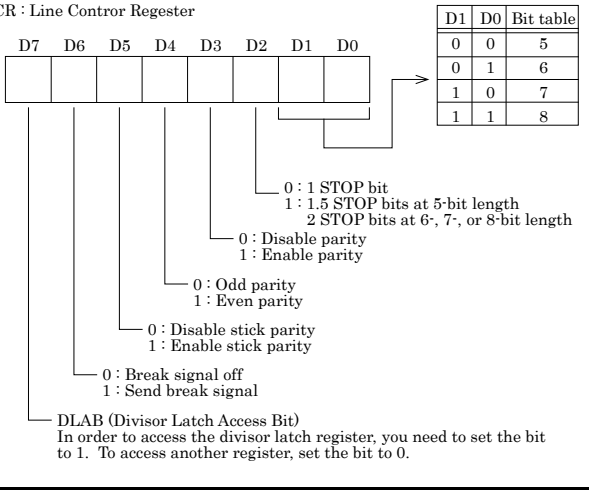
DLAB (Divisor Latch Access Bit) : The value in bit 7 of the line control register.

Table 7.3. Function of Each Register < *1 / 4* >

I/O address	Description
03F8H	THR: Transmitter Holding Register [DLAB=0] D7 D6 D5 D4 D3 D2 D1 D0 bit7 MSB ← → bit0 LSB Register dedicated to write transmitted data to
03F8H	RBR: Reciever Buffer Register [DLAB=O] D7 D6 D5 D4 D3 D2 D1 D0 bit7 MSB ← → bit0 LSB Register dedicated to read received data from
03F8H	DLL: Divisor Latch (LSB) [DLAB=1] D7 D6 D5 D4 D3 D2 D1 D0 bit7 MSB ← → bit0 LSB Baud rate setting register (LSB)
03F9H	DLH: Divisor Latch (MSB) [DLAB=1] D7 D6 D5 D4 D3 D2 D1 D0 bit7 MSB ← → bit0 LSB Baud rate setting register (MSB)
03F9H	IER: Interrupt Enable Register [DLAB=0] D7 D6 D5 D4 D3 D2 D1 D0 0 0 0 0 EMS ELSI ETHREI ERDAI ERDAI: Received data Interrupt enable ETHREI: Received data register empty Interrupt enable ELSI: Receiver line status Interrupt enable EMS: Modem status interrupt enable [Always used at 0.] 1: Enable interrupt 0: Disable interrupt

Table 7.3. Function of Each Register < 2 / 4 >

<table>
<tr><th>I/O address</th><th>Description</th></tr>
<tr><td>03FAH</td><td>
IIR : Interrupt Identification Register


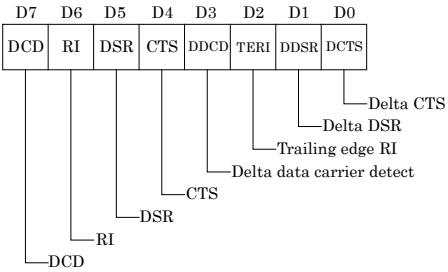
<table>
<tr><th>bit2</th><th>bit1</th><th>bit0</th><th>Priority</th><th>Description</th></tr>
<tr><td>0</td><td>0</td><td>1</td><td>——</td><td>Interrupts are not generated.</td></tr>
<tr><td>1</td><td>1</td><td>0</td><td>1 (high)</td><td>Generated by overrun, parity, framing error or break interrupt.
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 Contror Regester


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

Table 7.3. Function of Each Register < *3 / 4* >

<table>
<tr><th>I/O address</th><th>Description</th></tr>
<tr><td>03FCH</td><td>MCR: Modem Control Register
<table>
<tr><th>D7</th><th>D6</th><th>D5</th><th>D4</th><th>D3</th><th>D2</th><th>D1</th><th>D0</th></tr>
<tr><td>0</td><td>0</td><td>0</td><td>Loop</td><td>IRQ</td><td>X</td><td>RTS</td><td>DTR</td></tr>
</table>
DTR 0 : Inactive [HIGH]
1 : Active [LOW]
RTS 0 : Inactive [HIGH]
1 : Active [LOW]
Interrupt control bit
0 : Disable
1 : Enable
Diagnostic local loop-back test
0 : Disable
1 : Enable</td></tr>
<tr><td>03FDH</td><td>LSR: Line Status Regester
<table>
<tr><th>D7</th><th>D6</th><th>D5</th><th>D4</th><th>D3</th><th>D2</th><th>D1</th><th>D0</th></tr>
<tr><td>0</td><td>TEMT</td><td>THRE</td><td>BI</td><td>FE</td><td>PE</td><td>OE</td><td>DR</td></tr>
</table>
Data ready
(1 for existence of received data)
Overrun error
(1 for occurrence of an error)
Parity error (1 for occurrence of an error)
Framing error (1 for occurrence of an error)
Break interrupt (1 for detection of break state)
Transmitter holding register empty
(1 for transmission buffer being empty)
Transmitter empty
(Set to 1 when both transmitter holding register and transmitter shift register are empty.)</td></tr>
</table>

Table 7.3. Function of Each Register < *4 / 4* >

I/O address	Description
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 (1.8461MHz). The baud rate in terms of hardware can be set to a maximum of 115,200 bps for SERIALA, B. 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).

Table 7.4. Baud Rate Settings

Baud rate to be set	SERIAL A, B Clock input (1.8461MHz)	
	Value to be set in the divisor register (Decimal)	Setting error (%)
50	2304	---
75	1536	---
110	1047	0.18
134.5	857	0.099
150	768	---
300	384	---
600	192	---
1200	96	---
1800	64	---
2000	58	0.53
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.

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.

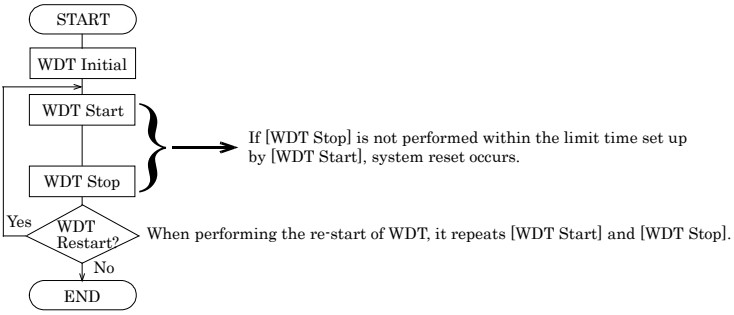
The application software created by user with the watchdog timer enabled, a RESET automatically generated unless the software periodically triggers the timer within the setting time-out interval. That is, while the system gets hung up, the running program can't trigger the timer periodically. The timer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

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.

Watch-Dog-Timer can be used with dedicated API. For API details, refer to Help File in CONTEC Manager. The CONTEC Manager is standard-installed in OS installed model.

⚠ CAUTION

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

Battery

Battery Specification

This product uses the following battery.

- Type : Lithium primary battery
- Model : BR-1/2AA
- Maker : Panasonic
- Nominal voltage : 3V
- Nominal capacity : 1,000mAh
- Lithium content : 1g or less

Removing the battery

Remove the battery according to the following figure.

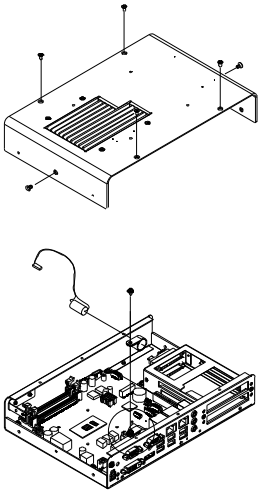


Figure 7.1. Removing the battery

Disposing of the battery

Dispose of the removed battery properly as instructed by local government.

Life of SSD

About write endurance

SSD contained in product has a write endurance which limits the number of times each memory may be written, due to the characteristic of the memory that is used. Write endurance can be calculated by the following formula as a reference value:

<MLC type>
Write endurance (Times) =
((Total capacity (KB)) × NAND Flash memory life span (cycles) / The file size of rewritten per 1 cycle

Example 1:
When the file of 4MB is made, and it rewrites it once per 10 seconds.
Write endurance = ((268,435,456 × 3,000)/4,096 = 196,608,000 (cycles)
Life = 196,608,000 / ((60 / 10) × 60 × 24 × 365) ≈ 62.3 (years)

<TLC type>

Write endurance (years) =

Total capacity (cycles) / (The number of annual consumed blocks / The total number of blocks)

Example 2:
If a 4 MB file is created on the SSD-256GS-2TP and is rewritten once every 10 seconds:
The number of annual consumed blocks = (4 x (60 / 10) x 60 x 24 x 365) / 18 = 700,800 (blocks)
Life = 3,000 / (700,800 / 14,400) ≈ 61.64 (years)

The life endurance is reference values under a certain condition. For the actual life, install the dedicated software (*) and write with the estimated actual operation, and check the SMART value.

*Life endurance can be estimated by installing the self-test program that can obtain the S.M.A.R.T. information of SSD. Ask your retailer for the software details.

8. List of Optional Products

AC adapter

- PWA-90AWD1 AC adapter (Input: 100 - 240VAC, Output: 12VDC 7.5A)

Hard Disk

- PC-HDD100GS-2 2.5 inch SATA Hard Disk Drive 100GB

SSD(MLC)

- SSD-256GS-2M 2.5 inch SATA SSD 256GB

SSD(TLC)

- SSD-256GS-2TP 2.5 inch SATA SSD 256GB

Brackets

- BX-BKT-FIX04 Attachment fittings (designed to fit to the sides)

⚠ CAUTION

If a product other than our option is used, the normal operation may be impaired or the functions may be limited.

*Visit Contec website regarding information on the optional products.

BX-T1000 Series

User's Manual

CONTEC CO., LTD.

October 2022 Edition

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[03022018]
[10282022_rev11]
Management No. NA08065
Parts No. LYZJ842