

### HITACHI EMBEDDED CONTROLLER

# **HF-W400E**

### **INSTRUCTION MANUAL**

Read and retain this manual.	
<ul> <li>Read the safety instructions carefully and ensure that you understand them before beginning operations.</li> <li>Keep this manual on hand for easy reference.</li> </ul>	
	USER'S MANUAL

#### **PREFACE**

This manual is intended for operators of the HITACHI EMBEDDED CONTROLLER HF-W400E (abbreviated hereinafter to *this equipment*), and it contains necessary information about normal operation and maintenance of the various devices. This manual also describes the setup procedures for the following pre-installed operating systems:

- Windows® 10 IoT Enterprise 2016 LTSB (64-bit)
- Windows® 10 IoT Enterprise 2019 LTSC (64-bit)

Hereinafter, the term Windows® 10 is used to refer to the preceding operating systems.

#### **Documentation structure**

The documentation of the HITACHI EMBEDDED CONTROLLER HF-W400E consists of the following manuals:

- SAFETY INSTRUCTIONS
- INSTRUCTION MANUAL (This manual)
- RAS FEATURES MANUAL

#### **Manual Structure**

This manual consists of the following sections:

**PREFACE** 

IMPORTANT NOTIFICATIONS

SAFETY INSTRUCTIONS

**PRECAUTIONS** 

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Repair Request Form and Statement of Received Goods

#### **Revision history**

July 2025 (First Edition) WIN-62-5001

#### **Contact information**

Information related to this product is provided through the following website.

In addition, use the following website to contact us about this product.

URL: https://www.hitachi-ip.co.jp/products/hfw/

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- All other product names of software and hardware described in this manual that are not from Hitachi are the registered trademarks, trademarks, or products of their respective owners.
- Zlib is used as a built-in compression and decompression engine in part of the software for this product. Its copyright notice is as follows:

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#### **IMPORTANT NOTIFICATIONS**

If you plan to export this product, verify the laws and regulations that are relevant to export to foreign countries, including the Foreign Exchange and Foreign Trade Act of Japan and the export controls of the United States, and complete all required procedures.

If anything is unclear, contact our sales representative.

- Any copying or reproduction of this manual, in whole or in part, without permission is prohibited.
- The contents of this manual are subject to change without notice for improvement.

#### NOTICE

Depending on the type of failure that occurs, important files might be lost when you use this equipment. Files can also be lost due to power failures and human error during operations in addition to equipment failures. In such cases, files cannot be recovered. To prevent data loss, save your files regularly and establish a systematic schedule for backing up files.

#### • Harmonic current standards

This equipment complies with the JIS C 61000-3-2 harmonic current standard.

#### • VCCI notice

This is a Class A product based on the standard of the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). If this equipment is used in a household environment, electronic interference might occur. In such cases, you might need to take corrective action.

#### Note on storage capacity calculations

Memory capacities and requirements, file sizes and storage requirements, and other values are calculated according to the formula 2<sup>n</sup>:

```
1 KB (kilobyte) = 1,024 bytes (2^{10} bytes)
```

1 MB (megabyte) = 1,048,576 bytes ( $2^{20}$  bytes)

1 GB (gigabyte) = 1,073,741,824 bytes ( $2^{30}$  bytes)

1 TB (terabyte) = 1,099,511,627,776 bytes ( $2^{40}$  bytes)

Disk capacities are calculated according to the formula 10<sup>n</sup>:

```
1 KB (kilobyte) = 1,000 bytes (10^3 bytes)
```

1 MB (megabyte) =  $1,000^2$  bytes ( $10^6$  bytes)

1 GB (gigabyte) =  $1,000^3$  bytes ( $10^9$  bytes)

1 TB (terabyte) =  $1,000^4$  bytes ( $10^{12}$  bytes)

#### Terms used in this manual

Terms used in this manual are defined as follows.

- Install: Incorporating software programs into a computer's storage
- Setup: Setting up an environment so that software can be used on the computer
- Virtual machine: A virtual hardware environment provided by Virtual PC or Hyper- $V^{\otimes}$

### SAFETY INSTRUCTIONS

#### • Information About Safety Warnings

Carefully read and fully understand the safety precautions below before operating the equipment.

- Operate the equipment by following the instructions and procedures described in this manual.
- In particular, note the safety precautions displayed on the equipment or in this manual and follow them. Failure to do so might result in personal injury and property damage, including damage to the equipment.
- Safety precautions are indicated by one of the following headings. A heading consists of a combination of a safety alert symbol and a word such as DANGER, WARNING, CAUTION, and NOTICE.



This is a safety alert symbol. This symbol is used to indicate potential hazards that might result in personal injury or death. Follow the instructions in the safety messages that follow this symbol to avoid possible injury or death.

A DANGER: This symbol is used to indicate imminent hazards that are highly likely

to result in serious personal injury or death. WARNING: This symbol is used to indicate potential hazards that might result in

serious personal injury or death.

CAUTION: This symbol is used to indicate potential hazards that might result in

minor or moderate personal injury.

NOTICE: This symbol is used to indicate hazards that might result in equipment

or property damage, but not personal injury.

The heading NOTE is used to indicate a cautionary note about the handling or operation of the equipment.

- Do not perform any operations that are not described in this manual. If you encounter any problems with the equipment, contact maintenance personnel.
- Read this manual carefully, and make sure you fully understand the directions and precautions in this manual before operating the equipment.
- Keep this manual nearby so that you can refer to it as needed.
- Although every effort has been made in this manual to specify the most complete and relevant precautions regarding the equipment, unexpected incidents might occur. When using the equipment, in addition to following the instructions, also use your own judgment on matters related to safety.

#### • Common Safety Precautions

Carefully read and fully understand the following safety precautions.

### **№** WARNING

- This equipment is not designed or manufactured for use in a life-critical system that requires extreme levels of safety. If the equipment might be used for such a purpose, contact our sales representative.
- In the case of smoke, a burning smell, or a similar problem, stop the supply of power to the equipment, and unplug the power cord from the DC input connector on the rear of the main unit. Then, contact your supplier or maintenance personnel. Using faulty equipment without repairing it might result in a fire or an electric shock.
- Do not hit the equipment or subject the equipment to shocks or vibrations. Doing so might cause the equipment to fail. If you drop the equipment or damage its chassis, unplug the power cord from the DC input connector on the rear of the main unit, and then contact maintenance personnel. Using faulty equipment without repairing it might result in a fire or an electric shock. Do not subject the equipment to shocks when unpacking or carrying the equipment.
- Do not modify this equipment. Doing so might result in a fire or an electric shock. The manufacturer is not responsible for any problems resulting from user modification of the equipment.
- Do not operate this equipment without using the dust filter. Doing so might cause a fire. In addition, use the Hitachi-brand dust filter.

### **!** CAUTION

- If the equipment falls or tips over, personal injury might result. Use caution when transporting the equipment.
- Be careful to avoid personal injury when unpacking or carrying the equipment, such as pinching or hitting your fingers.
- Before cleaning or replacing the dust filter of this equipment, shut down the OS and unplug the power cord from the DC input connector on the rear of the main unit. Failure to do so might result in injuries to the hands or fingers.

#### **NOTICE**

- This equipment alone cannot guarantee the safety of the system. To ensure sufficient safety for your
  system even in the event that this equipment fails, malfunctions, or contains program bugs, you must add
  systemic protections. For example, build external protective and safety circuits to facilitate safety
  measures intended to prevent personal injury and serious accidents.
- When installing or replacing hardware, wear an antistatic wrist strap to prevent the buildup of static electricity.
- When tightening or removing screws, use a screwdriver that fits the size and type of the head of the screw to avoid stripping the head.
  - To avoid damaging the threads when tightening screws, drive the screw along the axis of the tapped hole without applying too much torque.
- This equipment is evaluated assuming the use of the specified hardware. Accordingly, use only the
  specified hardware when installing or replacing components. If any other hardware is used for
  installations or replacements, the equipment is not guaranteed to operate correctly.
- Do not use the equipment in an environment full of dust or with corrosive gases present. Doing so might cause the equipment to fail.
- Do not subject the equipment to shocks when unpacking or carrying the equipment. Doing so might cause the equipment to fail.
- Ensure sufficient clearance for air intake and exhaust in front of and behind the equipment. Failure to do so might cause the temperature inside the equipment to rise, resulting in a failure or a shorter life span of the equipment. In addition, ensure sufficient clearance for maintenance work.

- Use the specified operating system. If you use any other operating system, operation is not guaranteed.
- Performing an emergency shutdown (that is, unplugging the power cord or shutting off the circuit breaker
  without properly shutting down the OS) might cause the OS or applications not to work properly or might
  cause saved data to be corrupted. Never perform an emergency shutdown unless some kind of error
  requires that you stop the system immediately.
- Note that if the power supply is cut, the system might not be able to recover automatically.

Safety Warnings in This Manual

Safety warnings indicated as 🕦 WARNING

• Do not remove, disassemble, or modify the power supply unit. If you do so, serious personal injury or death might result due to electric shock.

(Page 1-3)

- Use the supplied power cord for the AC adapter (optional). Using another power cord might result in
  equipment failure, fire, or electric shock. In addition, when using this equipment at voltages over 125 V
  AC, prepare a power cord that is compatible with the input voltage to be used.
- When plugging the power cord into an outlet, use an outlet with a ground terminal (ground pole) that is properly grounded. In addition, you must install and use an earth leakage circuit breaker. Failure to take these measures might result in fire or electric shock.
- Do not use a two-prong plug without a ground pole. Doing so might result in electric shock or equipment failure.

(Page 1-11)

• If any of the air intake and exhaust holes of the equipment are blocked, the temperature inside the equipment might rise, which might result in a fire or equipment failure. Ensure sufficient clearance around the equipment when installing the equipment. (See 1.5.2 Installation.)

(Page 2-1)

• In the case of smoke, a burning smell, or a similar problem, stop the supply of power to the equipment, and unplug the power cord from the DC input connector on the rear side of the main unit. Then, contact your supplier or maintenance personnel. Using faulty equipment without repairing it might result in a fire or an electric shock.

(Page 2-4) (Page 9-1)

• Install a dust filter for use with the equipment. Not doing so will allow dust into the equipment, which might result in a short circuit fire.

(Page 6-1) (Page 6-14)

• Before starting work, shut down the OS, and unplug the power cord. Failure to do so might result in an electric shock or equipment failure.

(Page 6-7)

• Before you install or remove memory modules, shut down the OS, and unplug the power cord. Installing or removing memory modules without shutting down the power might result in an electric shock or a fire.

(Page 6-9)

### Safety warnings indicated as ACCAUTION

Caution about the fans (rotating objects):
 Only maintenance personnel are allowed to remove fans. If you remove a fan yourself, your hand or other objects might be caught in the rotating parts of the operating fan, and personal injury might result.

(Page 1-3)

• If this equipment is stored at high temperatures, do not touch it with your bare hands. Doing so might result in burns.

(Page 1-10)

The equipment might cause injury if it falls or is dropped off of a desktop when placed vertically. Use the
vertical stand provided with the equipment, and place the equipment with the vertical stand on a level
surface.

(Page 1-11) (Page 6-16)

• Before you clean or replace the dust filter of this equipment, shut down the OS, and unplug the power cord. Failure to do so might result in injury to the hands or fingers.

(Page 6-1)

 When installing or removing components, do not directly touch parts inside the equipment with your hands. Such parts are hot, and touching them might result in burns. In addition, touching such parts might damage the parts, resulting in equipment failure.

(Page 6-8)

• When installing the cover of the main unit, do not insert your fingers into the inside of the cover of the main unit. Doing so might result in your fingers getting caught, causing injury.

(Page 6-9)

•	When installing	or removing ar	SSD, be	careful not to	cut vour f	ingers on the	protrusions.

(Page 6-13)

- When disposing of the equipment, remove the lithium battery according to the procedure.
- · Only repair staff may replace the lithium battery, so contact our sales representative.

(Page 6-17)

 When installing or removing a jumper socket, do not directly touch parts inside the equipment with your hands. Such parts are hot, and touching them might result in burns. In addition, touching such parts might damage the parts, resulting in equipment failure.

(Page 6-19)

#### Safety warnings indicated as NOTICE

Depending on the type of failure that occurs, important files might be lost when you use this equipment.
 Files can be lost due to power failures or human error during operation, in addition to equipment failures.
 In such cases, files cannot be recovered. To prevent data loss, save your files regularly and establish a systematic schedule for backing up files.

(Page iii) (Page C-7)

- Before moving this equipment, shut down the OS, and unplug the power cord. Not doing so might cause SSDs and other devices to fail.
- When transporting or carrying the equipment, pack it in the dedicated container (the container and
  packing materials used when the equipment was delivered). Using another container or other packing
  materials might damage the equipment.
- Do not use the dedicated container to transport or carry the equipment if the container has been damaged or broken. Doing so might damage the equipment.

(Page C-1)

- Never hot-swap SSDs. Doing so might cause a failure in the equipment or the SSDs. Before you replace an SSD, shut down the OS, and unplug the power cord.
- When using a USB port, check the orientation of the USB connector, and then insert the connector slowly. Failure to do so might damage the USB port.
- Do not remove or insert a USB device during online operation (system operation). Doing so might affect applications that are running.

(Page 1-3)

- Before moving this equipment, shut down the OS, and unplug the power cord. Not doing so might cause SSDs and other devices to fail.
- When transporting or carrying the equipment, pack it in the dedicated container (the container and
  packing materials used when the equipment was delivered). Using another container or other packing
  materials might damage the equipment.
- Do not use the dedicated container to transport or carry the equipment if the container has been damaged or broken. Doing so might damage the equipment.

(Page 1-11) (Page 6-1)

- Do not route interface cables and other cables (including cables for other devices, such as a PC) near the power cord. Doing so might cause a failure or malfunction in the equipment.
- Do not connect or disconnect an interface cable while the power for this equipment or for a remote device is on. If you do so, a short circuit between the power supply and the ground might cause a failure in the equipment.
  - If an interface cable comes off while the power for the equipment is on, shut down the OS and unplug the power cord.
  - Unplugging the power cord without shutting down the OS might destroy the contents of files.
- When you connect a cable for external contacts, always connect it to the external contact connector (EXT). A voltage as high as 40 V DC might be applied to the cable through a relay load. If you connect the cable to the wrong connector, this might cause a failure in the equipment.

(Page 1-14)

- Performing an emergency shutdown (that is, unplugging the power cord or shutting off the circuit breaker
  without properly shutting down the OS) might cause the OS or applications not to wo properly or might
  cause saved data to be corrupted. Never perform an emergency shutdown unless some kind of error
  requires that you stop the system immediately.
- Note that if the power supply is cut, the system might not be able to recover automatically.

(Page 2-4)

After washing a dust filter, dry it completely before re-attaching it to the equipment. Using the equipment while its dust filter is not completely dry might cause equipment failure. When using a detergent to clean a dust filter, use a neutral detergent. Using other types of detergents might degrade the dust filter's function.

(Page 6-2)

• Before you install or remove memory modules, shut down the OS, and unplug the power cord. Installing or removing memory modules without shutting down the power might result in an electric shock or a fire.

(Page 6-10)

- The orientation of a memory module in a connector is fixed. When installing a memory module, verify that the orientation is correct. An incorrect orientation might result in equipment failure.
- Do not install memory modules that have different capacities in slots DIMM1 and DIMM2. If you do so, the modules might not be recognized.

(Page 6-11)

- Place an SSD on a shock-absorbing material, such as an antistatic cushion, even for temporary tasks.
   Placing an SSD directly on a hard surface, such as a desktop, might result in the failure or a shorter life span of the equipment, or cause loss of data due to jarring or shocks.
- Never remove the screws on an SSD while the power to the equipment is on. Never hot-swap SSDs. Performing these actions might result in failure of the equipment or drive.
- · Before replacing an SSD, shut down the OS, and unplug the power cord.
- Install or remove an SSD only when necessary, for example, when you need to replace an SSD due to a failure. Performing these actions frequently might result in failure of the equipment or drive.
- Fully insert SSDs. Loose contacts or missing screws might result in failure.
- During installation or removal, do not subject an SSD that you are installing or an SSD that is already installed to shocks. Subjecting an SSD to shocks might result in drive failure.

(Page 6-13)

Recovery DVDs contain an image file created for the hardware configuration at the time of delivery. If
the hardware configuration has changed from the time of delivery, the OS might not start after the
recovery process. Remove all external storage devices to restore the hardware configuration at the time of
delivery before starting the recovery process.

When you use a recovery DVD, <u>all data on the system drive is deleted.</u> Back up your data in advance as necessary.

This product is not equipped with a DVD drive. Therefore, you will need to prepare an external DVD drive in advance.

(Page 7-1)

• Do not use a replaceable component for longer than the recommended replacement cycle. If you do so, a worn-out component might cause the equipment to fail.

(Page A-1)

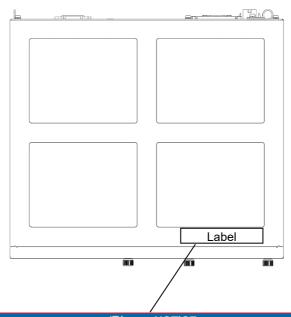
### WARNING Label

The warning label is attached to the following position on the equipment.



#### • NOTICE Label

The notice label is attached to the following position on the equipment.



#### 通知 NOTICE

当您更换驱动器设备的启动过程中,系统数据将被销毁。请参阅用户手册。 當您更换驅動器設備的啟動過程中,系統資料將被銷毀。請参阅使用者手冊。 装置の電源が入った状態でドライブの挿抜を実施すると、システムデータ破壊にいたりますので、取扱説明書に従いドライブの交換を実施してください。 Drive replacement during startup of the device, corrupts the system data. See User's Manual.

### • Disposing of the Equipment

This equipment contains materials that are potentially harmful to the environment if the equipment were to be improperly disposed of. When disposing of this equipment, you are required to issue a manifest for industrial waste.

• EU Battery Directive (2006/66/EC)



This symbol mark is valid in European Union countries. This symbol mark is specified in Article 20, "Information for end-users", and Annex II of EU Directive 2006/66/EC.

This equipment contains a lithium battery. When removing the battery, follow the instructions in 6.5 Removing the Lithium Battery.

In the European Union, a separate collection system for used batteries and accumulators is in place. Process batteries and accumulators appropriately at a local collection or recycling center.

### **PRECAUTIONS**

#### 1. Precautions About the Equipment

#### NOTICE

- Before moving this equipment, shut down the OS, and unplug the power cord. Not doing so might cause SDDs and other devices to fail.
- When transporting or carrying the equipment, pack it by using the dedicated container (the container and packing materials used when the equipment was delivered). Using another container or other packing materials might damage the equipment.
- Do not use the dedicated container to transport or carry the equipment if the container has been damaged or broken. Doing so might damage the equipment.

#### (1) Transporting the equipment

#### Required actions

- When transporting or carrying the equipment, pack it by using the dedicated container (the container and packing materials used when the equipment was delivered). If you must move the equipment while it is installed in a housing, protect the equipment so that any vibrations and shocks to the equipment are within the provided specifications.
- Keep the dedicated container (the container and packing materials used when the equipment was delivered). You can use the dedicated container later when transporting or carrying the equipment.

#### (2) Connection cables

#### **Precautions**

- Do not pull on a cable by using excessive force.
- In order to meet EMC standards (FCC, CE, and VCCI), use shielded cables for the interface cables connected to the equipment (the display interface cable, keyboard interface cable, and mouse interface cable).

#### Required actions

Route the cables neatly and orderly around the equipment so that they will not get caught on hands or feet.
 If the power cord is disconnected during operation of the equipment and power is lost, crucial data might be lost.

#### (3) Connectors

#### **Precautions**

- To connect a connector properly, insert it by using the proper orientation and at the proper angle. If a connector is not inserted properly, the connection might fail or malfunction.
- Verify that there are no loose I/O cable connectors on the equipment.

#### (4) Power supply

#### (a) Power voltage

#### Required actions

• Confirm that the voltage of the power input to the equipment is within the specified range (12 to 24 V DC). If the voltage of the power input is close to the upper or lower limit of the specified range, assume that the input voltage has been set incorrectly. Then ask the manager of the power facility to inspect the voltage output by the facility.

#### (b) Power cord

#### **Precautions**

- The power cord that comes with the AC adapter (optional) is rated at an input voltage of 125 V AC. When using
  this equipment at voltages over 125 V AC, prepare a power cord that is compatible with the input voltage to be
  used.
- Install Class D grounding (previously known as Class 3 grounding) as defined in the Technical Standard for Electrical Facilities of Japan. This is to maintain normal operation of electronic circuits containing highly integrated LSIs and to protect devices from abnormal voltage caused by lightning strikes or other causes.
- Use a power cord with a 2-prong plug and a grounding pole. (See 1.7 Hardware Connections.)
- When you plug the power cord into an outlet, use an outlet with a neutral pole that is properly grounded. In addition, install and use an earth leakage circuit breaker.
- If you are using a power cord clamp to prevent accidental disconnection, allow for extra length in the power cord around the connector when you secure the cord, in order to allow the cord to be disconnected in an emergency.

  Alternatively, install an emergency circuit breaker at the outlet.
- Do not place any objects on the power cord. In addition, do not install signal lines near the power cord.

#### (c) Turning the power on and off

#### **Precautions**

- After turning the power off, wait for at least one minute before turning the power on again. If you wait for less than one minute, the equipment might not operate as specified by the BIOS power settings. (See 5.6 BIOS Setup.)
- Do not turn off power to the equipment or press the reset switch during communication or while an SSD is being accessed.

#### Required actions

- When connecting or disconnecting a peripheral, verify that both the equipment and the peripheral have been turned off. If they have not been turned off, a malfunction or failure might result.
- When turning on the power, turn on the peripherals first, and then turn on the equipment. When turning off the power, turn off the equipment first, and then turn off the peripherals.
- When you are not using the equipment, turn off the power. If you do not intend to use the equipment for an extended period of time, unplug the power cord from the outlet.
- Depending on the material, a rug, lap blanket, or similar material might cause static buildup and consequently cause a malfunction of the equipment. Use a conductive rug or lap blanket resistant to static buildup.
- If lightning strikes nearby or the AC power supply is not stable, an instantaneous power failure or a brownout might occur during operation or the screen might black out. In such cases, turn off the power to the equipment, and then turn the power back on.

#### (5) Installation environment

#### **Precautions**

- When you use a USB device, verify that the power consumption does not exceed the maximum current rating. (See 5.1 (6) Maximum current specifications.)
- To use this equipment without failures for an extended period of time, proper environment and handling are required. Do not use the equipment in the following locations. Doing so might reduce the life span of the equipment or cause a failure in the equipment.
  - In a place exposed to direct sunlight (for example, too close to a window)
  - In a place subject to rapid temperature or humidity changes (for example, too close to an air conditioner)
  - In a place close to a device that generates electrical noise (for example, too close to an electric motor or generator)
  - In a place close to a device that generates a strong magnetic field (for example, too close to magnets or similar objects)
  - In an environment full of dust
  - In a place subject to vibrations
  - In an environment with corrosive gasses present
  - In a place with vibrations caused by loud sounds (for example, too close to a device that generates a loud buzzer or alarm)

- The following are precautions for the left, right, top, and bottom sides of the equipment:
  - Do not attach heating devices.
  - For ease of maintenance work, verify that the equipment can be moved easily. If the equipment is secured, ensure that the equipment can be removed easily.
- It is reported that zinc whiskers can cause a problem with the equipment. Do not use electrogalvanized materials near the equipment or the place where the equipment is installed.

(A quote from Technical Report of JEITA# ITR-1001 "Guideline of Facilities and Equipment for Information Systems")

Location of whiskers: Whiskers are created by electrogalvanized equipment such as floor panels, stringers, posts, and aseismatic flat steel.

Phenomenon: Hair-like zinc crystals (conductive whiskers) float into the air from the floor for some reason, go inside the device, and short-circuit a PCB or its pins. The root cause is difficult and time-consuming to determine, because the symptoms differ depending on the location of the short circuit, and often, the problem is mistakenly identified as a temporary issue.

#: JEITA: Japan Electronics and Information Technology Industries Association

#### Required actions

- If you mount the equipment in a housing or on a desk, take into consideration the temperature increase around the equipment.
- The system clock and similar operations inside the equipment always operate by using a backup battery, even when the power is off. Therefore, if you store the equipment at a temperature outside the operating temperature range, you might need to reconfigure the clock settings and other system BIOS settings when you start using the equipment again. When reconfiguring system BIOS settings, follow the instructions in 5.6 BIOS Setup.

#### (6) Operating conditions

#### **Precautions**

- Before moving the equipment, unplug the power cord.
- To prevent moisture condensation when moving the equipment from outside a building to the inside, wait at least four hours before using the equipment.
- The equipment is made by using precision electronics components. Do not subject the equipment to any vibrations
  or shocks.
- Do not sit on the equipment or place anything on the equipment.
- During normal operation, do not turn off the display. Set the display to standby mode instead.
- When you turn on the equipment, during normal operation, do not use the keyboard or mouse until the sign-in screen is displayed.

#### Required actions

• We recommend that you remove dust from around the equipment (in particular, below the equipment), in the vents on the equipment, and on the front of the equipment.

#### (7) Abnormal sounds

#### **Specifications**

• When turning on the power, you might hear a low-frequency humming noise. This is caused by transient, low-frequency vibrations from components such as the choke coils for suppressing high-frequency noises and does not impact the characteristics or life span of the equipment.

#### (8) Warranty

#### **Specifications**

- The manufacturer offers no guarantees against damage to data or application software that is caused by hardware damage to the equipment.
- Use an operating system specified by the manufacturer. If you use an operating system not specified by the manufacturer, proper operation of the equipment is not guaranteed.
- This equipment is evaluated under the assumption that the hardware specified by the manufacturer is used. Therefore, when installing or replacing hardware, use the hardware specified by the manufacturer. The manufacturer cannot guarantee proper operation of the equipment if you use other hardware.

#### 2. Networks

#### **Precautions**

• When you send a Magic Packet<sup>TM</sup> frame, verify that the standby lamp of the equipment is on. If you send a Magic Packet<sup>TM</sup> frame when the power is about to be turned off after an OS shutdown, the equipment might restart without being turned off or Wake-on-LAN (WOL) might not function at all. (See 2.6.2 Turning on the power by using a LAN.)

#### **Specifications**

- Depending on the status of the network, Magic Packet<sup>TM</sup> frames might be lost. To avoid this, set up the system so that Magic Packet<sup>TM</sup> frames can be propagated without loss. (See *2.6.2 Turning on the power by using a LAN*.)
- Even if a network drive is configured to reconnect at sign-in, reconnection is not always possible. If such cases, sign in again, or use the net use command to establish a connection. For details about the net use command, see the Windows® help.
- When you connect this equipment to another device or a peripheral device over the network, make sure that the "speed and duplex" settings of both devices match (see 2.7 Setting Up the LAN Interface). If those settings do not match, the performance of the network adapter might be compromised, or the network adapter might not work properly.
- The electric potential difference between units can generate heat. Therefore, use a twisted-pair Ethernet cable (such as Category 5 or STP cable) that is specified in (1) Motherboard (standard) under 5.8.1 Connector specifications for network connections. Do not use any other cables.

### 3. Display Screens

#### **Specifications**

- Before setting up the screen, terminate all running application software.
- When you change the connections to switch between single- and multi-display configurations, turn off the power
  to the equipment, change the connections of the display cables, turn the power back on, and then set up the screen
  configuration.
- When you change the connection configuration for the displays, reconfigure the screen settings accordingly.
- Depending on the application software, the screen might flicker and video playback might not be smooth.
- The multi-streaming function of DisplayPort (daisy-chain) is not supported.
- If a display connected via a DisplayPort connection is turned off, the display can no longer be detected.

#### Required actions

• If you want to enable "Collage" for multiple displays, use displays that support Display Data Channel (DDC). If you use displays that do not support Display Data Channel (DDC), you will not be able to use the "Collage" setting.

#### 4. Solid State Drives (SSDs)

#### NOTICE

Depending on the type of failure that occurs, important files might be lost when you use this equipment. Files can be lost due to power failures and human error during operations, in addition to equipment failures. In such cases, files cannot be recovered. To prevent data loss, save your files regularly and establish a systematic schedule for backing up files.

#### (1) Handling solid state drives

#### **Precautions**

• The access performance of SSDs differs depending on the equipment. Also note that the performance of an SSD is lower at high or low temperatures. When using SSDs, verify that the access performance of the SSDs at normal temperatures and their degraded performance at high or low temperatures do not cause problems in user applications.

#### Required actions

- Do not subject SSDs to vibrations or shocks.
- Take preventive action against static electricity due to human contact and other activities in the workplace.
- Hold the bracket or sides of an SSD. Do not touch the connectors.
- When you store an SSD for an extended period of time, put the SSD into an anti-static bag, and then store it in a dedicated box.

#### **Specifications**

- When modifying existing partitions, delete the partitions first, and then re-create them.
- The capacity and performance of an SSD might differ depending on the component.

#### (2) Backing up files

#### Required actions

- Back up the contents of all SSDs periodically.
- When deleting a partition, all files in the partition will be deleted. Back up any important files before deleting a partition.

#### 5. USB Devices

#### **Precautions**

- Test a USB device before you start using it. Never use a USB device for a mission-critical purpose.
- Do not connect a USB device during OS startup, because the OS might not start normally.
- If you switch screens during OS startup when you use a CPU/USB KVM switch, the OS might not start normally
  depending on the type of a CPU/USB KVM switch. When using a CPU/USB KVM switch, test its operation
  thoroughly.
- For USB 2.0 and USB 3.0, the length of the cable that you use must be less than or equal to the length specified in the specifications. Using longer cables might compromise transfer speed. Use a USB 2.0 or USB 3.0 cable that matches the device you are using. If you do not do so, the actual transfer speed of the device might not be as high as it should be, or communication errors might occur. For information about cable specifications, ask the manufacturer of the cable. (For details about cable length, see 5.8.3 External interface cable length specifications.)

#### Required actions

- When using a USB port, check the orientation of the USB connector, and then insert the connector slowly to avoid damaging the USB port.
- When a USB device is inserted, removed, or accessed, the system load might increase. If you need to use a USB device during online operation (system operation), you must confirm that using the device does not affect the currently running application software before using the device.
- After you clean a USB keyboard, check the connection between the equipment and the keyboard connector. A
  loose connection might cause the keyboard to be incorrectly recognized or prevent the system from starting
  normally.

#### **Specifications**

- Connection with all USB devices is not guaranteed.
- Some USB devices do not conform to the USB specifications. If you turn off the main power while a noncompliant USB device is connected, the equipment might not start properly, and the clock settings might be
  corrupted. When selecting a USB device, test its operation thoroughly.

#### 6. Lithium Batteries

#### Required actions

• This equipment uses a lithium battery. When disposing of the battery, observe all applicable local laws and regulations.

#### 7. Optical Mouse

#### Required actions

- Due to the nature of the optical sensor in an optical mouse, an optical mouse might not work on transparent materials or light-reflecting materials (such as glass and mirrors). Avoid using an optical mouse on these materials, or use a commercially available optical mouse pad.
- If the optical sensor is clouded with condensation or oil mist, the optical mouse might not work properly. If you are
  using an optical mouse in an environment where such effects might occur, take sufficient environmental measures
  as with the main unit to use the optical mouse.

#### 8. BIOS settings

#### **Specifications**

- If the power supply is turned off while the backup battery is dead or not connected, the settings will be set to Stay Off. When you press the power switch to start the system, the settings will be set to "After AC Power ON". However, if the power cord is disconnected, the settings will be set to Stay Off because the backup battery is dead. (See 5.6 BIOS Setup.)
- The purpose of the clock displayed on the BIOS setup menu screen is not to show the correct date and time, but rather to configure the time. Because of this, the date displayed on this screen does not change when the actual date changes. If the actual date changes during setup, you must update the date setting. (See 5.6 BIOS Setup.)
- When you are using the setup menu, the clock display might sometimes show a delay. After you are finished with the setup menu, verify that the clock is correct. (See 5.6 BIOS Setup.)

#### 9. Maintenance Services

#### **Specifications**

- Microsoft® Windows®, device drivers, and commercially available application software might not be directly modifiable as a countermeasure for a particular failure. Instead, the manufacturer might offer a workaround as a countermeasure.
- Adding commercially available hardware to the equipment without notifying the manufacturer will void the warranty of the equipment as a whole.
- Some components used in the equipment (such as LSIs from Intel Corporation) cannot be disassembled for failure analyses, because the manufacturer does not have the rights to do so.
- The price of this equipment does not include maintenance and support. When ordering the equipment, clarify the desired maintenance support level in the maintenance contract, and pay the required maintenance fee as defined by the maintenance support level.

### 10. Windows® Settings

(1) Applying hotfixes and other updates

#### **Specifications**

• Users are responsible for applying any necessary hotfixes, Windows updates, or the latest service packs. Verify system operation thoroughly to evaluate how the system will be affected by any applied hotfixes, Windows updates, or service packs.

#### 11. Detection of single-bit errors in memory

#### Restrictions

This equipment uses ECC (error checking and correction) memory. For this reason, any single-bit errors that occur
in the memory are automatically corrected, and do not impede equipment operation. In addition, the detection of
single-bit errors is performed upon BIOS startup and by the RAS software. Although users are notified if single-bit
errors occur frequently, in exceptionally rare cases, single-bit errors might not be detected and users might not be
notified.

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# **CHAPTER 1 GETTING STARTED**

### 1.1 Scope

This manual is intended for operators of the HITACHI EMBEDDED CONTROLLER HF-W400E, and contains information about the operation and maintenance of various devices necessary for operators' routine use.

After you unpack the equipment, examine the list of delivered items to confirm that all items have been delivered and that no items are damaged. If any items are missing or damaged, contact one of our sales representatives.

For information about RAS features, see the following manual:

• HF-W400E RAS FEATURES MANUAL (manual number WIN-63-0097)

### 1.2 Role of the Operator

To ensure stable long-term use of this equipment, take the following into consideration.

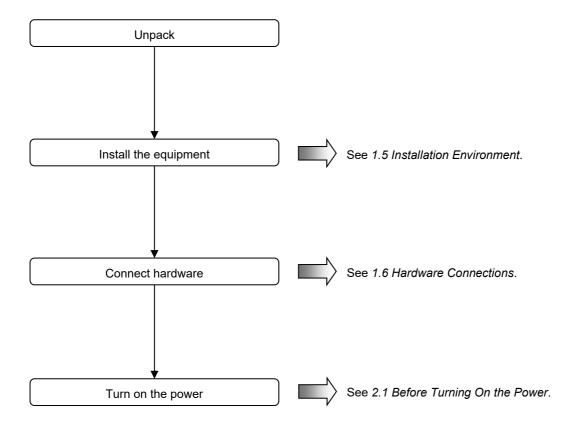
- (1) Installing replaceable components
  - When installing a replaceable component (such as an SSD or a dust filter), follow the replacement procedure in the relevant chapter.
- (2) Taking the characteristics of the equipment into account
  - See 1. Precautions About the Equipment in PRECAUTIONS, and take the necessary actions considering the characteristics of the equipment.
  - The instructions in this manual are the fundamental procedures that operators must follow when using the equipment. Always follow these instructions.
  - For information about how to use the equipment, clean the equipment, and so on, see the relevant chapters.
- (3) Keeping the equipment in good condition

When using this equipment, operators must take care of the following:

- Backing up files
  - See (2) Backing up files under 4. Solid State Drives (SSDs) in PRECAUTIONS.
- Unplugging the power cord and shutting down the power See (4) Power supply under 1. Precautions About the Equipment in PRECAUTIONS.
- (4) Inspecting the equipment
  - For information about inspections, see 6.1 Daily Inspections and 6.2 Periodic Inspections.

# 1.3 Workflow

The following is the workflow required before the equipment power is turned on.



### 1.4 Names and Functions of Parts

# **!** WARNING

Warning about the power supply unit (hazardous voltage):

Do not remove, disassemble, or modify the power supply unit. If you do so, serious personal injury or death might result due to electric shock.

# **!** CAUTION

Caution about the fans (rotating objects):

Only maintenance personnel are allowed to remove fans. If you remove a fan yourself, your hand or other objects might be caught in the rotating parts of the operating fan, and personal injury might result.

## **NOTICE**

- Never hot-swap SSDs. Doing so might cause a failure in the equipment or the SSDs. Before you replace an SSD, shut down the OS, and unplug the power cord.
- When using a USB port, check the orientation of the USB connector, and then insert the connector slowly. Failure to do so might damage the USB port.
- Do not remove or insert a USB device during online operation (system operation). Doing so might affect applications that are running.

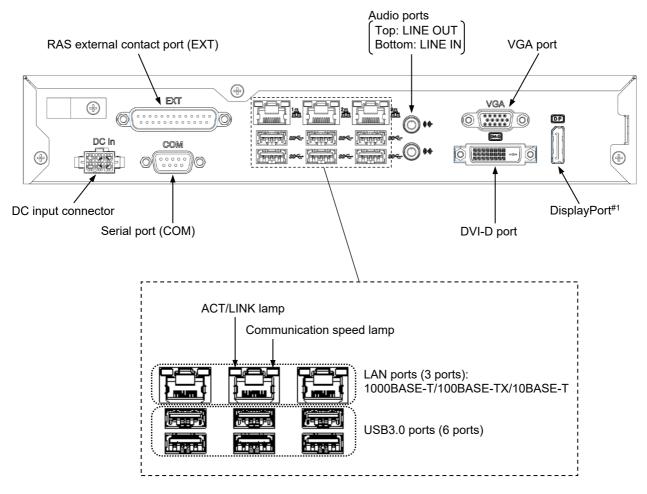
• Parts related to the display and user operation

# (1) Front view DRIVE2 bay DRIVE1 bay Digital LEDs for status indications DRINE/ STBY - NMI switch#1 Power switch USB2.0 ports (2 ports) DRIVE2 status lamp DRIVE1 status lamp Drive access lamp/ Standby lamp (STBY) Alarm lamp Status lamp (STATUS)

#1: Press the NMI switch by inserting an eject pin. If an eject pin is not available, use a pin that fits the hole of the NMI switch instead.

Figure 1-1 Names of parts (front view)

# (2) Rear view



#1: If a display unit connected with DisplayPort is turned off, the display will not be detected.

Figure 1-2 Names of parts (rear view)

Table 1-1 Functions of parts (1/4)

Name		Function			
Power switch (POWER)		Pressing this switch turns the power on. If you press the switch for four seconds or more, the power turns off, and the system goes into standby mode (for emergencies only).			
NMI switch	memory dump	If you press this switch while the OS is running, a blue screen appears and a memory dump is collected.  Under the default OS settings, the system will restart after memory dump			
Status lamp (STATUS)	Lamp	Status			
	Lit green	The equipment is operating (RUN status).			
	Lit red	<ul> <li>The equipment is not operating (STOP status):</li> <li>The equipment is starting up.</li> <li>An equipment shutdown has started and then stopped due to an error.</li> <li>The equipment has deadlocked due to an error.</li> <li>RAS software is not installed.</li> </ul>			
	Off	The main power is off or the system is in standby mode.			
Alarm lamp (ALARM)	This lamp lights red if one of the following abnormalities is detected:  • A fan inside the equipment has stopped.  • The inside of the equipment is at an abnormal temperature.				
Drive access lamp (DRIVE)	This lamp lights green while an SSD is being accessed.				
Standby lamp (STBY)	Lamp	Status			
	Lit orange	The equipment is in standby mode (only the auxiliary power is on).			
	Off	The power is shut down or the equipment is operating.			
DRIVE status lamps DRIVE1: For bay 1 DRIVE2: For bay 2	These lamps do not light on this model.				

Table 1-1 Functions of parts (2/4)

Name	Function
Audio port (LINE IN)	This is the audio line input.
Audio port (LINE OUT)	This is the audio line output.
Serial port (COM) (9 pins: RS-232C)	This port is used to connect a device that uses a serial interface, such as a modem. (See 5.8.1 Connector specifications.)
RAS external contact port (25 pins: EXT)	This port is used to connect external contacts. (See 5.8.1 Connector specifications.)
VGA port	This port is used to connect a cable from the analog interface of a display. (See 5.8.1 Connector specifications.)
DVI-D port	This port is used to connect a cable from the digital interface of a display. (See 5.8.1 Connector specifications.)
DisplayPort	This port is used to connect a cable from the digital interface of a display. (See 5.8.1 Connector specifications.)
USB ports (USB2.0/USB3.0)	These ports are used to connect USB devices.

Table 1-1 Functions of parts (3/4)

Name	Function				
LAN port (1000Base-T/100Base-TX/ 10Base-T)	You can connec specifications.)  • Onboard LAN	t a LAN cable to the LAN port. (See 5.8.1 Connector  Communication speed lamp  ACT/LINK lamp			
	ACT/LINK lamp				
	Lamp	Status			
	Lit green	A link is established. Both the equipment and the remote device are powered up and the connection over the twisted-pair Ethernet cable is stable.			
	Off	No link is established:  • The equipment is not physically connected to the network.  • The switching hub is not powered up.  • The connection over the twisted-pair Ethernet cable is not stable.  • The driver settings contain one or more errors.			
	Blinking	Network data is being transmitted or received. The blink			
	green	interval changes depending on network traffic.			
		Communication speed lamp			
	Lamp	Status			
	Lit orange	The link is operating at 1000 Mbps.			
	Lit green	The link is operating at 100 Mbps.			
	Off	The link is operating at 10 Mbps, or no link is established.			

Table 1-1 Functions of parts (4/4)

Name	Function
Digital LEDs for status indication	Various states of this equipment are indicated by two-digit hexadecimal codes and status indication LEDs.
	The digital LEDs and the status indication LEDs might remain lit after the equipment shuts down or enters standby mode. This condition will remain until the power is turned on again.
	Status indication LEDs: [1] RAS status (red)
[1] [2] [3]	[2] Application status (green) [3] BIOS status (orange)
Status indication LEDs	(For information about how to display arbitrary status data on the digital LEDs for status indication from a user application, see the <i>HF-W400E RAS FEATURES MANUAL</i> .)

# NOTE

• For information about the precautions for USB devices, see 5. USB Devices in PRECAUTIONS.

### 1.5 Installation Environment

### 1.5.1 Environment Conditions

# 🔼 CAUTION

If this equipment is stored at high temperatures, do not touch it with your bare hands. Doing so might result in burns.

This equipment must be used in an environment meeting the following conditions.

Item	Requirement	
Ambient temperature (operation)	5 to 40°C (or 5 to 35°C at altitudes of more than 1,000 m)	
Ambient temperature (storage)	−10 to 60°C	
Temperature gradient	±10 K/h or less	
Humidity	20 to 80% RH (non-condensing)	
Humidity gradient	10% RH/h or less	
Dust <sup>#1</sup>	No heavy dust (0.3 mg/m³ or less [JEITA IT-1004B Class B])	
Corrosive gas	None JEITA IT-1004B Class A (temperature: 25°C, humidity: 50% RH)	
Vibration resistance	49 m/s <sup>2</sup> (10Hz, 5s)	
Shock resistance	Operation: 19.6 m/s <sup>2</sup> (while not powered on: 98 m/s <sup>2</sup> )	
Power voltage	Main unit: 12 to 24 V DC ±10% AC adapter (option): 100 to 240 V AC ±10%	
Power frequency <sup>#2</sup>	AC adapter (option): 50/60 Hz ±3 Hz	
Electrostatic noise#2	1.0kV (Fast transient / burst wave)	
Electrostatic noise contact discharge	Main unit: 4 kV (air: 8 kV)	
Insulation resistance#2	500V DC , 20M Ω	
Dielectric strength#2	1.5kV AC , 1 min	
Instant power outage#2	20ms or less	
Altitude	Main unit: 2,000 m or less	

<sup>#1:</sup> This equipment cannot be used in an environment where conductive dust or similar substances are airborne.

### NOTE

• For information about environmental precautions, see (5) Installation environment under 1. Precautions About the Environment in PRECAUTIONS.

<sup>#2:</sup> Specifications when using the AC adapter (option).

#### 1.5.2 Installation Conditions

# **!** WARNING

- Use the supplied power cord for the AC adapter (optional). Using another power cord might result in
  equipment failure, fire, or electric shock. In addition, when using this equipment at voltages over 125
  V AC, prepare a power cord that is compatible with the input voltage to be used.
- When plugging the power cord into an outlet, use an outlet with a ground terminal (ground pole) that is properly grounded. In addition, you must install and use an earth leakage circuit breaker. Failure to take these measures might result in fire or electric shock.
- Do not use a two-prong plug without a ground pole. Doing so might result in electric shock or equipment failure.

# **CAUTION**

The equipment might cause injury if it falls or is dropped off of a desktop when placed vertically. Use the vertical stand provided with the equipment, and place the equipment with the vertical stand on a level surface.

### **NOTICE**

- Before moving this equipment, shut down the OS, and unplug the power cord. Not doing so might cause SSDs and other devices to fail.
- When transporting or carrying the equipment, pack it by using the dedicated container (the container and packing materials used when the equipment was delivered). Using another container or other packing materials might damage the equipment.
- Do not use the dedicated container to transport or carry the equipment if the container has been damaged or broken. Doing so might damage the equipment.

#### NOTE

• For information about precautions concerning the installation requirements, see (5) Installation environment under 1. Precautions About the Equipment in PRECAUTIONS.

Table 1-2 Dimensions, operation and service clearance, and installation clearance

Dim	Dimensions (mm) Operation and service clearance (mm) Installation clearance (mm)				Operation and service clearance (mm)			ım)		
Height	Width	Depth	Front	Rear	Left	Right	Front	Rear	Left	Right
50	285	249	500	600	200	200	50	100	10	10

- When you operate the equipment or do maintenance work, provide sufficient clearance, as shown in Figure 1-4.
- The equipment is cooled by fans. The intake holes are on the front and the exhaust holes are on the sides. Ensure that air flow is not blocked. In particular, leave sufficient clearance in the front (50 mm) and in the rear (100 mm). (This includes the clearance required for routing cable connectors to the rear side.)

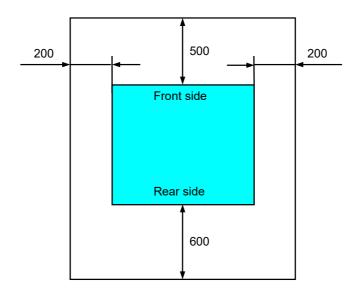


Figure 1-3 Operation and service clearance (top view)

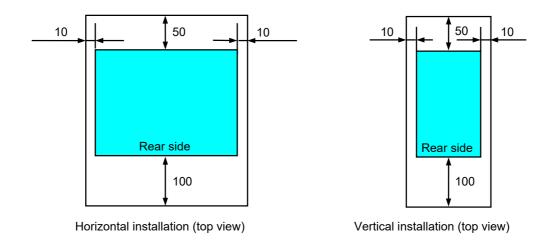
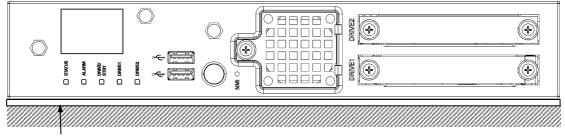


Figure 1-4 Installation clearance

### (a) Horizontal installation

Attach an anti-slip mat or similar material to the desk. The main unit has no rubber feet.



Anti-slip mat (prepared by user)

Figure 1-5 Installation view (horizontal installation on a desktop)

### (b) Vertical installation

Attach the vertical stand provided with the equipment. The vertical stand has rubber feet.

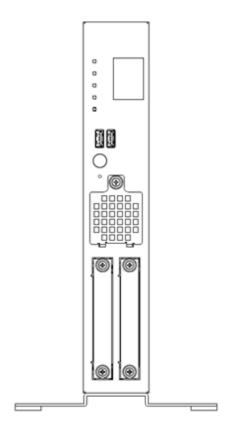


Figure 1-6 Installation view (vertical installation on a desktop)

### 1.6 Hardware Connections

### NOTICE

- Do not route interface cables and other cables (including cables for other devices, such as a PC) near the power cord. Doing so might cause a failure or malfunction in the equipment.
- Do not connect or disconnect an interface cable while the power for this equipment or for a remote device is on. If you do so, a short circuit between the power supply and the ground might cause a failure in the equipment.
- If an interface cable comes off while the power for the equipment is on, shut down the OS and unplug the power cord. Unplugging the power cord without shutting down the OS might destroy the contents of files.
- When you connect a cable for external contacts, always connect it to the external contact connector (EXT). A voltage as high as 40 V DC might be applied to the cable through a relay load. If you connect the cable to the wrong connector, this might cause a failure in the equipment.

Before connecting any hardware, carefully read and ensure that you understand the content of the *SAFETY INSTRUCTIONS* section of this document.

Connect hardware as shown in the following figure.

First connect the display, keyboard, and mouse, and then plug the power cord into an outlet.

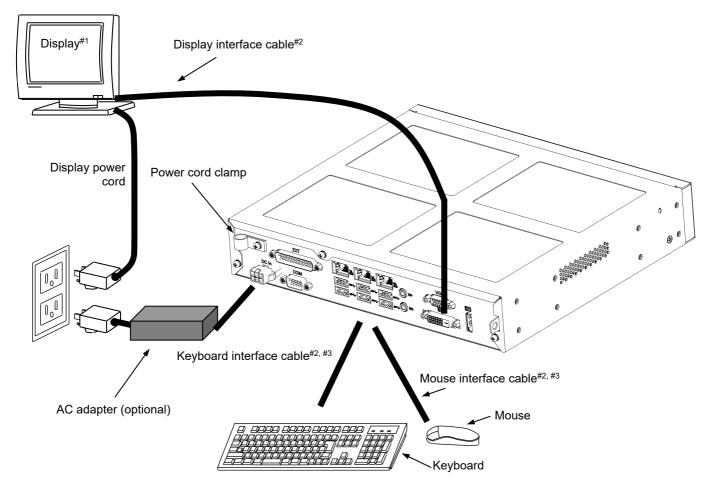


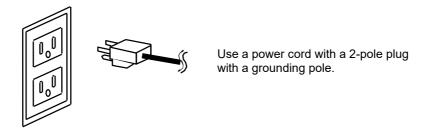
Figure 1-7 Hardware connections

- #1: For information about the names of user controls and how to operate and adjust the display, see the user's manual that comes with the display.
- #2: For information about the length of connection cables, see *5.8.3 External interface cable length specifications*. The mouse and keyboard interface cables must be directly connected to this equipment. Do not use extension cables for these cables. If you use extension cables, the mouse or keyboard might not work properly.
- #3: When connecting USB devices to the USB connectors, note the orientation of the connectors. In addition note that, because USB ports typically do not have a locking mechanism, an inadvertent contact with a USB cable might cause the connector to come loose. Secure USB cables as necessary when installing this equipment.

Note: To ensure conformity with EMC standards (VCCI, FCC, and CE), use shielded cables for the interface cables connected to the equipment (the display interface cable, keyboard interface cable, and mouse interface cable).

• Connecting to an outlet

Fully and securely insert the plug of the power cord of the AC adapter into an outlet with a grounding pole that is properly grounded.#1



#1: If you have no choice other than to use an outlet without a grounding pole that is properly grounded, use a 3-pole to 2-pole conversion adapter and connect the green ground line from the adapter to the ground of the outlet. Verify the proper functionality of the 3-pole to 2-pole conversion adapter before using it.

### NOTE

- The power cord that comes with the AC adapter (optional) is rated at an input voltage of 125 V AC. When using
  this equipment at voltages over 125 V AC, prepare a power cord that is compatible with the input voltage to be
  used.
- If you are using a power cord clamp to prevent accidental disconnection, allow for extra length in the power cord around the connector when you secure the cord. This is to allow the cord to be disconnected in an emergency. Alternatively, install an emergency circuit breaker at the outlet.

# **CHAPTER 2 OPERATION**

# 2.1 Before Turning On the Power

# **∕**¶ WARNING

If any of the air intake and exhaust holes of the equipment are blocked, the temperature inside the equipment might rise, which might result in a fire or equipment failure. Ensure sufficient clearance around the equipment when installing the equipment. (See 1.5.2 Installation.)

### NOTE

When turning on the power, see the following:

- (2) Interface cables under 1. Precautions About the Equipment in PRECAUTIONS
- (4) Power supply under 1. Precautions About the Equipment in PRECAUTIONS
- (5) Installation environment under 1. Precautions About the Equipment in PRECAUTIONS

# 2.2 Starting the Equipment

To start the equipment:

- 1. If a display is connected, turn on its power.
- 2. Connect a power supply such as the AC adapter (optional) to the DC input connector of the equipment. When the power supply is connected, the status lamp (STATUS) lights. The status lamp will turn red when the power is turned on and green when the OS starts and the equipment is operating.
- 3. After the OS starts, set up the equipment as described in 3.1 Setup Procedure When Turning On the Power for the First Time. (This procedure should only be done the first time you start the equipment after purchase.)

#### NOTE

• When RAS software is not installed or when restoring to the factory-shipped condition by using a recovery DVD, the status lamp (STATUS) does not turn green and remains red.

After these steps are complete, the equipment will automatically start up to the sign-in screen.

For information about controlling the power by using a LAN, see 2.6 Controlling the Power By Using a LAN.

### 2.3 Shutting Down the Equipment

When shutting down the equipment, first verify that no other users are using the equipment and that no background programs are running. Then perform the following actions:

- Stop application programs.
- Shut down the OS.

The specific procedure for stopping an application program differs depending on the application. For more information, see the manual of the relevant application.

To shut down the OS, click the **Start** button at the bottom-left corner of the screen to open the **Start** menu. Then, click **Power** and **Shutdown**. After the OS shuts down, the power automatically turns off, and only the auxiliary power supply remains on (standby mode). (In this mode, the status lamp (STATUS) is off and the standby lamp (STBY) is on.)

If the normal shutdown process cannot be performed (for example, a shutdown request cannot be accepted due to a system lock), press and hold the power switch for at least four seconds. The power will turn off and the equipment will go into standby mode. If you turn off the power by pressing and holding the power switch for at least four seconds, the power cannot be turned on via LAN at the next startup. Do not turn off the power this way except in emergencies. (See 2.6 Controlling the Power By Using a LAN.) For information about how to collect a memory dump, see 8.2 Collecting Memory Dumps.

### 2.4 Shutting Down the Power

- 1. Verify that the equipment is shut down. (See 2.3 Shutting Down the Equipment.)
- 2. Unplug the power cord from the DC input connector on the rear side of the main unit.
- 3. When the AC power is shut off as described in step 2, the standby lamp (STBY) turns off.

### 2.5 Emergency Shutdown



In the case of smoke, a burning smell, or a similar problem, stop the supply of power to the equipment, unplug the power cord from the DC input connector on the rear side of the main unit. Then, contact your supplier or maintenance personnel. Using faulty equipment without repairing it might result in a fire or an electric shock.

### NOTICE

- Performing an emergency shutdown (that is, unplugging the power cord or shutting off the
  circuit breaker without properly shutting down the OS) might cause the OS or applications not
  to work properly or might cause saved data to be corrupted. Never perform an emergency
  shutdown unless some kind of error requires that you stop the system immediately.
- Note that if the power supply is cut, the system might not be able to recover automatically.

In the following cases, turn off the power at the source of the AC power (such as a breaker):

- When the equipment exhibits an abnormal condition, and you must shut down the power immediately (for example, when you detect a burning smell)
- When you cannot shut down the equipment due to some abnormality
- When the power is turned off repeatedly due to overcurrent or overheating, or only the auxiliary power supply is on

In addition, unplug the power cord or turn off the power at the source of the AC power (such as a breaker) in the following cases:

- If the fan is stopped and the temperature becomes too high or too low, and consequently the power turns off automatically to protect the equipment while leaving only the auxiliary power supply on.

  Before the OS starts, a stopped fan is detected during BIOS startup. If a stopped fan is detected, the power turns
  - Before the OS starts, a stopped fan is detected during BIOS startup. If a stopped fan is detected, the power turns off automatically.
  - After the OS starts, when the RAS software detects that a fan is stopped, the OS automatically shuts down and the power turns off (this applies when RAS software is already installed).

### 2.6 Controlling the Power By Using a LAN

The power for this equipment can be turned on via a remote device by using a LAN.

This section explains Wake-on-Lan (WOL), which is used to turn on power to the equipment via a LAN. When you use WOL to turn on the power, the equipment is started through the transmission of a Magic Packet<sup>TM</sup> frame to the LAN interface while the standby lamp (STBY) is on.

This feature is disabled by default. To use this feature, follow steps 1 through 3 in 2.6.1 Enabling the Wake-on-LAN (WOL) feature to enable the WOL feature, and then perform the next procedure.

#### NOTE

• For information about the precautions that apply to a network, see 2. Networks in PRECAUTIONS.

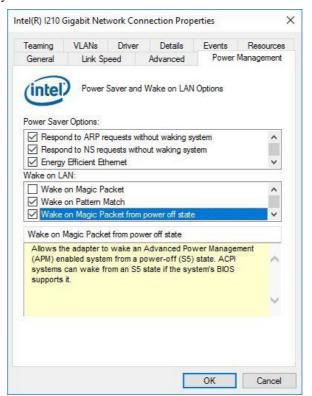
### 2.6.1 Enabling the Wake-on-LAN (WOL) feature

Perform the following procedure to specify whether to start WOL when a Magic Packet<sup>TM</sup> frame is received. The WOL feature is disabled by default.

- 1. Perform steps 1 through 5 in Setting the network transfer speed under 2.7 Setting Up the LAN Interface.
- 2. Click the **Power Management** tab. If you want to enable WOL, select the **Wake on Magic Packet from power off state** check box under **Wake on LAN**.

When using Windows® 10 2019 LTSC, click the **Advanced** tab, and then under **Property**, set both **Wake on Magic Packet** and **Enable PME** to **Enabled**.

3. Click **OK** and restart the system.



### 2.6.2 Turning on the power by using a LAN

- 1. Start the equipment, and then turn off the power by using the shutdown process so that the standby lamp (STBY) is on
- 2. Externally send a Magic Packet<sup>TM</sup> frame to the built-in LAN adapter of the equipment. When the built-in LAN adapter receives a Magic Packet<sup>TM</sup> frame, the equipment turns on.

The equipment must be in standby mode (STBY on) to start it via the LAN (that is, by using WOL). If you start the equipment and you want to use WOL again at the next startup, perform the shutdown process when turning the power off to leave the standby lamp (STBY) on.

The built-in LAN adapter of the equipment is WfM 2.0<sup>#1</sup> compliant and supports the Magic Packet<sup>TM</sup> technology<sup>#2</sup>. Because of this, the equipment power turns on when the built-in LAN adapter receives a special data packet called a *Magic PacketTM frame*<sup>#2</sup>.

The equipment does not come with a program for transmitting Magic Packet<sup>TM</sup> frames. Use a commercially available program to transmit Magic Packet<sup>TM</sup> frames.

- #1: Wired for Management (WfM) is a hardware specification guideline proposed by Intel Corporation for managing PCs on a network.
- #2: Magic Packet<sup>TM</sup> is a technology developed by Advanced Micro Devices, Inc., and can be used to start a PC over a network from a remote device.

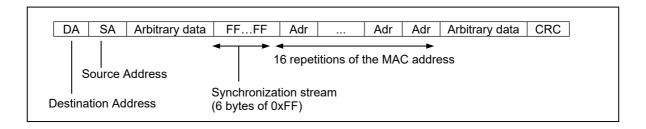
### NOTE

- A Magic Packet<sup>TM</sup> frame must be transmitted to the built-in LAN adapter of the equipment. (For information about the location of the connectors, see *1.4 Names and Functions of Parts*.)
- If you turn off the power by pressing and holding the power switch for more than four seconds, you will not be able to use WOL to turn the power on. In such a case, turn on the equipment by pressing the power switch, and then perform the shutdown process to turn off the power again.

### About Magic Packet<sup>TM</sup> frames

In a Magic Packet<sup>TM</sup> frame, the SOURCE ADDRESS, DESTINATION ADDRESS (the MAC address of the receiver or the MULTICAST ADDRESS including the BROADCAST ADDRESS), CRC, and the like must meet the basic requirements of the LAN in use. The data in a Magic Packet<sup>TM</sup> frame consists of a sequence of 16 repetitions of the MAC address of the node. This sequence can be anywhere in the packet, but it must follow a synchronization stream. The synchronization stream is defined as 6 bytes of 0xFF. As long as the MAC address that repeats itself 16 times targets the address of the equipment to be started, the device can receive a BROADCAST frame.

The following figure is an illustration of a Magic Packet<sup>TM</sup> frame:



### 2.7 Setting Up the LAN Interface

This equipment has three built-in 1000BASE-T/100BASE-TX/10BASE-T LAN ports. For information about the location of the LAN port connectors (1000BASE-T/100BASE-TX/10BASE-T), see *1.4 Names and Functions of Parts*.

### NOTE

- For information about the precautions that apply to the network, see 2. Networks in PRECAUTIONS.
- Automatic recognition of the network transfer speed and transfer mode The LAN ports have an auto-negotiation feature that automatically recognizes the network transfer speed and transfer mode. During normal use, enable the auto-negotiation feature. (Use the auto-negotiation feature when using the WOL feature. Note that if the speed is fixed to 1000 Mbps, the WOL feature cannot be used.) If there is a compatibility issue with a connected hub, the auto-negotiation feature might not work properly, which might affect communications with other terminals.

If the auto-negotiation feature does not work properly, configure the LAN interface as follows:

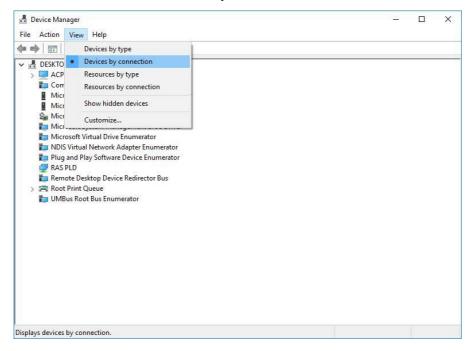
Charification of the bub	LAN setting specifications <sup>#</sup>			
Specification of the hub	Speed	Duplex		
10 Mbps, half-duplex	10 Mbps	Half duplex		
10 Mbps, full-duplex	10 Mbps	Full duplex		
100 Mbps, half-duplex	100 Mbps	Half duplex		
100 Mbps, full-duplex	100 Mbps	Full duplex		
1000 Mbps	1000 Mbps (1.0 Gbps)	Full duplex		

<sup>#:</sup> Settings vary depending on the LAN port being used.

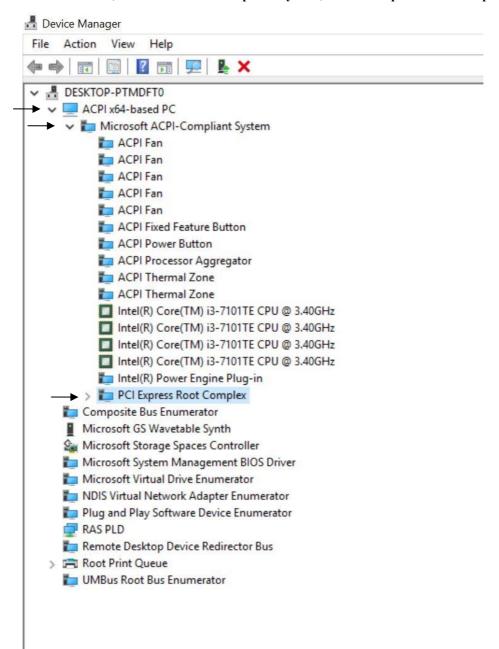
- Setting the network transfer speed
  - 1. Sign in to the computer by using an administrator account.
  - 2. Right-click the Start menu, and then click Device Manager. The Device Manager window appears.



3. Click the View menu, and then select Devices by connection.



4. Click ACPI x64-based PC, Microsoft ACPI-Compliant System, and PCI Express Root Complex.



Refer to the following and double-click the network adapter that you want to configure. The Network Connection Properties window appears.

Configuring the built-in LAN (LAN1):

Click Intel(R) 100 Series/C230 Series Chipset Family PCI Express Root Port #6 - A115.

Then, double-click the network adapter under it (in the example in the following figure, the network adapter is Intel(R) I210 Gigabit Network Connection #2).

Configuring the built-in LAN (LAN2):

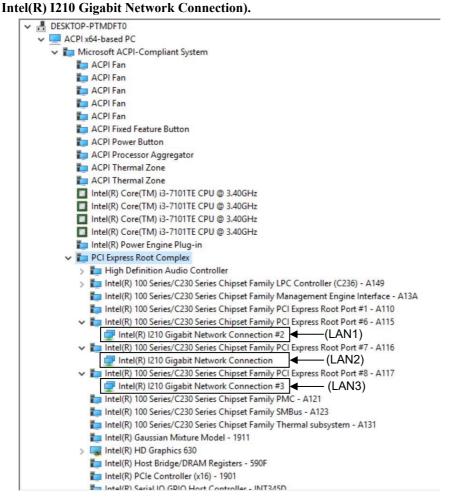
Click Intel(R) 100 Series/C230 Series Chipset Family PCI Express Root Port #7 – A116.

Then, double-click the network adapter under it (in the example in the following figure, the network adapter is Intel(R) I210 Gigabit Network Connection #3).

Configuring the built-in LAN (LAN3):

Click Intel(R) 100 Series/C230 Series Chipset Family PCI Express Root Port #8 - A117.

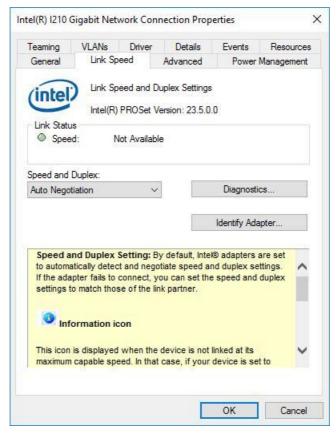
Then, double-click the network adapter under it (in the example in the following figure, the network adapter is



#1: The preceding displayed name differs depending on the versions of the OS and LAN driver you are using.

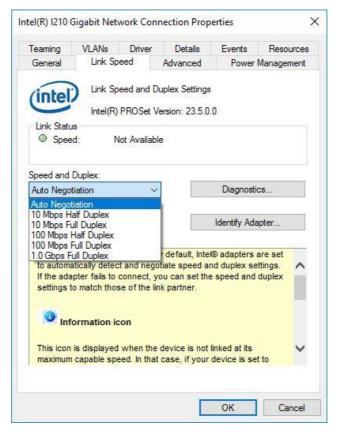
6 Click the Link Speed tab.

If you are using Windows® 10 2019 LTSC, click the Advanced tab.



- 7. From the **Speed and Duplex** drop-down list, select the transfer speed and the transfer mode you want to use. If you are using Windows® 10 2019 LTSC, select the transfer speed and transfer mode by using the **Speed & Duplex** item under **Property**.
  - Auto Negotiation: Auto-negotiation setting
  - 10 Mbps Half Duplex: 10 Mbps, half-duplex setting
  - 10 Mbps Full Duplex: 10 Mbps, full-duplex setting
  - 100 Mbps Half Duplex: 100 Mbps, half-duplex setting
  - 100 Mbps Full Duplex: 100 Mbps, full-duplex setting
  - 1.0 Gbps Full Duplex: 1.0 Gbps, full-duplex setting

If you do not need to configure the transfer speed or transfer mode, select **Auto Negotiation** at the top of the drop-down list to enable the auto-negotiation setting.



- 8. Click OK.
- 9. Close the **Device Manager** window.

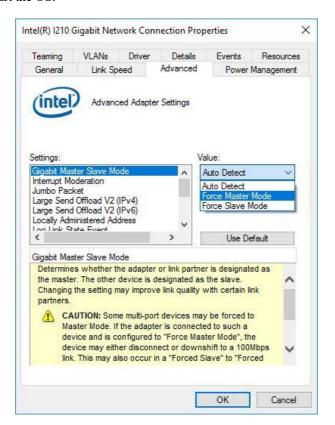
#### NOTE

• For information about precautions that apply to the network, see 2. Networks in PRECAUTIONS.

### <Actions to take if the link is unstable at 1000 Mbps>

Depending on the type of connected hub, the link might not be stable at 1000 Mbps. If you want to use the network at 1000 Mbps, verify the connection with the hub in advance. If the link is unstable at 1000 Mbps, you can stabilize it as follows:

- Use a cable that is 20 to 100 meters long (UTP Category 5e or better).
- Set the master/slave mode setting to Master (valid only when 1000 Mbps is set).
   Perform the following procedure to set the mater/slave mode to Master. The link might not function depending on the type of hub. In that case, change the setting to Auto Detect.
  - 1. Perform steps 1 through 5 in Setting the network transfer speed under 2.7 Setting Up the LAN Interface.
  - 2. Click the Advanced tab. In the Settings list, select Gigabit Master Slave Mode.
  - 3. From the Value drop-down list, select Force Master Mode.
- 4. Click **OK** to restart the OS.



Notes about cases where a link-down is recorded in the log during OS startup
 While Windows<sup>®</sup> is starting, the following warnings might be displayed in the event log. These warnings are recorded by the initialization process of the LAN driver at Windows<sup>®</sup> startup, and do not affect system operation.

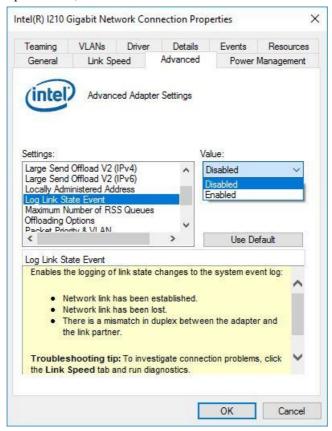
Event ID	Source	Туре	Category	Description
27	elrexpress	Warning		Intel(R) I210 Gigabit Network Connection <sup>#1</sup> Network link is disconnected. <sup>#2</sup>

- #1: The displayed name differs depending on the LAN adapter.
- #2: The displayed content differs depending on the OS.

You can prevent these warnings from being displayed in the event log by changing the LAN adapter settings as follows.

Note that if you change the following settings, log entries such as those for LAN connections and disconnections during system operation also will not be recorded, which might complicate failure analysis when a problem occurs.

- 1. Perform steps 1 through 5 in Setting the network transfer speed in 2.7 Setting Up the LAN Interface.
- 2. Click the Advanced tab. In the Settings list, select Log Link State Event.
- 3. From the Value drop-down list, select Disabled.



### 2.8 Setting Up the Screen

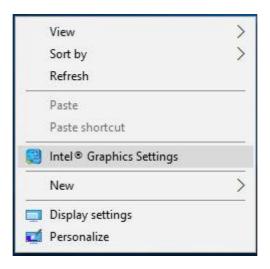
For the screen settings, you can configure the color depth (the number of colors that the screen can produce at the same time) and the resolution (the number of pixels that make up the screen). You can also configure the refresh rate (the number of screen refreshes per second) and the single-display and multiple-display settings.

### NOTE

- For information about the precautions that apply to the screen, see 3. Display Screens in PRECAUTIONS.
- If you want to change the screen settings, use Intel® HD Graphics Control Panel.
- (1) Configuring screen settings for a single display

When a single display is connected, perform the following procedure to configure the screen settings:

1. Right-click on the desktop. From the displayed menu, click Intel® Graphics Settings to open Intel® HD Graphics Control Panel.



2. In the Intel® HD Graphics Control Panel window, click **Display**.



3. Configure the setting items for the screen that are displayed in the middle of the window.



Setting item	Description
Resolution	This allows you to select the resolution.
Refresh Rate	This allows you to select the refresh rate.

#### NOTE

- Do not change the **Rotation** and **Scaling** settings.
- When configuring the resolution and refresh rate, you must choose from the options described in (6) Supported resolutions under 5.1 Equipment Specifications.
- 4. When you finish configuring the setting items, click **Apply**. If you changed the resolution or refresh rate, the following confirmation screen will appear. Click **Yes**.



#### NOTE

- The resolution options might include resolutions larger than the resolutions supported by the connected display.
- If you select a resolution larger than the maximum resolution supported by the display, the display will black out.
- After the display driver is installed, the resolution is automatically set to the maximum resolution supported by the connected display. When changing the resolution, select a resolution smaller than the maximum resolution.

### (2) Configuring screen settings for multiple displays

This equipment supports output to multiple displays. If you connect two displays, the two displays can be used simultaneously. The following shows how to set up output to multiple displays.

- 1. As described in (1) Configuring screen settings for a single display, open the Intel® HD Graphics Control Panel window, and then click **Display**.
- 2. Click Multiple Displays. Then, configure the settings for multiple displays.



The following shows how to set up Clone Displays, Extended Desktop, and Collage.

### NOTE

• The DisplayPort multi-streaming feature (daisy-chaining) is not supported.

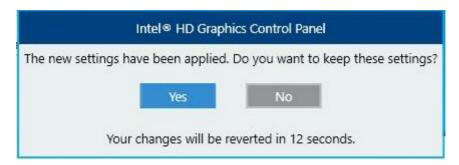
#### (a) Clone Displays

If you select this mode, multiple displays show the same screen and have the same resolution, color depth, and refresh rate. Before connecting displays, check the capabilities of the displays (such as their maximum resolution and maximum refresh rate).

- 1. In the Intel® HD Graphics Control Panel window, click **Multiple Displays**.
- 2. Under Select Display Mode, select Clone Displays.



3. When you finish configuring the settings, click Apply. If the following confirmation screen appears, click Yes.



#### (b) Extended Desktop

This setting displays a single screen across multiple displays. The resolution, color depth, and refresh rate can be configured independently. The task bar appears only on the primary display. The selectable resolutions, color depths, and refresh rates depend on the capabilities of the connected displays.

- 1. In the Intel® HD Graphics Control Panel window, click **Multiple Displays**.
- 2. Under Select Display Mode, select Extended Desktop.



3. When you finish configuring the settings, click Apply. If the following confirmation screen appears, click Yes.



#### (c) Collage

This setting displays a single screen across multiple displays. The screen resolution is the sum of the resolutions of all displays. For example, if you enable **Collage** with two displays placed side by side, the horizontal resolution becomes the sum of the horizontal resolutions of the two displays. The resolution, color depth, and refresh rate settings are the same for all displays. The task bar appears only on the primary display. The selectable resolutions, color depths, and refresh rates depend on the capabilities of the connected displays.

- 1. In the Intel® HD Graphics Control Panel window, click Multiple Displays.
- 2. Under Select Display Mode, select Collage.



#### 3. Select Enable.



4. When you finish configuring the settings, click Apply. If the following confirmation screen appears, click Yes.



# **CHAPTER 3 SETUP**

## 3.1 Setup Procedure When Turning On the Power for the First Time

## 3.1.1 Setting up Windows® 10 IoT Enterprise 2016 LTSB

This section provides set up instructions for the preinstalled Windows® 10 IoT Enterprise 2016 LTSB operating system.

- This procedure covers setup for the basic items of Windows® 10 IoT Enterprise 2016 LTSB.
- RAS features are automatically set up.
- The setup procedure takes about 20 minutes.

#### • Preparing for setup

The following items are required during the setup procedure. Prepare or confirm them before starting the setup procedure. In addition, perform the setup procedure described in this section by using the hardware configuration as was shipped.

License certificate	Verify that the license certificate is attached to the body of the computer.	
User name	The user name for the administrator account of the computer. This can be changed later from the Control Panel.	
Password	The user password. This can be changed later from the Control Panel.	

• Windows® 10 IoT Enterprise 2016 LTSB setup procedure

To set up Windows® 10 IoT Enterprise 2016 LTSB:

1. Turn on this equipment.

Windows® starts and prepares setup.

The message Setup is installing devices. Please wait... then appears, indicating that device drivers are being installed.

- This processing might take several minutes. Wait until it is complete.
- Setup continues after the system restarts.
- 2. The **Hi there** window appears.
  - Select a language and the setting items to use, and then click Next.

#### NOTE

The default time zone setting for this equipment is Osaka, Sapporo, Tokyo.

If you change the time zone, the system time of this equipment changes by the number of hours difference from the **Osaka**, **Sapporo**, **Tokyo** time zone.

- 3. The **Here's the legal stuff** window appears.
  - Check the contents, and then click **Accept**.
- 4. The **Get going fast** window appears.
  - Click Customize.
  - Select on or off for the settings as required, and then click Next.
  - Setup continues after the system restarts.
- 5. The Create an account for this PC window appears.
  - In Who's going to use this PC, enter a user name.
  - In **Enter password** under **Make it secure**, enter a password.
  - In **Re-enter password**, re-enter the password.
  - In **Password hint**, enter a password hint.
  - · Click Next.

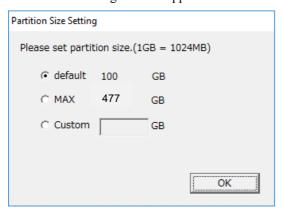
#### NOTE

In the **Create an account for this PC** window, even if you select **Japanese** as the language to use, the Windows keyboard layout is set to the English keyboard by default.

For this reason, you will not be able to enter Japanese text even when using a Japanese keyboard, and symbols and special characters will be entered from keys other than the ones that are marked as such on a Japanese keyboard. If you want to use Japanese text, as well as symbols and special characters, in the user name, password, or password hint, first enter values using alphanumeric characters only. Then, specify the values you want to use after setup is complete.

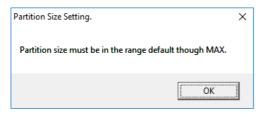
6. After setup is complete, the sign-in operation is performed automatically.

7. The Partition Size Setting window appears.



- The minimum possible size that can be created (**default**) and the maximum possible size that can be created (**MAX**) are displayed. Select the size that you want to create, and then click **OK**. The minimum possible size that can be created (**default**) is the size that is displayed when the product is shipped.
- To enter a size value directly, select **Custom**, enter a value for the partition size in GB (where 1 GB = 1,073,741,824 bytes), and then click **OK**.

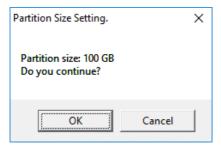
If you select **Custom** and click **OK** and the entered value is outside the range of values that can be entered, the following message will appear. Click **OK**, and then re-enter the partition size according to the message.



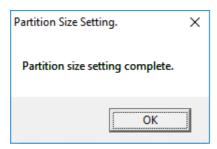
#### NOTE

If you are using a recovery DVD to return the system to its factory-shipped condition and you select **Only the system and boot partition**, the Partition Size Setting window does not appear. Setup proceeds to the point at which the dialog box in step 9 closes.

8. The Partition Size Setting confirmation window appears. If the displayed partition size is acceptable, click **OK**.



9. If the partition size settings succeed, the following message appears. Click **OK** to close the dialog box.



Setup then continues. A message about the Windows System Assessment Tool and the message Please wait. The system will restart automatically, will appear in that order. Wait until the system restarts. This takes several minutes.

#### NOTE

If you select Japanese during setup, the system might restart without displaying the message Please wait. The system will restart automatically., but this does not indicate a problem with system operation.

The Windows® 10 IoT Enterprise 2016 LTSB setup procedure is now complete. Now, configure the basic OS settings according to the procedure described in 3.2 Configuring Basic Settings After OS Setup.

# 3.1.2 Setting up Windows® 10 IoT Enterprise 2019 LTSC

This section provides set up instructions for the preinstalled Windows® 10 IoT Enterprise 2019 LTSC operating system.

- This procedure covers setup for the basic items of Windows® 10 IoT Enterprise 2019 LTSC.
- RAS features are automatically set up.
- The setup procedure takes about 20 minutes.

#### • Preparing for setup

The following items are required during the setup procedure. Prepare or confirm them before starting the setup procedure. In addition, perform the setup procedure described in this section by using the hardware configuration as shipped.

License certificate	Verify that the license certificate is attached to the body of the computer.	
User name	The user name for the administrator account of the computer. This can be changed later from the Control Panel.	
Password	The user password. This can be changed later from the Control Panel.	

• Windows® 10 IoT Enterprise 2019 LTSC setup procedure

To set up Windows® 10 IoT Enterprise 2019 LTSC:

1. Turn on this equipment.

Windows® starts and prepares setup.

The message Setup is installing devices. Please wait... then appears, indicating that device drivers are being installed.

- This process might take several minutes. Wait until it is complete.
- Setup continues after the system restarts.
- 2. The window for selecting the language to use appears.

Select the language to use, and then click Yes.

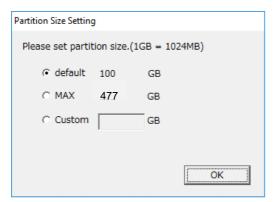
- 3. The window for selecting the region in which you reside appears.
  - Select the region in which you reside, and then click Yes.
- 4. The window for confirming the keyboard layout appears.
  - Check the displayed keyboard layout and then click Yes.
- 5. The window for adding a second keyboard layout appears.
  - To add a layout, click Add layout, select the keyboard layout to use, and then click Next.
  - If you do not want to add a layout, click Skip.
- 6. The window for connecting to a network appears.
  - · Click Skip for now.
  - The window changes. Click No.
  - Setup continues after the system restarts.
- 7. After the system restarts, the window for connecting to a network appears again.
  - Click Skip for now.
  - The window changes. Click No.
  - · Click No.
- 8. The Windows 10 License Agreement window appears.
  - Verify the displayed content, and then click **Accept**.
- 9. The Who's going to use this PC? window appears.
  - In the Name field, enter a user name, and then click Next.
- 10. The Create a super memorable password window appears.
  - In the **Password** field, enter a password, and then click **Next**.
  - The Confirm your password window appears. In the Confirm password field, re-enter your password, and then click Next.

#### NOTE

In the **Create an account for this PC** window, even if you select Japanese as the language to use, the Windows keyboard layout is set to the English keyboard by default.

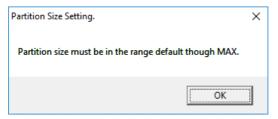
For this reason, you will not be able to enter Japanese text even when using a Japanese keyboard, and symbols and special characters will be entered from keys other than the ones that are marked as such on a Japanese keyboard. If you want to use Japanese text, as well as symbols and special characters, in the user name, password, or password hint, first enter values using alphanumeric characters only. Then, specify the values you want to use after setup is complete.

- 11. The Create security questions for this account window appears.
  - From **Security question**, select a question, and then enter your answer in **Your answer**. You can set three security questions.
  - · Click Next.
- 12. The **Do more across devices with activity history** window appears.
  - Click Yes or No as required.
- 13. The Choose privacy settings for your device window appears.
  - Turn the settings on or off as required, and then click Accept.
- 14. After setup is complete, the sign-in operation is performed automatically.
- 15. The Partition Size Setting window appears.



- The minimum possible size that can be created (**default**) and the maximum possible size that can be created (**MAX**) are displayed. Select the size that you want to create, and then click **OK**. The minimum possible size that can be created (**default**) is the size that is displayed when the product is shipped.
- To enter a size value directly, select **Custom**, enter a value for the partition size in GB (where 1 GB = 1,073,741,824 bytes), and then click **OK**.

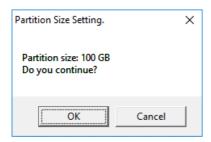
If you select **Custom** and click **OK** and the entered value is outside the range of values that can be entered, the following message appears. Click **OK**, and then re-enter the partition size according to the message.



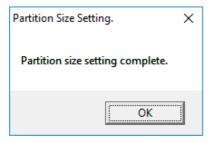
#### NOTE

If you are using a recovery DVD to return the system to its factory-shipped condition and you select **Only the system and boot partition**, the Partition Size Setting window does not appear. Setup proceeds to the point at which the dialog box in step 17 closes.

16. The Partition Size Setting confirmation window appears. If the displayed partition size is acceptable, click **OK**.



17. If the partition size settings succeed, the following message appears. Click **OK** to close the dialog box.



Setup then continues. A message about the Windows System Assessment Tool and the message Please wait. The system will restart automatically, will appear in that order. Wait until the system restarts. This takes several minutes.

The Windows® 10 IoT Enterprise 2019 LTSC setup procedure is now complete. Now, configure the basic OS settings according to the procedure described in 3.2 Configuring Basic Settings After OS Setup.

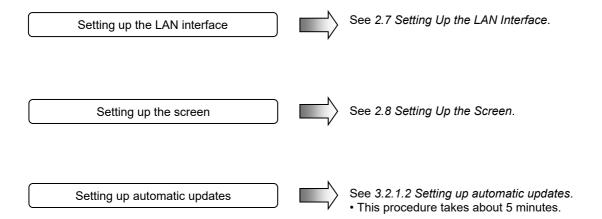
# 3.2 Configuring Basic Settings After OS Setup

# 3.2.1 Basic Settings for Windows® 10

This section provides set up instructions for the preinstalled Windows® 10 operating systems.

Perform this procedure as required after setting up the OS as described in 3.1 Setup Procedure When Turning On the Power for the First Time.

## 3.2.1.1 Overview of the basic settings procedure

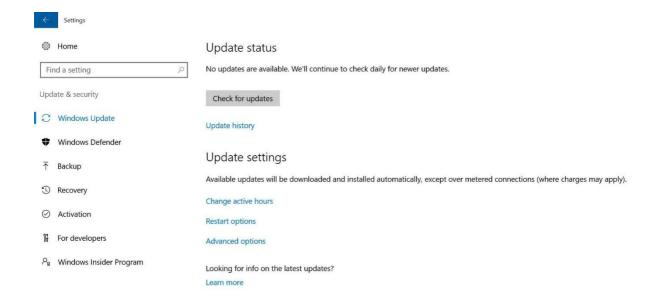


#### 3.2.1.2 Setting up automatic updates

Windows® 10 settings allow automatic application of updates delivered by Windows Update. System and application updates are regularly checked for, and are automatically downloaded and installed.

To set up automatic updates:

- 1. Click Start, and from the displayed menu, click Settings.
- 2. Click **Update & security**. The Windows Update window appears. (The following figure is an example from Windows® 10 IoT Enterprise 2016 LTSB.)

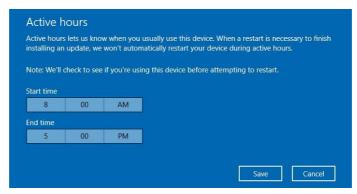


The automatic update settings in Windows® 10 include the following items.

#### (1) Changing the active hours

Downloads and installation will be performed automatically, but the system will not restart during active hours. Rather, restarts will be scheduled outside of active hours. Configure this setting according to the needs of the customer's environment.

(The following figure is an example from Windows® 10 IoT Enterprise 2016 LTSB.)



(Active hours are set for 8:00 a.m. to 5:00 p.m. by default.)

(2) Restart options (only for Windows® 10 IoT Enterprise 2016 LTSB)

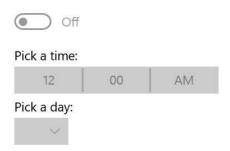
If updates are installed automatically and the system is restarted on a schedule, you can specify a temporary date and time at which to restart the system. This setting takes priority over the active hours setting.



# Restart options

## Schedule a time

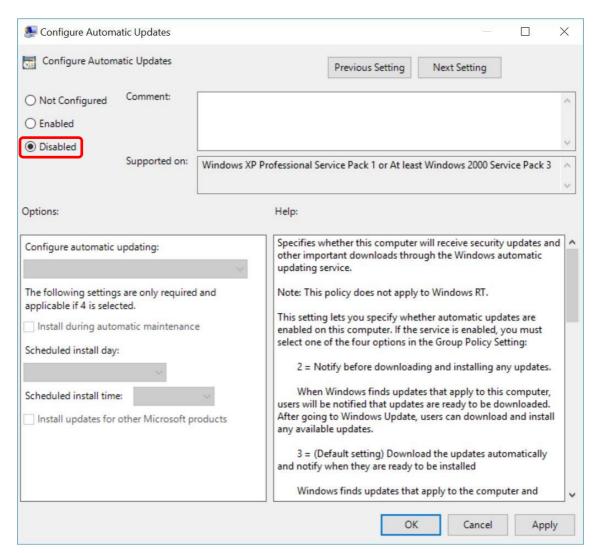
We'll restart to finish installing updates when you tell us to. Just turn this on and pick a time.



#### <Enabling manual updates via Windows Update>

If you do not want to automatically download and install updates, you can set Windows Update to manual updates by using the Local Group Policy Editor (gpedit.msc). The following is the procedure for setting Windows Update to manual updates.

- 1. Sign in to the computer as an administrator.
- 2. Right-click Start, and then click Run.
- 3. In the Run window, enter gpedit.msc to open the Local Group Policy Editor.
- 4. In the Local Group Policy Editor window, click Computer Configuration, Administrative Templates, Windows components, Windows Update, and Configure Automatic Updates.
- 5. In the Configure Automatic Updates window, select Disabled, and then click OK.



# CHAPTER 4 PRECAUTIONS WHILE THE OS IS RUNNING

## 4.1 Event Log Entries During Setup

This equipment might record the following events in the event log during OS setup, but these events do not affect system operation.

Table 4-1 Error and warning event logs (during setup)

Source	Event ID	Туре
Search-ProfileNotify	2	Error
SecurityCenter	16	Error
volmgr	46,49	Error
Service Control Manager	7000,7009,7022 7023,7024,7043	Error
Bits-Client	16392	Error
SideBySide	33	Error
Search	1008	Warning
e1rexpress	27	Warning
Kernel-PnP	219	Warning
User Profiles Service	1534	Warning
Winlogon	6005,6006	Warning

Event IDs 7009 and 7023 might be recorded in the event log even during situations other than OS setup, but this does not indicate a problem as long as they are not recorded intermittently.

Event ID 33 might be recorded when the RAS software is installed during setup, but this does not indicate an operational problem. This event log might also be recorded when the RAS software is re-installed.

Event IDs 6005 and 6006 do not indicate a problem if both are recorded.

# 4.2 Event Log Entries While the OS is Running

This equipment might record the following events in the event log while the OS is running, but these events do not affect system operation.

Table 4-2 Error and warning event logs (1 of 2)

Source	Event ID	Туре
DistributedCOM	10010	Error
Search	3104	Error
Security-SPP	1014,8198,8200	Error
iANSMiniport	11,16	Error
elrexpress	27	Warning
Time-Service	134	Warning
Search	3036	Warning
Windows Remote Management	10149	Warning
Service Control Manager	7023	Warning

When the OS is running on this equipment, the following event log might be recorded.

Table 4-3 Error and warning event logs (2 of 2)

Source	Event ID	Туре
DistributedCOM	10016	Error

Source: DistributedCOM (event ID 10016) does not indicate a problem if the content of the event log matches the following.

#### <Event log content>

For Windows® 10 IoT Enterprise 2016 LTSB

The application-specific permission settings do not grant Local Activation permission for the COM Server application with CLSID {\*\*\*\*\*} and APPID {\*\*\*\*\*} to the user \*\*\*\*\* SID (\*\*\*\*\*) from address LocalHost (using LRPC) running in the application container \*\*\*\*\* SID (\*\*\*\*\*). This security permission can be modified by using the component service management tool.

Verify that the CLSID and APPID recorded in the event log are one of the following:

CLSID	D63B10C5-BB46-4990-A94F-E40B9D520160
APPID	9CA88EE3-ACB7-47C8-AFC4-AB702511C276

CLSID	260EB9DE-5CBE-4BFF-A99A-3710AF55BF1E
APPID	260EB9DE-5CBE-4BFF-A99A-3710AF55BF1E

For Windows® 10 IoT Enterprise 2019 LTSC

The application-specific permission settings do not grant Local Activation permission for the COM Server application with CLSID {\*\*\*\*\*} and APPID {\*\*\*\*\*} to the user \*\*\*\*\* SID (\*\*\*\*\*) from address LocalHost (using LRPC) running in the application container \*\*\*\*\* SID (\*\*\*\*\*). This security permission can be modified by using the component service management tool.

Verify that the CLSID and APPID recorded in the event log are one of the following:

CLSID	Windows.SecurityCenter.WscBrokerManager		
	Windows.SecurityCenter.WscDataProtection		
	Windows.SecurityCenter.SecurityAppBroker		
APPID	Unavailable		

#### 4.3 Functions Scheduled by Default

In Windows<sup>®</sup>, various functions are scheduled by default and executed periodically in the background. Among these functions, drive optimization (or defragmenter) might significantly increase system load when it runs, and might affect the operation of business applications or the life span of SSDs.

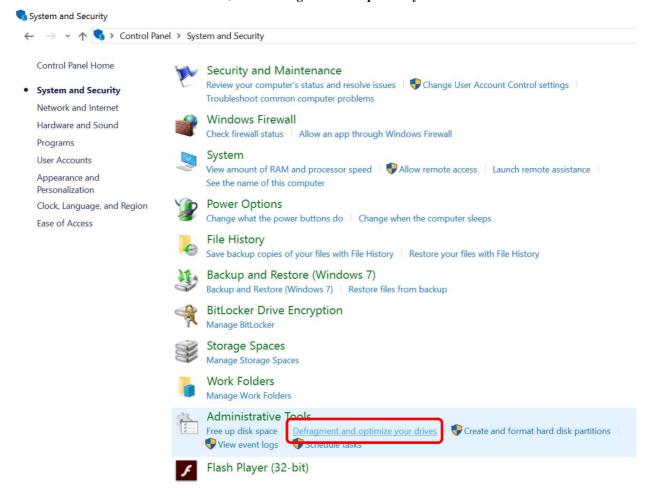
#### (1) Drive optimization

On this equipment, the drive optimization schedule is turned off by default. To optimize drives, use either of the following methods:

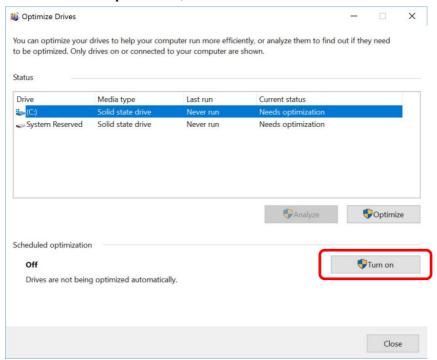
- (a) Turn on the drive optimization schedule
- (b) Optimize drives manually

The following are the procedures for these methods.

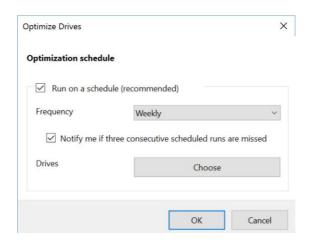
- (a) Turning on the drive optimization schedule
  - 1. Sign in to the computer as an administrator and open the Control Panel.
  - 2. Click System and Security.
  - 3. Under Administrative Tools, click Defragment and optimize your drives.



- 4. The Optimize Drives window appears.
  - Under Scheduled optimization, click Turn on.



5. The Optimization schedule window appears. Select the Run on a schedule (recommended) check box.

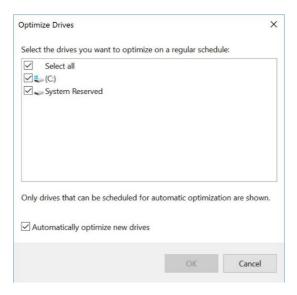


6. Set the required defragmentation frequency. The default defragmentation schedule is as follows.

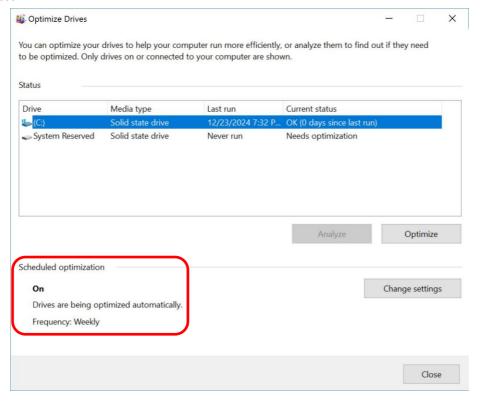
Frequency: Weekly

7. Click Choose.

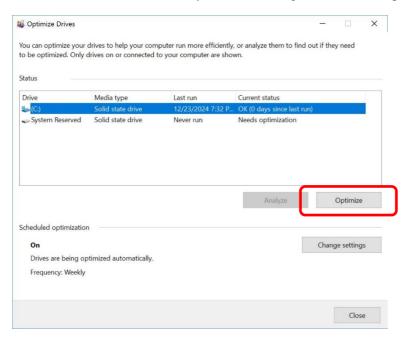
- 8. The Select the drives you want to optimize on a regular schedule window appears. Select the drives that you want to defragment.
  - Click OK.



- 9. The Optimization schedule window appears. Click OK.
- 10. The configured schedules are displayed under **Scheduled optimization**. Confirm the contents, and click **Close** to close the window.



- (b) Optimizing drives manually
  - 1. Perform steps 1 through 3 under (a) Turning on the drive optimization schedule.
  - 2. The Optimize Drives window appears.
    - Under **Status**, select the drive that you want to defragment, and click **Optimize**.



- When the disk optimization process is complete, the date and time of the optimization is displayed in the **Last run** column.
- 3. Click **Close** to close the window.

#### 4.4 Security Enhancement Functionality

By default, Windows<sup>®</sup> 10 enables Windows Defender, a function that provides anti-spyware functionality. Windows Defender also includes antivirus functionality. In some cases, this antivirus functionality might adversely impact application performance compared to using Windows<sup>®</sup> 7.

## 4.5 Factory Default Network Setting

- SNP (Scalable Networking Pack) is disabled
   SNP is intended to reduce processor load by delegating TCP-related processing to the network adapter. SNP consists of the following three features:
  - · TCP Chimney Offload
  - Receive Side Scaling (RSS)
  - Network Direct Memory Access (NetDMA)

Unfortunately, if the system is used in Windows® with SNP turned on, network processing might become unstable, or network performance might be reduced when you use the network in specific ways. For these reasons, SNP is disabled in this equipment.

Windows® 10 disables TCP Chimney Offload and Network Direct Memory Access (NetDMA) by default, so only Receive Side Scaling (RSS) is set to disabled.

#### 4.6 License Activation

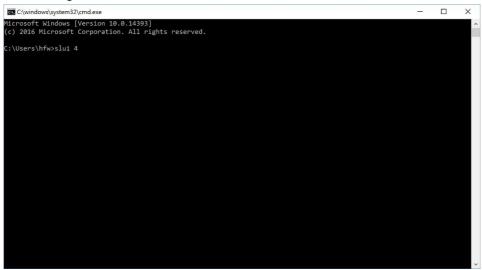
Windows® 10 is activated automatically when the equipment is connected to the internet.

For this reason, if Windows has not been activated in an environment that is not connected to the internet, the message *Connect to the internet to activate Windows* appears in **System** in the **System and Security** section of the Control Panel. Even so, you can continue to use the equipment.

To activate Windows offline over the phone, perform the following procedure:

1. Open command prompt as an administrator, and then run the following command:

C:\windows\system32>slui 4



- 2. When the Select your country or region window appears, select a country, and then click Next.
- 3. The Call and provide your installation ID window appears. Call the displayed phone number, and then verify the confirmation ID. After verifying the confirmation ID, click Enter confirmation ID.
- 4. The Enter your confirmation ID window appears. Enter your confirmation ID, and then click Activate Windows.
- The Windows is activated window appears. Click Close.
   Windows is now activated.

# 4.7 Unresponsive Mouse in the Sign-In Window

In Windows® 10 IoT Enterprise 2019 LTSC, if a memory dump confirmation message appears when a user with a set password is signing in, the window might be displayed only in the background and the mouse might become unresponsive.

In such cases, the sign-in window can be displayed by using the keyboard. Press the **Enter** key to correct the problem.

# **CHAPTER 5 SPECIFICATIONS**

## 5.1 Equipment Specifications

#### (1) Common specifications

Item		Specifications				
Model (pre-installed OS)		HJ-4075-WEMS (Microsoft® Windows® 10 IoT Enterprise 2016 LTSB (64bit)) HJ-4075-WFMS (Microsoft® Windows® 10 IoT Enterprise 2019 LTSC (64bit))				
Processor		Intel® Core <sup>TM</sup> i3-7101TE Processor (3.4 GHz, 2 cores/4 threads)				
Main memory		4 GB, 8 GB, 16 GB				
Display resoluti	on and color depth	See (4) Supported resolutions.				
Built-in file	DRIVE1	SATA SSD 512 GB				
device#1,#2	DRIVE2	SATA SSD 512 GB (optional)				
		Analog (RGB Mini D-sub 15 pins)				
	Display	Digital (DVI-D 24 pins)				
		Digital (DisplayPort, 20 pins) #3, #4				
	LICD monts	USB 2.0 × 2 (front)				
	USB ports	USB 3.0 × 6 (rear)				
Standard I/O	Serial port	RS-232C (D-sub 9 pins) × 1				
interface	LAN ports	1000BASE-T/100BASE-TX/10BASE-T by auto-negotiation × 3 (RJ45, Wake-on-LAN <sup>TM</sup> supported)				
	Audio	LINE IN × 1, LINE OUT × 1				
	External contact	Connector shape: D-sub 25 pins Type C: 2 DI contacts, 3 DO contacts, A contact Note: Specifications can be changed at the time of purchase.				
External Dimen (Width × Depth		50 × 249 × 285 mm (vertical stand for vertical installation not included)				
RAS features		Hardware status monitoring (fan failure, temperature failure, SMART, drive operating time, and more), OS lock monitoring, watchdog monitoring, alarm notification when failures are detected (pop-up notifications, digital LEDs for status indication, remote notifications, and more), memory dump collection, maintenance operation support commands, simulation functions				
Weight		Approx. 3.3 kg (vertical stand not included)				
Inrush current	#5	70 A or less (AC 100 V, 60 Hz)				
Leakage current <sup>#5</sup>		0.25 mA or less				
Consumption current (max.) 12 V DC /24 V DC		10.1 A/5.2 A				
Power voltage		12 - 24 V DC ± 10% AC adapter (optional): AC100~240V ±10%				

<sup>#1:</sup> For details about the precautions for SSDs, see 4. Solid State Drives (SSDs) in PRECAUTIONS.

<sup>#2:</sup> Installation of HDDs and RAID are not supported.

<sup>#3:</sup> When outputting to three screens, if you are using the DisplayPort-DVI conversion connector, select an active DisplayPort-DVI conversion connector, and use it after a preliminary evaluation.

<sup>#4:</sup> For details about the output resolution when using a DisplayPort-DVI conversion connector, see the specifications of the DisplayPort-DVI conversion connector.

<sup>#5:</sup> Specifications when using the AC adapter (optional).

## (2) Accessories

Item	Specifications			
Recovery DVD	For the pre-installed OS			
Vertical stand	With rubber feet and 4 securing screws			
Manual	SAFETY INSTRUCTIONS			

# (3) Options

Item	Specifications		
AC adapter	Input: 100 - 240 V AC ± 10% Output: 24 V DC AC cable supplied		
External contact port	B contact (For details, see 5.8.2 External contact specifications.)		
	A contact (For details, see 5.8.2 External contact specifications.)		
C	Failure Analysis Support Service (as-needed contract)		
Service menu	Failure Analysis Support Plus (included with purchase of main unit)		

## (4) Supported resolutions

Screen settings				Remarks
	Refresh rate <sup>#1</sup>			
Resolution	VGA	DVI-D	DisplayPort	
	Analog	Digital	Digital	
640 × 480	60 Hz	60 Hz	60 Hz	
800 × 600	60 Hz	60 Hz	60 Hz	
1,024 × 768	60 Hz	60 Hz	60 Hz	
1,280 × 1,024	60 Hz	60 Hz	60 Hz	
1,600 × 1,200	60 Hz	60 Hz	60 Hz	
1,920 × 1,080	60 Hz	60 Hz	60 Hz	
1,920 × 1,200	60 Hz	60 Hz	60 Hz	
2,560 × 1,440	-	-	60 Hz	
2,560 × 1,600	-	-	60 Hz	
3,840 × 2,160	-	-	60 Hz	

<sup>#1:</sup> All refresh rate settings indicated in the table have been confirmed to work in Hitachi's test environment. Supported resolutions and refresh rates differ depending on the display. Consequently, some settings might not be usable for a specific display.

#### (5) Memory specifications

Only the following memory combinations can be mounted on this equipment.

DIMM1	DIMM2	Total capacity
4 GB	-	4 GB
4 GB	4 GB	8 GB
8 GB	8 GB	16 GB

#### (6) Maximum current specifications

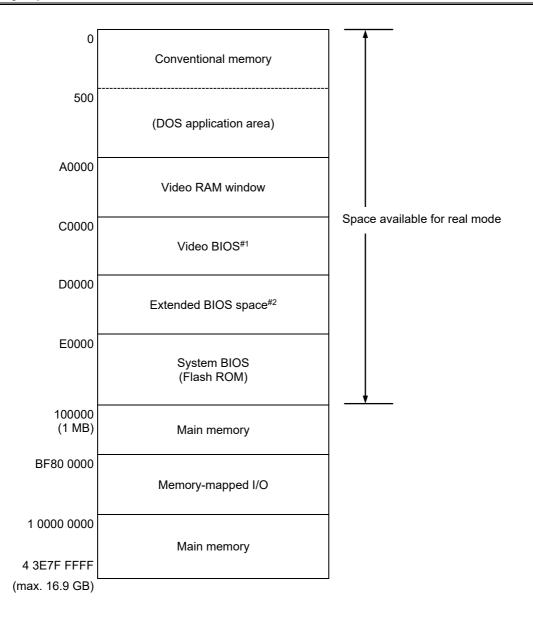
The following table shows the maximum total current consumption for the USB ports, VGA ports, and DisplayPort.

DC Output	Maximum total current consumption	
3.3 V	3.5 A	
5 V	7.5 A	

The following table shows the maximum current consumption for the USB ports, VGA ports, DVI-D ports, and DisplayPort. Make sure that the inrush current when a device is connected does not exceed the specified maximum current. If the inrush current exceeds the specified maximum current, the surge protection circuit might activate, and the connected device might not be recognized.

Item	Voltage	Maximum current
USB 2.0	5 V	0.5 A/port
USB 3.0	5 V	0.9 A/port
VGA	5 V	1.0 A/port
DVI-D	5 V	0.5 A/port
DisplayPort	3.3 V	0.5 A/port

## 5.2 Memory Space



- #1: The size of the video BIOS might change in future versions.
- #2: The extended BIOS space is a narrow space between D0000 and DFFFF, and might already be in use by other devices. In addition, the size of the BIOS of the standard built-in adapters might change in future versions. If possible, we recommend not using the extended BIOS space when designing new devices. If you do so, a conflict might occur between devices, resulting in device malfunctions.

# 5.3 I/O Spaces

# List of I/O spaces

I/O address	Device name	
0000-001F	DMA controller	
0020-002D	Interrupt controller	
002E-002F	Super I/O configuration	
0030-003D	Interrupt controller	
0040-0043	System timer	
004E-004F	System timer Super I/O configuration	
0050-0053	System timer	
0060, 0062, 0064, 0066	Keyboard controller	
0061	NMI controller	
0070-0077	RTC controller	
0080	DMA and POST code	
0081-0091	DMA controller	
0092	Reset controller	
0093-009F	DMA controller	
00A0-00B1	Interrupt controller	
00B2-00B3	Power management controller	
00B4-00BD	Interrupt controller	
00C0-00DF	DMA controller	
0000-00FF	Reserved (domain other than the preceding)	
0240-025F	RAS LSI register	
02E8-02EF	Serial port	
02F8-02FF	Serial port	
03B0-03DF	VGA controller	
02E8-02EF	Serial port	
03F8-03FF	Serial port 1 (COM1): A	
04D0-04D1	Interrupt controller	
0CF8-0CFB	PCI configuration (address)	
0CF9	Reset controller	
0CFC-0CFF	PCI configuration (data)	
1800-189F	Power management controller	
F000-F03F	VGA controller	
F040-F05F	SMBus controller	
F060-F07F	AHCI controller	
F080-F083	AHCI controller	
F090-F097	AHCI controller	

## 5.4 List of Interrupts

Interrupt pin	Description
IRQ0	System timer
IRQ1	Not used
IRQ2	Not used
IRQ3	Not used
IRQ4	Serial port 1 (COM1)
IRQ5	Not used
IRQ6	Not used
IRQ7	Not used
IRQ8	Real-time clock
IRQ9	Not used
IRQ10	Not used
IRQ11	SMBus
IRQ12	Not used
IRQ13	Coprocessor
IRQ14	Not used
IRQ15	Not used
IRQ16	Not used
IRQ17	Not used
IRQ18	Not used
IRQ19	Not used
IRQ20	Not used
IRQ21	Not used
IRQ22	Not used
IRQ23	Not used
MSI	xHCI, onboard video, LAN1, LAN2, LAN3, SATA controller

## NOTE

- This list is valid when the APIC is enabled (default).
- The IRQ numbers are fixed, and you cannot change the settings shown here.
- Even in an APIC-capable OS, APIC-enabled IRQ numbers are assigned only while the corresponding devices are active. In other cases, APIC-disabled IRQ numbers are assigned (see the next page).

IRQ assignment when the APIC is disabled

Interrupt pin	Description
IRQ0	System timer
IRQ1	Not used
IRQ2	Not used
IRQ3	Not used
IRQ4	Serial port 1 (COM1)
IRQ5	Not used
IRQ6	Not used
IRQ7	Not used
IRQ8	Real-time clock
IRQ9	Not used
IRQ10	LAN1
IRQ11	SMBus controller, onboard video, xHCI, SATA controller, LAN2, LAN3
IRQ12	Not used
IRQ13	Coprocessor
IRQ14	Not used
IRQ15	Not used

## 5.5 Serial Port Settings

The factory default settings for the serial ports are as follows. Do not change these settings. If you do so, the equipment might not work properly.

Name recognized by the BIOS	I/O address#	IRQ assignment#	Name recognized by the OS	Note
Serial port A	3F8h	IRQ 4	COM1	Standard feature

<sup>#:</sup> Automatically assigned by the BIOS

#### 5.6 BIOS Setup

The BIOS stores the system configuration information in the SPI-ROM. If you modify the system configuration, you might also need to change the BIOS settings.

For cautions on usage when changing the BIOS settings, see 8. BIOS SETTINGS.

#### NOTE

The BIOS is configured to match the system configuration when the equipment was shipped.

If the BIOS settings are changed, the system might not operate stably or start properly. Use sufficient care when changing the BIOS settings.

#### (1) Starting the setup menu

When you set up the BIOS, start the setup menu.

Turn on the power switch (see 1.4 Names and Functions of Parts). Messages related to system initialization will be displayed. Press the **F2** key to launch the setup menu.

#### (2) Navigating the setup menu

Use the following keys to navigate the menu.

Key name	Description		
Esc	Used to exit setup or return from a lower menu to a higher menu.		
$\leftarrow$ or $\rightarrow$	Used to select a menu or a menu group displayed at the top of the screen.		
↑ or ↓	Used to select an item or a sub-item under a menu group.		
+ or -	Used to select a value for the setting. Pressing these keys cycles through the available setting options.		
Space	Used to select a value for the setting. If there are only two available options, this key toggles the setting.		
Tab	When you are configuring the date and time, pressing this key shifts the focus among setting items, for example, from month to day and from hour to minute.		
Enter	Used to move from a higher menu to a lower menu, to exit setup (saving data to the SPI-ROM), and for various other purposes.		

#### (3) Overview of the setup menu

The setup menu consists of the following items:

**Main**: This is the screen displayed when the menu starts. You can configure basic system settings such as the date and time.

Advanced: You can configure detailed system settings such as interrupt ports and I/O address settings.

**Chipset**: You can configure ECC support settings and whether to enable or disable a LAN.

**Boot**: You can configure the priority order of OS boot devices.

**Save&Exit**: You can save modified configuration information to the SPI-ROM, reset configuration information to the default settings, and make other changes.

# (4) Details of the setup menu

The following tables show the details of the items you can set in each menu.

(1/5)

Top menu	Setting item		Default value	Notes
Main	System Date			You must configure these items when you set up the system for the first time.
Advanced	System Time  Beep on Boot		Disabled	Specifies whether to turn the beep sound on or off at startup. Options: <b>Disabled</b> , <b>Enabled</b>
	Correctable ECC	Error	Pause	Specifies whether to display a message and pause startup, or to ignore errors and proceed with startup when a Correctable ECC Error is detected. Options: <b>Pause</b> , <b>Pass</b>
	<b>Memory Testing</b>	Memory Testing	Enabled	Specifies whether to test the memory during startup. Options: Enabled, Disabled
		<b>Mode of Testing</b>	Normal Test	Specifies the test mode for the memory test during startup. Options: Normal Test, Fast Test
	CPU Configuration	Core Multi Processing	Enabled	Specifies whether to use a single core or multiple cores. Options: Enabled, Disabled
		Hyper-Threading	Enabled	Specifies whether to enable or disable Hyper-Threading Technology. Options: <b>Enabled</b> , <b>Disabled</b> This item does not appear for processors that do not support Hyper-Threading.
		EIST	Enabled	Specifies whether to enable or disable EIST. Options: <b>Enabled</b> , <b>Disabled</b>
		MMIO Range	Dynamic	Specifies whether MMIO is dynamic or fixed (2 GB). Options: <b>Dynamic</b> , <b>2 GB</b>

(2/5)

Top menu	Setting item		Default value	Notes
Advanced	Configuration  Selection  Drive 1 Slot  Drive 2 Slot  Drive 3 Slot  USB Configuration  Legacy USB Support  E		АНСІ	Do not change the default setting.
			Enabled	Specifies whether to enable or disable the applicable slot. Options: <b>Enabled</b> , <b>Disabled</b>
			Enabled	Specifies whether to enable or disable the applicable slot. Options: <b>Enabled</b> , <b>Disabled</b>
			Enabled	Specifies whether to enable or disable the applicable slot. Options: <b>Enabled</b> , <b>Disabled</b>
			Enabled	Specifies whether to activate USB devices. If you disable this setting, you can use a USB keyboard only for the setup menu and after Windows® starts.  Options: <b>Enabled</b> , <b>Disabled</b>
			Enabled	Specifies whether to enable or disable the front USB ports. Options: <b>Enabled</b> , <b>Disabled</b>

(3/5)

Top menu	Setting item		Default value	Notes
Advanced	Power Configuration	After AC Power On	Power On	Specifies settings that govern the behavior when power is restored after power is lost.  Stay Off: When the power is turned on, the system goes into the soft power off mode.  Power On: When the power is turned on, the OS starts automatically.  Auto: If the OS was running the last time the power was turned off, the OS starts as in the case of Power On. If the OS was not running the last time the power was turned off, the system goes into the soft power off mode as in the case of Stay Off. If the backup battery runs out of power or if the battery is not connected, the settings operate the same way as Stay Off when the power is turned off. If the backup battery runs out of power or the battery is replaced, the applicable settings value reverts to the default (Auto).
	Fan Failure Detection  Fan Speed Control  Cx State Enable		Enabled	Specifies whether to detect fan failures when the power is turned on. Option: Enabled, Disabled
			Auto	Specifies the rotational speed of the fan. <b>Auto</b> : The fan speed changes automatically according to the CPU temperature. <b>Full</b> : Fan speed is always at maximum.
			Disabled	Changes the behavior of the processor power state (Cx). Options: <b>Disabled</b> , <b>Enabled</b>

(4/5)

				1	1
Top menu		Setting item		Default value	Notes
Advanced	PCI Configuration	PCI-Express Device Slot #1	Enable Master	Enabled	
			Link Speed	Auto	
		PCI-Express Device Slot #2	Enable Master	Enabled	_
			Link Speed	Auto	Do not change the default settings.
		PCI-Express Device Slot #3	Enable Master	Enabled	
			Link Speed	Auto	
		PCI Parity Error Detection		Enabled	
		Serial Port A	Serial Port A		
	Connguration	Base I/O Addre	Base I/O Address		Do not change the default settings.
		Interrupt	Interrupt		

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Top menu	Setting item	Default value	Note	
Chipset	ECC Support	Enabled	Specifies whether to enable or disable the memory ECC function. Options: Enabled, Disabled	
	LAN 1	Enabled	Specifies whether to enable or disable the applicable LAN port. Options: Enabled, Disabled	
	LAN 2	Enabled	Specifies whether to enable or disable the applicable LAN port. Options: Enabled, Disabled	
	LAN 3	Enabled	Specifies whether to enable or disable the applicable LAN port. Options: Enabled, Disabled	
Boot	Bootup NumLock State	On	Specifies whether to turn on <b>Num Lock</b> on the keyboard at startup. Options: <b>On</b> , <b>Off</b>	
	UEFI Boot	Disabled	Specifies whether to enable or disable UEFI. Options: Disabled, Enabled	
	Boot Option Priorities	1. USB FDD 2. SATA CD/DVD 3. USB CD 4. DRIVE1 5. DRIVE2 6. PCI SCSI 7. USB HDD 8. Internal Shell	Specifies the priority for devices that start the OS, and whether to start the OS from those devices.	
Save&Exit	Exit Saving Changes		Saves the changes you made in setup to the SPI-ROM, and then reboots the system.	
	Discard Changes and Reset		Discards the changes you made in setup, and reboots the system by using the configuration that was last saved in the SPI-ROM.	
	Restore Defaults		Loads the BIOS default settings. Default values are loaded but not saved in the SPI-ROM. If you want to save the default settings in the SPI-ROM, use Exit Saving Changes.	

### (5) Restoring the default settings

To restore all items in the setup menu to the default settings:

- 1. Start the setup menu. (See (1) Starting the setup menu.)
- 2. Open Save&Exit in the top menu. Move the cursor to Load Setup Defaults and press Enter. The message Load Optimized Defaults? is displayed.
- 3. Select **Yes** and press **Enter**.
- 4. Open **Save&Exit** in the top menu again. Move the cursor to **Exit Saving Changes**. Press **Enter**. The message Save configuration and reset? is displayed.
- 5. Select **Yes** and press **Enter**.

This completes the procedure.

# 5.7 Hardware System Clock

This equipment has a hardware system clock that uses an RTC (real-time clock) IC.

The clock has a built-in calendar and continues to work by using a backup battery, even when the system power is off.

Table 5-1 Hardware system clock specifications

Item	Specifications	
Time function	Hour/minute/second (24-hour clock)	
Date function	Year/month/day	
Precision	±4 seconds per day#	
Battery backup	Lithium battery	

<sup>#:</sup> Approximate value when the ambient temperature is 25°C.

The system regularly updates the internal clock by using a periodic timer. The internal clock is adjusted by reading the time and date from the hardware clock when, for example, the system starts.

# **5.8 Interface Specifications**

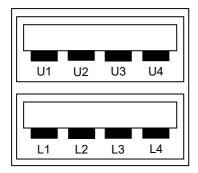
# 5.8.1 Connector specifications

The following shows the specifications of the interfaces from this equipment to external devices.

For information about the location of the ports, see *Parts related to the display and user operation* in 1.4 Names and Functions of Parts.

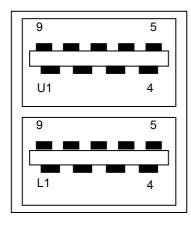
### (1) Motherboard (standard)

• USB 2.0 port (front)



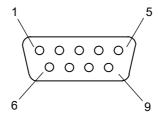
Pin no.	Signal name
U1	+5V
U2	USBD1-
U3	USBD1+
U4	GND
L1	+5V
L2	USBD0-
L3	USBD0+
L4	GND

### • USB3.0 port (rear)



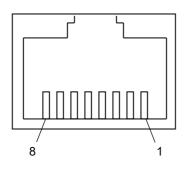
Pin no.	Signal name	Pin no.	Signal name
L1(1)	+5V	U1(10)	+5V
L2(2)	USBD0-	U2(11)	USBD1-
L3(3)	USBD0+	U3(12)	USBD1+
L4(4)	GND	U4(13)	GND
L5(5)	SSRX1-	U5(14)	SSRX2-
L6(6)	SSRX1+	U6(15)	SSRX2+
L7(7)	GND	U7(16)	GND
L8(8)	SSTX1-	U8(17)	SSTX2-
L9(9)	SSTX1+	U9(18)	SSTX2+

• Serial port (male connector, inch screws) (COM1)



Pin no.	Signal name	Pin no.	Signal name
1	CD	6	DSR
2	RD	7	RTS
3	TD	8	CTS
4	DTR	9	RI
5	GND		

• LAN port (RJ45 modular port, 8 pins)

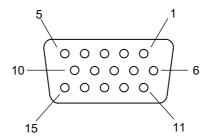


Pin no.	Signal name
1	TRD0+
2	TRD0-
3	TRD1+
4	TRD2+
5	TRD2-
6	TRD1-
7	TRD3+
8	TRD3-

For network connections, use the following specified cable.

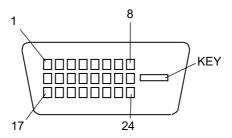
Cable specification: UTP cable (twisted-pair cable without shielding), Category 5e or 6

• Video port (VGA port Mini D-sub 15 pins, inch screws)



Pin no.	Signal name	Pin no.	Signal name
1	RED	9	+5V
2	GREEN	10	GND
3	BLUE	11	NC
4	NC	12	SDA
5	GND	13	HSYNC
6	RED-RTN	14	VSYNC
7	GREEN-RTN	15	SCL
8	BLUE-RTN		

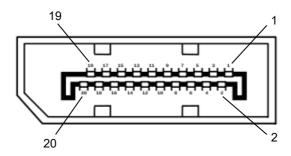
• Video port (DVI-D 24 pins, inch screws)



Pin no.	Signal name	Pin no.	Signal name	Pin no.	Signal name
1	TX2M	9	TX1M	17	TX0M
2	TX2P	10	TX1P	18	TX0P
3	SGND	11	SGND	19	SGND
4	NC(TX4M)	12	NC	20	NC
5	NC(TX4P)	13	NC	21	NC
6	DDCCLK2	14	P5DFP	22	SGND
7	DDCDAT2	15	PGND	23	TXCP
8	NC	16	NC	24	TXCM

Note: This video port supports single-link connections only.

• Video port (DisplayPort, 20 pins)

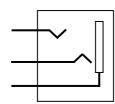


Pin no.	Signal name	Pin no.	Signal name
1	MainLane0+	11	GND
2	GND	12	MainLane3-
3	MainLane0-	13	GND
4	MainLane1+	14	GND
5	GND	15	Aux+
6	MainLane1-	16	GND
7	MainLane2+	17	Aux-
8	GND	18	HotplugDetect
9	MainLane2-	19	GND
10	MainLane3+	20	+3.3V

Note 1: When outputting to three screens using a DisplayPort-DVI conversion connector, select an active type DisplayPort-DVI conversion connector. Be sure to evaluate it before use.

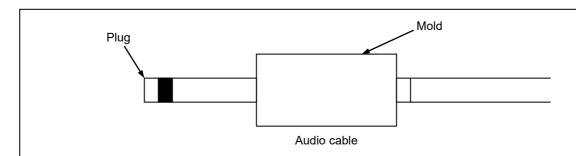
Note 2: For details about the output resolution when using a DisplayPort-DVI conversion connector, see the specifications of the DisplayPort-DVI conversion connector.

#### • Audio port: LIN and LOUT (3.5φ stereo audio port)



LIN LOUT

1711 1		LOCI	
Pin no.	Signal name	Pin no.	Signal name
1	AGND	1	AGND
2	LIN_L	2	LOUT_L
3	LIN_R	3	LOUT_R

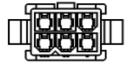


#### NOTE

Use cables with a mold diameter of 10 mm or less. If you try to connect cables with molds larger than 10 mm to both LINE IN and LINE OUT ports, the two molds will interfere with each other, preventing insertion of the cables.

# (2) DC Input Connector (DC In)

6 5 4



Manufacturer : Molex

Model : 5559-06P-210

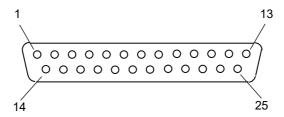
Part Number: 0039012066

3 2 1

Pin no.	Signal name	Pin no.	Signal name
1	12V-24V	4	GND
2	N/C	5	N/C
3	12V-24V	6	GND

# (3) RAS external contact interface (EXT)

• External contact I/O port (male connector, inch screws)



Type C

Pin no.	Signal name	Pin no.	Signal name
1	NC	14	NC
2	GENDO0_1	15	GENDO0_2
3	NC	16	NC
4	GENDO1_1	17	GENDO1_2
5	PSDOWN_1	18	PSDOWN_2
6	NI_RMTPWRON_1/NI_GENDI2_1	19	GND(NI_RMTPWRON_1/NI_GENDI2_2)
7	NI_GENDI1_1	20	GENDI1_2
8	NC	21	RMTPWRON_2/GENDI2_2
9	NC	22	GND(NI_GENDI1_2)
10	NC	23	NC
11	NC	24	NC
12	GENDI1_1	25	NC
13	RMTPWRON_1/GENDI2_1		

Types A and B

Pin no.	Signal name	Pin no.	Signal name
1	MCALL_1	14	MCALL_2
2	GENDO0_1	15	GENDO0_2
3	GENDO1_1	16	GENDO1_2
4	WDTTO_1	17	WDTTO_2
5	PSDOWN_1	18	PSDOWN_2
6	GENDI0_1	19	GND(RMTPWRON_2/GENDI2_2)
7	RMTSTDN_1/GENDI_1	20	GND(RMTSTDN_2/GENDI_2)
8	GND(RMTRESET_2)	21	GND(GENDI1_2)
9	CPUSTOP_2	22	GND(GENDI0_2)
10	RMTPWRON_1/GENDO2_2	23	CPUSTOP_1
11	RMTRESET_1	24	GENDO2_1
12	GENDI1_1	25	GND
13	GENDI2_1		

# 5.8.2 External contact specifications

Type C is the standard for external contact I/O. Users can change to Type A or Type B at the time of purchase. (This cannot be changed after purchasing the equipment.)

# (1) List of external contact I/O signals

	Signal line	Meaning
	PSDOWN	Activated when the OS is shut down (standby or the main power is off) or when power is not supplied to the equipment.
Output	CPUSTOP	Activated when the OS, application, device driver, or similar cannot run properly due to an abnormally high system load or hang-up condition.
	WDTTO	Activated when a timeout is detected by the watchdog timer. A timeout is also detected when the OS is shut down (standby or the main power is off) or when power is not supplied to the equipment.
	MCALL	This is a maintenance request signal. This contact is activated when the temperature or the fan status is abnormal.
	GENDO0 GENDO1 GENDO2	These are general-purpose contact output signals. The user can assign a task to each of the contacts GENDO0 to GENDO2.
	RMTSHTDN (GENDI)	This is a shutdown request signal or a general-purpose input signal. When this contact is closed, the OS will shut down. The user can select which signal to use.
	RMTREST	This is a reset request signal. When this contact is closed, the equipment is hard-reset.
Input	GENDI0 GENDI1	These are general-purpose input signals. The user can assign a task to each of the contacts GENDI0 and GENDI1.
	GENDI2 (RMTPWRON)	This is a general-purpose input signal. The user can assign a task to contact GENDI2. This input can also be used for the remote power-on feature.

# (2) External contact I/O port specifications

	Output <sup>#1</sup>						Input					
Item	PS DOWN	CPU STOP	WDTTO	MCALL	GEN DOO	GEN DO1	GEN DO2	RMTSHTDN/ GENDI#2	RMT RESET	GEN DI0	GEN DI1	GENDI2/ RMTPWRON <sup>#3</sup>
Type C (standard)	A contact			1	A co	ntact	1		1	1	Yes	Yes
Type B (option)	F	3 contact			A cont	act		Yes	Yes	Yes	Yes	Yes
Type A (option)			A co	ntact				Yes	Yes	Yes	Yes	Yes
Specifications	Load volta Load curre	Contact specifications: PhotoMOS relay contact Load voltage: Max. 40 V DC Load current: Max. 0.1 A/point (steady state) Max. 0.6 A/point (inrush) Dielectric strength: 250 V AC, 1 minute							fications: nt: 1 mA/		oltage tra	ansistor contact
Contact diagrams	40 V DO Contact specific	ations	Cable		arge killer	Fuse O	- /	and isolated (non-isolated: 5 V (VCC)  Contact input	ort for two not usable of the control of two not usable of the control of the con	o types	Us	er side

PS DOWN: Power supply down

CPU STOP: CPU stopped (OS freeze monitoring)

WDTTO: Watchdog time out

MCALL: Maintenance technician call

RMTPWRON: Remote power-on RMTSHTDN: Remote shutdown

RMTRESET: Remote reset

GENDI\*: General input GENDO\*: General output #1: The operation of the A contact and B contact are as follows:

A contact (MCALL):

Open when normal, closed when abnormal, open when power is cut.

A contact (PSDOWN, CPUSTOP, WDTTO):

Closed when normal, open when abnormal, open when power is cut.

A contact (GENDO\*):

The contact state depends on the user program instruction. Open when power is cut or without program instruction.

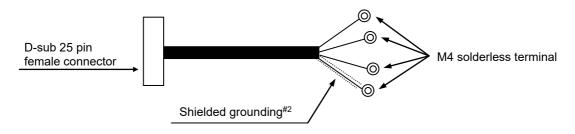
B contact (PSDOWN, CPUSTOP, WDTTO):

Open when normal, closed when abnormal, closed when power is cut.

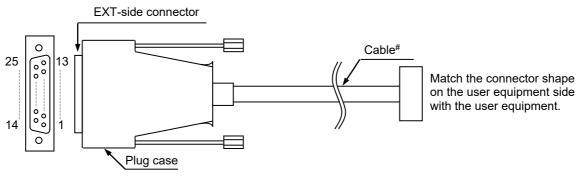
- #2: RMTSHTDN and GENDI use the same contact (switched by the RAS software setting). RMTPWRON and GENDI2 use the same contact (switched by the jumper pin setting). For details, see 6.6 Enabling the Remote Power-On Feature.
- #3: When you use the RMTPWRON function, ensure that no noise is added to the external contact. If the contact closes for 15 ms or more during the soft power-off mode due to noise or some other reason, the power might turn on unexpectedly. Note that when the OS or BIOS is running after the power turns on, the RMTPWRON function is disabled, and the contact can be used as a GENDI2 input.

#### (3) Recommended EXT cable specifications

1. The following cable is required for connections.#1



- #1: The maximum cable length is 30 m.
- #2: To connect a cable shield, in addition to the cable, you must provide a shielded grounding bar for dedicated use with shielded wire connections.
- 2. User-made cables must meet the following specifications:



Exterior view of the external contact cable and connector

- #: The shielded grounding of the cable must firmly contact the conductor of the plug case (frame ground). (Do not connect a GND pin of the EXT port to the shielded grounding, because all GND pins are signal ground. If you do so, the equipment might malfunction.)
- EXT side connector specifications (recommended connector)

Connector shape: D-sub 25 pin female connector (two lines)

Part name	Model	Manufacturer
Plug case	HDB-CTH1(4-40)(10)	Hirose Electric Co., Ltd.
Female connector	HDBB-25S	Hirose Electric Co., Ltd.

• Cable specifications (recommended cable)

Item	Specifications	Notes
Maximum cable length	30 m	
Electric shield of the cable	Required	Connected to the frame ground
Recommended cable	UL2464SB 13P × 24AWG	Hitachi Metals, Ltd.

# 5.8.3 External interface cable length specifications

## (1) External interface cable length specifications

The recommended maximum cable lengths for the various interfaces of this equipment are as follows:

No.	Connector name	Maximum cable length (m)	Notes
1	VGA port	3	
2	DVI-D port	3	
3	DisplayPort	3	
4	LAN port	100	UTP Category 5e or better
5	External contact port	30	For information about the cable specifications, see section 5.8.2 (3).
6	Serial port (COM)	15	Use a shielded cable.
7	Front USB 2.0 (2 ports)	3	Use a USB 2.0 compliant shielded cable. If you use an extension cable, connected USB devices might not work properly.
8	Rear USB 3.0 (6 ports)	2	Depending on the connected device, use a USB 3.0 compliant shielded cable or a USB 2.0 compliant shielded cable. If you use an extension cable, connected USB devices might not work properly.
9	Audio (LINE IN/LINE OUT)	2	

Connected devices might not work properly depending on the device. Verify proper operation of a device before using it.

Equipment operation cannot be guaranteed when used in combination with extension or switching devices. Verify proper operation of the equipment in advance.

# **CHAPTER 6 INSPECTION AND MAINTENANCE**

# 6.1 Daily Inspections

# ♠ WARNING

Install a dust filter for use with the equipment. Not doing so will allow dust into the equipment, which might result in a short circuit fire.

# **!** CAUTION

Before you clean or replace the dust filter of this equipment, shut down the OS, and unplug the power cord. Failure to do so might result in injury to the hands or fingers.

#### NOTICE

- Before moving this equipment, shut down the OS, and unplug the power cord. Not doing so might cause SSDs and other devices to fail.
- When transporting or carrying the equipment, pack it in the dedicated container (the container and packing materials used when the equipment was delivered). Using another container or other packing materials might damage the equipment.
- Do not use the dedicated container to transport or carry the equipment if the container has been damaged or broken. Doing so might damage the equipment.

#### (1) Cleaning the dust filter

### **NOTICE**

After washing a dust filter, dry it completely before re-attaching it to the equipment. Using the equipment while its dust filter is not completely dry might cause equipment failure. When using a detergent to clean a dust filter, use a neutral detergent. Using other types of detergents might degrade the dust filter's function.

#### (a) Frequency

Clean the dust filter once every one to three months, depending on the amount of dust in the environment.

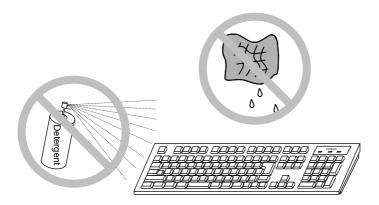
#### (b) Procedure

- 1. Shut down the OS.
- 2. Unplug the power cord.
- 3. Take out the dust filter and dust it off or wash it. If you wash the filter, wait until the filter is completely dry, and then re-attach the filter to the equipment. For details about how to install or remove the dust filter, see 6.4.6 Installing and removing a dust filter.

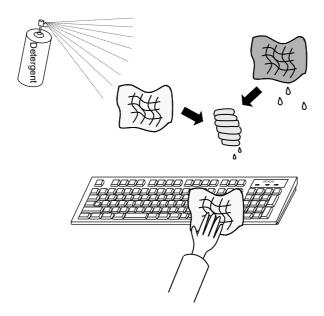
#### (2) Cleaning the optional keyboard

When cleaning the keyboard, note the following:

- Do not spray detergent directly onto the keyboard or spill liquid detergent on it.
- Do not wipe the keyboard with a wet cloth. Doing so might cause a failure.



- When using detergent, spray a minimum amount of detergent on a cloth.
- Before wiping the keyboard with a wet cloth, wring out the cloth well.
- Use a soft cloth, such as gauze.
- Before using detergent, carefully read the instructions on how to use the detergent.
- Alternatively, you can also cover the entire keyboard with gauze, spray detergent over it, allow it to stand for several minutes, and then wipe off the keyboard.



#### NOTE

For information about the precautions for USB devices, see 5. USB Devices in PRECAUTIONS.

## **6.2 Periodic Inspections**

The following table shows how to perform periodic inspections of the equipment. Periodic inspections are available through a maintenance contract with Hitachi, and are performed by Hitachi maintenance personnel (with the exception of daily inspections). Periodic inspections must be performed only by qualified maintenance personnel. Include the inspection plan in the system operation schedule.

Inspection item	Frequency	Note
Collection of logging information	Annually	
<ul> <li>Inspection and cleaning of components</li> <li>Inspection and cleaning of the inside and outside of the equipment</li> <li>Inspection of fan rotation and removal of dust</li> <li>Removal of foreign matter that has entered the equipment</li> <li>Other general inspection items</li> </ul>	Annually	
Replacing the dust filter	Annually	
Measuring the power voltage	Annually	
Operational checks  Operational checks of switches and lamps Operational checks by using test programs	Annually	
Periodic replacement of replaceable components#	As required	
Routine inspection  Cleaning the keyboard  Cleaning the dust filter	From once a month to once every three months	For details, see 6.1 Daily Inspections.

<sup>#:</sup> For details about how to handle replaceable components, see *APPENDIX HANDLING OF REPLACEABLE COMPONENTS*.

### **6.3 Maintenance Service Contract**

In the event of a malfunction, maintenance of this equipment will normally be performed as a return-to-depot repair (send-back repair). If you require any other type of maintenance service, you must execute a separate maintenance service agreement. For details, please contact your sales representative. Please note that the period during which maintenance services are available is shown in the table below, regardless of whether a maintenance service agreement has been concluded.

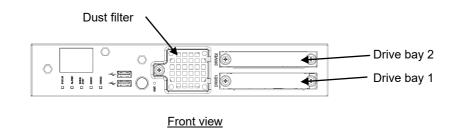
Table 6-1 Maintenance service period

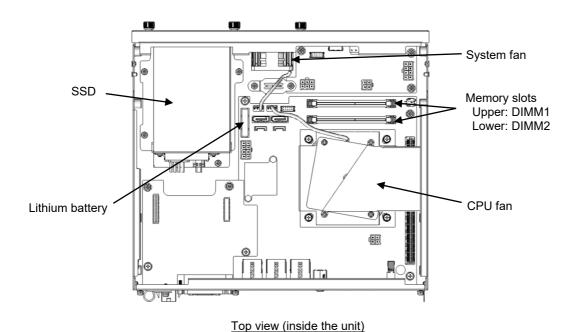
	Item	Maintenance period	Remarks
Hardware	Main unit	7 or 10 years	Selected at time of purchase of the main unit
	Optional peripheral devices	Same as main unit period	-
Software	Microsoft® Windows® (Embedded, licensed version)	Manufacturer's supported period	-
Soliwale	Hitachi RAS software	Same as main unit period	-

# 6.4 Installing and Removing Components

# 6.4.1 Types and locations of installed components

The following figure shows the types and locations of the components installed in this equipment.





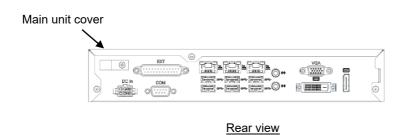


Figure 6-1 Types and locations of installed components

## 6.4.2 Before installing or removing components

When installing or removing components, comply with the following instructions.



Before starting work, shut down the OS, and unplug the power cord from the outlet. Failure to do so might result in an electric shock or equipment failure.

# ♠ CAUTION

When installing or removing components, do not directly touch parts inside the equipment with your hands. Such parts are hot, and touching them might result in burns. In addition, touching such parts might damage the parts or result in equipment failure.

- Ensure sufficient clearance for maintenance work. Work on a flat surface. (See 1.6.2 Installation.)
- Wear cotton gloves when installing or removing components.
- When tightening or removing screws, use a Phillips screwdriver (JIS #1 or JIS #2) to avoid stripping the heads.
- To avoid damaging the threads when tightening screws, drive the screw along the axis of the tapped hole without applying too much torque.

In addition, each work item has individual instructions. Comply with those instructions as well.

## 6.4.3 Installing and removing the cover of the main unit

# **!** CAUTION

When installing the cover of the main unit, do not insert your fingers into the inside of the cover of the main unit. Doing so might result in your fingers getting caught, causing injury.

Before starting work, see 6.4.2 Before installing or removing components.

#### (1) Removing the cover of the main unit

- [1] Remove the two screws on the sides.
- [2] Remove the three screws on the rear.
- [3] Slide the cover towards the rear.
- [4] Lift the main unit cover up and away.

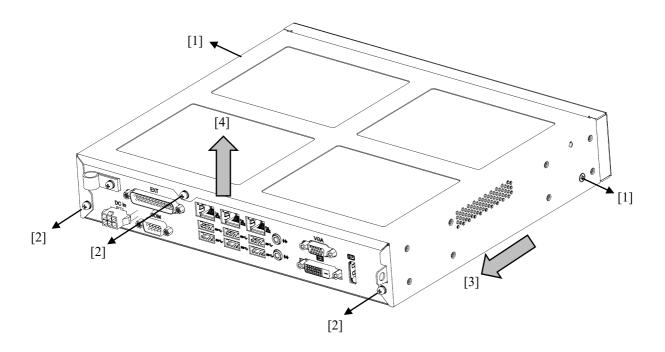


Figure 6-2 Removing the cover of the main unit

### (2) Installing the main unit cover

When installing the main unit cover, reverse the procedure described in (1) Removing the cover of the main unit.

## 6.4.4 Installing and removing memory modules

# 🚹 WARNING

Before you install or remove memory modules, shut down the OS, and unplug the power cord. Installing or removing memory modules without shutting down the power might result in an electric shock or a fire.

# **NOTICE**

Disconnect all external cables connected to the equipment before installing or removing memory modules. Not doing so might cause equipment failure.

#### (1) Installing memory modules

# **NOTICE**

- The orientation of a memory module in a connector is fixed. When installing a memory module, verify that the orientation is correct. An incorrect orientation might result in equipment failure.
- Do not install memory modules that have different capacities in slots DIMM1 and DIMM2. If you do so, the modules might not be recognized.
- [1] Follow the instructions in 6.3.4 Installing and removing the cover of the main unit to remove the cover of the main unit.
- [2] Check that there is no foreign matter on the connector of the memory slot, and remove any foreign matter by using a blower or similar tool.
- [3] Fully open the knobs on both sides of the memory slot outward.
- [4] Insert the memory module into the memory slot while paying attention to the orientation (the position of the notch), and push both ends of the memory module vertically from directly above the connector. Confirm that you hear a click and the knobs on both sides of the memory slot are fully closed.

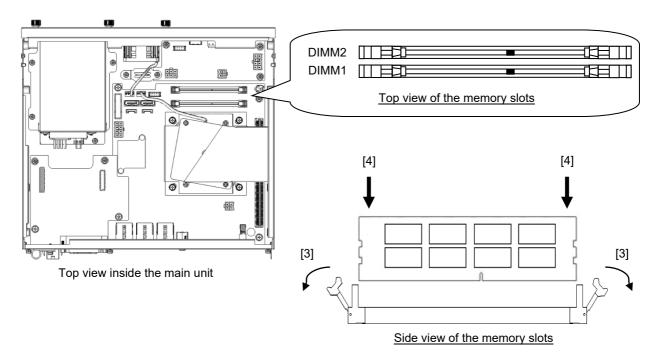


Figure 6-3 Installing the memory

Only the following combinations of memory modules are allowed with this equipment.

Number of memory modules	DIMM1 slot	DIMM2 slot	Total capacity
1	4 GB	-	4 GB
2	4 GB	4 GB	8 GB
2	8 GB	8 GB	16 GB

#### (2) Removing memory modules

- [1] Follow the instructions in 6.4.3 Installing and removing the cover of the main unit to remove the cover of the main unit of the equipment.
- [2] Fully open the knobs on both sides of the DIMM slot outward. The locks will be released and the memory module will rise upwards.
- [3] Hold both ends of the memory module and pull it straight up.

#### (3) Reconfiguring the memory dump file settings

When you change the memory capacity, you must reconfigure the memory dump collection settings. For details about reconfiguring the memory dump collection settings, see 8.2.1 Memory dump confirmation messages.

## 6.4.5 Installing and removing an SSD

# **A**CAUTION

When installing or removing an SSD, be careful not to cut your fingers on the protrusions.

#### NOTICE

- Place an SSD on a shock-absorbing material, such as an antistatic cushion, even for temporary tasks. Placing an SSD directly on a hard surface, such as a desktop, might result in the failure or a shorter life span of the device, or cause loss of data due to jarring or shocks.
- Never remove the screws on an SSD while the power to the device is on. Never hot-swap SSDs. Performing these actions might result in failure of the equipment or drive.
- Before replacing an SSD, shut down the OS, and unplug the power cord.
- Install or remove an SSD only when necessary, for example, when you need to replace an SSD due to a failure. Performing these actions frequently might result in failure of the equipment or drive.
- Fully insert SSDs. Loose contacts or missing screws might result in failure.
- During installation or removal, do not subject an SSD that you are installing or an SSD that is already installed to shocks. Subjecting an SSD to shocks might result in drive failure.

### (1) Before installing or removing an SSD

• Before starting work, see 6.4.2 Before installing or removing components.

#### NOTE

For information about the precautions for SSDs, see 4. Solid State Drives (SSDs) in PRECAUTIONS.

#### (2) Removing an SSD

- [1] Loosen the two set screws for the SSD case.
- [2] Use both hands to pull on the two set screws for the SSD case to remove the SSD case.

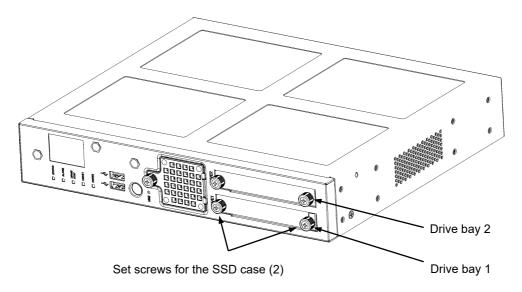


Figure 6-4 Removing an SSD

### NOTE

- When pulling out an SSD, be careful not to apply too much force to the connector. Slowly pull out the drive to avoid subjecting the SSD to shocks.
- When connecting an SSD to a connector, do not subject the SSD to shocks or jarring.

#### (3) Installing an SSD

Follow the procedure described in (2) Removing an SSD in reverse to install an SSD.

#### 6.4.6 Installing and removing a dust filter

# 🚹 WARNING

Install a dust filter for use with the equipment. Not doing so will allow dust into the equipment, which might result in a short circuit fire.

#### (1) Before installing or removing a dust filter

• Before starting work, see 6.4.2 Before installing or removing components.

## (2) Removing a dust filter

- [1] Loosen the screw for the dust filter cover.
- [2] Remove the dust filter cover from the equipment.
- [3] Remove the dust filter from the dust filter cover.

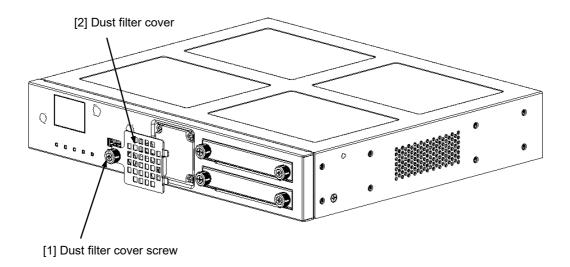


Figure 6-5 Removing the dust filter

#### (3) Installing a dust filter

Follow the procedure described in (2) Removing a dust filter in reverse to install a dust filter.

## 6.4.7 Installing and removing the vertical stand

# ♠ CAUTION

The equipment might cause injury if it falls or is dropped off of a desktop when placed vertically. Use the vertical stand provided with the equipment, and place the equipment with the vertical stand on a level surface.

### (1) Before installing and removing the vertical stand

- Before starting work, see 6.4.2 Before installing or removing components.
- Disconnect all cables connected to the equipment.
- Do not subject the equipment to shocks.

#### (2) Installing the vertical stand

Secure the vertical stand to the equipment with the screws provided with the vertical stand.

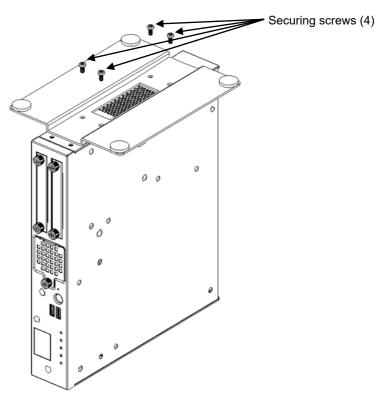


Figure 6-6 Installing the vertical stand

#### (3) Removing the vertical stand

Reverse the procedure described in (2) Installing the vertical stand to remove the vertical stand. Store the removed vertical stand and screws where they will not become lost.

#### 6.5 Removing and installing the lithium battery

# **!** CAUTION

- When disposing of the equipment, remove the lithium battery according to the procedure.
- Only repair staff may replace the lithium battery, so contact our sales representative.

#### (1) Before removing the lithium battery

• Before starting work, see 6.4.2 Before installing or removing components.

#### (2) Removing the lithium battery

- [1] Follow the instructions in 6.4.3 Installing and removing the cover of the main unit to remove the cover of the main unit.
- [2] If the surrounding cables interfere with removal of the lithium battery, remove them before removing the lithium battery.
- [3] Pick up both ends of the battery cover with your thumb and forefinger and lift one end of the battery cover.

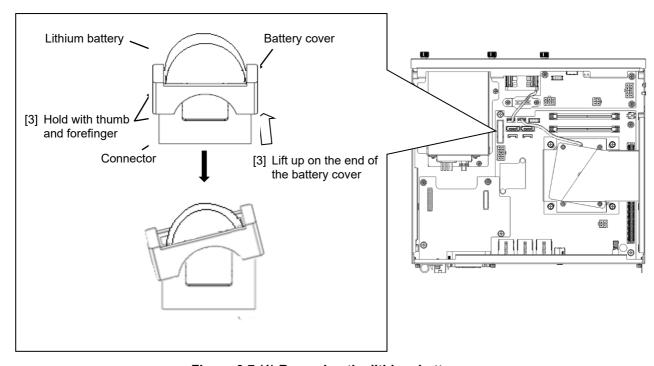


Figure 6-7 (1) Removing the lithium battery

- [4] Lift the other end of the battery cover which you lifted in step [3], and remove the battery cover from the battery connector.
- [5] Pick up the lithium battery and remove it from the battery connector.
- [6] Check the polarity of the battery as shown in the following figure and install the new battery.
- [7] Restore the equipment by performing the procedure in reverse, and then install the cover of the main unit.

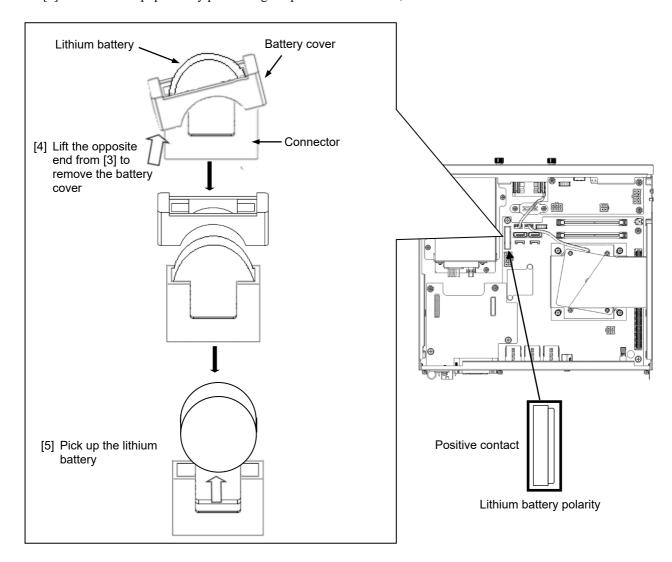


Figure 6-7 (2) Removing the lithium battery (continued)

#### NOTE

When disposing of a battery, observe local laws and regulations whenever applicable. In a foreign country, dispose of the battery in accordance with the laws and regulations of that country.

#### 6.6 Enabling the Remote Power-On Feature

# **!** CAUTION

When installing or removing a jumper socket, do not directly touch parts inside the equipment with your hands. Such parts are hot, and touching them might result in burns. In addition, touching such parts might damage the parts or result in equipment failure.

To use the remote power-on feature of the RAS external contact port, perform the following procedure to remove the jumper socket installed to the JP1 pin of the RAS external contact board. Whether a jumper socket is installed determines whether the input at the external contact GENDI2 is a general-purpose digital input signal or a remote power-on signal. (See 5.8.2 External contact specifications.)

Jumper socket	GENDI2 setting
Installed	General-purpose digital input signal
Not installed	Remote power-on signal

#### (1) Before installing or removing the jumper socket

• Before starting work, see 6.4.2 Before installing or removing components.

#### (2) Removing the jumper socket

- [1] Follow the instructions in 6.4.3 Installing and removing the cover of the main unit to remove the cover of the main unit.
- [2] Remove the jumper socket from the JP1 pin.

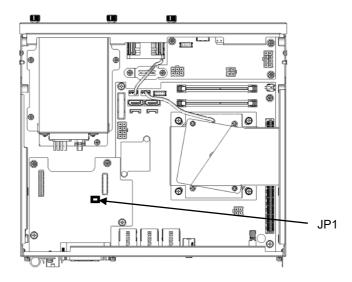


Figure 6-8 Removing the jumper socket

# (3) Installing the jumper socket

Reverse the procedure described in (2) Removing the jumper socket to install the JP socket.

### NOTE

Save the removed jumper socket in a safe place for when you want to restore the original settings later.

# CHAPTER 7 RESTORING THE FACTORY-SHIPPED CONDITION BY USING RECOVERY DVDs

# NOTICE

Recovery DVDs contain an image file created for the hardware configuration at the time of delivery. If the hardware configuration has changed from the time of delivery, the OS might not start after the recovery process. Remove all external storage devices to restore the hardware configuration at the time of delivery before starting the recovery process.

When you use a recovery DVD, <u>all data on the system drive is deleted</u>. Back up your data in advance as necessary.

This product is not equipped with a DVD drive. Therefore, you will need to prepare an external DVD drive in advance.

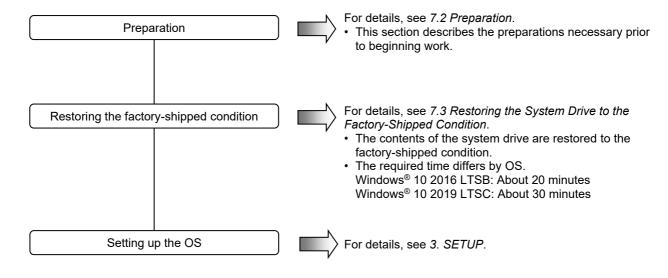
This chapter describes the following procedure:

• Restoring the system drive to its condition at the time of purchase, when you discontinue a system that you have built.

#### 7.1 Overview of the Restoration Procedure

This section provides an overview of the procedure to restore the system drive to the factory-shipped condition when you discontinue a system that you have built. After you restore the contents of the system drive to the factory-shipped condition by using a recovery DVD, follow the procedure described in 3. SETUP to set up the OS.

The following is a rough flowchart of the procedure.



# 7.2 Preparation

Prepare the following recovery DVDs before you start to the process of restoring the system to the factory-shipped condition.

Also, you need to prepare an external DVD drive in advance to perform restoration work because this product is not equipped with a DVD drive.

Recovery DVDs for HF-W	HITACHI <u>HJ-407x-****</u> Product Recovery DVD (The underlined part is the model number of the equipment you purchased.)
External DVD drive	Use a DVD drive whose operation you have verified

# 7.3 Restoring the System Drive to the Factory-Shipped Condition

# 7.3.1 Procedure for restoring the system drive to the factory-shipped condition

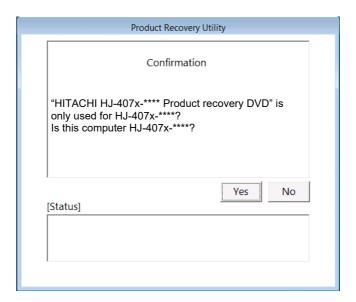
Perform the following procedure to restore the system drive of an HF-W400E to its factory-shipped condition by using recovery DVDs.

1. Turn on the power to the equipment, and insert the recovery DVD *HITACHI* <u>HJ-407x-\*\*\*\*</u> *Product Recovery DVD* into the DVD drive. If you have multiple recovery DVDs, insert the first disc (for example, if you have two recovery DVDs, insert the disc numbered 1/2).

Note: The underlined part is the model number of the equipment you purchased, and therefore the part indicated as \* differs depending on the model. In the following procedure, substitute the *HJ-407x-*\*\* with the actual model number of the equipment you purchased.

- 2. When you boot from the recovery DVD, a confirmation message window appears.

  Note 1: If you cannot boot from the recovery DVD, turn off the equipment, and then turn it back on.
  - If the model name displayed in the confirmation message is the same as the model name of the equipment, click **Yes**.
  - If the model name displayed in the confirmation message differs from the model name of the equipment, click
     No.



If you click **No**, the following message dialog box will be displayed. Click **OK**. The recovery DVD will be automatically ejected, and the equipment will shut down. To return the confirmation message window, click **Cancel**.



- 3. If you click **Yes** in the confirmation message window, the following confirmation window appears.
  - If the situation described in the message is acceptable, click Yes.
  - If it is not, click No.



If you click **No**, the following message dialog box will be displayed. Click **OK**. The recovery DVD will be automatically ejected, and the equipment will shut down.

To return to the confirmation message window, click Cancel.



- 4. If you click Yes in the confirmation window, the selection window for the drive restoration options appears.
  - To restore the system drive to the factory-shipped condition, select a restoration option, and then click Next.
  - To cancel restoration of the system drive to the factory-shipped condition, click Cancel.

#### **Entire drive:**

Select this option if you want to restore the entire system drive to the factory-shipped condition, or if you want to configure a new drive to the factory-shipped condition after you replace the system drive. If you select this option and click **Next**, proceed to step 5.

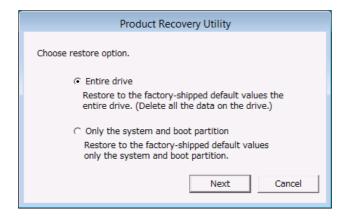
#### Only the system and boot partition:

Select this option if the system drive has partitions other than the boot partition (the partition on which Windows® is installed) for data storage or other purposes, and you want to restore the system drive to the factory-shipped condition while keeping those partitions. If you select this option, only the boot partition is restored to the factory-shipped condition.

If you select this option and click Next, proceed to step 6.

You cannot select this option in the following cases:

- The system drive has no boot partitions.
- The system drive has more than one boot partition.
- The size of the boot partition is less than the minimum boot partition size defined for the equipment. (For the HF-W400E, the minimum size is 100 GB.)



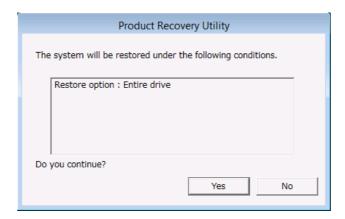
If you click **Cancel**, the following message will appear. Click **OK**. The recovery DVD will be automatically ejected, and the equipment will shut down.

To return to the selection window for the drive restoration options, click Cancel.



If you select **Entire drive** in the selection window for the drive restoration option:

- 5. If you select **Entire drive** in the selection window for the drive restoration option, the confirmation window for the settings of the drive restoration appears.
  - If the displayed partition size to be restored is acceptable, click Yes. Proceed to step 7.
  - If the displayed partition size to be restored is not acceptable, click **No**. The selection window for the drive restoration option will return.



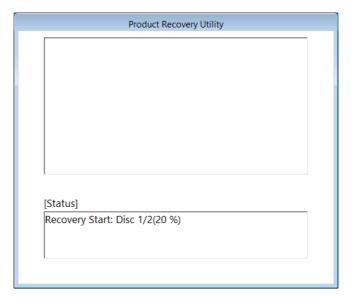
If you select **Only the system and boot partition** in the selection window for the drive restoration option:

- 6. If you select **Only the system and boot partition** in the selection window for the drive restoration option, the confirmation window for the settings of the drive restoration appears.
  - If restoration of only the boot partition is acceptable, click Yes. Proceed to step 7.
  - If restoration of only the boot partition is not acceptable, click **No**. The selection window for the drive restoration options will return.

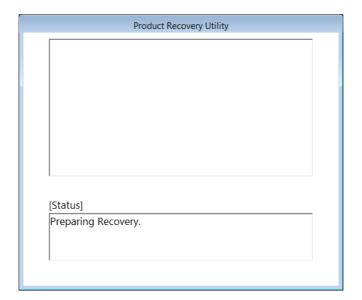


7. If you click **Yes** in the confirmation window for the settings of the drive restoration, the drive restoration process starts. Progress appears in the **[Status]** box.

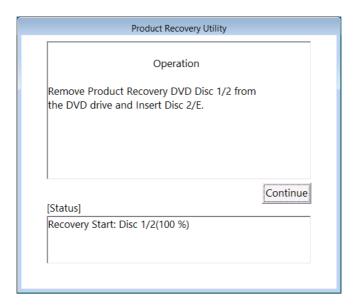
The following figure is an example when using two recovery DVDs.



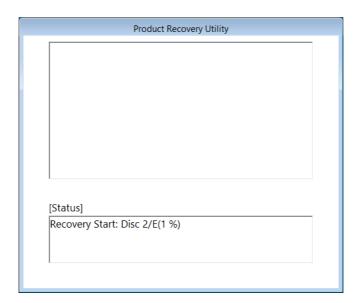
Note: If you select **Only the system and boot partition** in the selection window for the drive restoration option, the boot partition is formatted before the restoration process begins. Formatting the partition might take several minutes. (The time required for formatting depends on the size of the boot partition.) During the formatting process, Preparing Recovery appears in the **[Status]** box.



8. If you are using multiple recovery DVDs, the following message will appear and the DVD will be automatically ejected when the restoration process to the factory-shipped condition by the current recovery DVD is complete. Remove the recovery DVD from the DVD drive, and insert the next recovery DVD. The following figure is an example when using two recovery DVDs.



9. If you click **Continue**, the message Preparing Recovery. Please wait a few minutes. appears in the **[Status]** box. The restoration process to the factory-shipped condition then resumes, and the progress appears in the **[Status]** box.



10. If you are using multiple recovery DVDs, repeat steps 8 and 9 for each of the DVDs.

11. When the restoration process to the factory-shipped condition by the final recovery DVD completes, the message Recovery Complete. appears in the [Status] box, and the recovery DVD is automatically ejected. Remove the recovery DVD from the DVD drive, and then click Exit. The equipment will then shut down.



This completes restoration of the HF-W400E system drive to the factory-shipped condition by using recovery DVDs. Next you need to follow the procedure described in 3. SETUP to set up the OS.

# 7.3.2 Errors generated during the recovery process and corrective actions

When an error occurs during the recovery process, record the displayed error message and error code, and take action as shown in the following table. If you take action accordingly but are still unable to proceed with the recovery process, or if the No. 8 error message appears, contact our sales representative.

Table 7-1 Error messages generated during the recovery process

No.	Error message	Action
1	Retry time out. Please refer to the INSTRUCTION MANUAL.	• Check the integrity of the system drive. (For example, do read and write tests.)
2	Image file is not found. Please refer to the INSTRUCTION MANUAL.	<ul> <li>Retry the recovery process.</li> <li>Check the integrity of the recovery DVD. (For example, do read tests.)</li> <li>Verify that the DVD drive works properly. (For example, do read tests.)</li> </ul>
3	Drive failed or not connected. Please refer to the INSTRUCTION MANUAL.	<ul> <li>Verify that the system drive is connected correctly.</li> <li>Check the integrity of the system drive. (For example, do read and write tests.)</li> </ul>
4	Failed to access the drive. Please refer to the INSTRUCTION MANUAL.	
5	Failed to assign drive letter. Please refer to the INSTRUCTION MANUAL.	Verify that no devices that are not required for the recovery process are connected. If any such devices are connected, disconnect them.
6	Failed to read from Product Recovery DVD. Please refer to the INSTRUCTION MANUAL.	<ul> <li>Verify that the DVD drive is connected correctly.</li> <li>Check the integrity of the recovery DVD. (For example, do read tests.)</li> <li>Verify that the DVD drive works properly. (For example, do read tests.)</li> </ul>
7	Recovery failed. Please refer to the INSTRUCTION MANUAL.	Retry the recovery process.
8	Recovery invalid. Please refer to the INSTRUCTION MANUAL.	Contact one of our sales representatives.
9	Drive capacity is not enough. Please refer to the INSTRUCTION MANUAL.	Check the size of the system drive.
10	The capacity of drive is not equal.	Install drives with equivalent capacities.

# **CHAPTER 8 MAINTENANCE OPERATIONS**

This chapter describes maintenance operations that use the Reliability, Availability, and Serviceability (RAS) features of this equipment.

# 8.1 Overview

The RAS features of this equipment provide highly reliable functionality. The following table gives an overview of the RAS features of this equipment.

**Table 8-1 Overview of RAS features** 

Category		Item
Monitoring		Hardware status monitoring
		OS lock monitoring
		Watchdog timer monitoring
GUI features setting	gs	RAS Setup window
Status checks GUI display		Hardware status window
	Notifications	Event notifications
		Pop-up notifications
		Digital LEDs for status indications
		Remote notifications
		Status acquisition by using library functions
Control	Shutdown/startup	Automatic shutdown
	suppression	Shutdown via library functions
		Startup suppression when serious failures occur
		Controlling general-purpose external contacts
		Controlling digital LEDs for status indications
Library functions		RAS library
Maintenance/	Memory dumps	Memory dump collection
failure analysis		Bug check (blue screen) cause notifications
		Log information collection window
		Maintenance operation support commands
		Logging trends of the temperature inside the chassis
Simulation		Hardware status simulation

# Monitoring

# (1) Hardware status monitoring

This feature monitors the hardware status of this equipment, including fan status, drive status, and the temperature inside the chassis.

# (2) OS lock monitoring

This feature monitors the operational state of the OS by using an internal dedicated timer. As long as the process with the highest priority (real-time priority class) can run properly, the status lamp on the front of this equipment lights green.

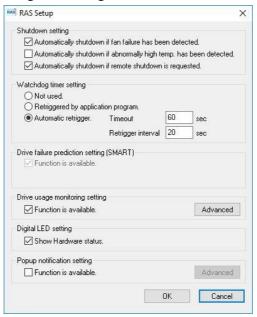
#### (3) Watchdog timer monitoring

This feature monitors whether processes are scheduled properly by using an internal watchdog timer. This feature also offers library functions for using the watchdog timer.

#### GUI features settings

#### (4) RAS Setup window

This window provides a graphical user interface for configuring RAS feature settings, including the conditions on automatic shutdown and the watchdog timer settings.



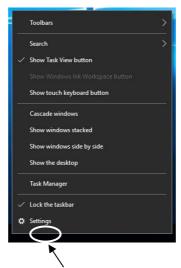
# Status checks

#### (5) Hardware status window

This window displays the hardware status of this equipment via a graphical interface. An icon in the notification area of the taskbar displays the hardware status at all times.



This icon is not shown when using the default settings at the time that the equipment is shipped, but if you click the arrow to the side of the notification area, the icon will appear. In addition, if you want this icon to be always displayed in the notification area of the taskbar, right-click the taskbar and, in the displayed menu, click **Settings** (in Windows® 10 IoT Enterprise 2019 LTSC, click **Taskbar settings**). In the displayed window, click **Select which icons appear on the taskbar** (in Windows® 10 IoT Enterprise 2019 LTSC, click **Select which icons appear on the taskbar**), and then set the icon for **envdisp MFC Application** to on.



Right-clicking the taskbar displays a menu.

#### (6) Event notifications

This feature allows user applications to check the hardware status of this equipment by monitoring the status of event objects.

#### (7) Pop-up notifications

This feature displays pop-up messages to notify users of errors in the equipment hardware.

## (8) Digital LEDs for status indications

The digital LEDs for status indications on the front of this equipment notify users of errors in the equipment hardware. These LEDs can also be used by user applications to notify of events such as application failures.

#### (9) Remote notifications

This feature enables a remote device to check the hardware status of the equipment. It also notifies the remote device whenever the hardware status changes.

# (10) Status acquisition by using library functions

This feature allows user applications to obtain the hardware status of this equipment by using the RAS library.

#### Control

#### (11) Automatic shutdown

This feature automatically shuts down the equipment when it detects a fan failure, abnormal temperature inside the chassis, or a remote shutdown signal input. You can configure the settings shown in (4) RAS Setup window under GUI features settings to enable or disable the automatic shutdown feature.

#### (12) Shutdown via library functions

You can shut down the equipment from a user application by using the RAS library.

## (13) Startup suppression when serious failures occur

This feature suppresses startup of this equipment when a failure, such as a fan failure, is detected during OS startup.

# (14) Controlling general-purpose external contacts (HJ-F4070-11 and HJ-F4070-12) and digital LEDs for status indications

This feature allows users to control the general-purpose external contacts and the digital LEDs for status indications by using the RAS library.

Four input and three output general-purpose external contacts are available. You can use these contacts to input signals from an external device to this equipment, and output signals from this equipment to an external device.

# (15) Controlling general-purpose external contacts (HJ-F4070-13) and digital LEDs for status indications. This feature allows users to control the general-purpose external contacts and the digital LEDs for status indications by using the RAS library.

Two input and two output general-purpose external contacts are available. You can use these contacts to input signals from an external device to this equipment, and output signals from this equipment to an external device.

#### Library functions

#### (16) RAS library interface

This interface offers library functions for recording log information. These are in addition to the library functions offered by item (10) under *Status checks* and items (12), (14), and (15) under *Control*.

## Maintenance/failure analysis

#### (17) Memory dump collection

This feature records the contents of the system memory in a file (a memory dump file) when the NMI switch is pressed after a failure occurs, for example, after the equipment stops unexpectedly. You can use the data in a memory dump for failure analysis.

#### (18) Bug check (blue screen) cause notifications

This feature detects a bug check (blue screen), and records the cause in the event log.

#### (19) Log information collection window

In this window, you can use a graphical user interface to collect log data and memory dump files for this equipment.

#### (20) Maintenance operation support commands

These commands can be used for saving failure information, such as memory dump files and event log files, to external media.

#### (21) Logging trends of the temperature inside the chassis

This feature periodically measures the temperature inside the chassis of this equipment and records the data in a file.

#### Simulation

#### (22) Hardware status simulation

This feature simulates the hardware status of this equipment. You can use this feature to test user applications or check the notifications interface of the RAS software without an actual hardware failure having occurred.

This manual explains the features in (13) Startup suppression when serious failures occur under Control, (17) Memory dump collection, and (20) Maintenance operation support commands under Maintenance/failure analysis. For details about other features, refer to the HF-W400E RAS FEATURES MANUAL. For more information about the POST display functionality of the digital LEDs for status indications described in (8) under Status checks, see 9.6.1 POST display.

# 8.2 Collecting Memory Dumps

When one of the causes in Table 8-2 arises, this equipment records the contents of the system memory in a file (a memory dump file). A blue screen then appears. You can use the data in the memory dump file for failure analysis.

Table 8-2 Causes that trigger memory dumps

Cause	Description	
Forced recovery from the CPS hanging	When the CPU hangs, press the NMI switch or input a remote reset signal to the external contact RMTRESET <sup>#1</sup> . This causes the collection of the memory dump.	
Hardware-caused NMI	When a serious failure (such as an uncorrectable memory error or a PIC bus parity error) occurs in the equipment hardware, a non-maskable interrupt (NMI) is generated, and a memory dump is collected.	
Windows® bug check	When a fatal error occurs in the Windows® kernel, a memory dump is collected.	

<sup>#1:</sup> Do not input a remote reset signal continuously to the external contact RMTRESET. Doing so will prevent this equipment from collecting a memory dump.

To select the memory dump file type, from the Control Panel, click **System**. You can select from the following five types of dump files. For this equipment, we recommend setting **Complete memory dump** for more reliable failure analysis. The factory default setting is **Complete memory dump**.

•	Complete memory dump:	The entire contents of the system memory are recorded. The boot volume#2 must	
		have enough free space to hold a paging file equal to the size of the physical	
		memory plus 1 MB.	

• **Kernel memory dump**: The kernel memory is recorded. The boot volume<sup>#2</sup> must have a paging file that is at least the size of the kernel memory.

• **Minimum memory dump**: The minimum information necessary to identify what caused the equipment to stop is recorded. The boot volume<sup>#2</sup> must have enough free space to hold a paging file greater than 2 MB in size.

• Automatic memory dump: Similarly to the kernel memory dump, the kernel memory is recorded. The difference from the kernel memory dump is that the automatic memory dump can create an initial paging file that is smaller than the physical memory size.

• Active memory dump: The contents of the memory assigned to Hyper-V virtual machines are filtered, and only the contents of the memory used in Hyper-V hosts are recorded. Active memory dumps can record memory dump files that are smaller than a complete memory dump.

#2: The boot volume is a volume that contains the Windows® files and Windows® support files.

To collect a complete memory dump file, you need a memory dump file of a size comparable to the capacity of the physical memory. In addition, the virtual memory (page file) and memory dump settings must be the ones that are recommended for this equipment<sup>#3</sup>.

- #3: For the recommended settings, in **Advanced system settings** in the Control Panel, set the following conditions. These are the factory default settings.
  - In Startup and Recovery, Complete memory dump is selected as the memory dump type.
  - In Startup and Recovery, Overwrite any existing file is selected.
  - In **Performance**, the **Initial size** and **Maximum size** for virtual memory are set to the physical memory size plus 300 MB.

When an incident occurs that triggers a memory dump or when the NMI switch is pressed, the window called the *blue screen* appears, and the memory dump collection process starts.

#### **NOTE**

- The time required to collect a memory dump depends on the type of dump file to be collected, the configuration of the installed drives, and the physical memory capacity. Note that when using the recommended setting for this equipment, **Complete memory dump**, the required time might be longer.
- Depending on the situation, after the blue screen appears, the memory dump progress count might not be
  displayed and the memory dump collection process might stop. This occurs when the memory dump collection
  process fails due to factors such as file system or storage abnormalities.
   If this occurs, record the contents shown on the screen. Then press the NMI switch, or turn the power off and
  then back on to restart the equipment.

# 8.2.1 Memory dump confirmation messages

This equipment displays the following message and records an event in the event log in some cases. This occurs if the capacity of the physical memory exceeds the capacity of the memory dump file or the virtual memory due to, for example, newly added physical memory. This also occurs if a complete memory dump cannot be collected because the memory dump settings have changed.



If you want to use the system with the memory dump settings recommended for this equipment, click **Yes** to close the message box. The system will then automatically change the memory dump and virtual memory settings and allocate an area for memory dump storage as required.

#### **NOTE**

- When the preceding message box is displayed, an information log entry with event ID 26 is recorded in the event log.
- If you do not want to use the system with the memory dump settings recommended for this equipment, click **No** to close the message box. This message box will then no longer be displayed.

If the following message is displayed thereafter, prompting you to restart the system, click  $\mathbf{OK}$  to close the message box, and then restart the system.



# 8.2.2 Configuring the settings related to memory dumps

This section describes how to configure the settings related to a memory dump.

Use the following procedure when you want to change the memory dump settings to the settings recommended for this equipment. If you are already operating the system with the memory dump settings recommended for this equipment (for example, immediately after it has been shipped from the factory), you do not have to perform this procedure. Additionally, if you clicked **Yes** in the dialog box described in 8.2.1 Memory dump confirmation messages, you do not have to perform this procedure.

#### NOTE

Before starting the procedures in this section, you must sign in to the local computer as an administrator (as a member of the Administrators group).

#### (1) Configuring virtual memory

- 1. Open the Control Panel and click System and Security. Then, click System.
- 2. Under Task on the left side of the window, click Advanced system settings.
- 3. In the Advanced tab, under Performance, click Settings.
- 4. In the Performance Options window, click the **Advanced** tab.
- 5. Under Virtual memory, click Change.
- 6. Clear the Automatically manage paging file size for all drives check box.
- 7. In the **Drive** list, select the drive where the paging file that you want to change is stored. (Assuming the system drive, click **C**: here.)
- 8. Select Custom size. In the Initial size (MB) or Maximum size (MB) box, enter the new size of the paging file in megabytes. Then, click Set.

Specify the following value for both the initial size and the maximum size based on the physical memory size:

- If the physical memory size is 4 GB: 4277
- If the physical memory size is 8 GB: 8373
- If the physical memory size is 16 GB: 16565

You can check the physical memory size as follows:

- a. Open the Control Panel and click System and Security.
- b. Click System, and then check the value displayed in Memory (RAM).
- 9. Click OK.

#### (2) Specifying a memory dump file

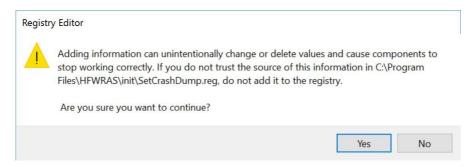
- 1. Open Control Panel and click System and Security. Then, click System.
- 2. Under Task on the left side of the window, click Advanced system settings.
- 3. In the Advanced tab, under Startup and Recovery, click Settings.
- 4. In the **Dump file** box, enter a memory dump file name.

  By default, %SystemRoot%\MEMORY.DMP is specified.

  If no changes are required, you do not need to enter anything in this box.
- 5. Select the **Overwrite any existing file** check box.
- 6. Click OK.

In addition, do the following procedure to enable collection of a complete memory dump as is recommended for this equipment.

- 1. In the C:\Program Files\HFWRAS\init folder, double-click the SetCrashDump.reg file.
- 2. The following message box appears. Click Yes.



- 3. A message box appears, indicating that information has been added successfully. Click **OK**.
- 4. The settings will be applied after the operating system restarts.

# (3) Reserve the area for saving a memory dump

Reserve the area to be used for saving a memory dump by using the createdmp command. For details, see 8.4 Maintenance Operation Commands.

# 8.3 Suppressing Startup Upon Detection of a Serious Failure

To protect the hardware, this equipment suppresses startup when one of the following incidents is detected during Windows® startup:

- 1. Fan failure
- 2. Remote shutdown signal input

#### NOTE

In the case of the preceding incident 2, startup is suppressed only when the **Enable automatic shutdown at remote shutdown input** check box is selected in the RAS Setup window. If the automatic shutdown setting is not enabled, startup is not suppressed. For details about how to use the RAS Setup window, see the *HF-W400E RAS FEATURES MANUAL*.

When the preceding incident 2 is detected, the equipment displays a blue screen and then stops. For information about the LED codes in this case, see *9.3 Bug Check Causes*.

# **8.4 Maintenance Operation Commands**

This section explains how to use the maintenance operation commands. These commands are used when problems occur in the equipment and during preventive maintenance. Run these commands from the command prompt. Table 8-3 shows a list of maintenance operation commands.

**Table 8-3 Maintenance operation commands** 

Command name	Feature	
logsave	Used to collect data for preventive maintenance or data for post-failure analysis during preventive maintenance, or when problems occur.	
mdump	Used to copy a memory dump file to portable media when a memory dump is collected due to a bug check.	
createdmp	Used to reserve storage space for a memory dump file when a message is displayed indicating that the space available for the memory dump file is insufficient.	
getrasinfo	Used for checking the status of the equipment, such as the status of the fan and the temperature inside the chassis.	

The manufacturer provides services to analyze the data collected by these maintenance operation commands, such as memory dump files and data for failure analysis, for a fee.

# 8.4.1 Log information collection command (logsave)

#### Name

logsave - Collects log information

#### Syntax

logsave [-e file-name][directory]

# Functionality

The logsave command saves data used for preventive maintenance and post-failure analysis of problems. The data is compressed and recorded as a single file with the file name logsave.zip.

The following options are available for this command. If no option is specified, the logsave directory is created directly under the system drive (usually C:\), and data is saved in that directory.

-e *file-name*: Data previously saved by the logsave command will be decompressed. For the file name, specify the absolute path of the file that you want to decompress. If you do not use this option, the logsave command will save the data.

directory: When you are not using the -e option, specify the directory in which you want to store the saved data. If this option is not used, the logsave directory is created directly under the system drive (usually C:\), and data is saved in that directory.

When you are using the −e option, specify the directory where you want to store the decompressed data. If you do not use this option, the data is decompressed in the current directory.

Table 8-4 shows the information collected by the logsave command.

Table 8-4 Information saved by the logsave command

Item	Description	
Windows® event log file	Backup of the event log file	
RAS software log data	RAS software operation log	
RAS software user settings information	User settings definition file for pop-up notifications	
Windows® version information	Version information for Windows® system files and driver files	
Minimum memory dump	Files in the minimum dump directory	
System information	System information that includes hardware resources and the software environment	
Output of the RAS information display command	Status of the equipment, such as the status of the fan and the temperature inside the chassis, as well as configuration information about the RAS software	
Output of the ipconfig command	Network setting information	
Windows® setup log	Log files from Windows® setup	

#### Diagnosis

When this command terminates with an error, the following error message appears. If a directory for storing saved data does not exist, an error message output by the Windows® xcopy command is displayed.

Table 8-5 Error messages of the logsave command

Error message	Meaning
You do not have the privilege to run this command. Please run this command again on "Administrator: Command Prompt".	You do not have administrator privileges. Sign in to the computer as an administrator, and then run the command again. If User Account Control (UAC) is enabled, open a command prompt as an administrator, and then run the command.

#### NOTE

- When you run the logsave command, sign in to the computer as an administrator (as a member of the Administrators group). You cannot run multiple instances of the logsave command simultaneously.
- Open a command prompt as an administrator to run the command.
- Log information can also be collected by selecting a program in the **Start** menu. For details, see the *HF-W400E RAS FEATURES MANUAL*.
- Double-click the saved logsave.zip file, and then verify that you can view the contents of the ZIP file. If you are unable to view the contents of the file, the ZIP file might be corrupted, so try running the command again.

# 8.4.2 Memory dump file copy command (mdump)

#### Name

mdump - Copies a memory dump file

#### Syntax

mdump[-n | -e file-name] copy-(decompression)-destination-path

#### Functionality

The mdump command compresses a memory dump file collected by Microsoft® Windows® when the equipment stops unexpectedly. The command then copies the compressed memory dump file to portable media. The dump file to be copied is specified in the **Startup and Recovery** window displayed by selecting **Control Panel**, **System and Security**, **System**, and **Advanced system settings** and then clicking **Settings** under **Startup and Recovery**.

Additionally, all files under the minimum dump directory are copied. The memory dump file is compressed and stored as a file named MEMORY.zip.

If you use the -e option, the compressed file is decompressed.

The following options are available for this command:

-n: Target files are copied without compression.

-e file-name: A file compressed by the mdump command is decompressed. You must specify the file name.

Copy destination path name: When you are not using the −e option, specify the name of the drive of the copy

destination. If you want to copy files to a subdirectory, specify the full path, including the directory name.

When you are using the -e option, specify the directory where you want to store the decompressed files.

A memory dump file is copied to the copy (decompression) destination specified by this command.

An existing file with the same name at the copy (decompression) destination will be overwritten.

When you run the mdump command by typing mdump /? or mdump -? at the command prompt or when there is an error in the specified parameters, a help message appears, indicating how to use the command.

#### Diagnosis

When this command terminates with an error, the following error message appears.

Table 8-6 Error messages of the mdump command

Message	Description
You do not have the privilege to run this command. Please run this command again on "Administrator: Command Prompt".	You do not have administrator privileges. Sign in to the computer as an administrator, and then run the command again. If User Account Control (UAC) is enabled, open a command prompt as an administrator, and then run the command.

#### NOTE

- When you run the mdump command, sign in to the computer as an administrator (as a member of the Administrators group). You cannot run multiple instances of the mdump command simultaneously.
- Open a command prompt as an administrator to run the command.
- If you run the mdump command and there is not enough free space at the copy destination, the Compressed Folders Error occurs. Ensure that there is sufficient free space comparable to the capacity of the physical memory before running the mdump command.
- Do not run the mdump command immediately after the OS starts after the blue screen appears. If you do so, the Compressed Folders Error occurs. For details, see the *HF-W400E RAS FEATURES MANUAL*.
- Double-click the saved MEMORY.zip file, and then verify that you can view the contents of the ZIP file. If you are unable to view the contents of the file, the ZIP file might be corrupted, so try running the command again.

# 8.4.3 Storage space allocation command for saving a memory dump (createdmp)

#### Name

createdmp - Reserves storage space for saving a memory dump file

#### Syntax

createdmp

#### Functionality

The createdmp command creates an empty memory dump file beforehand, and reserves storage space for saving a memory dump. This prevents memory dump collection failures due to insufficient storage capacity. You can use this command to avoid failures caused by insufficient storage capacity when collecting memory dumps.

The createdmp command reserves storage space if the following conditions are met. If these conditions are not met, the command terminates with an error. Ensure that the memory dump settings are appropriate, and then retry this command. For details about how to configure the memory dump settings, see 8.2.2 Configuring the settings related to memory dumps.

The Complete memory dump setting is enabled.

The file name of the memory dump is entered correctly.

The memory dump file can be overwritten.

After the space for the memory dump file is allocated, the partition used for allocation still has free space totaling at least 10% of the storage capacity.

The size of the allocated storage space will be the physical memory size plus 10 MB.

#### NOTE

- When you run the createdmp command, sign in to the computer as an administrator (as a member of the Administrators group). You cannot run multiple instances of the createdmp command simultaneously.
- If User Account Control (UAC) is enabled, open a command prompt as an administrator to run the command.

# Diagnosis

When this command ends normally, it terminates without outputting anything. When the command terminates with an error, one of the following error messages appears.

Table 8-7 Error messages of the createdmp command

Error message	Meaning
Error: In the current settings, memory dump file won't be saved.	A memory dump cannot be collected by using the current settings. In the memory dump settings, select the <b>Complete memory dump</b> option.
Error: Free disk space is too low.	The free storage space is insufficient. Increase the free storage space, and then try again.
Error: Systemcall failed. (%s, %x) %s: Name of the Windows API function where the error occurred %x: Error code from the Windows API	An internal error occurred.
You do not have the privilege to run this command. Please run this command again on "Administrator: Command Prompt".	You do not have administrator privileges. Sign in to the computer as an administrator, and then run the command again. If User Account Control (UAC) is enabled, open a command prompt as an administrator, and then run the command.

# 8.4.4 RAS information display command (getrasinfo)

#### Name

getrasinfo - Displays the status of the equipment, including the status of the fan and the temperature inside the chassis, as well as the RAS software configuration information.

#### Syntax

getrasinfo[/status|/setting][/efile-name]

# Functionality

The getrasinfo command displays the current status of the equipment, including the status of the fan and the temperature inside the chassis, as well as the RAS software configuration information. This information is displayed at the command prompt. This command can also store the output to a specified file in text format.

The following options are available for this command. If neither the /status nor the /setting option is used, the command displays both information about the equipment and the settings of the RAS software.

/status: Displays the current status of the equipment, including the status of the fan and the temperature inside the chassis.

/setting: Displays the configuration information of the RAS software.

/e *file-name*: The output is not displayed at the command prompt, but is instead stored in the file specified by the file name, in text format.

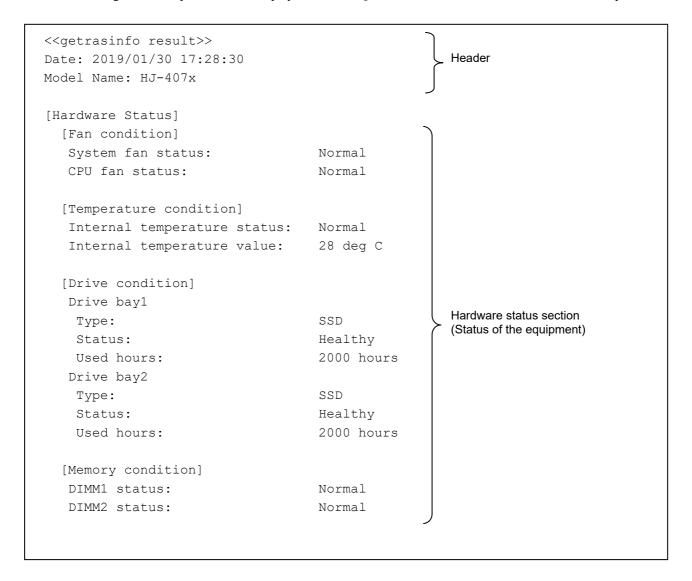
Table 8-8 shows the information displayed by the getrasinfo command.

Table 8-8 Information displayed by the getrasinfo command

Item	Description	
Status of the equipment	<ul><li> Fan status</li><li> Temperature status</li><li> Drive status</li><li> Memory status</li></ul>	
RAS software settings	<ul> <li>Automatic shutdown settings</li> <li>Watchdog timer settings</li> <li>Self-Monitoring, Analysis and Reporting Technology (SMART) settings</li> <li>Drive usage monitoring settings</li> <li>Digital LEDs for status indications settings</li> <li>Pop-up display settings</li> </ul>	

# Displayed output

The following is an example of what is displayed when the getrasinfo command is executed without options.



(Continued on the next page)

[RAS Setting]

[Automatic shutdown setting]

Fan: ON
Temperature: OFF
Remote shutdown: ON

[Watchdog timer setting]

Retrigger type:

Timeout:

Automatic

60 sec

Interval:

20 sec

[Drive failure prediction setting]

Function is available: Enable

[Drive used hours monitoring setting]
Function is available: Enable
Drive bay1: Enable
Drive bay2: Enable

[Advanced]

Time limit of drive bay1: 20000 hours Time limit of drive bay2: 20000 hours

[Digital LED setting]

Show Hardware status: ON

[Popup setting]

Function is available: Disable

[Advanced]

Fan: Enable
Temperature: Disable
SMART: Disable
Used hours: Enable
Memory: Disable
Memory Failure: Disable

RAS settings section (RAS software settings)

Explanation of the displayed output

#### ■ Header

This section shows the date and time when the getrasinfo command is executed and the model name. The following shows the contents of the header section:

<<getrasinfo result>>
Date: YYYY/MM/DD hh:mm:ss
Model Name: HJ-407x

YYYY: Year, MM: Month, DD: Day, hh: hour (24-hour clock), mm: minute, ss: second

# ■ [Hardware Status] section

This section shows the status of the equipment. The Hardware Status section has the following sections.

• [Fan condition] section

This section shows the status of fans. The following table describes the items displayed in this section and their meanings.

Output item	Description	
xx fan status: yy	xx	Shows the name of the fan. System: System fan CPU: CPU fan
	уу	Shows the status. Normal: The fan is normal. Error: The fan is not normal.

# • [Temperature condition] section

This section shows the various statuses related to temperature. The following table describes the items displayed in this section and their meanings.

Output item		Description
xx Temperature status: yy	xx	Shows the type of temperature. Internal: Inside the chassis
	уу	Shows the status. Normal: The temperature is normal. Error: The temperature is not normal.
xx Temperature value: zz	xx	Shows the type of temperature. Internal: Inside the chassis
	ZZ	Shows the temperature value.

# ullet [Drive condition] section

This section shows the status of a drive. The following table describes the items displayed in this section and their meanings.

	Output item	Description	
Drive bayxx xx		xx	Shows the drive bay number.
	Type: ww	ww	Shows the drive type.
	Status: yy	уу	Shows the status of the drive.  Healthy: Normal  Not Connected: No drives are installed.  Smart Detected: SMART is detected.  Overrun: Drive usage hours exceeded the threshold.  Unknown: Unknown status  Smart Detected, Overrun: SMART is detected, and
	Used hours: zz	ZZ	the drive usage hours exceeded the threshold.  Shows the drive usage hours.

ullet [Memory condition] section

This section shows the status of the main memory. The following table describes the items displayed in this section and their meanings.

Output item	Description	
xx status: yy	xx	Shows the memory slot name.  DIMM1: DIMM1  DIMM2: DIMM2
	уу	Shows the status of the memory.  Normal: The memory is normal.  Error: Error corrections occur frequently.  Not Mounted: No memory modules are installed.

# ■ [RAS Setting] section

This section shows the settings of the RAS software. The RAS Setting section has the following sections.

• [Automatic shutdown setting] section

This section shows the automatic shutdown setting. The following table describes the items displayed in this section and their meanings.

Output item	Description		
Fan: xx	xx Shows whether the system automatically shuts down when a fan failure occurs.  ON: Automatically shuts down.  OFF: Does not automatically shut down.		
Temperature: yy	уу	Shows whether the system is automatically shuts down when the temperature is abnormal.  ON: Automatically shuts down.  OFF: Does not automatically shut down.	
Remote shutdown: zz	zz	Shows whether the system automatically shuts down when a remote shutdown signal is input to the contact.  ON: Automatically shuts down.  OFF: Does not automatically shut down.	

• [Watchdog timer setting] section

This section shows the watchdog timer setting. The following table describes the items displayed in this section and their meanings.

Output item	Description		
Retrigger type: xx	xx	Shows the retrigger type. Automatic: Automatically retriggered. Application: Retriggered by an application. Not used: Not used.	
Timeout: yy	уу	Shows the timeout time when the watchdog timer is automatically retriggered.	
Interval: zz	ZZ	Shows the interval of retriggering when the watchdog timer is automatically retriggered.	

 $\hbox{$\bullet$ [Drive failure prediction setting] section } \\ This section shows the Self-Monitoring, Analysis and Reporting Technology (SMART) setting. The following }$ 

Output item	Description	
Function is available: xx	xx	Shows whether the Self-Monitoring, Analysis and Reporting Technology (SMART) is enabled or disabled. Enable: Enabled For the HF-W400E, this setting is always set to Enable.

• [Drive used hours monitoring setting] section

table describes the item displayed in this section.

This section shows the drive usage monitoring setting. The following table describes the items displayed in this section and their meanings.

Output item	Description	
Function is available: xx	xx	Shows whether the drive usage monitoring feature is enabled or disabled. Enable: Enabled Disable: Disabled
Drive bay1: yy	уу	Shows whether the monitoring feature for the usage time of drive bay 1 is enabled or disabled.  Enable: Enabled  Disable: Disabled
Drive bay2: ww	ww	Shows whether the monitoring feature for the usage time of drive bay 2 is enabled or disabled.  Enable: Enabled  Disable: Disabled
[Advanced]		Shows the advanced settings.
Time limit of drive	уу	Shows the drive bay number.
bay <i>yy: zz</i>	ZZ	Shows the threshold used for the drive usage monitoring feature.

• [Digital LED setting] section

This section shows the setting of the digital LEDs for status indications. The following table describes the item displayed in this section.

Output item	Description	
Show Hardware status: xx	xx Shows whether the hardware status display is enabled or disabled. ON: Enabled OFF: Disabled	

# • [Popup setting] section:

This section shows the pop-up notification settings. The following table describes the items displayed in this section and their meanings.

Output item		Description		
Function is available: xx		Shows whether the pop-up notifications feature is enabled or disabled.  Enable: Enabled  Disable: Disabled		
[Advanced]		Shows the advanced settings.		
Fan: yy	уу	Shows whether pop-up notifications are displayed for fan failures. Enable: Displayed Disable: Not displayed		
Temperature: zz	ZZ	Shows whether pop-up notifications are displayed when the temperature is abnormal.  Enable: Displayed  Disable: Not displayed		
SMART: aa	aa	Shows whether pop-up notifications are displayed when SMART is detected. Enable: Displayed Disable: Not displayed		
Used hours: bb	bb	Shows whether pop-up notifications are displayed when the drive usage hours exceed the threshold.  Enable: Displayed  Disable: Not displayed		
Memory: dd	dd	Shows whether pop-up notifications are displayed when frequent memory error corrections are detected.  Enable: Displayed  Disable: Not displayed		
Memory Failure: ee	ee	Shows whether pop-up notifications are displayed when a potential memory failure is detected.  Enable: Displayed  Disable: Not displayed		

## Diagnosis

When the getrasinfo command ends normally, it returns exit code 0. When the command terminates with an error, the command displays one of the following error messages, and returns exit code 1.

Table 8-9 Error messages of the getrasinfo command

Error message	Meaning
Usage: getrasinfo [/status   /setting] [/e File]	There is an error in the specified options. Specify the options correctly.
An error occurred in %s. errorcode=%x %s: Name of the Windows API function or internal function where the error occurred %x: Error code from the Windows API or internal function	An internal error occurred. Rerun the command.
You do not have the privilege to run this command. Please run this command again on "Administrator: Command Prompt".	You do not have administrator privileges. Sign in to the computer as an administrator and run the command again. If User Account Control (UAC) is enabled, open a command prompt as an administrator, and then run the command.

## NOTE

- When you run the getrasinfo command, sign in to the computer as an administrator (as a member of the Administrators group). You cannot run multiple instances of the getrasinfo command simultaneously.
- Open a command prompt as an administrator to run the command.
- When you are using the /e option, an existing file with the same name at the output destination will be overwritten.
- If the command fails to acquire some of the information to be output, it is possible that only a section name will appear in a section, or part of the information will be replaced with ---. In this case, rerun the command.
- When a drive is newly connected or replaced due to maintenance or other reasons, recognition of the drive may take some time upon the first startup after it is connected. Additionally, Not Connected might appear for Status of the Drive condition section. In this case, restart the computer.

# **CHAPTER 9 TROUBLESHOOTING**

This chapter describes the possible causes of common problems and the actions to take to address them. First select the relevant symptom from the list in 9.1 List of Problems. Then, see the references to other sections 9.2 Causes and Countermeasures to 9.6 Digital LEDs for Status Indications and take action according to the instructions. If following the instructions in 9.2 Causes and Countermeasures does not resolve the problem, contact the system administrator or maintenance personnel.

# **!** WARNING

In the case of smoke, a burning smell, or a similar problem, stop the supply of power to the equipment, and unplug the power cord from the DC input connector on the rear side of the main unit. Then, contact your supplier or maintenance personnel. Using faulty equipment without repairing it might result in a fire or an electric shock.

# 9.1 List of Problems

The following sections list problems that can occur in the equipment. See the relevant item in the following list, find the cause, and then take action as appropriate.

# 9.1.1 Problems that occur before OS startup

This section provides a list of problems that occur before the desktop appears (before the OS starts up). For information about the names of the lamps on the front panel, see 1.4 Names and Functions of Parts.

#### (1) The equipment does not start.

Plug the power cord into the outlet, and then check the operation of the equipment in the order of the following steps 1 to 7. If any of the items in the steps apply, follow the appropriate reference. (If multiple items apply, the one appearing first takes precedence.)

- 1. The fans do not rotate and the status lamp of the main unit does not turn on. (See page 9-3.)
- 2. When the power switch is turned on, the fans rotate and the status lamp is lit, but the status indication LEDs and the digital LEDs for status indications do not display anything. (See page 9-3.)
- 3. The digital LEDs for status indications show alphanumeric characters, and the system stops.

	(See page 9-3.)
4. The screen is blank.	(See page 9-4.)
5. The screen shows an error message, and the system stops.	(See page 9-4.)
6. The system stops when the Windows® logo is displayed.	(See page 9-5.)
7. The system stops when a blue screen is displayed.	(See page 9-5.)
(2) Beeping sounds are generated.	(See page 9-5.)
(3) The BIOS setup menu cannot be opened.	(See page 9-6.)
(4) The remote power-on feature cannot be activated through the RAS external contact.	(See page 9-6.)
(5) Wake-on-Lan (WOL) cannot be used.	(See page 9-6.)

# 9.1.2 Problems that occur after OS startup

This section provides a list of problems that occur after the Windows® logo is displayed and the desktop appears (after the OS starts up).

(1)	The alarm lamp is lit and the digital LEDs for status indications show alphanumeric charact	ers. Alternatively,
	only the digital LEDs for status indications show alphanumeric characters.	(See page 9-7.)
(2)	The processing speed of the equipment is slow.	(See page 9-8.)
(3)	The equipment is unresponsive.	(See page 9-8.)
(4)	The equipment automatically goes into standby mode or restarts.	(See page 9-9.)
(5)	The screen flickers, nothing is displayed, or the display is incorrect.	(See page 9-10.)
(6)	In the screen resolution settings, an unconnected display appears.	(See page 9-10.)
(7)	The screen display blinks, or in some cases the contents of the screen are displayed again af	ter blacking out.
		(See page 9-11.)
(8)	A blue screen appears or appeared.	(See page 9-11.)
(9)	The equipment is unable to connect to the network.	(See page 9-12.)
(10)	The network connection is disconnected frequently, or the connection speed is slow.	
		(See page 9-12.)
(11)	Keyboard input is not accepted.	(See page 9-13.)
(12)	Mouse input is not accepted, or the cursor or a button does not work normally.	(See page 9-14.)
(13)	A USB device (other than a keyboard or mouse) cannot be recognized or does not operate.	(See page 9-14.)
(14)	No sound is generated, or the sound is extremely faint.	(See page 9-15.)
(15)	A serial port does not operate properly.	(See page 9-15.)
(16)	The RAS external contact port does not operate properly.	(See page 9-15.)
(17)	The equipment cannot be shut down.	(See page 9-16.)

# 9.2 Causes and Countermeasures

# 9.2.1 Problems that occur before OS startup

- (1) The equipment does not start.
  - 1. The fans do not rotate and the status lamp of the main unit does not turn on.

Possible cause

Power is not being supplied to the equipment.

Action

- 1. Make sure that the DC input connector is properly connected to the main unit.
- 2. Remove the DC input connector from the main unit.
- 3. Make sure that the DC output voltage of the power supply unit or AC adapter (optional) is normal.
- 4. Make sure that the circuit breaker on the power distribution panel is on.
- 5. After steps 1 to 4 are finished, connect the DC input connector to the main unit.
  - → When the equipment starts, the fans rotate and the status lamp turns on.
  - 2. When the power switch is turned on, the fans rotate and the status lamp is lit, but the status indication LEDs and the digital LEDs for status indications do not display anything.

Possible cause

The equipment has failed.

Action

- 1. Contact your system administrator or maintenance personnel.
  - 3. The digital LEDs for status indications show alphanumeric characters, and the system stops.

Possible cause

An error was detected during POST.

- 1. See 9.6.1 POST display and take appropriate action.
  - → When the equipment recovers, the alphanumeric characters on the digital LEDs for status indications disappear, and the OS starts.

4. The screen is blank.

Possible cause

The display has a problem.

#### Action

- 1. Make sure that the power switch of the display is on.
- 2. Make sure that the power cord for the display is plugged into an outlet.
- 3. Make sure that the equipment and the display are connected through a display interface cable.
- 4. Review the display settings. For information about the display settings, see the manual attached to the display.
  - 5. The screen shows an error message, and the system stops.

Possible cause

The battery is dead, no SSDs are installed, or the OS is corrupted.

## Action

- 1. If one of the following error messages is displayed, take the corresponding action:
  - Error: Remove Battery or Clear CMOS, Load default value
    - → If this message is displayed each time the equipment starts, the battery is dead.

Contact your system administrator or maintenance personnel.

- Operating System not found
  - → There is an error in an SSD or the OS. Check the following items:
    - i) Check whether a USB CD, USB FD, or USB boot device is connected to the equipment.
      - → If a USB CD, USB FD, or USB boot device is connected, disconnect it.
    - ii) Make sure that an SSD is fully inserted into drive bay 1 and is secured by screws.
      - $\rightarrow$  If the SSD is set properly, it is recognized on the BIOS screen. (See 5.6 BIOS Setup.)
    - iii) If you have recovery DVDs, use them to restore the system to its factory default settings.

6. The system stops when the Windows® logo is displayed.

Possible cause

There is an error in the hardware or the OS is corrupted.

Action

- 1. Unplug the power cord from the outlet and remove all USB devices except for the keyboard and mouse. Then, plug the power cord into an outlet again and start the equipment.
- 2. If the symptom persists after step 1, the OS might be corrupted. If you have recovery DVDs, use them to restore the system to its factory default settings, and use backup data to restore the system.

## NOTE

- Do not connect a USB device during OS startup, because the OS might not start normally.
- Depending on the CPU switching device, changing screens during OS startup might cause the OS to fail to start normally. If you use a CPU switching device, sufficiently verify operation.
- 7. The system stops when a blue screen is displayed.

Possible cause

The equipment received a remote shutdown signal input.

Action

- 1. Take appropriate action by referring to 8.3 Suppressing Startup Upon Detection of a Serious Failure and 9.3 Bug Check Causes.
- (2) Beeping sounds are generated.
  - a) One beep is generated.

Possible cause

A single beep is part of the normal power-on sequence. It is not an error indication.

b) Two or more beeps are generated.

Possible cause

A hardware error was detected.

Action

1. Check the information displayed by the digital LEDs for status indications, and take appropriate action by referring to 9.6.1 POST display.

Possible cause
Keyboard input is not accepted.
Action —
Disconnect the keyboard cable and securely reconnect it to ensure a stable connection.
2. Connect the keyboard cable to another port.
(4) The remote power-on feature cannot be activated through the RAS external contact.
Possible cause
The remote power-on feature is disabled.
Action
1. Enable the remote power-on feature by referring to 6.6 Enabling the Remote Power-On Feature.
1. Enable the femole power-on realtife by felefining to 0.0 Enabling the Remote I ower-on Fedure.
(5) Wake-on-Lan (WOL) cannot be used.
Possible cause
The WOL feature is disabled.
— Action —
1. Check which OS is being used. The WOL feature might be unavailable depending on the OS specifications.
2. Enable the WOL feature by referring to 2.6.1 Enabling the Wake-on-LAN (WOL) feature.

(3) The BIOS setup menu cannot be opened.

# 9.2.2 Problems that occur after OS startup

(1) The alarm lamp is lit and the digital LEDs for status indications show alphanumeric characters. Alternatively, only the digital LEDs for status indications show alphanumeric characters.

Possible cause

This is a hardware error notification from the RAS software, or is being displayed by a user application.

- 1. If one of the status indication LEDs is lit red, this is a hardware error notification from the RAS software. Check the display on the digital LEDs for status indications.
  - If 12 or 13 is displayed on the digital LEDs for status indications:
    - → The rotation of a fan is abnormal. (12 indicates a system fan failure, and 13 indicates a CPU fan failure.) Perform the following actions:
      - i) Make sure that no foreign objects are interfering with the fan.
        - → If foreign objects interfere with the fan, the cooling efficiency inside the equipment will be reduced. Remove any foreign objects.
      - ii) Make sure that the power cord for the fan is connected to a power supply connector.
        - → A loose connection might have caused the symptom. Remove the power cord for the fan from the power supply connector, and then reconnect it.
  - If 21 is displayed on the digital LEDs for status indications:
    - → The temperature is abnormal. Perform the following actions:
      - i) Make sure that the dust filter at the front of the equipment and the exhaust outlet at the rear are not clogged.
        - → If they are clogged, clean the dust filter and the air intake and exhaust holes. If necessary, replace the dust filter.
      - ii) Make sure that sufficient clearance is provided around the equipment. (See 1.5.2 Installation.)
        - → If clearance is insufficient, provide sufficient clearance around the equipment.
      - iii) Make sure that the temperature of the installation environment (the ambient temperature) is less than 40°C.
        - → Remove obstacles to airflow or use air-conditioning to keep the ambient temperature lower than 40°C.
  - If 31 or 32 is displayed on the digital LEDs for status indications:
    - → A failure is predicted for the drive. (31 indicates the drive in the drive bay 1 and 32 indicates the one in the drive bay 2.) We recommend that you back up the data on the drive and replace the drive.

(2) The processing speed of the equipment is slow.

Possible cause

The capacity of the memory or the SSDs is not sufficient.

Action

- 1. Close any unnecessary applications to increase the available memory.
  - → To check the CPU and memory usage, follow the instructions in 9.5 Checking the System Load by Using Performance Monitor.
- 2. Delete any unnecessary files to increase free space on the SSDs.
- (3) The equipment is unresponsive.

Possible cause

There is a hardware or software malfunction.

Action

- 1. The screen can appear to be frozen when an application freezes. If the equipment responds when you press **Alt+Tab** or **Ctrl+Alt+Delete**, try performing the following procedure:
  - i) Switch applications by pressing Alt+Tab, and identify which application is frozen.
  - ii) After you identify the frozen application, use Task Manager to terminate the application. To open Task Manager, press Ctrl+Alt+Delete to open the Windows Security window, and then click Task Manager.
  - iii) Restart the equipment.
- 2. Press the NMI switch to collect a memory dump. If you want to have an analysis performed on the memory dump (a service provided for a fee), restart the equipment and save the log (see 8.4 Maintenance Operation Commands). Then, contact one of our sales representatives. If the restart is not performed automatically, turn off the power of the equipment by referring to the following section (Forcibly terminating the equipment).
- 3. If you cannot collect a memory dump after following the instructions in step 2, turn off the power of the equipment by referring to the following section (*Forcibly terminating the equipment*).
- 4. If performing steps 1 and 2 does not resolve the problem, turn off the power, remove all USB devices except for the keyboard and mouse, and then start the equipment.

#### Forcibly terminating the equipment

If you are unable to shut down the equipment by using the preceding methods, press the power switch for at least four seconds. The power will turn off and the equipment will go into standby mode.

- (4) The equipment automatically goes into standby mode or restarts.
  - a) The digital LEDs for status indications show alphanumeric characters and the system goes into standby mode. Possible cause

This is a hardware error notification from the RAS software or it is being displayed by a user application.

Action

- 1. Check the display on the digital LEDs for status indications.
  - If the status indication LEDs are lit red, the RAS software has detected a hardware abnormality. See 9.6.1 POST display and take appropriate action.
  - If the status indication LEDs are lit green, a user application is using the LEDs to display characters. Contact your system administrator or maintenance personnel.
  - b) A warning or error message is recorded in the event log.

Possible cause

There is a hardware or software malfunction.

Action

- 1. Check the description of the messages in the System or Application category in the event log and take action accordingly. (See 9.4 Event Log.)
- 2. If the source of the message is a component purchased by the user, contact the supplier.
  - c) Neither a nor b

Possible cause

There is a problem with a cable connection, or the power supply is unstable.

- 1. Make sure that the power cord is securely plugged into an outlet.
- 2. If the symptom persists after step 1, the power supply might be unstable. Verify that the power voltage is appropriate.

(5) The screen flickers, nothing is displayed, or the display is incorrect.

Possible cause

There is a display or video card malfunction.

Action

- 1. Make sure that the display power cord is plugged into an outlet.
- 2. Make sure that the equipment and the display are securely connected through a display interface cable. (Verify that the cable connection is not loose.)
- 3. Replace the display interface cable with a new one. (Check whether the cable is broken.)
- 4. Review the display settings. For information about how to adjust the display, see the manual attached to the display.
- 5. If you are using a display that supports the MST (Multi Stream Transport) technology of DisplayPort, perform the following procedure. (See the manual attached to the display for the setting details.)
  - i) If the display can be switched between DisplayPort 1.1 and DisplayPort 1.2, select DisplayPort 1.2.
  - ii) If the display's MST setting can be changed, set it to Primary.

#### NOTE

If MST is enabled, the **DisplayPort topology** item appears when you right-click the desktop window.

(6) In the screen resolution settings, an unconnected display appears.

Possible cause

An unconnected display is shown due to OS specifications.

- 1. Right-click the desktop to display the menu, and then click Screen resolution in the displayed menu.
- 2. In the screen resolution setting window, select the unconnected display.
- 3. Under **Multiple Displays**, select **Delete this display**. If this setting change is not applied, click **Apply** to delete the unconnected display.
- 4. If multiple unconnected displays are shown, repeat steps 2 and 3.

(7) The screen display blinks, or in some cases the contents of the screen are displayed again after blacking out.

Possible cause

Windows<sup>®</sup> is performing a process to correctly recover the graphics feature if the graphics driver is taking time to respond due to a high load on the system or other reasons.

## Action

- 1. If this phenomenon occurs, when the balloon message Response stop and recovery of display driver appears or when a warning log of event ID 4101 is recorded in the event log, reduce the system load. Then, use the system under a load that will not cause this kind of indication or recording.
- (8) A blue screen appears or appeared.

Possible cause

There is an OS or equipment malfunction.

- 1. If the blue screen is still being displayed, record the cause code (0x00000080 or similar) or distinguishable name (NMI HARDWARE FAILURE or similar).
- 2. If you cannot record the cause code, search the System category in the event log for the cause code.
- 3. Check the description in 9.3 Bug Check Causes to determine what caused the memory dump to be collected.
- 4. To request an analysis of the memory dump (a service provided for a fee), save the log after you restart the equipment (see 8.4 Maintenance Operation Commands) and contact one of our sales representatives.

(9) The equipment is unable to connect to the network.

#### Possible cause

There is an error in the settings of the LAN or the network device (the hub or another device), or there is a problem with the cable connection.

## Action

- 1. Review the network settings by referring to the instructions in 2.7 Setting Up the LAN Interface.
- 2. Disconnect the LAN cable and securely reconnect it to ensure a stable connection.
- 3. Make sure that the LAN cable is connected to the correct port.
- 4. Replace the LAN cable with another LAN cable.
- 5. If using a network device, perform the following procedure:
  - i) Make sure that the power of the network device is on.
  - ii) Turn on the power of the network device before turning on the power of this equipment.
  - iii) Check the operation by replacing the network device with another one.
- (10) The network connection is disconnected frequently, or the connection speed is slow.

#### Possible cause

There is an error in the settings of the LAN or the network device, or there is a problem with the cable connection.

- 1. Review the network settings by referring to the instructions in 2.7 Setting Up the LAN Interface.
- 2. Disconnect the LAN cable and securely reconnect it to ensure a stable connection.
- 3. Make sure that the LAN cable is connected to the correct port.
- 4. Replace the LAN cable with another LAN cable.
- 5. If using a network device, perform the following procedure:
  - i) Turn on the power of the network device before turning on the power of this equipment.
  - ii) Check the operation by replacing the network device with another one.

(11) Keyboard input is not accepted.

Possible cause

An application has frozen, there is a problem with the cable connection, or the keyboard has failed.

Action

1. Keyboard input might not be accepted temporarily due to a frozen application.

If the equipment responds to Alt+Tab or Ctrl+Alt+Delete, try the following procedure:

- i) Switch applications by pressing **Alt+Tab** and identify which application has frozen.
- ii) After you identify the frozen application, use Task Manager to terminate the application. To start Task Manager, press Ctrl+Alt+Delete to open the Windows Security window, and then click Task Manager.
- iii) Restart the equipment.
- 2. Disconnect the keyboard interface cable and securely reconnect it to ensure a stable connection.
- 3. Connect the keyboard interface cable to another port.
- 4. Check the operation by replacing the keyboard with another one.
- 5. Restart the equipment.

(12) Mouse input is not accepted, or the cursor or a button does not work normally.

#### Possible cause

The mouse does not work properly due to dust or dirt on the mouse, there is a problem with the cable connection, or the mouse has failed.

#### Action

- 1. If you are using an optical mouse, perform the following procedure:
  - i) Check whether dust or dirt is clinging to the optical sensor. If dust or dirt is present, clean it off.
  - ii) Do not use an optical mouse on glass, a mirror, or a shiny material. (We recommend using a mouse pad designed for use with an optical mouse.)
- 2. If you are using a mouse that is not an optional component provided by the manufacturer, see the manual attached to the mouse for information about how to use it.
- 3. Disconnect the mouse interface cable and securely reconnect it to ensure a stable connection.
- 4. Check the operation by replacing the mouse with another one.
- 5. If you are using a CPU/USB switching device, read the user's documentation that comes with the CPU/USB switching device. The problem might be alleviated if you change settings such as emulation settings.
- 6. If the OS starts while a serial port is receiving data, use the serial port after the OS starts instead, and check whether the problem goes away.
- (13) A USB device (other than a keyboard or mouse) cannot be recognized or does not operate.

## Possible cause

There is a problem with the cable connection, or the device driver for the USB device has not been installed.

- 1. Disconnect the cable for the USB device and securely reconnect it to ensure a stable connection.
- 2. Replace the cable for the USB device with another cable.
- 3. If the USB device you are using requires the installation of a device driver, install the device driver by referring to the manual attached to the USB device, and then restart the equipment.
- 4. If the USB device you are using requires an external power supply, make sure that the power cord of the USB device is plugged into an outlet.
- 5. If the USB device you are using uses bus power, make sure that the current consumption of the USB device does not exceed the specified maximum current for the USB port of the equipment. (See 5.1 (6) Maximum current specifications.) If the USB device can accept an external power supply, connect the device to an external power supply.
- 6. If steps 1 to 5 do not resolve the symptom, a failure of the USB device might be the cause. Take action by referring to the manual attached to the USB device.

(14) No sound is generated, or the sound is extremely faint.

#### Possible cause

There is an error in the settings of the equipment or the speakers, there is a problem with the cable connection, or the speakers have failed.

#### Action

- 1. Adjust the volume of the equipment to an appropriate level. (See Setting the volume.)
- 2. When you use speakers, perform the following procedure:
  - i) Make sure that the speakers have amplifiers.(If the speakers do not have amplifiers, you cannot hear sound.)
  - ii) Make sure that the power cord of the speakers is plugged into an outlet.
  - iii) Turn on the power of the speakers.
  - iv) Make sure that the volume level of the speakers is adequately adjusted.
  - v) Make sure that the cable from the speakers is connected to LINE OUT of the equipment.
  - vi) When you record an audio signal from an audio device, connect LINE OUT of the audio device to LINE IN of the equipment by using a cable. (LINE IN cannot be used for MIC input.)
  - vii) Disconnect the cable from the speakers and securely reconnect it to ensure a stable connection.
  - viii) Replace the speakers with other speakers.

## Setting the volume

- 1. Open the Control Panel, and then click **Hardware and Sound**.
- 2. Click **Adjust system volume** to adjust the volume.
- (15) A serial port does not operate properly.

Possible cause

There is a problem with the cable connection, or the destination device has failed.

#### Action

- 1. Disconnect the cable and securely reconnect it to ensure a stable connection.
- 2. Check to see if the destination device has failed.
- 3. If the OS starts while a serial port is receiving data, use the serial port after the OS starts instead to check whether the problem goes away.
- (16) The RAS external contact port does not operate properly.

Possible cause

There is a problem with the cable connection or the interface with the destination device.

- 1. Disconnect the cable and securely reconnect it to ensure a stable connection.
- 2. See 5.8.2 External contact specifications and confirm that the external contact specifications are met.

- (17) The equipment cannot be shut down.
  - a) The drive access lamp is lit or blinks.

Possible cause

The shutdown process is simply taking a long time.

Action

- 1. Wait until the shutdown process finishes.
- b) Something other than a

Possible cause

The OS has frozen.

Action

- 1. Press the NMI switch to collect a memory dump. If you want to have an analysis performed on the memory dump (a service provided for a fee), restart the equipment and save the log (see 8.4 Maintenance Operation Commands). Then, contact one of our sales representatives. If the restart is not performed automatically, turn off the power of the equipment by referring to the following section (Forcibly terminating the equipment).
- 2. If you cannot collect a memory dump after following the instructions in step 1, turn off the power of the equipment by referring to the following section (*Forcibly terminating the equipment*).
- 3. If performing step 1 does not resolve the problem, turn off the power, remove all USB devices except for the keyboard and mouse, and then start the equipment.

## Forcibly terminating the equipment

If you are unable to shut down the equipment by using the preceding methods, press the power switch for at least four seconds. The power will turn off and the product will go into standby mode.

# 9.3 Bug Check Causes

Bug check causes are the events that cause a bug check (blue screen) to occur.

These values are logged to a memory dump file when a blue screen occurs, and a distinguishable name (NMI HARDWARE FAILURE or WHEA UNCORRECTABLE ERROR) appears on the screen.

In addition, the digital LEDs for status indications that are installed in this equipment show codes that correspond to the causes of bug checks (blue screens).

There are multiple possible bug check causes. You can find detailed information about the specific cause in the event log (event ID: 800, source: HFWRAS SYS).

Table 9-1 List of codes for bug check (blue screen) causes

No.	Code	Cause	Action
1	Fb	An NMI occurred because the NMI switch was pressed.	The cause is recorded in the event log. Take action by referring to <i>Table 9-2 List of actions</i> for bug checks (blue screens). If nothing is recorded in the event log, contact the system administrator or maintenance personnel.
2	F8 or F9	An NMI occurred due to a parity error in a location such as the PCI or LPC bus.	
3	FA	An uncorrectable memory error occurred.	
4	80	When Windows® started, a remote shutdown input was detected.     Another problem occurred.	For causes related to remote shutdowns, contact the system administrator or maintenance personnel.

Table 9-2 List of actions for bug checks (blue screens)

Contents logged in the event log (event ID: 800, source: HFWRAS_SYS)	Cause	Action
A reset signal was input. Detailed code = 0x9201	Forced recovery from CPU lock	Check whether the NMI switch was pressed before the message appeared.
An uncorrectable error occurred at DIMM2. Detailed code = 0x9217	Uncorrectable memory error	Verify that the main memory is correctly installed. If this error still occurs with the main memory correctly installed, the error might be due to a main memory failure.
An uncorrectable error occurred at DIMM1.  Detailed code = 0x9218		Contact the system administrator or maintenance personnel.

# 9.4 Event Log

When a critical event occurs, for example, when the environment information changes or when a remote shutdown request is generated, this equipment collects logs by using the Windows® event log feature.

To check the event log:

- 1. Open the Control Panel, and click System and Security and then View event logs.
- 2. The Event Viewer window opens. Select **Windows Logs** and then select **System** or **Application** to check the system log or application log.

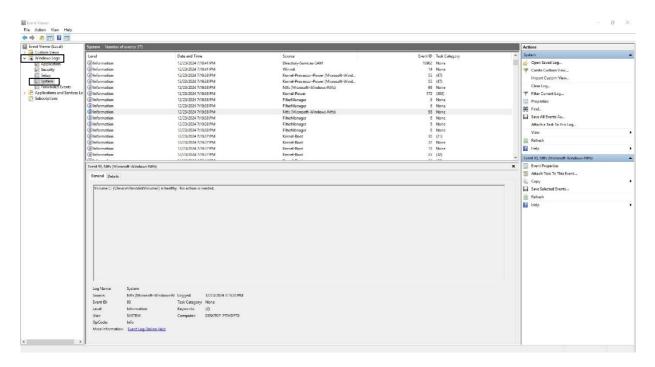


Table 9-3 lists the event log entries that are specific to this equipment. Nos. 1 to 15 and Nos. 18 to 31 are collected in the system log, and Nos. 16 and 17 are collected in the application log.

Table 9-3 Event log entries specific to the equipment (1/2)

No.	Event ID	Source	Туре	Description	Action
1	259	HFWRAS_SYS	Warning	The temperature exceeded the specified value.	Read the description of abnormal temperature in 9.2.2 (1) and take action accordingly.
2	260	HFWRAS_SYS	Information	A remote shutdown request occurred.	No action required.
3	263	HFWRAS_SYS	Information	The temperature returned to the specified value.	No action required.
4	265	HFWRAS_SYS	Warning	A hardware failure might be imminent on the drive (%2) in drive bay %1.	We recommend that you back up the data and replace the drive.
5	266	HFWRAS_SYS	Error	The CPU fan speed decreased significantly.	Read the description of fan failure in 9.2.2 (1) and take action accordingly.
6	267	HFWRAS_SYS	Information	The CPU fan speed returned to normal.	No action required.
7	268	HFWRAS_SYS	Error	The computer shut down because the temperature became unsafe.	Read the description of abnormal temperature in 9.2.2 (1) and take action accordingly.
8	270	HFWRAS_SYS	Information	The usage hours on the drive in drive bay %1 exceeded the specified value.	We recommend that you back up the data and replace the drive.
9	277	HFWRAS_SYS	Error	The system fan speed decreased significantly.	Read the description of fan failure in 9.2.2 (1) and take action accordingly.
10	278	HFWRAS_SYS	Information	The system fan speed returned to normal.	No action required.
11	524	HFWRAS_SYS	Information	Under the current settings, the memory dump file is not saved. %1	See 8.2.1 and take action, or see 8.2.2 and change the settings manually.

Table 9-3 Event log entries specific to the equipment (2/2)

No.	Event ID	Source	Туре	Description	Action
12	525	HFWRAS_SYS	Information	In DIMM%1, error corrections have been occurring at a high frequency.	The DIMM might have failed. Contact your system administrator or maintenance personnel.
13	539	HFWRAS_SYS	Error	The %1 monitor finished.	Hardware monitoring of the RAS software has been terminated. If restarting the equipment does not resolve the error, contact the system administrator or maintenance personnel.
14	540	HFWRAS_SYS	Information	In DIMM%1, the number of single-bit errors that have been detected since the OS started is %2 (comparison with last time: %3).	No action required.
15	541	HFWRAS_SYS	Warning	DIMM%1 might have failed.	The DIMM might have failed. Contact the system administrator or maintenance personnel.
16	769	HFWRAS_APP	Error	An error occurred in the $\%1$ function. Error code = $\%2$ .	An error was generated while the RAS software was running. If restarting the equipment does not resolve the error, contact the system administrator or maintenance personnel.
17	771	HFWRAS_APP	Error	Because the registry value %1 is incorrect, it will be changed to the default value %2.	If restarting the equipment does not resolve the error, contact the system administrator or maintenance personnel.
18	800	HFWRAS_SYS	Information	%1 Detailed code = %2.	A bug check event occurred. Check the details and contact the system administrator or maintenance personnel.
19	900	HFWRAS_SYS	Information	The power shutdown factor code is %1.	A power shutdown occurred. Contact the system administrator or maintenance personnel.

- No. 4 %1 denotes the drive bay number. %2 denotes the manufacturer and the model name of the drive.
- No. 8 %1 denotes the drive bay number.
- No.11 %1 stores the cause of the record in message format. One of the following messages is recorded.

%1
Write debugging information is not set to Complete memory dump.
Overwrite any existing file is disabled.
The size of the paging file is insufficient.
No memory dump file exists or the size of the memory dump file is insufficient.

- No. 12 %1 denotes the slot number of the DIMM.
- No. 13 %I records one of the following values:

  FAN, TEMP, RMTSTDN, MEM, CPU, TEMPLOG, WDT, SMART, USETIME, RASLOG, INTERNAL LOGD
- No. 14 %1 indicates the DIMM slot number. %2 indicates the total number of times that a single-bit error has been detected.
  - %3 indicates the difference compared to the last time that the total number of times that a single-bit error has been detected was recorded.
- No. 15 %1 indicates the DIMM slot number.
- No. 16 %1 indicates the name of the function that terminated with an error. %2 denotes the error code.
- No. 17 %1 indicates the value of a registry key that has an incorrect value. %2 denotes the default value of the registry key.
- No. 18 %1 and %2 record one of the following combinations:

%1	%2
A reset signal was input.	0x9201
A PCI parity error occurred.	0x9202
An uncorrectable error occurred in DIMM2.	0x9217
An uncorrectable error occurred in DIMM1.	0x9218

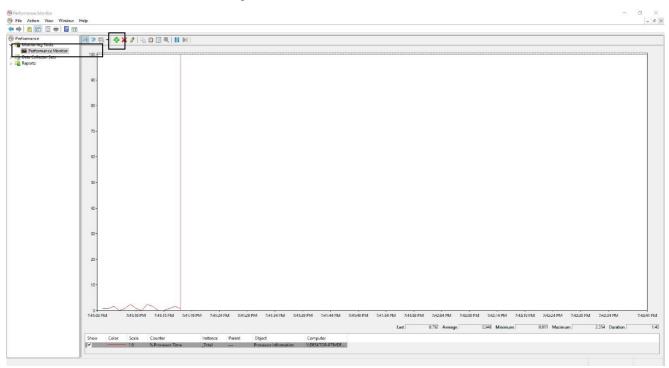
No. 19 %1 denotes the power shutdown factor code.

# 9.5 Checking the System Load by Using Performance Monitor

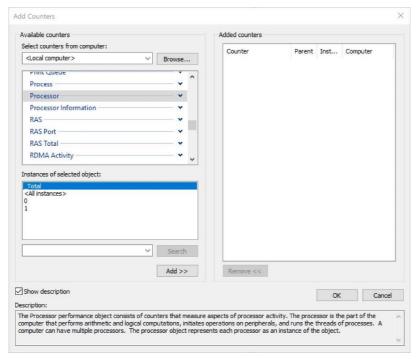
The Performance Monitor tool that comes with Windows® is used to monitor the usage of the CPU and memory. Use this tool when, for example, you want to analyze the system load.

To start Performance Monitor:

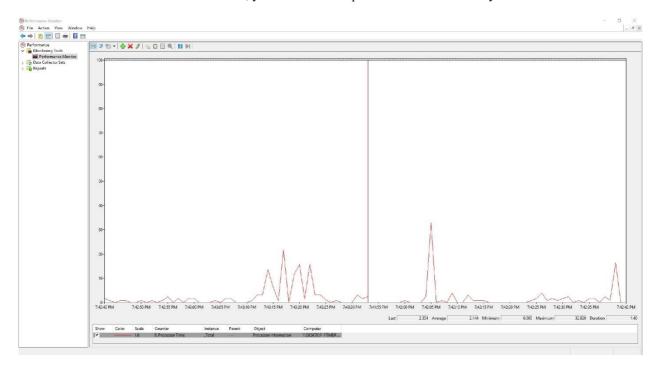
- 1. Click Start, Control Panel, System and Security, and Administrative Tools.
- 2. Double-click **Performance Monitor**.
- 3. The Performance Monitor window opens. Click **Performance Monitor** and then click ...



4. The Add Counters window opens. Select items whose performance you want to check, such as **Processor**, **Memory**, **PhysicalDisk**, and **Network Interface**, click **Add** >>, and then click **OK**.



5. In the Performance Monitor window, you can check the performance of the items you selected.



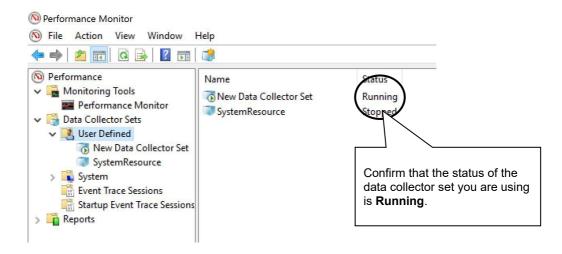
The following table shows a list of performance counters most closely related to the performance of the equipment.

Table 9-4 Performance counters related to the performance of the equipment

No.	Performance object	Counter	Description
1	Processor	%Processor Time	Shows the CPU usage. If this value is continuously high, CPU performance is likely to be in a bottleneck condition.
2	Memory	Pages/sec	Indicates the number of pages per second that are read from or written to storage to resolve page faults. If this value is high, it is likely that the amount of memory is insufficient. The closer this value is to 0, the better.
3		Available Bytes	Indicates the size of the physical memory available for processes. If this value is on a decreasing trend, it is likely that there is a memory leak.
4		Pool Nonpaged Bytes	Indicates the size of the memory area that will not be paged out to storage and that stays in the physical memory as long as it is allocated. If this value is on an increasing trend, it is likely that there is a memory leak.
5	PhysicalDisk	%Disk Time	Indicates the percentage of time that the storage device is busy reading and writing. If this value is continuously high, storage performance is likely to be in a bottleneck condition.
6	Network Interface	Bytes Total/sec	Indicates the number of bytes per second that are sent and received by the network adapter. If the ratio of this value is continuously high compared to the value of No. 7, the network is likely to be in a bottleneck condition.
7		CurrentBandwidth	Shows the network bandwidth.

#### NOTE

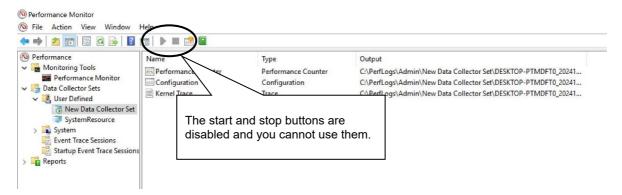
You might not be able to properly start collecting performance counter data when the system load is high. After you start collecting performance counter data, confirm that the status of the data collector set you are using is **Running**.



Confirm that Performance Counter data collection has started properly.

In addition, if the system load is high or if you repeat collection start and stop operations for performance counter data frequently, you might not be able to start or stop collecting performance counter data.

If this situation happens, terminate Performance Monitor, wait for a while, restart Performance Monitor, and then start collecting data again.



Performance Counter data cannot be collected.

If you cannot start collecting performance counter data even after you have restarted Performance Monitor, restart the operating system.

# 9.6 Digital LEDs for Status Indications

The digital LEDs for status indications are used to display POST codes at system startup (for the period of time from when the BIOS starts to when the OS starts). They are also used to display a hardware status code when an error occurs in the hardware during system operation.

The digital LEDs for status indications and the status indication LEDs might remain lit even after the equipment is shut down and put into standby mode. This state is maintained until the main power is shut down or the power is turned on again.

It should be noted that the digital LEDs for status indications might display a code even when there is no error. (For example, when the startup screen of the BIOS setup menu is displayed (1F) or when the POST code is displayed from turning on the power supply unit to OS startup.)

As shown here, the numerical display can show digits from 0 to F in hexadecimal.



## 9.6.1 POST display

Power On Self Test (POST) is a feature whereby the system BIOS routine checks the hardware for failures when the power of the computer system is turned on. If any failure is found, the POST code corresponding to the location of the failure is displayed on the digital LEDs for status indications on the front of the equipment. The user is then notified by a message on the display or by sounding a beep several times.

When a POST code is displayed, the BIOS status lamp in the status indication LEDs is lit orange.

The following table shows the POST codes that are indicated when the system stops during startup and the respective actions for resolving them.

Table 9-5 POST codes, reasons for stopping, and actions (1/2	Table 9-5 POST of	codes. reasons	for stopping.	and actions	(1/2)
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POST code	Reasons for stopping and actions	POST code	Reasons for stopping and actions
A3 A5	There might be a problem with the main memory or CPU. Verify that the main memory is installed properly.	1E 21	There might be a problem with the main memory.
61 83	There might be a problem with the keyboard or mouse.  Verify that the cables are connected correctly and the keyboard and mouse are operating properly.	57 F8	There might be a problem with the main memory. Verify that the main memory is installed properly.

Table 9-5 POST codes, reasons for stopping, and actions (2/2)

POST code	Reasons for stopping and actions		Reasons for stopping and actions		
39 88	Not applicable for this equipment.		The CPU might have failed.		
5C 5E 82 F8 F9	Not applicable for this equipment.	5C	There might be a problem with the boot device. Verify that the SSDs are installed properly. If they are installed properly, the boot device might have failed.		
93	There might be a problem with a serial device. Verify that cables are connected correctly and that the connected devices are working properly.	25 38	There might be a problem with a storage medium (SSDs, USB memory, or similar). Verify that they are installed properly. If they are installed properly, the storage medium might have failed.		
34 53	There might be a problem with a USB device.  Verify that USB devices are connected correctly	E1	The rotation of system fan 1 is abnormal. Read the description of fan failure in 9.2.2 (1) and take action accordingly.		
83 84	8		The rotation of CPU fan 2 is abnormal. Read the description of fan failure in 9.2.2 (1) and take action accordingly.		

# 9.6.2 Display of hardware status codes

A hardware status code is displayed when an error occurs in the hardware during system operation.

Hardware status codes are displayed while the RAS status lamp (one of the status indication LEDs) is lit red.

Table 9-6 Hardware status codes and related causes and actions

Status code	Cause	Action		
12	The rotation of the system fan is abnormal.	Read the description in 9.2.2 (1) and take action		
13	The rotation of the CPU fan is abnormal.	accordingly.		
21	The temperature is abnormal.	Read the description in 9.2.2 (1) and take action accordingly.		
31	A failure is predicted for the drive in drive bay 1.	W		
32	A failure is predicted for the drive in drive bay 2.	We recommend that you back up the data and replace the drive.		

# NOTE

If a code other than the preceding codes is displayed, contact the system administrator or maintenance personnel.

# APPENDIX HANDLING OF REPLACEABLE COMPONENTS

# NOTICE

Do not use a replaceable component for longer than the recommended replacement cycle. If you do so, a worn-out component might cause the equipment to fail.

- Components gradually deteriorate and wear out during use. The following components must be replaced at fixed intervals:
- Replacement of these components is available for a fee.
- The recommended replacement cycle in the following table assumes that the average ambient temperature during operation of the equipment is maintained at 25°C or less.

Note that when the average ambient temperature exceeds 25°C, the replacement cycle might be shortened in some cases.

In addition, note that the recommended replacement period is a simple guideline based on the usage status assumed under the design of the equipment. In some cases, the replacement cycle might be shorter than what is indicated here for reasons such as the ambient environment conditions and the usage conditions (for example, the access frequency when using magnetic disk devices). Conduct regular inspections and replace parts early as appropriate when considering the usage in your particular environment.

Replaceable component	Recommended replacement cycle	Note
SSD	7 years or the expected life, whichever comes first	The expected life (in years) is calculated by using the following formula based on the TBW (total bytes written) to the drive. The SSD must be replaced before reaching its expected life (in years).  Expected life (years) =   Volume (in GB) written to drive daily × 365 days
		To ensure quick recovery of corrupted files, routinely back up your files.
Dust filter	1 year	If you do not replace the filter regularly, failure or shorter life span of the equipment might result.
Keyboard (optional)	4 years	
Mouse (optional)	4 years	
AC adapter (optional)	2 years	

## NOTE

- When you request replacement of a component, for repair due to a failure or some other reason, it might be replaced with a functionally compatible component.
- If you repair a component in a manner not specified by the manufacturer, proper operation of the component is not guaranteed.

Address fo	Hitachi-shi, Ibaraki-ken, 319-1293 Hitachi Industrial Products, Ltd. HF-W Returns and Repairs Center			Sender information (entered by customer)				
2-1, Ō				ompany:		,	,	
Hitach				Office: Responsible department:				
•								
				ontact person:				
: I	GISTEED East Japan,	Ltd.		mail:				
Tel.: +	81-294-52-7496			ddress:		/E-1	,	
Contact info	ormation regarding parts re	eturn	<u> </u>	el.:		(Extension number:	))	
Any inq	uiries regarding parts retu	rns will be received by the main office		led to the appropriate	divisions.			
Tel.: +8	1-45-762-3023	Email: hfw.support.af@hitac						
	<u>H</u>	F-W - Repair Request For	m and State	ement of Receive	ved Good	<u>ds</u>		
Parts bein	g ☐ Entire system	1		(Enter a	check mark i	n the box.)		
returned	- System model:							
(entered by cu	- System manufa	acturing no.:						
	(Always enter the sys	tem information contained on the label attached to the	he main unit even if vo	u are returning only internal co	omnonents A fee	might be charged if this informa	ation is not available )	
Description	(Always enter the system information contained on the label attached to the main unit, even if you are returning only internal components. A fee might be charged if this information is not formation is not performed by the problem specifically.) (Attach additional documentation as necessary.)							
problem	`	y filling out this information as completely as			,			
(entered by cu		rence (YYYY/MM/DD hh:mm):	possible. Litter che			□ Yes □ No	□ Unknown	
					produced?	_ 100 _ 110		
	■ Frequency	□ Only ones □	times every (he	ur day wook month)				
	■ <u>Frequency</u>	•		ur day week month)				
	<u>oi occuirence</u>	<u>⊇:</u> □ Occasionally □ Always	□ Otner:					
	■ State upon	☐ When turning power on ☐ Befo	re the BIOS scre	en appears 🔲 Durin	g BIOS startu	p 🗆 During OS set	up	
	occurrence:		r OS startup		o OS is stoppe	-	•	
	999911911991	☐ When using a device added by t	•		• • • • • • • • • • • • • • • • • • • •			
		,	the castomer	•		uns   Other:		
		(Manufacturer and model:	)	(Manufacturer	and name:	)		
	■ LEDs:	■ Digital LEDs for status indication	ns: 🗆 Alphan	umeric display		☐ Off		
		-		. ,				
		■ STATUS LED state:	☐ Red	□ G	Green	☐ Off		
		■ ALARM LED state:	☐ On			☐ Off		
С		■ DRIVE/STBY LED state:	☐ On	□B	linking	☐ Off		
		■ DRIVE1 STATUS LED state:	☐ On	□В	linking	☐ Off		
U		■ DRIVE2 STATUS LED state:	□ On	□в	linking	□ Off		
		= BRIVEE OTHER ELECTRICAL	_ 0		ug	_ <b>0</b>		
T	■ Description of	f the problem (actions to take when the	nrohlem occure	operating procedures	s etc ) detail	e of requests, etc.		
	The state of the s	■ <u>Description of the problem (actions to take when the problem occurs, operating procedures, etc.)</u> , <u>details of requests, etc.</u> (Please attach photographs, screenshots, or other materials that depict the problem when it occurs to provide information that will allow the problem to be objectively identified.						
<b>!</b>	The inclusion of such materials can help speed up an investigation into the problem. Fill out this section not only for repair requests, but also for requests to verify operation.)							
	■ Customer info					100 110		
	,	ovide any information about customer additions or	cnanges that will aid	an investigation into the prob	iem, such as any	/ additional devices, externally	connected devices,	
	or BIOS setting chan	ges.)						
Notes rega	arding							
repairs		estimate required? (Yes No)	Popair start tir	ne (Immediately After	r octimato)	Return of parts who originated required	•	
(entered by cu	istomer)	estimate required: (Tes No)	Nepali Start tii	ne (inimediately Alter	estimate)	Note: This service is ava	,	
		Recovery required? (Yes No)				noto required? (Yes No	,	
	Note: This s	e repair period.	Note: This ser		e for a fee. Describe the co hotographs.	ntents of any		
	Note the Collect				Р	notograpris.		
	Note the follow							
	*	Attach this sheet to the parts to be repaired, and return the parts to the preceding address. In addition, notify the shop you purchased the product from that it has been returned for repairs. Please indicate whether to proceed with repairs within one month after Hitachi provides a repair estimate. If no repairs are necessary or if you do not indicate a preference, the parts will be returned to you without re in such cases you will receive a separate invoice for the cost of the investigation.				to return parts		
	2) Please indicate who				er offig if diffe	erent from the sender)		
					ress:			
	3) Repairs are accepted during the repair period for each device.							
	Depending on the p period has ended.	· ·	npany:					
	Please understand	Please understand that customers are responsible for the costs of investigating submitted parts, even						
		<ul> <li>are not possible. Please return parts to the repair center only if you agree to this policy.</li> <li>4) Note that, in some cases, the data recorded on HDDs and SSDs might be lost during the proces an investigation or repair. Always back up your data before submitting such devices.</li> </ul>						
					tact person:			
		ems related to information security, such as prograi an investigation or repair, delete any such items be						
	are not required for parts.	note returning the						
		at have failed take the form of replacement parts on cases, parts might be replaced with parts that are f		Tel.:				
	Note that, in some the original parts, du							
	7) We cannot repair or	·	npany.					
		arts in which failures originated during the free repa , including those related to exports or the environme		durina				
	9							